



# The state of the telecoms industry in Asia Pacific

INFORMATION, COMMUNICATIONS & ENTERTAINMENT



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## Introduction from Kieran Lane and Edwin Fung



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Partner, Asia Pacific Regional Head of Information, Communications & Entertainment (ICE)  
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**Edwin Fung**

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Across many markets in Asia Pacific, the process of tendering for upgrades to broadband networks is underway and the focus of regulation has shifted. We have moved from created competition to the need to generate effective market structures that can support the future requirements of an ever-expanding information society. As such, it is now timely for us to launch a fresh analysis of developments in telecoms throughout the region.

Asia already boasts some of the most developed telecoms infrastructure in the world. Equally, it has often been the region's emerging markets which have driven new innovations, applications and commercial models. Robust mobile carriers have evolved with their own culture and dynamics, and mobility through technologies such as WiMax continues to be a major driving force.

Within the consumer space, the most popular applications have largely been technology and customer driven. Telecoms companies and vendors are increasingly working hand-in-hand and our study clearly indicates that continuing this trend will be essential, if they are to succeed. The need for an ongoing close business liaison between these groups may well become an even stronger driver for M&A and consolidation activity in markets around the region.

In the commercial space, investment in technology and communications remains an essential strategy to assist organisations to remain competitive and even to reduce their environmental impact. These considerations are particularly pressing in the current austere market environment, and lead us to believe that the articulation of a new role and clearer value proposition for the region's large telecoms companies, is ready to emerge.

This report seeks to explore these changing dynamics in the Asia Pacific telecoms market, and as always, 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.

## Introduction from John Ure and Peter Lovelock



**John Ure**  
Associate Professor and Director  
of the Telecoms Research Project  
Director of TRPC

Traditionally, investors tended to view the telecommunications sector as a safe haven - one where companies could generate a steady cash-flow because of their wide subscriber base and ability to sell services for which there was an ongoing demand from the consumer and corporate sectors. In recent years, markets and investors seem to have been less convinced that the industry could maintain that stable performance.<sup>1</sup>

Market overshooting is a well known phenomenon, and for a sector like telecoms which was riding high for so many years the reversal of fortunes probably appears more dramatic than it is when its fundamentals – its ability to generate sustainable long-term revenues – are examined. Nevertheless, the roles and interrelationships of key players are clearly in a state of flux. The transition to broadband and the world of the Internet and Web-based services, while opening many new opportunities, have also thrown doubt over the industry's ability to develop new sustainable business models.



**Peter Lovelock**  
Deputy Director of the Telecoms  
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Director of TRPC

This paper looks at how this uncertainty arises from the challenges now facing the industry, telecom carriers, operators and vendors alike, with particular reference to Asia Pacific region. The paper argues that the industry, in particular the carrier business, has reached the point of a mid-life crisis, defined as a moment in its development when past visions and roadmaps no longer seem appropriate or attuned to the times, leaving the industry in a search of new directions.

It argues that vendors are also facing challenges arising from technological changes overtaking the industry, but also from new entrants from the IT world, including original design manufacturers and original equipment manufacturers. As a result, vendors, like the carriers, are diversifying into services while at the same time looking to consolidate.

We believe that many telecoms companies are confronting the dual challenges of a maturing industry and increasingly tech-savvy consumer base. The challenge that now confronts telecoms companies is to find a new role and formulate a new set of objectives to cope with these demands. This paper explores how new technologies including high speed and wireless broadband are being rolled out around the region and how the different players in this vast market might hope to profit from these opportunities.

<sup>1</sup> 'Investors look towards Vodafone for guidance' Financial Times, 10 November 2008

## Trends in context



The global financial crisis is taking its toll on all sectors, including telecom operators and equipment vendors, but these effects should not be confused with the longer-term challenges facing the industry. To understand this point better, it is helpful to place the current challenges facing the sector in historical context.

In the early 1990s, when telecommunications was first moving away from its analogue past, the industry had the vision of being both builder and tollbooth of the new *Information SuperHighway*. The vision went way beyond providing the broadband pipes that would carry a host of converged new services. It extended to supporting the providers of 'new media' applications and content services with a platform for managing these services and billing for them. Telecom companies would be at the forefront of e-commerce, video-on-demand (VOD), and a range of hosted software applications and managed data services.

There were two models at work here. The first was the hosting and managed services or outsourcing model and early examples of this were value-added network services (VANS)<sup>2</sup> such as voice mail services to replace the home answering machine. The second model was content-based and implied that telecom companies would branch out to become direct providers of programming, information services and other media-related content.

By the mid-1990s, this vision had been clearly articulated across the region, but events did not unfold quite as expected. Instead, the Internet spawned a series of new players who sold to the customer directly. The Internet offered the means to connect customers with any provider of applications or content from any location, by-passing the tollbooth role of the telecom companies.

<sup>2</sup> VANS are provided by and over a carrier's network, whereas VAS are provided by a third party non-carrier.

Compounding this, the economics of content creation and provision for services such as video-on-demand (VOD) and IPTV proved quite different to the economics of telecoms companies. In the world of television, network costs are relatively low compared with telecoms, but programming entails high recurrent costs.

Management requirements similarly differ. Whereas a telecoms business is highly geared towards engineering requirements, a TV business is highly geared towards the negotiating skills of its management team in buying programmes that will sell advertising slots. Convergence of telecoms and TV by multiplexing through broadband pipes (and over-the-air in the case of digital TV) has been achieved in several parts of Asia, but achieving business synergies between the two continues to be a challenge.

In contrast to the traditional one-sided telephone market, where one side sells a service to the other, Internet markets are two-sided, meaning there are multiple suppliers and buyers on either side of the market, and the network effects created are mutual. In the case of goods and services sold over the Internet, the more consumers there are, the greater the benefits and incentives for service providers to supply those consumers; the more service providers there are the more attractive the network becomes for consumers. This two-sided market has emerged strongly in Asia Pacific, where large and increasingly wealthy populations have embraced new consumer and media behaviours.<sup>3</sup>

The clearest example of the two-sided market is broadband wireless cellular technology such as 3G, which, in addition to providing voice and text communications, paves the way for a market in web-based services. The initial strategy of many 3G operators was to try a 'walled garden' approach which, among other things, constrained the supply of application and content providers by signing them into exclusive deals with the operators. This undermined the network effects for consumers who steered towards alternative channels to access the Internet and web-based services. The vision of the telecom operators owning the customer in this mobile Internet world crumbled.

The resulting mid-life crisis facing telecommunications can therefore be defined as the loss of the original vision in an industry which twenty years ago was looking forward to being at the very heart of the information society. Search engines, for example, are not run by telecom companies. The crisis sparked off by the 2000 dot com crash – but proceeded in Asia Pacific by the financial crisis of 1997 that triggered a general retreat of foreign telecom investment from the region – landed the industry in a period of self-reflection and readjustment, having to come to terms with new realities and adjusting the vision accordingly.

<sup>3</sup> See Consumers and Convergence: published by KPMG International, 2009

## The emerging picture in Asia Pacific



The spread of wireless telecommunications across Asia Pacific has been crucial to raising overall penetration rates. Satellite communications were the principal means of bringing connectivity to remote areas in countries such as China and India, Indonesia and the Philippines, Australia and the Pacific Islands, and in many cases remain so today.

However, they have also supported the growth of mobile networks, which now reach most populated areas of Asia Pacific countries. Driving the demand for cellular has been pre-paid services. These account for over 95 per cent of subscriber accounts in most developing countries, and even in high-income economies such as Hong Kong account for nearly 40 percent. In recent years yet more uses of mobile phones have emerged in the region, in areas such as mobile payments and mobile banking.<sup>4</sup> New wireless technologies, such as WiMax are beginning to make their mark.

Putting technology trends in context, there have been five major developments overtaking the telecoms world. These shifts are:

- from analogue to digital
- from telecom protocols (standard and proprietary) to Internet protocol (IP)
- from narrowband to broadband
- from wireline to wireless (including cellular, satellite, microwave including WiMax)
- from broadband (bit rates for domestic users 144kbps upwards<sup>5</sup>) to high speed broadband (bit-rates for domestic users up to 100 Mbps and 1Gbps) for wired networks and 3G for wireless networks.

<sup>4</sup> KPMG International: Mobile Payments in Asia Pacific, September 2007

<sup>5</sup> Broadband-Integrated Services Digital Network (B-ISDN) is a telecoms protocol offering 144Kbps.

## The broadband opportunity

In their search for sustainable revenues and a way out of the sector's mid-life crisis, telecoms companies have increasingly focused on broadband. The rising demand for bandwidth has become a source of growth, but as prices tumble and competition increases, bandwidth is rapidly becoming commoditised in the advanced economies and even in some of the metropolitan cities of developing countries. There are limits to growth with the rise in the proportion of homes and offices serviced and among users upgrading to higher bandwidths, so this ultimately becomes a low-growth, albeit sustainable, opportunity.

As more people surf the Internet, download movies, upload videos, watch TV on PC and mobile phone screens, and make online purchases, telecom companies around the region are seeking to understand how to monetise these activities for themselves. Answers vary according to market and segment. A consumer may prefer flat rate pricing for basic access, a pay-per-view option for TV, a premium advert-free service for an additional fee or maybe a personalised advertising driven service for a lower fee, whereas a business customer may prefer dynamic pricing of bandwidth-on-demand, or a licensing agreement where Web applications such as accounting software, a database, CRM and billing software are available. Search-driven advertising has become a topic of interest in the mobile cellular sector, and vendors such as Google, Microsoft and Yahoo! in particular are exploring deals with handset vendors and carriers to preload their respective search engines.

For telecom companies who are used to acting as access gatekeepers, it becomes impossible to monopolise services and to tariff commerce over the Internet in a world where broadband access is ubiquitous and the number of close substitutes for both fixed wired and wireless networks is growing. As a result, the business models of the narrowband era based upon ownership of the customer are faltering.

In this regard, wireless networks have been facing the problem. The advent of 3G after 2000 was the first step towards broadband in cellular networks. Mobile network operators (MNOs) were looking for new revenue streams and searching for new business models as average revenues per user from 2G (digital) and 2.5G (IP) voice traffic declined. Walled garden models, based upon the instinct of MNOs to control the gateways to content, fell apart early on after they failed to stimulate the market. A more open approach has since seen a rapid spread of 3G and its HSPDA upgrades, but the search for ways to boost 'data' revenues over 'voice' revenues remains a challenge, although there may yet be signs of renewed growth as broadband wireless applications become more widely available and in demand.<sup>6</sup> In low-income emerging markets, price competition is especially severe.

The debates of the recent past have often centred on wireline versus wireless and whether they are competing or complementary goods, and upon fixed-mobile substitution or fixed-mobile convergence. While their functionalities may be different, the broadband versions of both pose similar business model challenges.

