

Broadband Wireless Access in Asia Pacific

From Opportunity to Profitability

KPMG International





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Introduction

The development of broadband wireless access (BWA) across Asia is expected to require the biggest wave of investment in wireless communications infrastructure since the mid-1990s.



Kieran Lane
Asia Pacific Regional Head
Information, Communication
& Entertainment



Sean Collins
Global Chair
Information, Communication
& Entertainment

However, the world confronted by the mobile operators today is radically different from the world of the 1990s. The sophistication and expectation level of users has moved up exponentially, as has the quality and capability of devices and applications.

While network operators see ongoing growth and new revenue streams emerging to secure a return on their considerable investments, the advances in downstream technology and shift of power to consumers that wireless broadband has enabled have profound implications for business models. To that extent, operators will indeed be the “big fish” in a new commercial ecosystem; one where digital content providers are getting more adept in monetising their businesses and where broadband services can be consumed across a range of devices and platforms. Operators must embrace these trends and rethink their business accordingly.

Globally operators are seeking answers to the following questions:

- Can or should they relinquish their “ownership” of their customers in return for a share of those revenues or closer partnerships with key vendors?
- Can or should they increase support for content and e-service providers, for example with billing or bandwidth management?
- How will the technical side of the business adapt to support a changing business focus?

This paper developed in collaboration with the Telecoms Research Project (TRPC), endeavors to answer some of these questions and provide insights into operator strategies in the areas of managing capacity expansions, achieving operational efficiencies and identifying new revenue streams. We appreciate your feedback on our thought leadership programme and would welcome the opportunity to discuss this analysis, and the issues it raises, with you further.

A large white satellite dish antenna is mounted on a hill. The dish is a complex lattice structure, and its feed horn is visible at the top. The foreground is filled with a dense field of bright yellow flowers, likely a species of wildflower, with green foliage. The background is a clear blue sky with a few wispy white clouds. A semi-transparent dark blue horizontal band is overlaid across the middle of the image, containing the text "Executive summary" in white.

Executive summary

This paper does not dispute the ongoing central importance of the network operators and their ability to command revenue on a utility model basis.

However, this model cannot deliver strong margins indefinitely. Differentiating the value of wireless broadband and gaining competitive advantage will require effective understanding and management of the key challenges surrounding establishing intelligence in the network, building of strong customer relationships, and working with the right new partners.

Successfully delivering a BWA offering requires operators to understand how the telco business has evolved and change the way they look at the traditional telco organization. Focus will need to be placed on understanding the corresponding need for business transformation across strategy, organization, and operations. When planning their BWA services delivery strategy, operators will also need to consider and address several key items:

Ownership of the core network remains central to provisioning high-speed broadband access to meet the demand for new applications and services via mobile devices. However, successfully monetizing the emerging

new services will require movement beyond simply providing a “big pipe” access to broadband services.

Innovative business models will be required to monetize new bandwidth-intensive services with operators needing to learn to work with content and service delivery partners in a far more open fashion to better extract and capture the value of their network.

The supply chain is becoming less linear with more participants involved to provide an increasing range of components, devices, and services. This increasing complexity has placed additional importance on vendor selection along with contract and partner management as Network operators broaden the scope of services for which seek to charge value-based pricing.

Movement away from the typical silo mentality through Integration of the business side and the technology side into a team with shared focus and priorities will be essential to respond to the challenges of successfully developing and delivering BWA services.



BWA: From opportunity to growth engine



Broadband Wireless Access (BWA) defined as broadband¹ wireless access to the Internet, is an access technology based principally 3G/ 3G+/ 4G broadband cellular standards and a family of related WiFi/WiMax (Worldwide Interoperability for Microwave Access) standards. BWA is set to become the growth engine of the broadband industry and the telecom industry at large. Ten years after the introduction of 3G, followed by the phenomenal success of the iPhone, introduction of Netbooks, and now continuing with connected devices such as the iPad, BWA has become the fastest adopted technology to date.

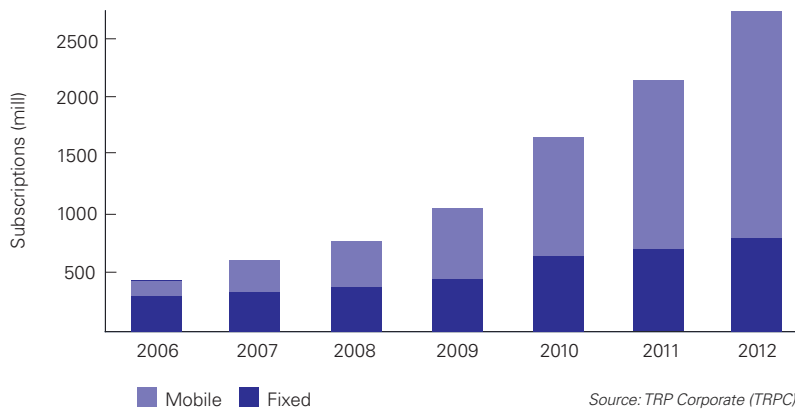
Wireless broadband subscribers have been growing at a faster rate than fixed broadband subscribers.

But broadband wireless access is potentially a Pandora's Box of a boom, as data revenues fail to keep pace with either the subscriber growth and their exponentially increasing data usage or the additional costs required to support the service. Industry forecasts illustrate that the costs of delivering mobile data will soon outstrip incremental revenues should operators fail to rationalize their wireless broadband offering strategies. Movement away from offering flat rate unlimited data plans, such as done by

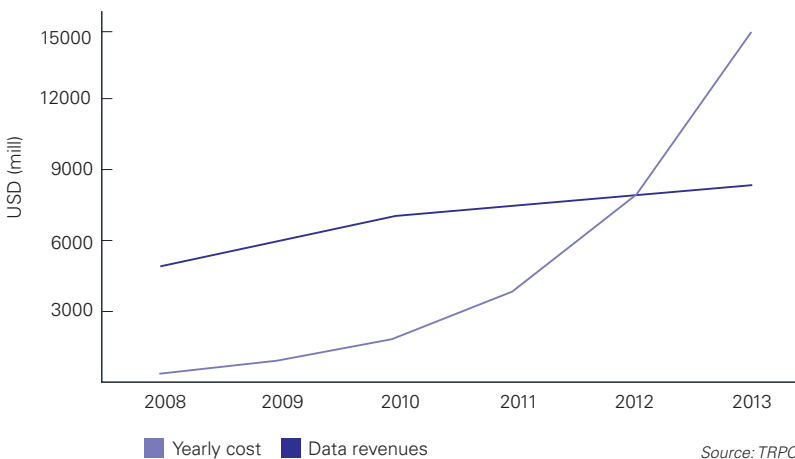
AT&T Wireless, is an example of the initial responses to help manage the widening gap between costs and revenues associated with the increasing usage of BWA services.

The growth of data traffic and usage not translating in revenue growth is causing the carriers around the globe to wonder how they could monetize the data infrastructure investments. Data revenues are failing to keep with additional costs and carriers in the developing world face an additional task of managing an increasing subscriber base.

Global growth of mobile and fixed broadband subscribers



Growth of mobile data cost and revenues



¹ ITU currently defines broadband speed as anything above 256kbps, in at least one direction.

I. Focusing on Asia

Asia's market size, geographical diversity and divergent market dynamism are creating test beds for the technical standards and business cases for BWA. The developments in Asia will likely provide key indicators and, in some cases, the necessary volume, or carrier innovation, for global adoption. According to TRPC, one sixth of the world's mobile phones are in China and India alone. If China continues to favour its own 3G (and future 4G) standard over WiMAX this could tip

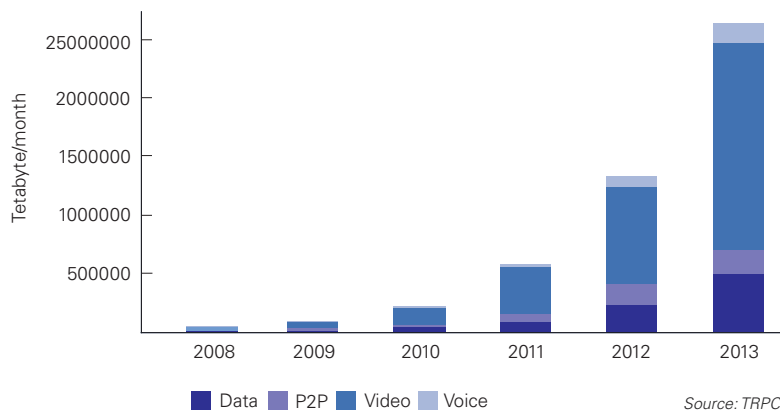
the balance for the future of BWA while India's stance on 3G technology adoption also has great potential to impact market dynamics.

Japan and South Korea have been two of the world's most advanced mobile and broadband markets while Taiwan has been championing WiMAX as an industrial policy issue. WiMAX has also been most advanced in Malaysia while this technology choice may also prove an ideal substitute for fixed broadband in other emerging

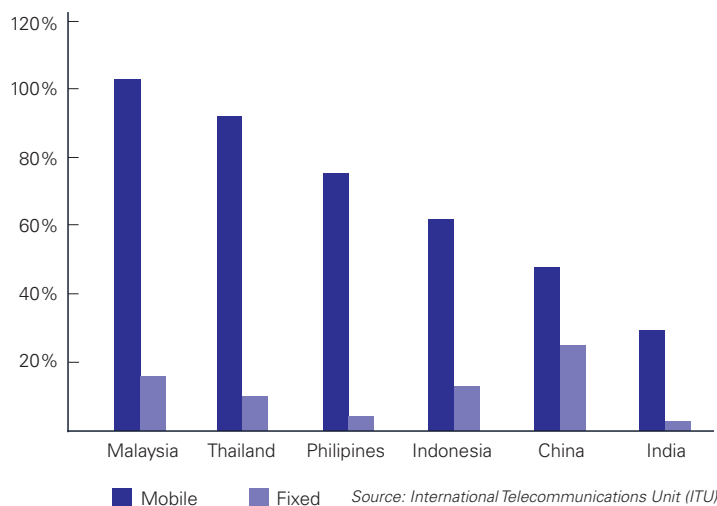
markets such as archipelago Indonesia or the Philippines.

Industry estimates also show that Asia will soon be the top region for BWA video consumption and, by 2017, this region is predicted to generate over half (53%) of all traffic, followed by Europe (26%) and North America (14%). These estimates can be explained by the fact that wireless broadband has been the widely chosen option for broadband connectivity across many of the Asia Pacific countries.

Video to dominate the mobile data traffic consumption



Mobile and Fixed Line penetration in selected Asian countries



II. BWA transforms the landscape



BWA is transforming the way that users consume broadband services. However, the introduction of BWA provides a number of challenges for a MNOs (mobile network operator), some of which are summarized here.

- **The technology choice:** Which mix of technology standards to adopt and when? For example, how long should a carrier run parallel voice (circuit switched) and data (IP routed) networks? Does the carrier need to build out next-gen networks in one go, or can rollout be staggered?
- **The business model choice:** Where and when to open the delivery network to service providers and how to do it in a way that protects the integrity of the network? Where does the carrier look to 'own' the customer relationship and where does it need to share ownership with partners to create value?
- **Organization alignment choice:** How should operators align their organization and blend together multiple skill sets in acquiring, packaging and delivering these services? How do they break down structured silos based upon traditional lines-of-business and integrate the necessary processes based on clear service-oriented objectives?

This paper endeavours to answer some of the questions and provide insights on operator strategies in the areas of managing capacity expansions, achieving operational efficiencies and identifying new revenue streams.

III. Carrier transformation considerations



Successfully preparing to support BWA services, calls for genuinely fresh thinking welded to established leading practices. The question for telecom companies now facing the coming BWA era is how to successfully undertake and manage these transformational shifts in strategy, business organization and operational mindset while staying in touch with the fundamentals of the business which are based upon having a big pipe generating a monthly utility income.

An example of such new perspectives to approach BWA services would be for an MNO to look for ways to promote VoIP services as a means of driving other chargeable data services instead of resisting such services that would directly by-pass its own billing gateway. Verizon Wireless and Skype's partnership to allow unlimited Skype-to-Skype VoIP calling utilizing Verizon's 3G network is such an example. Potentially MNO could consider ways in which to make its own appearance on major social networking sites, so it could combine

its own content with privileges and promotions attached to bundled access.

The following are issues we believe should be examined to help achieve a successful business transformation shift to support BWA services:

- **Strategic:** As both the service (broadband) and service delivery is different than traditional voice services, the traditional strategies applied for voice networks may no longer be useful. Development of new strategies will be required to unleash the full potential of BWA networks and derive maximum business benefit from them. These new strategies will need to establish a new set of objectives/goals, desired timelines, and KPI's which can extract the utmost value out of the BWA assets.
- **Organizational:** An assessment of the current organization is necessary to determine the ideal alignment to support BWA services delivery. From a matrix perspective, vertical silos need to be dismantled (integrating service delivery and

communications across different lines-of-business), while redundant horizontal layers need to be removed (to replicate the flat network structure).

- **Operational:** While getting the strategic goals clarified and getting the organisation in place is the first half of the puzzle, the second half is realigning the operational processes. Operational processes need to be redesigned in a manner that encourages seamless delivery of services and improves customer satisfaction. Operators need to put into place the right business and operations processes and systems that will allow its operations to be more effective, streamlined, and providing for a high standard of delivery of BWA services.

These issues, based on extensive carrier interviews across the region, are addressed in Chapter 4, with a selection of carrier case studies providing specific illustrations in Chapter 6.

IV. Key theme for carrier transformation

Operators can get a share of the revenues earned by the OTT players by providing services such as - billing on behalf of the vendor or offering the vendor further value by providing intelligent information.

BWA redefines the way operators conduct business. It forces operators to look at new business models that are interdependent with over-the-top (OTT)² applications and content. A few new themes that emerge due to the BWA business models are summarized here.

- **High speed networks become increasingly valuable.** Among MNOs the concern to be more than a 'big pipe' continues to dominate strategic thinking. However the value in this 'big pipe' and its ability of earning utility revenues by being the centre of the delivery chain is undeniable. Differentiating the value of high speed networks is the main challenge and revolves around developing intelligence in the network and customer – and supporting enhanced partner – relationships.
- **Supporting the developer/partner ecosystem with open interfaces gains importance.** iTunes provides a good example with users paying the vendors directly or through third

party payment platforms such as PayPal. Google's transformation of YouTube to an ad-driven service provides another example of bandwidth-hungry application that does not contribute to the operators bottom-line. Operators can get a share of the revenues earned by the OTT players by providing services such as - billing on behalf of the vendor or offering the vendor further value by providing intelligent information (e.g., subscriber location, access device, user history, etc.). This will require the carrier to partner with OTT players and open up their delivery network to the OTT players. For many carriers this will be both a technical challenge and a structural challenge.

- **The decline in relevance of ARPU as a key metric.** Carriers need to learn to understand the value of their service delivery in new terms, which means understanding the customer data usage. When users choose to access the same set of services (voice, email, chat, games, music, video, etc.) via different devices over

different types of network according to time and location, ARPUs lose their meaning. Metrics such as average margin per user, average connections per user, and customer life-time value make better sense, resulting in the need to revise billing methods as well as update customer relationship systems and, internally, integrate service delivery and reporting functions.

- **Emerging revenues would be up for grabs.** Raising the speed and capability of the network does not plot the path to raising revenues on its own. It does, however, create a path for carving out partnership deals with a growing number of third parties and OTT application service providers. To accomplish this, network operations need to effectively establish cooperative arrangements with these application service providers to be able to grab a share of the emerging revenues for applications which are being delivered over their wireless broadband network.

² A key feature of Over-the-Top (OTT) services is that they by-pass the billing and revenue accounts of the MNOs - utilize the network and provide services to the end users.

A woman with long dark hair, wearing a green sari with a silver necklace, is talking on a mobile phone. She is positioned in the foreground on the right side of the image. The background features the Taj Mahal in Agra, India, illuminated by the warm, golden light of a sunset. The sky is a clear, pale orange. The text "Transforming the landscape: Asian BWA trends" is overlaid in white on a semi-transparent orange banner across the middle of the image.

Transforming the landscape: Asian BWA trends

Asia is not only the largest and the fastest growing broadband wireless market globally but also encompasses the broadest array of new technologies. Of all the current 337 HSPA (High Speed Packet Access) networks tracked by the GSM Association (GSMA), 21 percent are in Asia; of all the 592 WiMAX networks tracked by the WiMax Forum, nearly 20 percent are in Asia³. At the beginning of 2010, the GSMA projected that there would be US\$72 billion invested in mobile broadband technologies through the year, of which US\$34 billion (or 47%) was slated for Asia. To understand the trends emerging and the strategies

being adopted, we have divided the various markets along the following three dimensions.

1. Whether they are developed or emerging markets as this naturally impacts the networks being rolled out, the timing of deployment, and the services being offered.

2. 4G path(s) being adopted (or envisioned); put very simply: whether the economy has WiMAX deployments or not. In some cases, such as the 'giant' markets of China and India, it is the lack of 3G deployment until recently, that has had a profound effect on the strategies now being

adopted by the carriers, as well as the prospects for particular standards (i.e., detrimental for WiMAX, positive for TD-SCDMA).

3. The level of government involvement, or impact, in the adoption of BWA strategies. Although the nature of the interventions differ, they have significant repercussions both for services deployment and manufacturing development, for example, Taiwan and China for network equipment; South Korea for handset development.