<sup>6</sup> In an interesting development, BT found that Y-Gen users of Apple's 'cool' 2.5G iPhone were using more data (downloads of music video clips, uploads of pictures, etc) than the higher income group users of 3G phones, despite the early marketing of 3G phones as enabling video; hence the emphasis upon 'lifestyle' and 'personalization'.

“Building the next generation of high speed broadband networks is expensive... In larger economies either state-invested companies are required to subsidise network building-out or a direct state subsidy is needed.”

### Fixed-line broadband technologies

Various technologies are being deployed to achieve higher fixed line broadband speeds. Bit rates of over 100 Mbps are obtainable using co-axial DOCSIS 3 (Data Over Cable Service Interface Specification) cable TV modems, of over 200Mbps using copper-based VDSL 2 (‘Very-highspeed Digital Subscriber Line’, second generation), and 1Gbps FiOS (Fibre Optic Service) using fibre-to-the-home (FTTH).<sup>7</sup> These fixed line speeds are already available in markets such as Hong Kong, Japan and South Korea.

The shift from first generation fixed line broadband networks of the 1990s to second generation high speed broadband in the 2000s has been an interesting mix of technology push and demand-driven usage. Against conventional wisdom, HKBN in Hong Kong (see case study) installed a symmetrical broadband network for residential users deploying MetroEthernet technology, which is well adapted to connecting computers and modems to a metropolitan area network (MAN). Conventional thinking within the industry assumed residential users would download far more than they upload. In fact, HKBN managed to tap into the young generation using file sharing sites, blogs and social networking sites. They discovered that among this segment, uploaded traffic outweighed downloaded traffic by a ratio of three to one.

Building the next generation of high speed broadband networks (HSBNs) is expensive. While fibre is cheap and the cost of the electronics of subscriber line equipment is falling, the construction of the customer access network is expensive for two key reasons. First, road digging and trenching, putting up poles and obtaining local permits is typically costly in terms of time and resources.<sup>8</sup> Second, signal attenuation requires repeaters and costs tend to rise geometrically with distance. In a compact market such as Hong Kong, the private sector can afford the investment as it tends to pay for itself, but in larger economies either state-invested companies are required to subsidise network building-out or a direct state subsidy is needed, especially in cases where broadband is to be included in the universal service obligation.

Australia, Malaysia and Singapore are three markets that have grappled with this economic challenge. Since 2007 Australia has been debating how to upgrade its telecommunications infrastructure to a National Broadband Network. The government was proposing to tender for the right to build a network meeting minimum speed and quality of service that passes up to 98 percent of homes and businesses, including the sparsely populated and uneconomic settlements in rural areas. In April 2009, in a change of approach the federal government in Canberra announced that it would fund a majority state-owned high-speed nationwide network to the tune of up to 43 billion (USD 31 billion).<sup>9</sup>

In 2008, Malaysia embarked on a national HSBN project, awarded to Telekom Malaysia. The estimated cost of the project is RM 11.3 billion (USD 3.2 billion) of which the state will contribute RM 2.4 billion (USD 700 million), in order to roll out 1.3 million lines in key metropolitan and industrial locations over 10 years. On top of that, as part of its recent second stimulus package, the government

<sup>7</sup> Also Fibre-to-the-Building (FTTB) or Fibre-to-the-Kerb (FTTK).

<sup>8</sup> Up to 40 percent of network costs in geographically small markets like Hong Kong, and more like 60 percent in geographically larger markets.

<sup>9</sup> “High-speed broadband backed by Canberra,” Financial Times, 8 April 2009

will pump in an additional RM5.4 billion through its various agencies to improve broadband facilities in the country and to set-up broadband community centres in rural areas. This is in line with the government's vision to raise penetration rates to 50 percent by the end of 2010 from about 21.1 percent in 2008. It is also complemented by the bottom-up approach by WiMax, WiFi and HSPA service providers that will be able to provide local connectivity in more cost effective ways. For example, the Malaysian island state of Penang is aiming to be the country's first free WiFi state by 2010 while the while the government of Sarawak is supporting the use of WiFi to bring e-education to schools in remote areas (see Malaysia case study, page 28).

In 2008, Singapore awarded an island-wide fibre-to-the-home HSNB contract to the OpenNet Consortium led by SingTel with Axia NetMedia (Canada), Singapore Press Holdings Ltd and SP Telecommunications. The contract included a state subsidy of SGD 750 million (over USD 500 million). SingTel's broadband network facilities, including exchanges, ducts and poles will be vested into a new company 'Asset Co' while the building and maintenance of the network was awarded to the consortium as 'NetCo'. A new company, 'OpCo' (awarded to StarHub) will operate the network at wholesale prices while retail telecom service companies will lease capacity or purchase bit-rate services. According to this model, which bears similarities to developments in the UK and New Zealand, the fibre network will be a gigabit passive optical network (GPON), which implies that other operators may have to add their own electronics (co-location) if they want to offer highly tailored or specialised services.

### Wireless broadband technologies

Broadband came to cellular markets in the form of 3G, providing a spurt of growth but at the cost of high investment in network equipment, handset subsidies and radio frequencies, and in most markets the competition is severe. Competition drives the need for speed in the sense that users quickly get use to higher speeds giving shorter download and upload times, and greater screen resolution or 'high definition'.



In preparation of the shift to fourth generation wireless technologies – but only second generation broadband – the industry is looking at speeds up to 100 Mbps using WiMax (Worldwide Interoperability for Microwave Access) and for cellular networks using LTE (Long Term Evolution) of speeds up to 300Mbps.<sup>10</sup>

Malaysia is one country that has already made some headway in introducing WiMax services. Local licensees like Green Packet, Redtone, and Asiaspace have begun rolling out services across the nation since mid-2008 albeit in stages.<sup>11</sup> Regulators require that by 2010 such operators cover at least 40 percent of their respective network areas.

The initial response has been promising with Green Packet's P1 recording over 20,000 subscribers since launching in August 2008. To compete against existing celcos offering portable 3G and HSPA devices in the country, P1 has even launched a portable WiMAX USB dongle in April 2009.

Higher 4G wireless speeds are anticipated in certain Asia Pacific markets some time after 2010, but until then carriers seem more focused on exploiting the full potential of HSPA (High Speed Packet Access) developments of 3G. Combined with smart antennae – using MIMO-OFDM (Multiple-Input and Multiple-Output) - (Orthogonal Frequency-Division Multiplexing) – which intelligently select from a range of available frequencies to increase the bit rate throughput and reduce signal attenuation or fading, speeds for individual users of 14 Mbps downlink and 5.8Mbps uplink are claimed. The operators face a trade-off between exploiting these opportunities, which are more than sufficient for downloading music and short videos, and delaying the potential to market additional services over higher speed networks for full length video downloads.<sup>12</sup>

Another twist to the story comes from China. The government has decided that its home-grown TD-SCDMA (Time Division-Synchronous CDMA) 3G technology will be deployed by China Mobile given its position as the largest and most cash-rich of its telecom companies. Contracts for network equipment and 3G handsets are important for non-Chinese vendors, firstly, because of the large numbers involved, especially in a period of global recession and secondly, because of the precedent they will set for future supply.

One strategy is for foreign vendors to partner with local vendors. In anticipation of the introduction of TD-SCDMA, Ericsson, the global leader in mobile infrastructure sales and also the leader in the Asia Pacific region, entered a partnership with ZTE in 2005 to include ZTE's TD-SCDMA 'Node B' base stations (CDMA as distinct from GSM base stations) into its radio access network on an OEM basis. Chinese players who have won substantial network contracts from China Mobile for TD-SCDMA include Datang (Beijing) and Huawei (Shenzhen), New Postcom (Guangzhou) and Fibercom (Wuhan), and Alcatel Shanghai Bell. Siemens (Germany) was an early participant in TD-SCDMA development and consequently Nokia-Siemens Networks (NSN) is among the leading foreign companies bidding for contracts.

<sup>10</sup> These top speeds assume ideal operating conditions, few users to share the frequencies, and in the case of WiMax distances far shorter than the 40-50 kilometres maximum range.

<sup>11</sup> The fourth licensee, YTL E-Solutions will be launching operations sometime this year.

<sup>12</sup> In practice, download speeds for individual users have to contend with many obstacles, including the configuration and number of servers being connected, operator firewalls and network congestion. Handset storage capacity is less of a problem.

The importance of the China market in a period of global downturn cannot be overstated for many vendors. Nortel from Canada, for example, specialises in CDMA equipment and came to rely on Asia for more than 20 percent of its revenues. By the third quarter of 2008, a fall in demand in North America meant that Asian business was accounting for 24 percent of revenues, before it filed for bankruptcy in January 2009.

The reorganisation of telecoms in China during 2008 gave China Telecom the CDMA network previously operated by China Unicom, which along with its GSM network has been folded into China Netcom. China Telecom is forecast to spend RMB 80 billion (upwards of USD 12 billion) 2008-2010 to extend and upgrade the CDMA network, and before the reorganisation China Unicom had announced plans to spend RMB100 billion (USD 14.67 billion) in 3G mobile services 2008-2010. The report of Nortel winning a China Telecom contract for over RMB 1 billion (over USD 650 million) in 2008, Ericsson winning a contract for over RMB 1 billion from China Mobile for GSM network extension and upgrade, and Alcatel-Lucent a contract to build 3G networks in 14 provinces for China Unicom, are indicators that China's network equipment market remains open to some degree

On the devices side of the wireless market, those joining Samsung (Korea) and LG (Korea) in making TD-SCDMA dual handsets for the China market include Nokia, Sony-Ericsson, Foxconn and HTL (Taiwan) and Motorola (US). However, the bigger market inside and outside China is 3G W-CDMA (Wideband CDMA), the successor to GSM, along with its HSPA (High Speed Packet Access) enhancements.<sup>13</sup> China Mobile, which operates the world's largest GSM network, is already planning an enhancement to LTE in addition to being awarded a 3G licence for TD-SCDMA, and has plans to integrate the latter into the global LTE standard. By 2010 the largest market will be for 3G, but the market to watch will be the transition to LTE. Projected estimates for 2012 by the Gartner Group suggest that the worldwide market for 3G and its enhancements will account for 57 percent of network equipment sales, with LTE accounting for 1 percent. The remaining market demand will be principally for extensions and enhancements of existing 2.5G networks. However, for 2009 it is clear that revenues are expected to fall as sales are hit by the global recession and accordingly all equipment vendors have issued quarterly profits warnings. Total market revenues for Asia-Pacific (ex-Japan) for the year 2008 were estimated by the Gartner Group to be worth USD 15.7 billion and for Japan USD 2.2 billion. Table 1 gives the breakdown of market shares.