Based on these dimensions the Asian markets have been classified as follows:

Classification of the Asian BWA markets

Classification	Market definition	Markets
The leaders	100%+ mobile penetration and advanced 3G/HSPA networks	Australia, Japan, Korea, Hong Kong, Singapore, Taiwan and New Zealand
The giants	Large population countries with room for increasing mobile penetration, nascent 3G/HSPA networks, and potential for WiMAX adoption	China, India and Indonesia
The emerging markets	Room for increasing mobile penetration and nascent 3G/HSPA networks with extensive promise for WiMAX adoption	Philippines, Malaysia, Thailand and Vietnam

Source: KPMG International, *Broadband Wireless in Asia Pacific*, 2010

I. The leaders

The government of each of the global leaders is focused on delivering broadband access to the population because of a belief in the economic and productivity benefits derived from broadband. These countries have a carrier that has independently focused on the development of the wireless data market. In South Korea, SK Telecom led the world in creating a successful business model for profitable mobile data uptake. In Japan, NTT DoCoMo followed suit with the creation of what was arguably the world's most successful mobile data business in both the pre- and post-BWA eras. In Australia, Telstra not only entered the Guinness Book of World Records in 2009, when it launched the world's

first 21Mbps HSPA+ service⁴, it was able to maintain its premium pricing and increase ARPU. In each of these markets, there was an existing customization to broadband access, which was then married with the convenience of wireless (anytime, anywhere) access modelled around specific interests.

The Japanese carriers have committed to be one of the first in Asia in adopting LTE, with NTT DoCoMo expected to launch in late 2010⁵. DoCoMo views video as one of the key drivers, and has been provisioning its content for mobile access. It is also promoting cloud services to take over functions currently offered by handsets. Softbank, on the other hand, views WiFi

as key, on the basis that upgrading to LTE will not provide sufficient bandwidth. With 50 percent of data traffic consumed at home during peak periods, Softbank believes, this is a segment served by Wi-Fi.

South Korea initially forged ahead with its own government-backed version of WiMAX, known as WiBro. But WiBro has not lived up to the expectations as by late-2009, some four years after service launch, there were only about 250,000 WiBro subscribers. The Korean carriers – like KT, now want to provide broadband wireless offerings with a marriage of the so-called '3Ws' – W-CDMA, Wi-Fi, and WiBro – enabling a seamless service delivery⁶.



⁴ Telstra press conference, Mobile World Congress, February 2009

⁵ NTT DOCOMO, Press Release, June 8, 2010

Leader BWA markets

Market	3G Networks licenses	3G and 4G Networks	WiMAX Networks	Government Involvement
Japan	3 licenses	HSPA: 2 (DoCoMo, Softbank) HSPA+: 1 (eAccess) LTE (Long Term Evolution): 2 nets planned 2010; 2 nets 2011	1 trial net (Tokyo, Yokohama, Kawasaki)	Competition with Korea has dictated much of the policy framework for broadband development over the last decade. Ministry of Internal Affairs and Communications (MIC) allows spectrum re-farming after 3 years from assignment.
Korea	3 licenses	HSPA: 2 (KT, SKT) LTE: 3 planned 2010	2 nets (KT, SKT launched aggressive WiBro buildouts)	Overt government backing of home-grown WiMAX variant "WiBro". Regulator wants to grow the country's wireless Internet landscape to "world-leading standards" by 2013. Government agencies re-working convergence legislation between telecoms, IT, media.
Taiwan	5 licenses covering WCDMA, CDMA2000	HSPA: 3 (CHT, FET, Taiwan Mobile) LTE: 4 nets planned for 2013	6 nets launched in late-2009, or early-2010	Govt-led industrial policy program for WiMAX development; In bid to drive usage, govt plans to release 2 technology-neutral mobile TV licenses in 2010.
Singapore	3 licenses covering WCDMA	HSPA: 3 HSPA+: 2 (Singtel, StarHub) LTE: 1 net planned 2011, 2 nets 2012	5 license holders (Qmax, M1, Singtel, P1, StarHub)	Government-driven NBN being rolled out with mandated structural separation. Subsequently, govt giving effort to seed development of OTT mobile applications (e.g., 'FutureMobile' and 'Digital Concierge' programs) and mobile transactions.
Hong Kong	4 licenses covering WCDMA, CDMA2000	HSPA: 4 HSPA+: 3 (CSL, PCCW, SmarTone) LTE: 1 net trial, 3 nets in 2013	5 BWA license holders (China Mobile, CSL, Genius, HKBN, SmarTone)	Broadly non-interventionist with technology-neutral and pro-consumer licensing regime, and frequency assignment through auctions.
Australia	6 licensees	HSPA: 4 (Optus, Telstra, Virgin, VHA) HSPA+: 1 (Telstra) LTE: 3 planned 2013; 1 planned 2012	Various major city networks launched by independent players	Government has taken over the roll-out of NBN, and is attempting to enforce structural separation of incumbent Telstra; Government considering the auction of digital dividend spectrum, and also the reallocation of 2.5GHz band.
New Zealand	4 licenses	HSPA: 2 (TNZ, Vodafone) LTE: 2 nets planned for 2012		Commerce Commission promoting use of common infrastructure for 4G network.

Source: TRPC and KPMG International research, 2010



In Australia, Telstra has successfully used BWA to turn around a lacklustre market demand for, and patchy connectivity to, broadband and a decline in profitability. Telstra's success demonstrates one of the key trends of the data era: people are prepared to pay for reliable, good quality, high-speed access. Telstra recognized one further point in their strategic execution: they rolled their entire national network out in 10 months because consumers now lead enterprises in service demand and uptake.

With 166, 138, and 110 percent mobile density respectively, Hong Kong, Singapore and Taiwan are three of the most mobile penetrated localities in the world.

Taiwan is seen as the epicentre of WiMAX development globally, with the government having long seen WiFi and WiMAX technology as the island economy's chance to lead globally in the next wave of electronics development. Taiwan is also at the forefront of WiMAX network component and peripheral development and manufacturing. Notably, only one of the big three carriers - FarEasTone (FET) has been licensed for WiMAX.

In Singapore, the focus has been on creating 'multimedia' carriers, with the belief that content should be multi-provisioned across multiple platforms and for a host of end-user devices. Both StarHub and Singtel have begun moving in this direction by adopting convergent services strategies. M1 has

also started to look at convergent services by acquiring Qala, a WiMAX provider, and stealing a march on its rivals by beginning LTE trials in February 2010.

⁷ CNET interview with former Telstra CEO Sol Trujillo, January 2009

⁸ PCWorld October 18, 2005

⁹ In Feb, M1 completed a 100Mbps data call on its LTE network, making it the first South Asian operator to do so. Source - www.cellular-news.com 2010

II. The giants



China Mobile's move to adopt a TD-LTE roadmap would allow it to move rapidly to an LTE network. A direct leap of this nature would also allow China to avoid the problem of Korea's carriers as they try to maximize the return on their 3G investments before moving on to 4G versions of BWA.

China's long-derided 'third 3G standard', TD-SCDMA, is changing the evolutionary roadmap of most vendors. It can also have a great impact on frequency allocations and the plans of carriers and regulators around the world. China Mobile's move to adopt a TD-LTE roadmap would allow it to move rapidly to an LTE network. A direct leap of this nature would also allow China to avoid the problem of Korea's carriers

as they try to maximize the return on their 3G investments before moving on to 4G versions of BWA. Due to the sheer volume of subscribers, decisions made by China can render both technologies and services either viable or unviable for the rest of Asia.

India is still anticipated to see the world's largest deployment of WiMAX¹⁰, but following the poor start to 3G suffered by the incumbents BSNL and

MTNL the extent to which the services will be promoted to populations considered 'uneconomic' has become questionable¹¹. As highlighted in a recent KPMG paper¹², outsourcing, facilities sharing and revenue-sharing with companies that finance infrastructure have become marked features of India's telecom sector, especially as a means of bringing connectivity to rural areas. With the government targeting 20 million

¹⁰ KPMG in India. The Indian Telecom Success Story. (2009)

Giant BWA markets

Market	3G Networks Licenses	3G and 4G Networks	WiMAX Networks	Government Involvement
China	3 licenses covering WCDMA (Unicom), CDMA 2000 (Telecom), TDSCDMA (Mobile)	HSPA: 1 (Unicom) LTE: 1 net planned 2010, 1 net planned 2012	Some small independent urban offerings (e.g., MoqiZone and CHTL)	Government strongly promoting home-grown 3G standard TD-SCDMA; has restricted major carriers from WiMAX deployment.
India	Licenses not yet awarded. 2 limited licenses (BSNL, MTNL) covering WCDMA		2 networks (BSNL, MTNL) have limited launch	WiMAX licenses yet to be allocated due to govt jockeying over control, deployment, and revenue issues. State champions BSNL & MTNL granted temporary 3G and WiMAX licenses to get a head start on commercial competitors.
Indonesia	5 licensees covering WCDMA, CDMA2000	HSPA: 4 (3, XL, Indosat, Telkomsel) LTE: 3 nets planned 2013	8 licensees (Internux, Berca Har-dayaperkasa, First Media, Telkom, Indosat, Comtronics, Jasnita Telekomindo, Indonesian WiMAX). Service to begin Nov 2010	Local procurement requirements for vendors have created a 'buy Indonesian' policy within the telecom sector, which may raise costs and therefore limit deployment; Govt forced RIM to set up Blackberry support and development centres in the country following strong take-up of the smartphones.