The following table shows one estimate of the market shares of vendors supplying mobile network infrastructure as estimated by Gartner Group. It should be noted that different sources offer slightly different estimates.

In the network equipment markets the vendors are trying to move into longer term relationships with the operators by offering managed capacity and managed services (MCMS) to operators who are increasingly prepared to outsource their network operations (see below). In the handset markets, vendors are faced with very different challenges.

<sup>13</sup> HSDPA (High Speed Downlink Packet Access) and HSUPA (High Speed Uplink Packet Access) are currently available. The next generation HSPA+ will theoretically offer speeds up to 42 Mbps. According to the GSMA, by November 2008 there are 805 different HSDPA devices from 129 suppliers available on the market, of which 118 are notebook computers.

**Table 1**  
**Mobile infrastructure market shares of**  
**vendors in Asia Pacific (ex-Japan) and Japan (end 2007)**

Company	Market Share Asia-Pacific (ex-Japan)	Market Share Japan
Ericsson	27.9%	12.8%
Nokia Siemens Networks	22.6%	8.2%
Huawei	10.4%	7.4%
Alcatel-Lucent	10.4%	See 'Others'
ZTE	10.0%	See 'Others'
Samsung	4.7%	See 'Others'
Motorola	5.7%	See 'Others'
Nortel	3.9%	See 'Others'
NEC	See 'Others'	43.7%
Fujitsu	See 'Others'	10.8%
Others	4.4%	17.0%

Source: Gartner Group

## Markets and broadband applications

The individual components of the NGN at the services control level or middle layer determine what range of services, content and applications can be offered to the end user at the services and applications level.<sup>14</sup> This is where technologies and markets interplay. Services, content and applications need to be monetised. Some of the most successful cases in the consumer markets have been technology-driven, such as SMS, email, instant messaging, ringtones, uploads and downloads to community or social websites. Most companies, but rather were the outcome of social trends whereby the consumer personalised the use of technologies and services made available to them. The marketing departments came in later, often with services such as mobile MMS, video conferencing and location-based services (LBS) which to date have typically been less successful. Despite the overall slow growth of data services, there does appear to be one application that has caught on, namely the download of music. However, this was pioneered by Apple, through the iPhone and iTunes, not by the MNOs as such. Operators are now trying to catch up with their own services, but this is also giving rise to struggles over the music stores turf with vendors such as Nokia (see case study, page 27).

## Enterprise market

Growing competition from new entrants and the trend towards corporate-owned local (LANS) and wide area networks (WANS) – in an all-IP world Intranets and Extranets – over virtual private networks or VPNs and IPVPNs, private leased circuits (PLCs) and dedicated data networks substantially changed the shape of these markets. Outsourcing through managed data services backed up by SLAs has been the cornerstone of the approach of most telecom companies.

<sup>14</sup> In pre-NGN networks services using different protocols, such as voice and data and frame relay, are handled by the digital workhorse, the Asymmetric Transfer Mode (ATM) switch. Despite service limitations, reliability is high, and relatively speaking so is the cost base.

In recent years IT companies have been promoting integrated solutions based upon a services-oriented architecture (SOA). This allows an enterprise to access and deliver from its various distributed databases targeted information – for example, customer accounts and profiles or inventory data, supplier profiles and costs – to a single computer screen. Call centres and customer relations, for example, make use of such technology. Standing between telecom companies and IT companies are business processes outsourcing (BPO) companies, but the experience of telecom companies to offer outsourced data management has the potential to be leveraged here. For small and medium-sized companies, hosting software-as-a-service (SAAS) applications is an area in which telecom companies could go head-to-head or alternatively collaborate with IT companies such as Google and Microsoft.

Fixed-mobile convergence or FMC is another area with growth potential in the enterprise sector. The data access capabilities of modern mobile devices, including PCs equipped with dongles, offer advantages to companies in many commercial applications, such as stock control, sales support, customer support and payment systems. Organisations that adopt a flexible office approach and do away with permanent desks and office space are also likely to migrate to mobile communications with the functionality of connecting wirelessly to fixed line office hubs. In the UK, BT withdrew its Fusion service from the consumer market to refocus on the enterprise sector by offering a common platform for fixed and mobile communications.

## Consumer market

Diversification based upon new convergent technologies is steering telecom companies in consumer markets in the broadband age. Leading companies are offering the so-called 'quadruple play' of fixed and mobile, broadband or 'fast' Internet and either IPTV or cable TV. Examples include PCCW in Hong Kong, NTT and NTT DoCoMo in Japan, Korea Telecom and SK Telecom in Korea, and Singapore Telecom and Starhub in Singapore. Asian telecom companies are mirroring global trends in seeking ways to create content, or attract content providers to partner, for ventures such as Internet Protocol TV or IPTV.

### Triple and quadruple plays

This is the second wave. The first wave came in the 1990s when telecom companies either bought into cable or satellite companies or experimented with early versions of Video-on-Demand or VOD. Neither the technologies nor the markets were ready at that time and the new wave of activity is more cautious. PCCW in Hong Kong is an example of a company that has successfully cross-sold broadband lines to customers who wish to receive the company's IPTV service, thereby growing a profitable side of the business based upon recurrent monthly subscription revenues.<sup>15</sup> The potential to sustain that growth may be more limited in the years to come, so PCCW is pursuing further diversification, by looking to extend its broadband services in two directions. First, the company has ventured into its own content production, notably into Chinese business news channels. This model relies on a mix of advertising and sponsorship and

<sup>15</sup> PCCW's IPTV service has been generating an operating profit since 4Q 2007 before capital charges are taken into account.

“Consumer markets around the world have proved resistant to converging their fixed line and mobile platforms. By contrast, fixed-mobile substitution has been a very strong trend.”

if, in the future it finds synergies with Web 2.0 services, it could yield dividends. In China, NCB Universal’s Web 2.0 digital distribution channel Hulu, which runs commercial TV shows in contrast to the mostly amateur videos placed on YouTube, was launched in March 2008 and is already catching up with close to USD 70 million of advertising compared with YouTube’s over USD 100 million.<sup>16</sup>

Second, PCCW is moving beyond IPTV into home networking. As a first step PCCW is certifying approved vendor home media equipment to conform to standards set by PCCW as a way to minimise the need for home visits by their engineers. The company has launched a service level agreement with customers to install and maintain and trouble-shoot the home network that will provide services throughout the home, such as TV and videos running different content in different rooms. Ultimately services could include enabling customers to view their home webcam on their mobile phones when they are travelling, turn home devices on and off from a remote location, and stream infotainment services to monitors throughout the home.<sup>17</sup> While such services have the advantage over IPTV of not requiring the telecom company to pay content providers large revenue shares, profit margins are likely to be small and profitability will have to be driven by numbers, which is an uncertainty, especially because the market, unlike IPTV, could be segmented by competitors. On the other hand, PCCW has already formed a joint venture in Indonesia with fixed line carrier PT Telkom (TelkomVision) to upgrade the DTH (Direct-to-Home) satellite network to an IPTV service and operates a contract through Cascade to support an IPTV in Sri Lanka, and this may be a pointer to future plans for internationalisation.<sup>18</sup>

#### Fixed-mobile convergence (FMC) and fixed-mobile substitution (FMS)

With a few notable exceptions, consumer markets around the world have proved resistant to converging their fixed line and mobile platforms.<sup>19</sup> By contrast, fixed-mobile substitution (FMS) has been a very strong trend, especially among younger users. In many parts of Asia, fixed phone lines to households are declining in numbers while mobile cellular phone usage often exceeds 100 percent of the population as measured by pre- and post-paid subscribers.<sup>20</sup>

The decline in average revenues per user is a universal problem, and boosting data revenues seems to be the universal answer within the industry. In a post-3G market, operators are aiming for ‘data’ to mean uploads and downloads of higher value-added services such as mobile TV, Internet commerce using the mobile phone, m-banking and m-payment services from which the mobile operators would hope to make money on commissions and fees as well as on transmissions.<sup>21</sup> Conventional wisdom within the mobile sector is that the other side of data is search and search implies advertising. Emulating Google’s model for advertising revenues with online mobile search has become something of a ‘holy grail’ within the industry in recent years.

<sup>16</sup> “YouTube’s popularity with the public fails to sway advertisers,” Financial Times, 17 November 2008. More recently, YouTube announced a deal with Sony, MGM and other Hollywood studios to showcase TV episodes and movies; see “Coming to YouTube soon: TV episodes, films” Singapore Business Times 18-19 April 2009

<sup>17</sup> Software to support home networking applications using smartphones, such as the iPhone, over the open Internet already exists, but without SLAs.

<sup>18</sup> PCCW operates a broadband wireless (WiMax) licence in the UK.

<sup>19</sup> France is the most notable exception. One reason is that for over two decades France Telecom promoted its Minitel base station for access to information services and French consumers are more accustomed to telecom hubs in the home.

<sup>20</sup> Mobile numbers are notoriously unreliable and inflated. Subscribers own multiple cards, operators adopt different cut off times for ex-subscribers, and so on.

<sup>21</sup> Mobile operators will charge banks to install credit card connections into m-wallets. See KPMG-TRPC (2007) Mobile Payments in Asia

## New entrants and new models

Coming in the other direction is Google itself, along with other IT and Internet companies, such as Apple, Dell, Microsoft and Yahoo! Some offer competing operating systems for smartphones, some offer services such as music stores that compete with handset vendors and mobile network operators. Some advertising revenue models have the potential to complement operators' business models while others could change them radically.

### Smartphones

IT and software companies entered the high-end of the market with smartphones, taking advantage of broadband mobile. Apple has also cleverly exploited its customer relationship with end users by making iTunes available as pay-per-track downloads directly to the iPhone from its music store. In 2008 Sony-Ericsson followed suit with its 'PlayNow' music download service, and Nokia launched a subscription service 'Nokia Comes with Music' which allows consumers to download from its *Ovi* portal (see Nokia case study, page 27). In effect, vendors are competing with operators over who owns the customer.

Google's strategy is very different. Apple wants to sell iPhones and iTunes downloads to the phone, whereas Google wants to put G1 phones loaded with Google applications such as search, maps, instant messaging and email into peoples' hands. By making its Android operating system open source, Google is looking to stimulate a developer community to invent popular applications that will further drive the use of the Internet and therefore data services to the mutual benefit of Google, mobile operators and advertisers. The Symbian Foundation led by Nokia has likewise announced its intention of going open source.