Source: KPMG International, *Broadband Wireless Access in Asia Pacific, 2010*

broadband users by 4Q 2010, BWA not only offers a lower cost solution than fixed lines but also a cheaper alternative device to a PC.

Indonesia is a market awaiting consolidation rather than BWA¹¹. According to TRPC, with around 160 million SIM cards in the market approximating to around 100 million actual users, and the subscriber market

growing at around 40 percent per annum, there is still a lot of growth left in the market for basic services. However, BWA has a great potential as an internet access technology particularly in high density and upper-income pockets of the population. The geography of the country makes operating fibre networks extremely expensive with questionable ROI; hence BWA services make commercial sense.

¹¹ By 4Q 2009 there were 11 operators, 3 operating CDMA mobile networks, plus 2 offering FWA services, on 450MHz and 800MHz frequencies, and 8 offering GSM on 900MHz and 1800MHz. Source – TRPC

¹² P1 has been given the green light to extend its operations to Eastern Malaysia and through an acquisition of the WiMAX service license of Singapore-based Pacific Internet; P1 is positioning itself as a regional player. ZDNet Asia, Oct. 23, 2009

III. The emerging markets

BWA is now the dominant means of broadband usage in Malaysia, accounting for over 50 percent of net additions, up from 30 percent in 2008. In Malaysia WiMAX licensees were obliged to cover 25 percent of their populated area by early 2009 and 40 percent by 2010. By 3Q 2009 only one of the licensees, Packet One Networks (P1), had met its targets. With more than 100,000 subscribers, mostly for fixed wireless access

substitution for cable and DSL, Packet One is already one of the world's largest WiMAX carriers¹². MCMC has adopted a technology and service neutral licensing which would enable the WiMAX licence holders to switch to LTE, should WiMAX prove commercially unviable¹³.

Vietnam, despite launching 3G recently, has the signs of an emerging BWA market. The government has its eyes firmly set on IT as a key driver of

growth, and the country has rapidly growing cellular and Internet markets. More importantly, there has been a keen adoption of relatively new applications such as online games and social networks. As reported by TRPC, Vietnam has been toying with WiMAX as a DSL replacement, but despite trials being conducted, there have been no major rollouts of the technology yet.

Emerging BWA markets

Market	3G Networks Licenses	3G and 4G Networks	WiMAX Networks	Government Involvement
Philippines	4 licenses	HSPA: 4 (Digitel/Sun, Globe, Red Mobile, Smart) LTE: 1 net planned 2013	1 net running (Globe); 3 nets planned (Prime, Liberty, e-telco)	The regulator maintains a pro-competitive approach, but licensing and spectrum assignments are often delayed, subject to approvals by Congress or to litigation.
Malaysia	4 licenses	HSPA: 4 (Celcom, DiGi, Maxis, U Mobile) LTE: 3 nets planned 2013	2 nets (P1, YMax)5 license holders (Izzinet, AsiaSpace, Y Max, RedTone, P1)	Govt has targeted 50% of population to be covered by broadband which has led to WiMAX initiatives as alternative to DSL solutions. Government has used a performance-based approach to WiMAX licensing, to encourage deployment.
Thailand	Licenses not yet awarded	HSPA: 4 nets planned (AIS, DTAC, TOT, True) LTE: 2 nets planned 2014	11 companies given permission to test WiMAX for 3 months in 2008 ¹⁴	3G and WiMAX licenses yet to be allocated due to political in-fighting and issues over formation of new regulator.
Vietnam	4 licensees covering WCDMA	HSPA: 3 nets planned 2010 (Mobifon, Viettel, VinaPhone) LTE: 3 nets planned 2014	5 trial nets (VDC (VNPT), VTC, FPT Telecom, Viettel, EVN Telecom, Saigon Postel)	Govt following an Information Industry Plan to become one of the top 70 countries globally by 2020. MIC issues licenses and assigns frequencies to state-owned telecom enterprises with foreign revenue-sharing partners.

Source: TRPC and KPMG International research

¹³ Regulatory Framework from Malaysian Communications and Multimedia Act 1998


¹⁴ True Move, True Universal, Nokia-Siemens, Ericsson, Loxley, CAT, TOT, Samart, Transpacific Thailand, Triple T Broadband, Shin Satellite, United Communication. Also, two trial University networks – Mae Fah Luang University and Rajabhat Maha Sarakham University given 2-year and 3-year licenses respectively. Source – TRPC

The drivers for BWA deployment



To make an assessment of the potential return on investment in the adoption of BWA against the business transformation required, it is necessary to identify and understand the key drivers which will impact this calculation. Three key challenges for operators will likely impact their ability to generate a sufficient return on investment for BWA:

- Increasing **capacity** to handle the growth in mobile data;
- Exploiting BWA technologies to achieve greater capacity at a lower operating **cost** per megabit; and
- Finding new revenue streams and maintaining/increasing profit margins as total costs increase and traditional **revenue** streams decline.

A photograph of a woman with long brown hair, wearing a white long-sleeved shirt, smiling and talking on a black mobile phone. She is sitting on a sandy beach with the ocean and a clear blue sky in the background. A clear plastic cup is visible in the foreground on the right.

Increasing capacity to handle the growth in mobile data is one of the three key challenges for operators that impact their ability to generate a sufficient return on investment for BWA.

I. Capacity drivers

Few operators foresaw the changes to user behaviour brought about by 3G cards and smartphones, and while the associated upsurge in data traffic is good, managing this surge combined with the lack of accompanying revenue has been a key challenge.

A laptop equipped with a dongle consumes 450 times more bandwidth than a standard mobile phone, while an average smartphone, such as an iPhone or a Blackberry, generates the same amount of traffic as 30 basic cell phones.

In 2008, data traffic on mobile operators' networks increased by

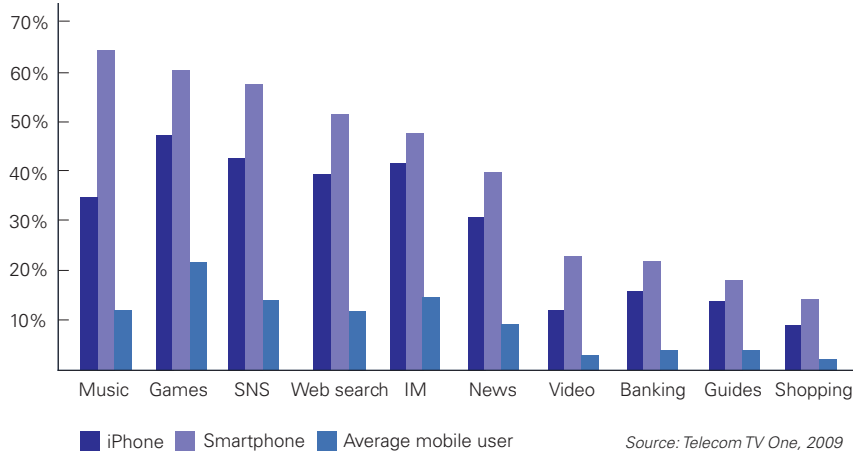
almost five times on average, with some operators seeing traffic surge more than ten times, boosted by the uptake of wireless data cards.

Few operators foresaw the changes to user behaviour brought about by 3G cards and smartphones, and while the associated upsurge in data traffic is good, managing this surge combined

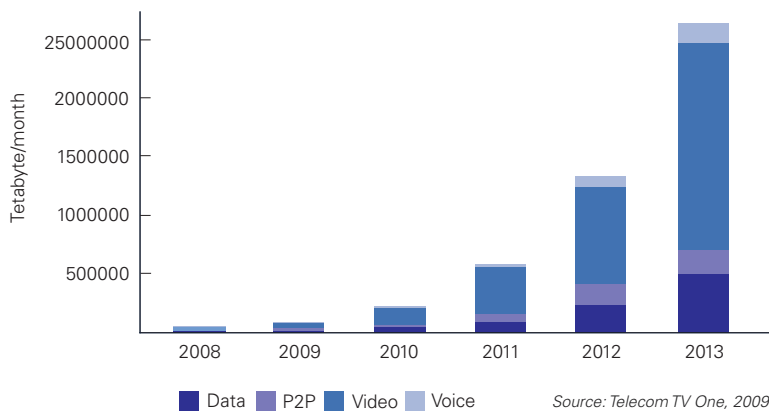
with the lack of accompanying revenue is tough. MNOs are in broad agreement with the fact that extensive investment is required to support the increase in data traffic, however new business models are needed to effectively monetize these investments. From a capacity perspective operators need to provide for the following services:



Global mobile content consumption, 2007-09



Smartphones and devices driving data uptake



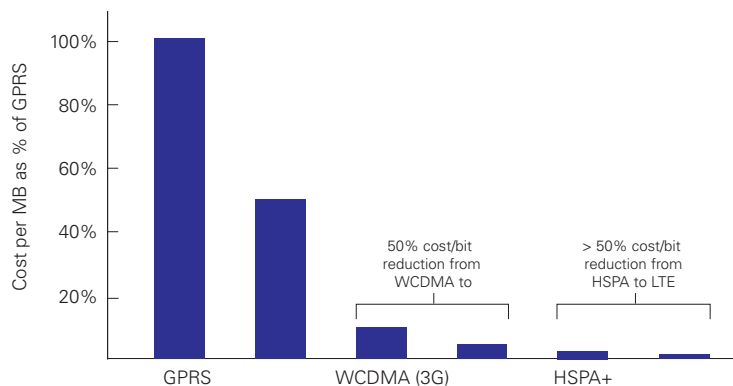
Capacity provision for voice and data

Application	Description
Voice	Most mobile operators plan to keep voice traffic as circuit switched for the foreseeable future. However operators may need to add capacity for voice delivered through VoIP. While this is a trivial capacity issue, it is a concern for its potential impact on traditional voice revenue and operators need to effectively strategize while providing this service.
Low-Band-width Data	Applications such as SMS, ringtones and wallpaper, social networking services etc. fall in this category. Minor data streams are also capacity trivial, but they have a significant revenue impact.
Bandwidth-hungry Data	P2P services, file sharing live streamed video and multi-player games etc. fall in this category. These applications being run on wireless networks by the usage of dongles is the real driver of data usage.

Source: KPMG International, Broadband Wireless Access in Asia Pacific, 2010

II. Cost drivers

Higher speed networks enable dramatic cost reductions



Source: Telecom TV One, 2009

The decoupling between traffic growth and revenue growth is a key challenge that network operators face. With revenue generation from BWA services still a vexing question, a primary attraction of BWA initially is the impact on cost control. The two main costs to consider while planning for BWA services are Network Costs and Operational Costs.

Network costs

BWA technologies offer high speed broadband services at considerably lower costs per megabit due to flatter architecture of the networks and increased integration. With the base station rather than the RAN (radio access network) in LTE controlling functions such as handoff, authentication, and loading, the result will be a far more efficient routing of traffic and significantly reduced transmission costs. In addition, LTE's use of OFDM

(orthogonal frequency division multiplexing) for signal modulation reduces the cell: frequency re-use ratio from typically 7:1 to 1:1, meaning that network capacity can be increased using single rather than multi-cell enlargements with greater spectrum efficiency by allowing adjacent cells to re-use the same frequency, offering substantial cost savings, not least in terms of BTS site rentals¹⁵.

Cost for Backhaul, which provide the point-to-point links between the network equipment, on the other hand, are close to linear to network investment and, as such, are set to be one of the biggest cost centres for new network rollouts.

In Singapore, the traffic generated from a single GSM base station typically requires an E1 backhaul, while a single HSPA base station requires five E1s. By 2010, bandwidth-hungry applications

will have driven this requirement to the equivalent of 45 E1s across heavily-used locations¹⁶.

With backhaul, MNOs can save on CAPEX by entering into site sharing or network sharing arrangements, a practice that has been gaining momentum in recent years. Other measures operators are adopting or experimenting with to reduce costs include the deployment of femtocells and self-organizing network (SON) technology as part of the overall BWA network architecture.

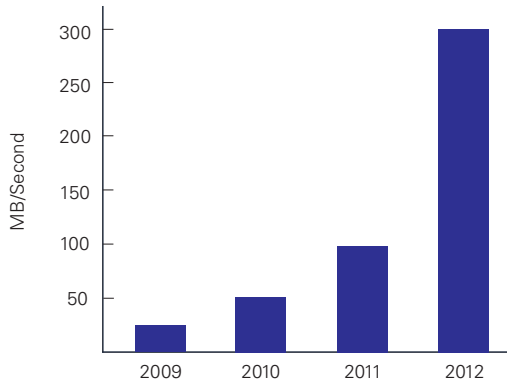
Business operational costs

While network cost management solves a part of the BWA business puzzle, understanding the correspondence between the technical architecture of the network and the way business practices are organized is of paramount importance. BWA allows for a fundamental transformation of the

¹⁵ WiMAX using OFDM brings the cell frequency re-use ratio down to 3:1. The difference is less critical for large-cell data-centric WiMAX networks connecting to PCs than for voice-centric mobile cellular networks. Source: TRPC

¹⁶ TRPC analysis based on carrier interviews

Global mobile content consumption, 2009 - 2012



Source: Telecom TV One, 2009

business away from siloed departments focusing on specific lines of business.

But for the operator to see the full force of these benefits, the 'IP transformation' in the network layer needs to be pulled right through to the sales and administration channels. This includes:

- Rationalizing product portfolios and, in parallel, improving the efficiency of operational areas such as call centers, field sales, retail stores, installation and repair. In other words, optimizing the 'order-to-cash' process.
- Optimizing the business support areas such as marketing, product management, finance, human resources, benefits, and sourcing and procurement.

Mobile data traditionally falls into 'small screen' (handsets) and 'large screen' (TVs, PCs) products and services. All-IP next generation BWA

networks blur these distinctions as the same content becomes available in different formats to multiple devices delivered from a common platform.

This leverage from a single platform must then be replicated across all selling, general and administrative (SG&A) functions and business units – not just functions like HR and finance – because ad hoc improvements in silos will simply mute the overall impact of the network transformation. Multiple improvement levers need to match the business strategy to be leveraged across a set of SG&A functions, including shared services centres, process reengineering, strategic sourcing, controllable expense reductions, ERP implementations, and quality and process management.

III. Revenue drivers



Much of the excitement around broadband wireless lies in the potential revenue derived from the new service offerings being enabled. The question facing BWA operators is how to tap into these revenue streams, many of which can run OTT of the network.

Four areas of revenue enhancement are available to MNOs:

1. New Service Development
2. New Pricing Scheme Development
3. New Measurements Development
4. New Partnership Development

New service developments

- In South Korea **KT** has been successfully targeting the youth demographic through its HSPA offering branded **SHOW**. **SHOW** enables 'rich communication with

peers' through services such as 3D multiuser gaming, MMS videos, mobile blogging, user generated content, tools to continually personalize the mobile experience etc.

- **China Unicom** has successfully used mobile advertising to bring free mobile music to users. Users are exposed to embedded advertisements while downloading clips, full tracks and other types of music content. The service also has interactive features including the ability for users to vote or send SMS, as well as a click-through to attractive advertiser portals where ringtones may be purchased, coupons downloaded, etc

New pricing scheme developments

To commercialize the mobile broadband businesses, network operators have

experimented with a variety of approaches to pricing data service offerings. The transition from familiar plans based on per minute of use to plans based on per byte of use initially proved to be a difficult sell. The various price plans being offered today can generally be grouped into three categories:

- (i) Unlimited and tiered flat-rate plans, categorized by speed, data volume, and time (hours/days);
- (ii) 'Per unit' pricing for ad-hoc users, or those exceeding data volume limits;
- (iii) VAS plans for services such as navigation, on-demand music, etc.

These classifications are playing out in various permutations, depending on carrier and service. For example, in Singapore, **StarHub's** prepaid plans are categorized according to expiry period

Broadband wireless services and applications

Service	Overview	Examples
Cloud computing and Apps stores	Mobile users accessing tens of thousands of apps without worrying about disk space.	Numerous carriers across the region have begun setting up their own app stores (e.g. China Mobile, SingTel, SK Telecom, Telstra), and promoting cloud computing services (e.g., Singtel, NTT DoCoMo).
Mobile video and (free)TV	Video content delivered to a mobile device	SingTel provides music videos as part of its AMPed service; KT's SHOW service allows MMS videos and user generated content.
Location-based services (LBS)	Applications for mobile devices which rely upon knowledge about where the mobile device is currently located.	US-based Foursquare is already available from Beijing and Tokyo down to Bangkok, Singapore and Kuala Lumpur. Local start-ups such as ShowNearby in Singapore, are working with the local carriers such as StarHub.
Mobile search	Internet search engines such as Google, Microsoft, Yahoo optimized for mobile devices	In China, search giant Baidu has partnered with China Unicom to provide wireless search for the carrier's 3G mobile subscribers. Baidu's services are preinstalled in Unicom's 3G phones.
Mobile Payments	Mobile money transfer services are increasing exponentially in volume, particularly for remittance to emerging markets from foreign workers	In Japan, Osaisu-keitai (mobile wallet), first developed by NTT DoCoMo, has become the de facto standard mobile payment system. G-Cash (Globe) and Smart Money (Smart) in the Philippines are global leaders in the development of mobile remittance and peer-to-peer transfers.
Mobile Advertising	Recent revisions of mobile ad metrics have helped advertisers see and understand what they are paying for on the mobile channel.	China Unicom embeds ads to enable the delivery of free mobile music to users. YouTube has launched mobile ad sales in Japan.
Security	Viruses, malware and identity theft will be even more of an issue on mobiles.	A still nascent market, but one that is rapidly gaining attention. In Asia, a few specialists such as Qpay in Australia are emerging to provide secure ID and secure platforms.
Healthcare	From hospitals harnessing wireless tech to improve communications and track patients to health apps that count calories and monitor vitals.	Telstra Diabetes Management Online Service features real-time alerts and messages using SMS or e-mails to the patient and care team to allow virtual real-time monitoring.
Micro blogging	Updates on Twitter broke the results of the US elections and the Mumbai attack, while Ushahidi is crowdsourcing news reports in Kenya and Congo.	SingTel was first in Asia to launch INQ's 'Twitter phone', which is also Facebook friendly.