### Search and advertising

One area in which vendors are collaborating closely with operators is in search, and potentially in advertising. Google, Microsoft and Yahoo! are all cutting deals with handset vendors and network operators to install their search engines on the handsets.<sup>22</sup> Applications that can marry mobile phone browsers, search engines and an MNO's GPS (global positioning system) will be a breakthrough. But a problem from the viewpoint of the mobile operators is that until mobile advertising grows to reach critical mass, an economic downturn will rapidly undermine any business model dependent upon advertising revenues.<sup>23</sup> One estimate puts worldwide advertising on mobile phones at less than USD 1 billion from a total estimated spending of over USD 600 billion.<sup>24</sup> Another problem for advertisers is the lack of metrics by which to judge the effectiveness of advertising on mobile phones.

<sup>22</sup> Currently the search results from Google or Yahoo! or other search engines are far from calibrated for the mobile phone experience. Instead of relating to where a person is at a particular moment in time or what they are doing, search results are far more scattergun. Wading through two or three pages of search results to find the most appropriate one may be acceptable on a PC, but not on a mobile phone for someone on the move.

<sup>23</sup> One of the problems for the advertising industry is the multitude of different operating platforms among mobile service providers that fragments the industry, making it less attractive and slow to take off. To address this problem in Singapore, in December 2008 the three operators announced a common platform for adverts by mobile phone.

<sup>24</sup> 'Getting a direct line to India's consumers: mobile phones give companies access to an affluent crowd,' The Wall Street Journal, 10 March 2008

“The phasing of capital investment in NGNs and in its various components being offered by vendors is a critical issue for operators and vendors alike.”

### Next generation networks

The convergence of broadband fixed wireline and wireless technologies at the network level (the physical and transport layers) is the basis of end-to-end all-IP Next Generation Networks or NGNs. NGNs are now the entry level for new operators and the destination of carriers with large legacy networks. The certain advantage to the carriers (fixed and wireless) of an NGN is its lower cost base due to the simplified three-layered (transport, control, services) architecture compared the seven-layered architecture of traditional networks.<sup>25</sup> The uncertain advantages to carriers lie in new broadband and converged services and the extent to which market demand and revenues can be assured.

The phasing of capital investment in NGNs and in its various components being offered by vendors is a critical issue for operators and vendors alike. It is subject to many considerations, such as the anticipated market response to new services, the positioning of the competition, the scale and architecture of the legacy network, issues of backwards compatibility, the costs of accelerated depreciation, the proofs of concept of the new technologies and cash management issues.

For these reasons few incumbents are under such pressure that they need to accelerate the depreciation of their existing and functioning ATM (Asynchronous Transfer Mode) switch – the digital workhorse of the pre-broadband era – to upgrade to a complete Broadband NGN overnight. AT&T did undertake huge write-offs in the late 1990s to upgrade their US network, mainly to offer converged services, including TV. In the UK, in 2004, BT announced the building of their 21st Century Network (21CN) which will take several years to complete, and is also closely linked to the decision in the UK to structurally separate the wholesale and retail sides of the business.

All incumbents are moving in this direction, but the speed of the transition for the carrier is a business issue, not a technology issue as such, and the longer the change takes place the more likely new technologies will overtake those the vendors are currently marketing. For the vendors this is a dilemma, only made worse by the global recession.

<sup>25</sup> Similarly, the most easily identified early advantage of 3G mobile networks to carriers was not the services they could offer, such as video calls, but their more efficient use of spectrum that lowered operating costs.

## Case study

### Cisco and Hong Kong Broadband Network (HKBN)

Since the 2007 acquisition of Sunday, a mobile cellular start-up by the incumbent telecom company PCCW, City Telecom (the parent company of HKBN) is the only carrier in Hong Kong not to be backed by either a conglomerate or an incumbent.

The market opened in 1995 to three new entrants, Hutchison, New World and Wharf, all backed by powerful property companies who installed fibre backbones and xDSL networks in their property developments. Late entry into the broadband market was an enormous leap of faith, especially because, owing to a five-year moratorium by the regulator on new fixed line licences, the only technology available was Local Multipoint Distribution Service (LMDS), a wireless technology that was expensive and logistically challenging to install on the roof tops of high-rise buildings. Of the five LMDS licences available, only HKBN's was ever activated. It was a risky way to enter the market, but it served a longer term strategic purpose. In 2002, City Telecom was awarded a fixed telecom network services license, but without the rights enjoyed by the 1995 licencees to regulated interconnection charges with the incumbent.

This was the point at which HKBN joined hands with Cisco. Cisco is a leading company in designing, making and selling routers, but by 2002 routers were still primarily the province of Internet service providers. HKBN's innovation was to use Metro Ethernet, a technology that came from Cisco's world of computer networking and offered several advantages over a SDH synchronous digital hierarchy (SDH) interface, the traditional choice of carriers, including cost and support for high bandwidth with granularity to support different customer

requirements. For Cisco, this was an opportunity to break into the carrier-grade routing market and acquire a reference client.

Because of its small size, HKBN relies heavily upon close relationships with its vendors. City Telecom, for example, has only ever used Nortel equipment for its IDD traffic management, while HKBN has a long term maintenance agreement with Alcatel-Lucent for its gigabit passive optical network (GPON). A similarly close relationship with Cisco has involved HKBN feedback to the benefit of both. HKBN points out, for example, that whereas routers are normally found in clean and air conditioned environments in ISP and corporate offices, in an outdoor network covering a metropolitan area serving buildings of various vintages, dust, heat and humidity are all common hazards. Also, rebooting a system across an entire city network is more problematic than rebooting an office system. This type of customer feedback has helped Cisco re-engineer up to the highest standards demanded by carriers, and would be difficult to achieve if the vendor-customer relationship were not so close and long-term.

The outcome has been enormously successful for HKBN. Ricky Wong, HKBN's chairman and co-founder, says HKBN was lucky, entering the broadband network market at a time when the focus of its competitors was elsewhere, specifically on Internet services, including TV. By forming teams of engineers and salespeople and targeting entire residential high rise buildings for a week at a time, HKBN was able to sign up and install in the same day. By choosing a technology that offer synchronous as opposed to the traditional asynchronous broadband connections

of ADSL, HKBN has discovered that younger users upload three times the traffic as they download, a remarkable statistic that completely confounds conventional carrier thinking.

HKBN also discovered that by being the first to offer residential speeds of 100Mbps and 1Gbps, it has cornered the market for the demand for high speed downloads. HKBN discovered that even raising the tariff by 10 percent per month from 2007 through 2008, demand for the 100Mbps service has continued, propelling the company into the number-one position with regards prices and the second-highest number of subscribers, including a growing list of corporate clients. HKBN's self-declared target is to become the largest next generation network in Hong Kong by 2016.

Despite these successes, and strong free cash flow given that sunk costs are 95 percent and operating costs only 5 percent, Wong points out that returns on investments are lower than treasury bonds, and he still sees telecoms as an important community service. This is not meant as a joke. The entrepreneur is also a serious corporate citizen who returned from Canada with a passion to see Hong Kong and China and the wider region catch up with the West. HKBN is a good example of how to do this and its relationship with Cisco illustrates how the customer-feedback process can enable a vendor to reap the benefits of an innovative customer.

## M&A trends and consolidation



The motive for M&A during economic upturns is usually associated with market expansion, product diversification and bullish sentiments among investors. The motive during downturns has more to do with buying assets at low prices. In the present climate, the sense of caution among investors and the requirements of cash management have to be balanced against decisions to acquire. A major advantage of acquisition in telecom markets is that it is less expensive to acquire the customers of an existing company than gain new customers. However, the 'fit' still needs to be right. If the market segments do not meaningfully extend the strategic focus of the acquiring company, or if the technology does not match, then M&A is questionable even in the case of the immanent market exit of the target company.

There are regulatory hurdles as well. Market expansion and diversification may be deemed as bringing about a 'significant lessening of competition', an issue over which regulators across Asia Pacific have been given additional powers in recent years. There are also policy hurdles, mainly concerned with limits on foreign ownership and control which remain hot issues in many Asian countries.

In recent years, several cash-rich telecom companies from within or outside the region have invested in Asian markets. From within the region, for example, China Mobile has invested in Hong Kong and Pakistan; Axiata (formerly TM International) in Bangladesh, Cambodia, India, Indonesia, Iran, Pakistan, Singapore, Sri Lanka and Thailand; and Korea Telecom (KT) in Indonesia.

From outside the region, Qatar Telecom has invested in Cambodia, Indonesia, Laos, Pakistan and Singapore;<sup>26</sup> Saudi Telecom in Indonesia; and Vodafone in China and India.<sup>27</sup>

<sup>26</sup> See <http://www.zawya.com/crn/profile.cfm/cid5327/Qatar%20Telecom>

<sup>27</sup> Examples of regional expansion (i) within the region, include China Mobile in Hong Kong and Pakistan, Telekom Malaysia in Bangladesh, Cambodia, India, Indonesia, Pakistan, Singapore, Sri Lanka and Thailand, Korea Telecom (KT) in Indonesia and KT Freetel (KTF) in Malaysia, NTT/NTT DoCoMo (Japan) in Hong Kong, Malaysia, the Philippines and Vietnam, and Singapore Telecom in Australia, India, Indonesia, Pakistan, the Philippines and Bangladesh; (ii) from outside the region include Qatar Telecom in Cambodia, Indonesia, Laos, Pakistan and Singapore, Saudi Telecom in Indonesia, Telenor (Norway) in Bangladesh, India, Malaysia, Pakistan and Thailand, Telefonica (Spain) in China, and Vodafone in China and India.

While cash retention becomes a strategic priority for CFOs in times of recession and credit crunch, the opportunities for buying assets at attractively low prices is also a consideration, especially where synergies are at their greatest. This will be true in two types of market and for two types of strategies: (i) assets in closely related or converging industries where the strategy is one of diversification into new media content, Web 2.0 applications (ii) complementary assets in emerging or mature markets where the strategy is one of regional expansion or internationalisation.

In light of this, M&A activity at the regional level can be expected to continue, but at a slower pace than in recent years. Telecom companies may be less concerned about issues of direct ownership and control and may be less cautious about emerging markets than companies in many other sectors.<sup>28</sup> Even in the latter part of 2008, several foreign companies showed a willingness to pay high prices for entry into emerging markets in the region, calculating that their long-term growth prospects will not be threatened by the downturn.

M&A activity involving telecom companies diversifying into related markets, such as e-commerce, Web 2.0 applications and services and new media content can be expected to grow. Partnerships, joint ventures and acquisitions are all highly probable.

Accompanying a strategy of consolidation, many companies will take the opportunity to close down some services such as 2G cellular networks and slow-speed data services. They may also begin selling off non-core activities such as telephone directories, separating out their engineering teams into subsidiary companies as 'profit centres' and outsourcing their network operations and maintenance either to these subsidiary companies or to vendors.