Source: KPMG International, Broadband Wireless Access in Asia Pacific, 2010



and transfer speed, with unlimited data; while in Hong Kong SmartTone-Vodafone's pre-paid package is based on price, with fixed charge per kilobyte and top-ups based on monetary value. Post-paid plans vary similarly, in some cases when data limits are reached, speeds may be throttled (as for Telstra's and Maxis' post-paid service), or overage data charged per kilobyte (SingTel). Pricing schemes for dongles and mobile phones also commonly differ, with the latter often having a set limit on data volume.

Data roaming agreements among carriers also mean more attractive pricing schemes in the form of per-day caps on charges (in the case of the Conexus Mobile Alliance) or data bundles (Bridge Alliance's DataRoam), as opposed to

charges based on per byte usage. In addition, operators have used access and VAS bundling to increase the uptake of mobile broadband on handsets. In many cases data download for VAS is unmetered, with revenue coming from the VAS instead. However, in attempting to monetize these service offerings carriers often face the challenge of overcoming the consumer desire to receive VAS services without additional charges.

New measurement developments

To date the mobile cellular industry has measured revenues in terms of ARPU. With intensified competition for traditional voice and data services driving down ARPU, margins have now come under pressure as the reduction in marginal costs has not been able to keep pace.

But with BWA a new horizon is offered based upon services that rely upon:

- (i) Speed of network access and download/upload,
- (ii) Smart devices driven by computer operating systems, such as smartphones, game consoles, Netbooks, e-Book tablets, and
- (iii) Integrated IP systems within the access and core networks rendering them smarter and capable of identifying who the individual customer is, what their usage patterns and preferences are, where they are and how to reach them by network (cellular, WiFi, fixed, cable, etc) and by type of device.

As this new world opens up, ARPU will dwindle in relevance except as a performance measurement for a

particular line of business. The aim of BWA operators will likely be to maximize total revenues across different channels using a portfolio of services, applications and content that appeal to users of different networks and different devices. Instead of ARPU, operators will likely begin to track performance and profitability by average margin per subscription (AMPS), average connections per user (ACPU), or 'customer lifetime value' that maximizes profits across all connections of a user or their family.

New partnership developments

When Apple announced in December 2009 its takeover of La La Media, a music streaming company, it heralded

the start of a new business model for the hugely successful iTunes. In the future, instead of paying for a song download the customer may end up paying for a virtual song accessible anytime, anywhere by any Internet-connected device without having to download Apple's software. Direct payment facilitated by a third party payment service will continue to by-pass the operator of the network, just as it does with today's walled-garden App Store. So access to the Internet, which is BWA's primary function, will continue to facilitate revenue by-pass of the operator.

For the carriers this means striking partnerships with applications developers and content providers so as to capture

some of this revenue. To illustrate how imperative this trend is expected to become, we only need to look at the development of the mobile Internet industry in Japan over the last decade where there has been increasing integration. The key point here is that while the big pipe has significant value, and increasingly so, as the new high speed networks are built, if that value is not re-identified and captured, then the network value will be undermined and eroded. And success here requires opening the network and creating new delivery partnerships. That structural transformation is examined in Chapter 5.



Business transformation to support emerging business models



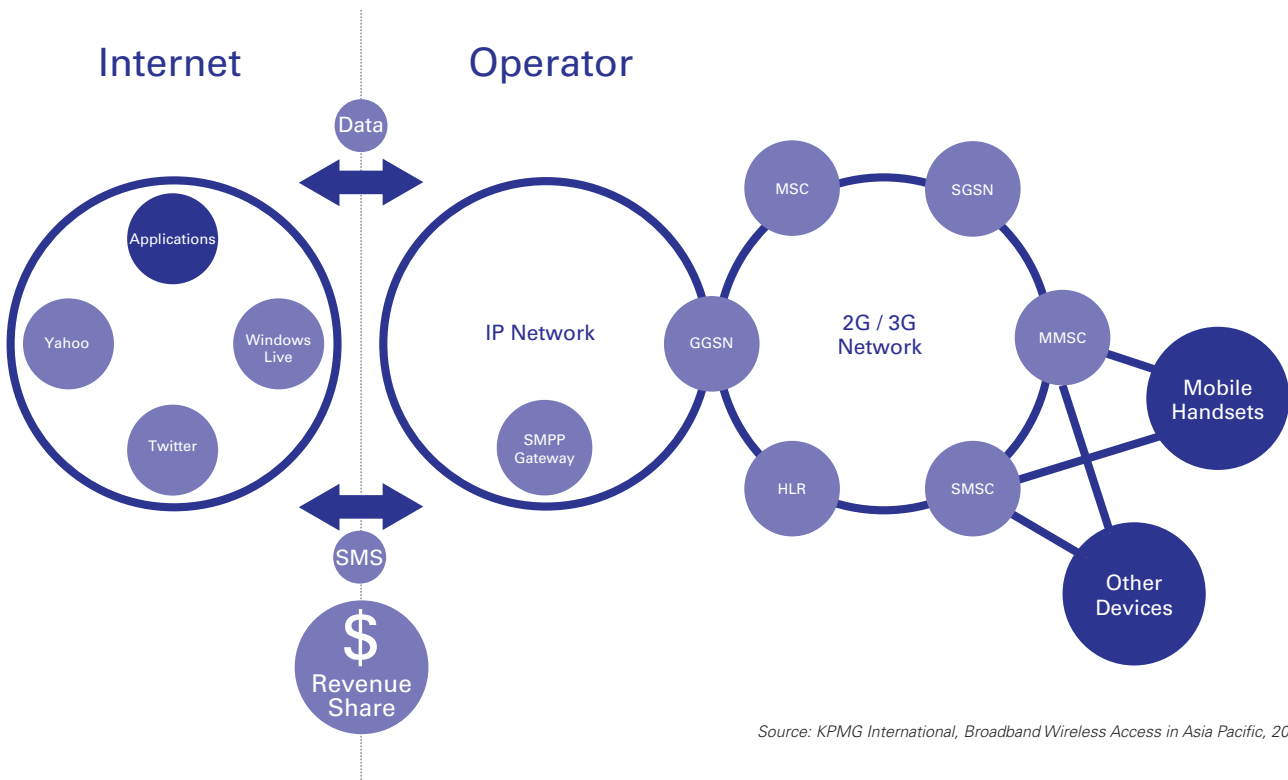
The service capability of today's wireless network is more important than ever to help ensure enhanced customer experience. While infrastructure can be easily replicated, either by building it, leasing it or sharing it, what differentiates an operator is the ability to successfully develop and support a range of BWA services for the right set of consumers at the right price points.

Ideally for the MNO, many of the new broadband services themselves have business models built on knowing not just where the customer is, but

what type of broadband device they are using. Supporting such a business model will likely require an evolution to a 'smart' big pipe which in turn requires a degree of network opening to partners, a sharing of the intelligence in the network, and intelligence built upon network elements such as location, CRM data, billing data, security and authentication, and future elements, such as remote device identification. If managed properly though, the sharing of information could open the way for a much richer and mutually-beneficial collaboration between BWA service providers and content and applications providers.

In this picture of BWA, the intelligence being installed at the edge of the network can be used to enhance customer experience and maintain growth of the subscriber base by using information about who the customer is, what they are looking for, where they are, and how to reach them (what network, which device). This sharing of information between parties is not a revelation, however, how this is executed and how the business transformation to support such sharing comes about, is all important.

Opening up network delivery to OTT providers to help maximize revenue



Source: KPMG International, Broadband Wireless Access in Asia Pacific, 2010

I. The emerging BWA value chain

For the overall value proposition of this ecosystem to grow, broadband access needs to be monetized in a way that captures the value of the new network systems.

BWA network operators cannot create all the applications and services to be delivered over the wireless broadband network. In the ecosystem, device makers and their component and chip suppliers must play their part, and move away from tying applications directly to the OS and “look to the runtimes, virtual machines, widgets and other enablers on top of the OS to help apps go cross-platform, which will make things a lot easier for developers¹⁷.” Initiatives such as the Wholesale Applications Community, organized by the GSMA have brought together operators and manufacturers to make it easier for application developers to create applications that can work across multiple networks and operators.

Making things easier for developers by assisting them in tailoring their applications to the API's of a diverse range of access devices is one of the strategies available to carriers to do deals such as billing, revenue-sharing, and offering a managed opening of network intelligence to selective third parties. Opportunities such as these are arising because of game changing developments currently surrounding BWA.