<sup>28</sup> However, the issue of risk associated with management control, and the lack of it for foreign investors, was a key finding of a World Bank study into the flight of foreign capital from the telecoms sector in Asia Pacific following the dot.com crash of 2000. See John Ure (2005) 'Infrastructure in East Asia and the Pacific - The Way Forward: Telecom Note' The World Bank, [http://www.trp.hku.hk/publications/telecom\\_note040721.pdf](http://www.trp.hku.hk/publications/telecom_note040721.pdf)

## The reorganisation of telecoms in China



A major overhaul of China's telecom industry was announced on 24 May 2008, when it was agreed that the earlier '5+1' carrier structure, organised around specialist fixed-line and mobile carriers, would be replaced by three integrated full-service carriers: China Mobile, China Telecom and China Unicom.

The reorganisation is the fourth since China first began opening its telecom industry to competition. Each time, the government has sought to rationalise the industry's development and to mirror the desirable aspects of market-driven development it has seen in other markets. The process has worked well in many ways, as fees are low and access is broadening rapidly. Through the course of three previous restructurings, China's telecom industry has become the world's largest by subscriber number, and one of the world's most lucrative with total carrier revenues in 2008 of RMB 814 billion (USD 119.1 billion).

With growth in basic access still having quite some way to run, growth in broadband access just beginning, and 3G networks belatedly beginning to roll out, the China telecom market holds enormous promise in its potential to turn around the fortunes of service providers or vendors who pursue the right strategies for the China market.<sup>29</sup>

### Restructuring

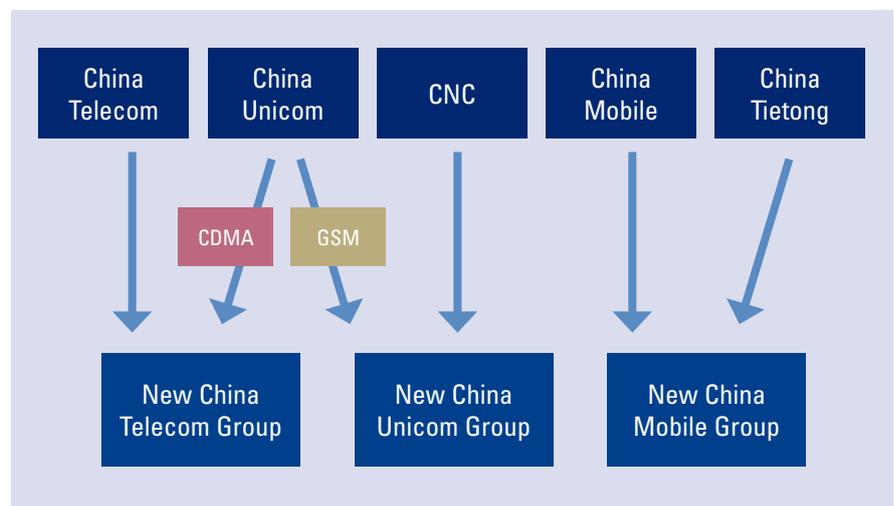
The previous '5+1' organisation of the industry resulted from then Premier Zhu Rongji's interest in addressing the dominance of the incumbent China Telecom by splitting the operator, first by fixed and mobile functionality, and then by geography, in a north-south divide. From that reform four major companies emerged: China Mobile and China Unicom for mobile phones, China Telecom and China Netcom for fixed lines.<sup>30</sup> In addition to these four, China Tietong (also known as Railcom) served the fixed lines on the Ministry of Railway's internal telecom network. China Satcom was the so-called '+1' in the equation.

<sup>29</sup> 'China alone may not be enough to save Nortel, but at 24% of revenue, Asia is a really big help,' Stone Tseng, Nortel Vice President for Solutions and Marketing, Greater China. See 'Nortel sees China as bright spot amid troubles' Dow Jones Newswires, 19 November, 2008.

<sup>30</sup> China Unicom remained as the only fully-licensed carrier in the market, but its comparatively smaller size and the ongoing frenetic growth of the mobile sector in China resulted in Unicom focusing almost exclusively on mobile.

Under the latest restructuring, China Telecom acquired the CDMA networks of China Unicom, along with China Satcom; China Unicom retained its GSM networks and was merged with China Netcom; and China Mobile acquired Railcom. Figure 1 illustrates this dynamic.<sup>31</sup> Following the reorganisation, all three remaining carriers offer both fixed-line and mobile wireless service. In announcing the reorganisation, the MIIT (Ministry of Industry & Information Technology) stated that the government would formally issue 3G licenses once the industry restructuring had been completed. Those licenses were finally awarded in January 2009 (see below).

**Figure 1: The 2008 Restructuring of the Chinese Telecommunication Industry**



This latest restructuring was undertaken with four interconnected targets in mind:

- The need to increase competition by creating a stable of full-service carriers<sup>32</sup>
- Introducing 3G licenses, including the 'China standard', TD-SCDMA
- Rebalancing the industry focus to increase the emphasis on broadband without impeding the growth of mobile<sup>33</sup>
- Preparing the carriers for international growth, including presumably the exporting of China's TD-SCDMA standard.

<sup>31</sup> Railcom has said that it will maintain an independent operation within the New China Mobile. However, by early 2009 that was already being challenged.

<sup>32</sup> According to an MIIT announcement in May 2008, the government "hopes to enhance the competitiveness of local operators and clear the way for 3G licenses to be released."

<sup>33</sup> In 2008, Vice Minister Lou Qinjian told the China-ASEAN ICT Ministerial Forum that the three major tasks for the new MIIT were: synergic overlapping of informatization and industrialization; telecommunications system reform; technological and business innovation. According to Lou, China would focus on "moderate and healthy market competition, convergence, and the development of 3G wireless communication," while efforts would be made to "guard against monopoly, over competition and repeated construction within the industry." See [www.chinazone.com/download.php?id=271&name=20081031034553.ppt](http://www.chinazone.com/download.php?id=271&name=20081031034553.ppt)

### Increasing competition

According to the government, the fundamental goal of reorganisation was to help in developing three industry bodies with nationwide network resources, comparable strength and scale, the capability for full-service operation, and strong competitiveness.

At the time of the announcement, China Mobile had some 390 million GSM subscriber accounts and by the start of 2009, this had increased dramatically to 457 million subscribers.

By contrast, after being restructured, China Telecom had some 208 million customers in its fixed-network services of which 47 million are Personal Handyphone System (PHS) subscribers, and gained another 28 million customers through the newly-acquired CDMA service.<sup>34</sup> However, in February 2009 the MIIT discontinued registration of new users and any expansion of the PHS networks.<sup>35</sup> With fixed-line subscribers continuing to decline (falling to around 207 million by March 2009), CEO Wang Xiaochu has indicated that the focus for the company will increasingly be on mobile as much as it is on the carrier's stronger broadband offerings.<sup>36</sup>

The new China Unicom, with some 280 million customers at the time of restructuring, including 120 million GSM users, 20 million PHS users and 140 million fixed-network users, is in a rather different position. As the only fully-licensed carrier prior to the restructuring, it already has both mobile fixed-line (including broadband) experience. And while its fixed network operations were relatively modest previously, the acquisition of China Netcom means that it has both experienced engineers and sales people.

To help level the competitive playing field, the government subsequently announced that 'necessary asymmetric regulations' would be adopted after the restructuring. One example of this was the 'Notice on Promoting Joint Construction and Sharing of Telecommunication Infrastructure' issued by the MIIT on 6 October 2008, ordering that from 1 October 2008, the three carriers were required to begin joint construction of their infrastructure and share each other's existing infrastructure resources. The Notice specified that all three carriers' existing base stations and terrestrial cables must be accessible to one another, and if conditions are 'not ready for sharing', the carriers need to 'demonstrate due efforts to develop relevant technologies that facilitate the sharing'.

Further, the carriers are required to 'closely collaborate' in building new base stations and other facilities, and should 'any carrier plan to build new facilities like mobile towers or transmission pipes, it must notify the other two; accordingly, the other two shall feedback within ten business days, stating whether they already have resources to share, or plan to join the construction.'<sup>37</sup>

<sup>34</sup> China Telecom annual report, March 2009.

<sup>35</sup> The Ministry had previously required telecom operators to cancel the wireless telephone service by the end of 2011.

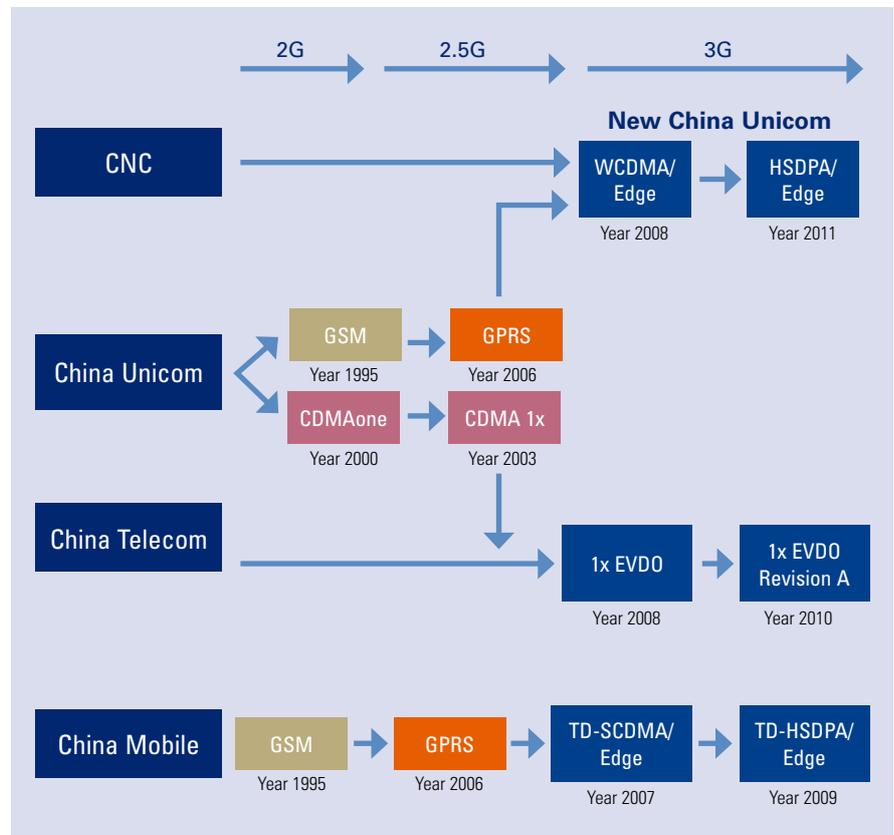
<sup>36</sup> China Telecom has stated that it plans to invest at least RMB80 billion over the next three years to update the CDMA network, "Nortel sees China as bright spot amid troubles," Dow Jones Newswires, 19 November, 2008.

<sup>37</sup> The Notice goes on to specify that those who refuse to cooperate will be subject to severe punishment, both economically and administratively, such as the responsible officials being sacked and barred from carrier re-employment for three years.

### 3G licenses

In January 2009, the government announced the allocation of 3G licenses. China Mobile was awarded the rights, and responsibility, to launch the homegrown standard, TD-SCDMA, while China Unicom received the rights to the 'European standard' W-CDMA and, China Telecom was given the right to build out CDMA2000 and its upgrade technology, EV-DO. Figure 2 presents a flow chart of the impact of the reorganisation on the wireless sector.

**Figure 2: Wireless sector standards progression in China**



Source: TPRC

While the announcement had been anticipated for some time, the fact that only three 3G licenses were awarded suggests that it may only be a first step in a new phase of market development. Allocating just the one license to China Mobile, which currently serves well over 450 million subscribers, may make sense if the objective is to encourage the carrier to focus on TD-SCDMA, and eliminating the remaining problems still said to exist (primarily on the handset side). In so doing, the government's objective of standard setting would be met, and the stage would presumably be set for China Mobile to accelerate its overseas expansion.

However, China's approach does mean that different technologies will continue to compete against one another, with the drawback that that roaming across networks, or switching carriers, will be more difficult.

China's stance on wireless standards, while promoting the development paths of the three local carriers and the locally-driven TD-SCDMA, could still provide an attractive opportunity for various foreign companies. For example, with the new structures in place, Qualcomm (US) continues to earn a royalty on CDMA patents, while helping both China Unicom and China Telecom serve their markets. Another likely winner is Apple. With China Unicom awarded the W-CDMA license, Apple has been negotiating with both China Mobile and China Unicom to sell the iPhone into the largest and fastest-growing mobile market in the world.

With the shape of the industry more clearly set for the next three to five years, the way is also potentially open for foreign service providers to attempt to acquire larger shares in the three carriers. This could take the form of expanding existing relationships or forming new joint ventures as the three carriers look for partners to assist in developing their new lines of business, including 3G service provision. Telefonica's prior 7.2 percent stake in China Netcom, for example, although diluted within the new Unicom structure, has placed it well to help the carrier aggressively pursue its WCDMA ambitions and services. Similarly, both Britain's Vodafone, with its stake in China Mobile, and South Korea's SK Telecom, with its existing interest in Unicom, have long expressed an interest in increasing their ownership positions.

One final challenge to be resolved in the dynamic wireless sector still concerns the large installed base of Personal Handyphone System (PHS) subscribers (around 69 million at the end of 2008). These fixed wireless systems were previously installed by China Telecom and China Netcom as an alternative to offering mobile services.

It had been thought that the carriers might look to continue nurturing the market as a specialised niche, nourishing it with new features and services as a type of value offering for poorer subscribers, particularly in rural and semi-rural markets. After all, at around 7-8 percent of the market, it is not insignificant. However, the government's February 13 announcement ending PHS development means that the carriers need to look at converting as many subscribers as possible to CDMA (in the case of China Telecom) and GSM (in the case of China Unicom) and let the rest decide over time.<sup>38</sup>

## From mobile to broadband

China's mobile market, while still having a lot of room to grow, is maturing, while broadband penetration remains relatively low. At the point of reorganisation, the penetration rate for mobile phones in China was 42 percent, and the country was still adding 9 million new mobile subscribers per month. If sustained, this rate would give China a penetration rate for mobiles of around 70 percent by 2010.

The broadband subscriber base in China, on the other hand, is growing at approximately 1.3 to 1.4 million per month, almost the same rate as three years earlier. In other words, it had become clear that to expand broadband access and services across the country the government needed to engage China Mobile in

<sup>38</sup> Both carriers have already taken financial write-downs as a result of the decision to preemptively curtail PHS.

infrastructure construction, due to its resources and large subscriber base. To focus the carriers' interests on this sector, the creation of competitive integrated operators was required.

## International growth

The final aspect of the industry-wide reorganisation stems from the Chinese government's long-harbored aspiration to challenge European and American dominance in wireless communications and have its own share of the international market. In announcing the reorganisation plan, officials stressed that the telecom industry should 'persist in independent innovation' and 'make special efforts to foster the world's top-ranking telecom companies with core competitiveness.'

The first part of that statement refers directly to government support for the locally-developed 3G technology, TD-SCDMA. The latter statement is an expectation that China's powerful state-owned telecom companies now stand to gain ground in the global market, specifically China Mobile. Having already invested in Pakistan and Hong Kong, China Mobile recently announced that it was interested in expanding into the African market.

Therefore, despite the avowed 'necessary asymmetric regulations', the government's intention to help China Mobile prosper in the international market also remains in place. By taking advantage of the world's biggest GSM subscriber base, and tightening control over the industry chain, it can remain a dominant force in the industry over the next two to three years, while the transition transpires. The overriding objective is therefore to improve the strengths of the domestic marketplace and the three dominant carriers within, so that they can export China's technologies and services to the world.

## Vendors in China

The release of 3G licenses in China has paved the way for a new round of growth for the communications equipment market, bringing with it huge market opportunities to communications equipment manufacturers. One early estimate put the 3G China 'boon' at USD40 billion of equipment and services within 24 months.<sup>39</sup>

Along with adjustments in domestic 2G communications networks, the level of fixed investment in China's telecom industry dropped somewhat in 2004 and 2005, but regained growth from 2006 driven by increased demand. In 2008, a new cycle of telecom investment began following the restructuring, but really moved into high gear in 2009 as priority was given to 3G networks, providing opportunities to manufacturers of mobile communications, data communications and optical communications equipment. The suppliers of core network equipment, including Ericsson, Nokia Siemens Networks, Nortel, Alcatel-Lucent, ZTE and Huawei, have all benefited from the emerging deluge of mobile contracts. ZTE's position in TD-SCDMA has been particularly strong.<sup>40</sup> On the mobile network infrastructure side, such as the radio access networks, Ericsson, Huawei and ZTE have all benefited strongly.

<sup>39</sup> "Li Yizhong, minister for industry and information technology, said at an industry conference in December that China will spend 280 billion yuan, or about \$40 billion, on 3G networks over the next two years, stimulating China's economy and helping fend off the financial crisis." China Daily, 5 February, 2009, p.5.

<sup>40</sup> ZTE has over 2,000 engineers specializing in GSM/CDMA and 3G technologies. Of these, 900 engineers are focusing on TD-LTE (the next generation TD-SCDMA) which will offer greater economies of scale than TD-SCDMA. 'ZTE gears up for LTE' telecomasia.net, 18 November 2008; [http://www.telecomasia.net/article.php?id\\_article=11334](http://www.telecomasia.net/article.php?id_article=11334)

However, along with a drop in telecom equipment pricing, fueled by the ever fiercer competition in China, particularly from the Chinese vendors, specific technical requirements have been promoted, resulting in vendors facing further challenges. Furthermore, the operators have begun to shift their priority from network rollout and development to business operations, resulting in a focus on the development of next-generation OSS/BSS systems and the development of network management systems, resource allocation systems and IT support systems.<sup>41</sup> For the vendors the impact is seen in a sharp drop in price for basic communications equipment (which, admittedly, volume in China helps address), and a need to shift their own focus to operation and management capabilities, and ongoing supplier support services if they are to maintain sustainable business in China.

#### **Fixed-mobile convergence**

One particular area of focus for vendors targeting the carriers' new development strategies is in the development of fixed-mobile convergence (FMC) services – again thanks to the restructuring. With cross delivery of services previously barred by the licensing restrictions on the carriers, the expectation is that FMC will be rushed out in earnest once the new mobile networks have been rolled out. Already in 2008, the carriers had added in excess of 7,000 new hotspots across China.

For the vendors, EDGE and Wi-Fi dual-mode handsets may become new hot selling products. (In the past, regulators forbade selling handsets with Wi-Fi features in China.) In this area, the reorganisation has laid the foundation for the fixed-line phone carriers to also launch one-number-for-call services in the mobile sector. Some of China Telecom's enterprise clients have already adopted the one-number-in-different-offices service, and this is therefore expected to be a service that China Telecom will seek to rapidly develop as a competitive advantage.

<sup>41</sup> According to Eran Ofir, COO of Admocs China, 'Some of the big provincial subsidiaries of the Chinese carriers have already begun consolidating their networks and replacing the local customizations and patch-based legacy systems with new platforms.' In 2008, Amdocs won their first China contract for an off-the-shelf OSS for Guangdong Mobile. '3G to drive Chinese telco's OSS spend' telecomasia.net, 21 November 2008; [http://www.telecomasia.net/article.php?type=article&id\\_article=11440](http://www.telecomasia.net/article.php?type=article&id_article=11440)

## Case study

### Nokia's approach in mature and emerging markets

While Nokia is well-known for the design, manufacture and sale of mobile handsets, Nokia Siemens Networks (NSN), a separate company formed through a merger of the two company's network equipment sides in 2006, has now become a leader in its field as well.

On the handset side, Nokia has recently made two strategically important moves: adopting an open source mobile phone operating system and establishing its mobile portal, *Ovi*.

Led by Nokia, the Symbian operating system was developed as a consortium that also included Ericsson, Motorola and Psion. Symbian Ltd licensed its system to handset manufacturers. In June 2008, following Nokia's purchase of all remaining Symbian shares from Ericsson, Sony-Ericsson, Panasonic and Samsung, Nokia announced the launch of the Symbian Foundation with the aim to 'provide royalty-free software and accelerate innovation.' Nokia has made it clear that this is the first step to making Symbian fully open source to encourage its widest possible development by others, and as a strategy for it to capture the majority of the market.

In 2007, Nokia established the mobile portal *Ovi* (Finnish for 'door') and in 2008 launched the 'Nokia Comes with Music' service. The ensuing challenges in agreeing revenue splits illustrate the ongoing tensions between vendors and carriers over customer ownership.<sup>42</sup>

If economies of scale are important in the handset market, they are even more important in the network equipment market because of the high R&D and manufacturing costs involved.

The markets for mobile wireless network equipment fall broadly into two categories: mature and emerging.

Mature markets in the Asia Pacific, including Australia, New Zealand, Hong Kong, Japan, South Korea, Singapore and Taiwan, remain crucially important as test-beds for network upgrading with emerging high-capacity technologies. The problem is that growth rates are lower.

The region's emerging markets are growing faster and often leapfrogging into high speed technologies in major cities and towns. This leaves many provincial areas searching for secondary solutions although these, too, are often high tech. For example, WiMax is being trialed in rural Vietnam, while orthogonal frequency-division multiplexing (OFDM), a digital technology designed to minimize signal interference and attenuation, is being considered in parts of Malaysia as a way to provide wireless connectivity from a national optical fibre backbone to local area WiFi networks.