Apple's iPhone, together with iTunes and the App Store, has changed the landscape for mobile handsets. Mobile handsets were the very last part of the telecom systems to undergo a revolution at the same time coinciding with the evolution of broadband networks. The iPhone has led the industry into the world of application downloads using BWA services, including a growing enterprise applications software market. This has given rise to a further twist in the relationship between operators and handset vendors, where Apple was able to negotiate operator subsidies for the costly iPhone and a previously unheard of revenue share. In anticipation of the erosion of the iPhone's competitive advantage, Apple is already changing its model, for example raising the possibility of streamed applications from its App Store¹⁸. This will mean not only an explosion in applications, but also an upsurge in streaming content to be delivered through BWA service.

The evolution of BWA has changed the game by presenting the two-sided market issue in stark terms¹⁹. For example, subscribers will likely be

attracted to a BWA network offering a rich source of content, such as games, music or other applications. The more subscribers that log on to this network, then the more games providers (etc.) will likely be attracted to supply new content to them. This network effect increases the range of vendors that operators need to deal with.

The introduction of new BWA networks is also introducing new vendors into the value chain and at multiple points. For example, Microsoft will operate at the middleware layer in an IPTV system and at the content layer with Windows Live service²⁰. Network operator will be required to manage not only one more complex vendor relationship but also the inter-dependencies of vendors within the BWA ecosystem.

For the overall value proposition of this ecosystem to grow, broadband access needs to be monetized in a way that captures the value of the new network systems. This requires the mix of new service offerings by operators and OTT business arrangements with third parties premised upon some degree of a managed opening of the networks.

¹⁷ Karl-Johan Dahlström of Sony Ericsson cited in Telecomasia.net 24 November 2009
<http://www.telecomasia.net/content/top-5-app-store-strategy-tips>

¹⁸ Ars Technica December 1, 2009

II. Business alignment to support BWA business models

BWA can be used to support the delivery of data services such as SMS, IM and email which typically have been maintained as discrete VAS products managed at the marketing level with little interaction across other business departments. A senior Indonesian executive pointed out that the management of BWA service in their company had begun with a project manager at the GM level but, within only a few months, already involved an entire department handling everything from engineering through to marketing. Operators have now begun to transform their business model in response both to their desire to achieve revenue growth from BWA services and to respond to the increasingly competitive and margin-stressed industry for their traditional services.

Operators who can overcome a silo company culture will be better positioned to make a success of BWA. The following are some of key considerations when transforming

business operations to support the new BWA business models.

- Simplification and rationalization of the legacy product portfolio can be accomplished as part of the business transformation program to support BWA operations. A robust product profitability review and retirement of legacy products should be examined. In conjunction with the overall business transformation such product rationalization can serve to improve the overall customer experience and lower costs to serve.
- Customer-centric management of BWA resources, including the horizontal mobilization of technical and business personnel for planning, marketing, operations and customer relationship management (CRM).
- Achieving procurement and supply chain excellence is of utmost importance for a multi-channel approach to the procurement of services, including the management of content Intellectual property rights (IPRs) and digital rights management (DRM). Effective vendor management and partner selection become key components of an enhanced Supply Chain function.
- Shifting sales and marketing focus from discrete and bundled services to converged multi-channel services.
- Implementing pricing structures and billing systems those offer both multi-channel options and third party OTT access pricing and revenue sharing.
- Management of data warehousing, customer profiling, real time data integration and analysis for location-based services.

As SKT and StarHub case studies (Chapter 7) illustrate, the first step towards revenue maximization with wireless data is to respond to customer demand and begin to cross-sell, cross-synergise, and cross-brand the carrier's services.



¹⁹ Two sided markets are markets that involve network effects on both the supply and demand sides.
²⁰ Microsoft Press Release, October 10, 2006



Conclusion



Focus needs to be on understanding the way the telco business has evolved and on the corresponding need for business transformation across strategy, organization, and operations.

Based on observations of the business complexities involved in delivering a BWA offering, KPMG International believes that operators need to change the way they look at the traditional telco organization. Focus needs to be on understanding the way the telco business has evolved and on the corresponding need for business transformation across strategy, organization, and operations. Key points that operators need to consider when planning their BWA services delivery strategy include:

1. Demand for new applications and services via mobile devices is set to grow dramatically, which means ownership of the core network remains central, along with the provision of high-speed access.
2. Determining how to move beyond a big pipe mentality, so as to enable the provision and monetization of these emerging new services²¹.
3. The BWA ecosystem requires extensive management both

upstream and down; and the scope for new bandwidth-intensive services is set to grow enormously requiring innovative business models to monetize them. From the demand side, Network operators will need to begin to learn to work with content and service delivery partners in a far more open fashion so to extract and capture the network value.

4. Vendor selection, contract and project management for BWA is becoming more complex as the supply chain becomes less linear with more participants involved to provide an increasing range of components, devices, and services.
5. From the supply-side, network operators need to look at their Partner management so as to broaden the scope of services for which they can charge value-based pricing.
6. Integration of the business side and the technology side into a team with shared focus and priorities is essential to successfully take up the challenges of BWA.

²¹ Note: we are not saying here that the network operators need to take these steps for service delivery to become viable. In many cases, as for say with Web TV, these services will likely emerge. The question, around the dumb pipe/smart pipe question is how actively the carrier is able to manage the process and thereby capture value.

Case studies



Starhub

StarHub sees itself as a media company and a telco; its strength in the content side of the business has led it to become a market leader in developing a compelling mobile TV product.

StarHub became a quad-play info-communications company, after its merger with Singapore Cable Vision in 2002, based upon three 'big pipes': a hybrid-coaxial network (previously Singapore Cable Vision), a mobile network and a fixed line network (previously ISP Cyberway and StarHub's own fixed assets). The challenge for the carrier in transitioning to BWA was how to synergise three 'big pipe' operations into a portfolio of multi-platform broadband services. StarHub's major challenge on the services was in replacing the legacy systems associated with three 'big pipes' as it moved towards an integrated NGN-type network capable of broadcasting similar content across three different platforms.

StarHub sees itself as a media company and a telco; its strength in the content side of the business has led it to become a market leader in

developing a compelling mobile TV product. Going forward, StarHub's competitive advantage in BWA may be clearly demonstrated as it exploits these media relationships.

StarHub's legacy advantage also lies most strongly in its organizational strategy in offering converged services, even when the technology for doing so is not yet entirely in place.

As Peter Cook, StarHub's Vice President for Integrated Network Engineering puts it, "We started as a converged operation, that is, only one marketing team, only one sales team, only one product team and only one network team." The uniqueness of StarHub lies less in its intentions and more in its execution. The hubbing concept has enabled the carrier to bundle residential services, such as broadband, IP telephony, digital HDTV and mobile services, into competitive

billing packages that enable the tracking of customer preferences and raising opportunities for cross-selling.

Looking forward, StarHub sees the BWA platform as an additional distribution channel for content and applications that can be leveraged across the entire broadband network, fixed and mobile. According to StarHub the key to its success lies in the recognition by management that quadruple play telecom companies must think more like media companies in terms of (i) product and service portfolios, (ii) business collaboration with vendors, content and application and device partners, as well as (iii) network management and (iv) marketing. This involves an evolution to a common all-IP services platform, product and services simplification, and a customer-centric focus on pricing schemes, the quality of service and customer care.

The launch of Next G mobile network allows Telstra to increase its mobile market share and dramatically grow its data revenues.

By 2005, Australian incumbent Telstra had been losing market share for 10 years running and watching the erosion of core profitability. The launch of the Next G mobile network in 2006 turned this situation around, increasing Telstra's mobile market share, and dramatically growing data revenues. The rollout of the 3.5G network in 2006 was the fastest network deployment to date globally, and the step up to 21Mbps in early 2009 and 42Mbps in 2010 gave the carrier the fastest mobile network in the world.

In 2005 a major organizational overhaul was initiated. A legacy of technology choices had left Telstra with multiple mobile spectrum and

technologies, operating in four different bands: 850MHz (CDMA & CDMA 2000 EVDO), 900/ 1800MHz (GSM & EDGE), and 2100MHz (W-CDMA). The CDMA network was focused on reaching rural communities, while GSM provided service to Australia's metropolitan population.

The technology review resulted in a re-focus on one technology and one spectrum band: HSPA in the 850 MHz band, with CDMA completely phased out by 2008. The operational review resulted in an immediate streamlining of the existing 2,200 products, 236,000 product codes, 421,000 pricing charge codes and 10,000 discount codes. The subsequent

deployment of Telstra's BWA network had several strategic elements which differentiated the network.

- 1. Frequency** – 850MHz (rather than 2100MHz) substantially reduced the number of base stations required, enabling the carrier to roll the entire network out far faster than anticipated.
- 2. Speed to market** – Next G was brought to market in 10 months, and switched on in a single day.
- 3. Reliability** – Resulting from spectrum choice, the Next G network retained signal strength in traditional black spots (e.g., lifts, car parks, tall buildings).