These technologies complement but can also compete with each other, so vendors need to maintain a broad portfolio of technological capabilities without spreading themselves too thinly. For this reason, Nokia has designed its Flexi Multimode Base

Station technology for wireless networks to handle LTE, WCDMA and WiMax transmissions, although as of 2009 Nokia has decided not to develop WiMax as part of its own portfolio of products.

The size and the diversity of Nokia's technology portfolio cannot insulate it entirely from growing competition coming from low cost companies based within Asia Pacific. Under these mounting pressures in different markets, vendors such as Nokia are shifting into services. "A key part of NSN's business is now to provide consultancy services for operators as they decide how they will move forward," says Marc Rouanne, head of NSN's Radio Access Business Unit.<sup>43</sup> In IT markets, companies like IBM have made similar moves, and services may well become a profitable line of business in its own right.

<sup>42</sup> For example, international carriers like Vodafone prefer own-branded handsets and with design specifications to their requirements, whereas vendors would prefer their brands and their standard specifications to be the default.

<sup>43</sup> "Nokia Siemens Networks stresses scale is key to survival," Total Telecom, 29 October 2008

## Case study

### Bottom-up approaches to connectivity in Malaysia's provinces

Bottom-up approaches to internet connectivity suffer from the disadvantage that they cannot plausibly offer national coverage. But they have the advantage that they can be more closely tailored to local requirements, which vary widely between areas within a country. In Malaysia, quite different challenges exist between the metropolitan and city centres of Kuala Lumpur, the Klang Valley, Penang and Johor Bahru, and the smaller towns and agricultural districts of provinces such as Sarawak where many of the population still live in relatively remote villages.

As the second-smallest state in Malaysia with an area of 1,030 square kilometres, Penang has the highest population density in Malaysia with a population of 1.52 million or 5.5 percent of the national total. It contributes about a third of the federal government's tax revenues and 30 percent of the nation's exports, with the manufacturing sector accounting for 39.5 percent of its GDP in 2007.

With such a high concentration of people and commercial activity, Penang offers a potential density of demand to make an island-wide WiFi access project attractive. The Wireless@Penang project, part of the state island's i-Land 2010 Master plan, started in September 2008. It aims to be completed within 18-24 months, covering the entire state with 750 hotspots and making Penang the first free WiFi state in Malaysia.

Wireless@Penang is significant for two reasons. First, it is a broadband service offering 10 Mbps, which exceeds the current fastest paid-broadband service in Malaysia, currently offered at 4 Mbps. Second, although promoted and backed by the state government, the project's financial investment, infrastructure

development and WiFi services are provided by a private consortium made up by content manager REDtone Telecommunications Sdn Bhd and service enabler Hotgate Technology (M) Sdn Bhd. The consortium has expressed optimism of achieving a return on investment with an 18-36 month timeframe, something that is likely to rely upon advertising revenues.

To complement the free WiFi project, the government has initiated a second component, namely the WiMAX@Penang project to cater for serious mobile Internet users who require faster speed at an affordable price. The state government's partner in the project, Packet One Networks Sdn Bhd (subsidiary of Green Packet), successfully launched the WiMAX project in early April 2009 and aims to cover at least 70 percent of the state's population by the end of 2010.

In contrast to Penang, Sarawak in Eastern Malaysia is the largest state in Malaysia and is mostly rural, with vast forests and mountainous regions accessible only by air, by river or by trekking. It has the lowest population density in Malaysia of 17 people per square kilometre, although nearly 50 percent of the population lives in the towns. Agriculture logging and petroleum are the major industries, but the state government has been proactive in developing the manufacturing and service sectors.

One of the most notable initiatives is the Sarawak Rural Broadband Initiative (SRBI). While it is supported with some state funding, the lead is taken by a partnership between Danawa and Sacofa. Danawa Sdn Bhd operates deConneXion, the largest Internet Service Provider in Sarawak. Sacofa Sdn Bhd was incorporated in 2001 with the prime objective of developing

the state's telecommunications infrastructure. Its stakeholders are the State Financial Secretary, Celcom (Malaysia) Bhd, the Sarawak Information Systems Sdn Bhd, PASB Technology Sdn Bhd (an online trading company) and Yayasan Sarawak (Sarawak's Education Foundation). This combination of private and public investment is promoting a bottom-up approach to the provision of broadband as part of the state's commitment to raising the household penetration rate from 1.3 percent in 2006 to 50 percent by 2010. A specific objective is to serve rural communities and in particular the provision of education services to schools. This part of the initiative, lead by Danawa, is collaborating with the one laptop per child project and the Cambridge ICT Starters Programme.

Sacofa operates the optical fibre submarine backhaul link from the border of Brunei in Borneo to Mersing on the east coast of Peninsular Malaysia. Satellite links are used to reach most isolated inland areas. Long-distance backhaul between the towns in Sarawak relies on OFDM (orthogonal frequency division multiplexing) wireless using unlicensed 5.8 GHz radio spectrum, and local access points are provided using unlicensed 2.4 GHz WiFi. REDtone's P1 brand has a licence to install WiMax throughout Sarawak and at some point WiMax may provide an additional backhaul opportunity for WiFi traffic. The use of unlicensed spectrum has given this initiative room to experiment and to use local resources to meet local needs. It differs from the Penang approach in its greater involvement of the state government, which given the scale of the challenge is to be expected. However, what they share in common is the bottom-up approach to complement top-down initiatives being driven at the federal level.

## Transfer pricing issues in the telecoms industry



Transfer pricing issues are receiving more attention around Asia Pacific, with Vietnam and Sri Lanka issuing their first transfer pricing laws, and China, Singapore, Korea and Malaysia releasing major new requirements. In addition, there has been increased audit activity in Australia, Thailand, Korea and Japan.

Telecoms companies operating in the region face several specific challenges. In particular, they need to work out how to allocate risk and expenses related to network charges, head office/R&D expenses, technical support and implementation services, and considerations related to excess capacity. They also face difficulties in finding comparable companies for benchmarking.

Telecoms executives need to understand where their core competencies lie, in terms of their position in the value-chain and potential Key Entrepreneurial Risk Taking (KERT) functions.

As with other industries, in order to decide the appropriate transfer pricing methodology, it is first necessary to perform a function and risk analysis. If, after analysis, the KERT function is judged to be performed by the parent, the local subsidiaries will receive a reasonable return while the parent will act as the KERT and receive all the excess profit or loss. Losses or risks related to excess capacity would, for example, lie with the parent company in this case.

On the other hand, if the local company acts as the KERT, the headquarters will continue to provide management services, but will record the cost of such activities (including provision of network operations and maintenance services as well as management itself) using either direct or indirect charges. In this case, calculating the cost pool and properly allocating costs become more important. Losses and risks related to excess capacity could be shared by the parties involved as indirect charges.

A telecommunication equipment manufacturer may well hold a monopoly-like position for its product and be incurring large amounts of R&D expenses while acquiring rival companies and their valuable IP. This leaves the parent company with core competencies, ownership of valuable IP, and a position as a KERT.

Many vendors have manufacturing plants in locations around the world, but often these are only managed, rather than owned, by the company. In some cases, assembly is outsourced to third-party manufacturers in Eastern Europe, China or elsewhere in Asia.

Many companies have separate subsidiaries in each of their main markets. Some of the subsidiaries are buy-sell type distributors for the company's equipment, and some are commission agents with limited functions. In the case of the commission agents, products are assembled after receiving a purchase order, which means that the subsidiary does not hold any inventory. In addition, spare parts are owned by the parent companies and warehouse management is outsourced. As the parent companies have strong pricing power, products prices are sometimes set across different markets.

Local subsidiaries often provide some technical support to their customers. The post-sales support services are particularly important because telecom companies are not in a position to stop services.

### Value chain analysis

A transfer pricing function and risk analysis seeks to identify which functions are performed by which entities in which jurisdictions, in order to then determine the appropriate transfer pricing. A typical function and risk analysis would cover the following aspects:

- Corporate strategy: Strategic planning and management across all aspects of the business is typically performed by the parent company.
- R&D: Design and development of new and existing products is typically performed by the parent and by some manufacturing subsidiaries.
- Manufacturing: Manufacturing, testing, quality control, packaging and logistics are typically divided between the parent and the manufacturing subsidiaries. Assembly is in some cases outsourced to third parties.
- Marketing: Marketing plans, budgeting and implementation can be performed by both the parent and local subsidiaries.
- Sales and Distribution: Sale and distribution of products is done directly or through subsidiaries; pre-sale services are provided.
- After-sale Services; Implementation phase and maintaining customer relations can be performed either by the parent or the local subsidiaries.

An additional question relates to the valuation of pre-sales and post-sales services. Based on these services, the tax authorities may suggest that the profit-split method should be used, and regard pre-sale technical support and post-sale implementation as valuable services that should receive a return. Since many telecoms companies are in unique positions, in terms of their products, services and market position, it would be hard for the company to find comparable companies which could be used to justify the return of the local distributors.

## Conclusions — Operational implications



Spending money to save money is a common occurrence in business, but when resources are squeezed spending money usually implies cutbacks elsewhere. While cash management is a current priority for many companies, telecoms operators and vendors cannot afford to neglect the longer term strategies, which will keep them at the forefront of their respective markets.

The CEOs of telecom companies face a profound challenge in understanding the business issues, often resulting from inefficient cost structures and legacy systems, that can hinder them in realising strategic goals. No organisation can succeed until it has the support and infrastructure in place to respond effectively to market and consumer-driven trends. Aligning business processes to customer-centric and personalised services can involve substantial investments that cannot be overlooked, even when executives are preoccupied by their often constrained financial position.

Outsourcing has been one important tool available to telecoms operators as they seek to become leaner and more nimble organisations. It typically starts as a way to take staff costs out of the business. A common way is by setting up a subsidiary or associated company to offer engineering and maintenance services.<sup>44</sup> From there, it is used to jettison non-core businesses, such as operating the transport fleet, building security or telephone directories. Eventually, companies look to outsource operational and transactional tasks (business process outsourcing) that can be done either routinely or more efficiently by specialist third parties.

All three are widely practiced across many parts of Asia Pacific. Hutchison, for example, has outsourced the operations of its 3G network in Australia to Ericsson where it has also more recently agreed to jointly market 3G services with Vodafone.

<sup>44</sup> NTT (Japan) did this during its privatization in the 1980s. PCCW did this in 2003, setting up Cascade to employ around one-quarter of its staff to sell engineering and maintenance services to PCCW and third parties.

“The CEOs of telecom companies face a profound challenge in understanding the business issues, often resulting from inefficient cost structures and legacy systems, that can hinder them in realising strategic goals.”

Other Asian examples of outsourcing include Wateen Telecom (Pakistan) which has a network and customer support agreement with Pakistan’s IT vendor Inbox Business Technologies, and Bharti (India) and Ericsson who have a USD 1 billion agreement based upon the managed capacity, managed services (MCMS) model that allows Bharti to buy on an ‘as-needs’ basis additional cellular network capacity built by the vendor. The deal also involves Bharti migrating to a soft switch across its cellular network nationally as a step towards a next generation network that should eventually enable Bharti to offer a range of converged services at low cost while avoiding technological obsolescence.

The MCMS model is a new direction for vendors and promises to seal closer and longer term collaboration with carriers, a strategy that can offer security for vendors faced with the commoditisation of equipment prices and significant cost efficiencies for carriers. Consolidation of this sort is an area in which the vendors are increasingly hoping to win carrier business and requires a much closer working relationship than was true in the past. But it also poses the challenge of vendor services avoiding conflict of interest with vendor sales if the carrier is looking for a combination of the best equipment deals and service level agreements.

#### Customer retention

An important part of any business strategy is understanding and agreeing on how to build and retain the customer base. This requires, as Vodafone CEO Vittorio Colao put it, “shifting away from texting, towards family plans and longer-term contracts.”<sup>45</sup> That vision, now part of the common wisdom of the industry, fits nicely with the world of 3G+ mobile communications insofar as plans for families and friends can include special rates for emails, sending family pictures and sharing video, in contrast to plans that simply specify discounted rates for ‘on-net’ (on the same network) as opposed to ‘off-net’ (across different



<sup>45</sup> “Title,” Financial Times, 12 November 2008

networks) communications. Central to the vision is an old telecommunications concept: 'communities of interest'. People gravitate in their communications towards family and friends, business and social acquaintances, and towards the same websites and TV programmes. Ease of access and simplification of process and procedures are key elements in the success of this approach, whether it be simplified charging principles, or use of applications. Business models have to reflect these changes.

Market share will always be seen as an important indicator for the health of a company. In this respect, bundling and cross-selling have proved to be key parts of customer retention and sales, as have customer-centric personalised services and support services.

All these issues, along with many others, have been well-rehearsed within the industry, but realising them is the challenge. Realisation implies a staff and company culture and business processes that are very different from earlier times. A customer-centric approach is required to reduce churn rates. This requires data for consumer profiling, service support history and accounts history that can easily and rapidly be assembled from diverse sources across the company onto a single terminal screen either within the company's customer relations department or at a call centre (a 'single customer view'). The other side of the same coin is revenue assurance, which can be increasingly problematic as companies develop more complex billing systems and revenue streams based on digital content or digital payments. Understanding the whole picture will be key to fulfilling a customer retention strategy.

It may be possible for careful market analysis and customer profiling to draw upon information that the company already holds, to a large measure, in its systems. IT systems that can provide the necessary data mining, collation, processing and analysis from often disparate databases within the company and deliver the results effectively should pay for themselves. In an ideal world, it can go beyond systems integration to a services-oriented architecture (SOA), but in the real world of legacy systems, upgrades and migration paths, SI inevitably stands at the centre of the picture.

### Disruptive technologies

In the two-sided markets enabled by broadband internet, the industry and individual companies need to find ways to excite consumers. A product such as the iPhone can seemingly come out of nowhere and almost overnight change the market parameters. The sight of long lines of young people queuing up to buy the phone caught the imagination of a generation focused upon web-based services for their entertainment, social interaction and information needs.<sup>46</sup>

Operational success usually relies upon good engineering backing up successful sales and marketing, but runs the risk of becoming routine and cautious. Spotting the often 'trivial' product or service that can become disruptive to the entire industry is often more an art than a science, but the ability to respond sooner rather than later should become built-in, and be more of a science than an art.

<sup>46</sup> 17 million iPhones were sold and there were over 500 million downloads over the eight months to Dec 2008. Revenues rose from \$241 million in Dec 07 to \$1.2 billion Dec'08. 'Apple to unveil latest software for the iPhone' Asian Wall Street Journal, 16 March 2009

## Conclusions — Implications for the future of broadband



Rapid advances in broadband transmission and routing technologies have set the entry level for new operators, putting pressure on incumbents to upgrade and leverage their wide customer base.<sup>47</sup> As a result, carriers have to find ways to monetise the new service capabilities of broadband networks.

### Technologies

Delaying the shift to broadband and to next generation networks is increasingly not an option, but that does not mean that the 'first to market' principle should be their sole consideration. It is crucial for telecom operators and service providers to stay abreast of fast moving technology developments, but always to ensure quality of service can be fully guaranteed.

Cost cutting coming on top of the pressure to migrate to broadband services implies that financial priorities have to be rethought and strategic planning needs to change gear. Two examples to illustrate the issue: (i) moves in the direction of fixed-mobile convergence have not gained traction in Asia Pacific and only in one significant market further afield, namely France. (ii) in Asia Pacific, as elsewhere, the jury remains out on broadband technologies such as WiMax. In a number of cases, new entrants have adopted the technology; on the other hand some vendors have changed gear and opted for LTE development only, while among the carriers there is a trend to focus more on exploiting the market opportunities for HSPA and postponing capital commitment on LTE.

Broadband transmission networks, including HSBNs, are just the ground level of NGNs. Vendors have the middleware for the services control layer, but for incumbents the migration path to all IP-networks involves a lengthy and complex transition period, including the upgrading of BSS and OSS systems. Operators therefore need to be mindful to the risk of over-build if the markets fail to support new services.

<sup>47</sup> In the mobile cellular sector, examples would include soft switches and directional antennae using orthogonal frequency division multiplexing technology to increase the efficiency of spectrum usage.

While most of the legacy digital networks in Asia Pacific have been fully depreciated, falling revenues from traditional fixed line voice services and declining margins from mobile voice services place a further imperative on monetising new services. Market demand is revealing that customisation is a key ingredient. While system intelligence is needed to target 'push' services, the emphasis needs to shift to 'pull' services that are designed for ease of use and personalisation by users. This is all part and parcel of becoming more customer-centric.

The structure of charges, for example flat rate, time-rated, bit-rated or pay per view, and billing processes, for example consolidated billing, itemised billing, billing by email attachment, and billing inquiries need to be streamlined, for the most part standardised and simplified. This, together with the use of bundled products and services will help customer retention, will lead to longer-term customer relationships and translate into a greater take-up of new services, especially where these can be promoted through cross-selling, such as IPTV and DSL.

Despite financial constraints, it remains important for telecoms companies to prepare for new services based upon ongoing developments in technology. For example, the shift from broadband to IPTV to home networking to managed services is being facilitated by readily available and ever cheaper technologies. However, the delivery of new services based upon emerging technologies needs involve a culture shift towards customer-centric business processes and also a diversification strategy into content and applications management.

The needs of the enterprise market can be understood in terms of (i) the generic requirements of all enterprises, such as integrated IT systems which give rise to the market for outsourcing management and maintenance of data functions, and (ii) the specific requirements of industry verticals, such as the shipping industry, or hospitals, or the retail distribution sector. Here the opportunities for telecom companies are to work with hardware and software vendors to provide and manage solutions, possibly based upon common platforms to support unified communications for the larger companies, and server-based applications for the smaller companies. This should lead to the fostering of new strategic and long term corporate and SME customer relationships.

## Polices and regulations

Past policy decisions designed to create national information infrastructures are now being revised to support the building of HSBNs. In many cases state funds are involved, and regulations guaranteeing equal access and competition at the service level should follow. As such, policies in Asia Pacific have increasingly focused on issues such as the financing of HSBNs, the redefining of universal service to include broadband Internet access, and the promotion of e-government.

While most of the issues arising from narrowband, broadband and mobile cellular competition have been dealt with, many regulators have taken greater powers to review mergers and acquisitions in anticipation of industry consolidation. The need to finance HSBNs has led to a renewed emphasis upon equal access. The 'Net neutrality' debate in the USA over whether to allow dynamic pricing or differential pricing for different grades of broadband access to the Internet has not really surfaced in Asia to date.

Many economies in Asia Pacific are implementing or planning the switchover from analogue to digital TV and the key policy debate will be over the 'digital dividend' or what to do with the 700-900 MHz UHF spectrum released by free-to-air broadcasters. Although the allocations of the spectrum bands freed up to services such as 4G mobile will be decided mainly through the ITU's World Radio Conference (WRC), the implementation of ITU regional recommendations, that is the actual assignment of frequencies, is likely to have a significant impact on the services and competition landscape over the next five years.

Policy makers in developing economies are thinking about how to include broadband access into the concept of universal service to close the digital divide. State funds will certainly be needed to support uneconomic networks, but more flexible and strategic spectrum management policies can also help local initiatives by micro-businesses and local state-supported programmes to bring wireless broadband access to rural schools and communities.

Regulators, having been reasonably successful in shepherding the industry towards effective competition in the 1990s, are now confronted with the uncertainties facing the industry in the 2000s. Some have taken on greater powers in preparation for possible industry consolidation. It is important in light of what has happened in financial markets that regulation focuses on effectiveness not heavy-handedness.



## Conclusions — Implications for vendors



As the world of radio communications moves towards its fourth generation, vendors of wireless network equipment are having to make technology choices, and are taking their lead from the carriers. The MCMS model, where vendors build, enhance, maintain and even operate networks for carriers on an as-needs basis, is a prime example where vendors are moving to establishing longer term relationships with operators.

In the handset market, sales are down across the board, but the two ends of the market may do better than the middle. Cheap handsets will meet basic demands in emerging markets, while the demand for high-end smartphones will grow in tandem with 3G+ networks and the growth of online content and applications. This may particularly benefit some of the new entrants, such as Apple, Asus, Dell, Google, HTC, Microsoft and others. There are certainly risks in these value-added sectors, but there is less overall uncertainty of market demand than in the fixed line sectors.

Vendors with a focus on the fixed broadband market are likely to face the greatest squeeze. The shift to NGNs will be paced by the availability of resources to invest, the scale of the legacy problems and the market opportunities for new services. Risk is low in these utility sectors, but uncertainty of market demand is high.

The foremost technological hurdle for application and content developers in the mobile space is the multitude of different vendor application protocol interfaces (APIs), which allow their software to work with the software that drives the vendors handsets. Vendors and mobile operators must therefore make the shift from differentiation of products to differentiation at the services level.

While WiMax licences have been issued to several new entrants in Asia Pacific, most recently in Malaysia and Taiwan, most first tier operators seem to be opting for the upgrade to LTE route. They are also inclined to postpone the commitment of capital while the potential of HSPA networks are being exploited.

The China market in particular has become more strategically important to vendors, following the award of the country's 3G licences and the slump in markets elsewhere. The signs so far are that while foreign vendors will find many opportunities to market products, China's own vendors are in a strong enough position to get a lion's share of the business.



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Publication date: April 2009