These factors when combined allowed Telstra to go to market and not compete on price. While the content offerings, marketing, and back-end simplification, have been important, the key success has been in the provision of simple mobile-based Internet access. While today wireless data represents only 6.5 percent of Telstra's total revenues, it will drive more than 50 percent of its total revenue²² growth over the next couple of years²³.

Telstra did not introduce new content immediately, but focused on streamlining menus to enable the user to access material faster. Telstra content properties, such as Foxtel, BigPond, Sensis, Yellow Pages and Trading Post,

were specifically woven into the user's packages with a 2-click mentality, i.e., all handsets had a BigPond hot key to take users directly to Telstra-related content, putting the user only one click away from a specific service. Thus, it wasn't content that differentiated Telstra, but the simplified access.

In bringing Next G to market, Telstra has recognized the fundamental difference between the old telecom ('trickle down') model and the broadband model: success is all about mass market delivery as it is now consumer driven – access must be offered to everyone very fast and as affordably priced as possible.

²² Note: this is for the overall company's revenue share, as opposed to the mobile carrier's portion.

²³ This excludes revenues from Foxtel distribution.

SK Telecom

In 1997, wireless Internet services accounted for less than one percent of SK Telecom's cellular service revenues. By 2006, the figure was 28.5 percent, and SKT had what many considered to be the best mobile data service in the world: more complete and with better consumer quality. But, contrary to the common focus on cutting edge technology and ubiquitous broadband, SKT's early success had much more to do with competitive positioning and a strategy of transforming their business operations.

SKT's launch of commercial CDMA2000 1x in 2000 followed by CDMA2000 1x

EVDO (3G) in 2002 was a world's first, and by the time of its launch of HSDPA in 2006, wireless internet services accounted for 28.5 percent of service revenues. Between 2000 and 2006, SKT's mobile data business development occurred in three phases:

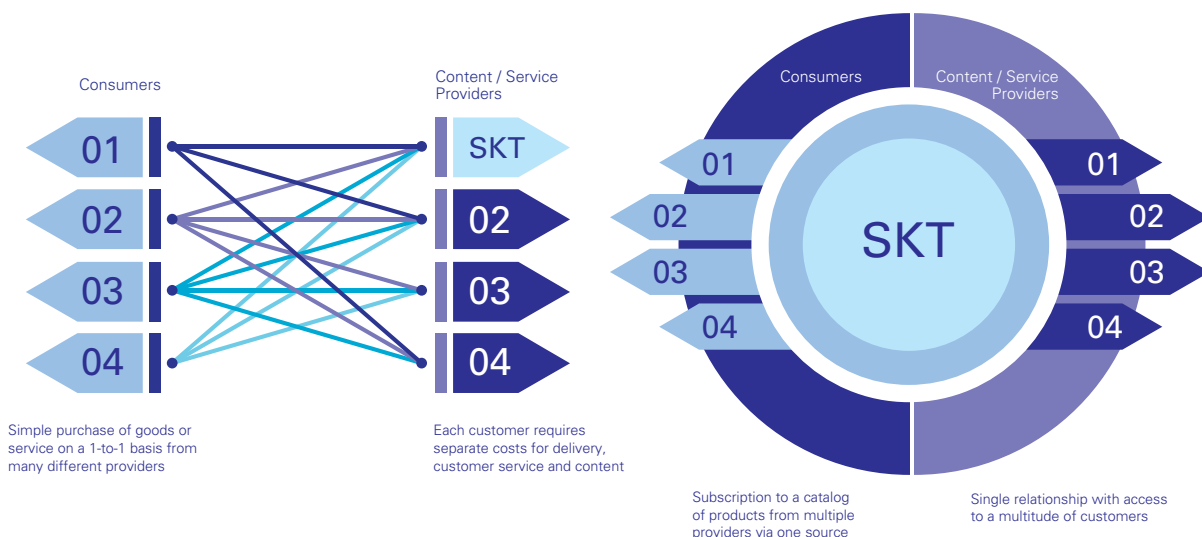
(i) **Phase 1** focused on business strategy with the carrier looking to leverage their competitive positioning advantage. In direct contrast to DoCoMo's 'walled garden' approach in Japan, SKT set themselves up as the open, trusted, reliable platform between content providers and delivery channels;

(ii) **Phase 2** focused on aggregating content into specific platforms ('channels') and developing strong brands for each of those channels. In so doing, they iteratively built the brand – and positioning – of SKT;

(iii) **Phase 3** focused on competing in terms of High Speed Broadband access.

SKT's business transformation was largely achieved by reorganizing the carrier's interface with its partners on the one side, and with its customers on the other, and then following through the organization with the ramifications

SK Telecom Service Delivery Transformation



Source: Sun Kyung Telecom (SKT)

Using brands to target segmented customers with specific service offerings

Brand	Launched	Service
June	2002	Premium brand targeting high-end subs: music, VOD, sports, games.
MelOn	2004	Ubiquitous music service enabled through wired +wireless networks.
Moneta	2002	Combined wired and wireless financial portal.
GXG	2005	Premium 3D game portal. 3D streaming video and stereo sound.
Cizle	2005	Movie portal offering convenient cinema interface.
Tu Media	2004	Mobile multimedia HDTV broadcasts via mobile phones and PDAs.
Loview	2005	Enables transmission of photos to digital frame on real time basis.

Source: SKT

from these choices. First, the carrier reinforced and leveraged its central position in the delivery chain. Previously customers had a 1-to-1 relationship with many different providers, each requiring separate costs for delivery, customer service, content, and so on. After the transformation customers were provided with subscriptions to a catalogue of products from multiple providers via one source (SKT), and suppliers and service providers developed a single relationship with access to a multitude of customers.

Second, SKT developed specific brands for specific services, thereby building its own branded offering.

Brands were used to target segmented customers with specific service offerings.

SKT's early rapid growth in data revenues resulted from a focus on its position in the market and building a consumer-oriented front-end rather than delivery of high speed access. SKT's investments in consumer experience (branding, content, and marketing) made the service successful. SKT was also able to manage relations with device manufacturers to guarantee high capabilities, thus enabling content providers to build to a higher subset of compatible features.



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Global and regional contacts

For more information about this survey or our services, please contact one of the following Information, Communications, and Entertainment professionals.

Kieran Lane

Asia Pacific Regional Head
Information, Communication
& Entertainment
Tel: +61 (2) 9335 7514
kieranlane@kpmg.com.au

Sean Collins

Global Chair
Information, Communication
& Entertainment
KPMG Asia Pacific Ltd.
Tel +65 6372 3300
sean.collins@kpmg.com.co.uk

Gary Matuszak

Global and Americas Chair
Information, Communication
& Entertainment
KPMG LLP
Tel: +1(650) 404 4858
gmatuszak@kpmg.com

Carl Geppert

Americas Chair
Communication & Media
KPMG LLP
Tel: +1 (303) 295 8827
cgeppert@kpmg.com

Graeme Ross

EMA Chair
Information, Communication
& Entertainment
KPMG Europe LLP
Tel: +44 (20) 7311 3372
graeme.ross@kpmg.co.uk

Edwin Fung

ASPAC Chair
Communication & Media
KPMG China
Tel: +86 (10) 8508 7032
edwin.fung@kpmg.com.cn

Contributors

We acknowledge the significant contribution of the following individuals who assisted in the development of this report:

Industry insights

Juwanus Tjandra
Shea Silider
David Frey
Malcolm Alder
Anson Bailey
Peter Lovelock
John Ure

Marketing and Research

Idan Moskovitch
Zileena Doctor
Michael Hurle
Patricia Rios
Yuki Tobinaga

Country contacts

Australia

Malcolm Alder
Tel: +61 (2) 9335 8041
malcolmalder@kpmg.com.au

China

David Frey
Tel: +86 (10) 8508 7039
david.frey@kpmg.com.cn

Hong Kong SAR

Anson Bailey
Tel: +852 2978 8969
anson.bailey@kpmg.com.hk

Indonesia

Iwan Atmawidjaja
Tel: +62 (21) 574 0877
iwan.atmawidjaja@kpmg.co.id

Japan

Takuji Kanai
Tel: +81 (3) 3548 5160
takuji.kanai@jp.kpmg.com

Malaysia

Taihai Woon
Tel: +60 (3) 7721 3388
thwoon@kpmg.com.my

New Zealand

Greg Knowles
Tel: +64 (9) 367 5989
gknowles@kpmg.co.nz

Philippines

Michael Arcatomy Guarin
Tel: +63 (2) 885 7000
mguarin@kpmg.com

Republic of Korea

Sean Choi
Tel: +82 (2) 2112 0300
schoi@kr.kpmg.com

Singapore

Irving Low
Tel: +65 6411 8888
irvinglow@kpmg.com.sg

Taiwan

Pederson Chen
Tel: +886 (2) 8101 6666
chenpederson@kpmg.com.tw

Thailand

Christopher Dolton
Tel: +66 (2) 677 2619
cdolton@kpmg.co.th

Vietnam

Lucas Kurniawan
Tel: +84 838 219 266
lucaskurniawan@kpmg.com.vn

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