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Briefing paper

Hong Kong as Asia's Wireless Development Centre

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The objective of TIF is to stimulate informed interest in the policy and regulatory aspects of information and communications technologies (ICTs), to foster greater transparency and a better understanding of the economic and technological dynamics of the sector, its impact on social welfare and its policy implications.

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Hong Kong as Asia's Wireless Development Center

In December 2003 the Hong Kong Wireless Development Centre (HKWDC) opened at Cyberport. Under the project management of the Wireless Technology Industry Association (WTIA) and led by Stephen Lai, the Centre Director, it marks a major step in Hong Kong's determination to establish itself as a regional centre for the development of content and applications for wireless platforms. TIF is particularly proud to be associated with the HKWDC as the proposal for it first arose in public at the November 2002 conference *Next Generation Wireless Services in Hong Kong*.¹

Hong Kong's Advantage

As the paper below suggests, although Hong Kong is a small open economy, which means that critical mass for mobile 'data' services is difficult to achieve and there is intense competition, these 'weaknesses' and 'threats' also represent enormous 'opportunities' and 'strengths'. First, the challenge of making things work technically and commercially in Hong Kong has always been an attraction to equipment vendors and operators alike. If it could be made to work in Hong Kong, it could be made to work anywhere. Second, the skill with which entrepreneurs in Hong Kong have made the city-economy a world leader in telecommunications and especially in mobile communications is reflected in the penetration rates, now 100 per cent. It is also reflected in the fact that despite a market of just over 7 million people in which six mobile service providers operate eleven networks all of them managed to struggle back into profit during 2003 after several years of the Asian economic recession. Third, Hong Kong is a natural gateway to Mainland China, and China's WTO commitments have opened content, applications and services delivered over mobile and Internet platforms to 50 per cent foreign direct investment.²

Fourth, Hong Kong is ideally positioned to customize world products and services to local Chinese and other Asian market conditions and requirements. Customization can involve languages, metrics, designs and local cultural references. But it also includes a good working knowledge of local and regional companies and markets. Fifth, Hong Kong consumers are very price conscious and receptive to innovations in designs and content. They will try out anything once, but not twice if expectations are not realized. On the other hand, while local business people are also highly price sensitive they tend to invest in new services only if they can see a tangible benefit. So although the market size is small and may lack critical mass for 'data' services, the customer-base is 'critical' in the other sense. The implications are twofold. First, to stir the market into action, service providers and developers need to 'excite' the market with products and services that appeal, and not let the technology dominate. This is a real problem in Hong Kong because in the past customer churn has been closely related to new handset releases and heavily discounted prices. Technology was uppermost, but to drive the demand for

¹See http://www.trp.hku.hk/tif/papers/2002/nov/exec_digest021120.pdf for an Executive Digest. The sponsors for that event were CITB, Cisco, CSL, Ericsson, KPMG, Nokia, Qualcomm, Smartone and Sunday. Bruce Hicks of Sunday made the proposal.

² Mobile operations are currently limited to 49 per cent FDI.

content and applications the technology must fade into the background. It must become a 'no-brainer'.³ Second, it is difficult to please and sustain the interest of Hong Kong users and consumers, so developers and service providers must come up with innovations that really add value, save time and money and are compelling. It means that if Hong Kong developers come up with successful products there is a very good chance they will also win markets far beyond Hong Kong.

HKWDC

This is where the HKWDC can play an important role as facilitator and promoter. First, by providing SME developers with direct connectivity to service providers to access their technical and business specifications and to test their products. (HKWDC provides low-cost direct broadband access to their servers.) Second, by providing SMEs online and library access to technical and market information and access to vendors. Third, by providing incubation facilities. Fourth, by providing exhibition space, seminar rooms and supporting promotional events in and out of Hong Kong. (HKWDC works closely with the HKPC and Tech Centre in these activities.) Fifth, by leveraging their location in Cyberport and by providing Cyberport tenants with specialized wireless-based services. Sixth, by exploring opportunities to aggregate content and applications with the SMEs to promote marketing opportunities. By doing this in open cooperation with vendors and service providers, HKWDC can help promote a sense of an eco-system that draws upon the synergies across the industry. This was the main theme of the November 2002 conference.

The seventh role the HKWDC can play, and especially important in light of the TIF-WDC conference, is to promote collaboration with operators and development centres outside Hong Kong. The opportunities are very real. They include providing access for developers to the service providers in all the economies involved in the collaboration, certification procedures to make market entry faster and financially less expensive, market information, access to willing technical and business partners, and business collaboration between development centres whereby each can promote the products and services of the other on a revenue-sharing basis. On this basis the sustainability of development centres can be increased.

ARPUs and Data

As voice ARPUs continue to trend downward, the pressure is mounting on Hong Kong mobile operators to find a new source of growth - specifically, how they manage to increase ARPU from their data services, particularly from the more advanced ones, will be a key factor in justifying sizeable network investments and ensuring continued profitability. As Table 1 shows, wireless data as a percentage of total service revenue for wireless operators in Hong Kong currently stands at 8%. It is interesting to note this figure does not lag too far behind a country like South Korea (12%) but still lags behind the region's pacesetter Japan (22%).

³ See the presentation by Alex Young in November 2002 where he points out that most young people who are attracted to new handset designs have little knowledge of what functions they can perform. Can be found at <http://www.trp.hku.hk/tif/papers/2002/nov/proceedings021120.pdf>.

Table 1: “Data” Revenues as Percentage of Total Service Revenues (2003)

Country	Data as % of Total Service Revenue
Australia	13%
China	7%
Hong Kong	8%
India	7%
Indonesia	14%
Japan	22%
Malaysia	10%
New Zealand	12%
Philippines	38%
Singapore	15%
South Korea	12%
Taiwan	5%
Thailand	6%
Rest of Asia	1%

Source: Gartner Group

One challenge facing Hong Kong mobile operators is to drive, and to exceed if realistically possible, data ARPUs up to and beyond Japan's current level. In how they go about reaching this goal, the six Hong Kong operators - CSL, Hutchison Telecom, Sunday, Smartone, People's, and New World Mobility - can draw practical lessons (and applications) from the neighboring wireless data markets of Japan, South Korea, and China. This briefing paper will briefly examine each country's market - with a reasonable share of optimism and skepticism - before closing with a look at the most recent developments in Hong Kong.

Japan

Japan has been at the forefront of the wireless data wave. According to Analysys, 85% of Japanese cellular customers use mobile data services, generating a non-voice annual ARPU of US\$150, the bulk of which is derived from non-SMS services.

NTT Docomo's early and singular dominance of the Japanese cellular market gave it the requisite muscle to insist on its own specifications from handset manufacturers and content providers, in particular its I-Mode service platform. Docomo, through I-Mode, is often cited as having revolutionized the mobile industry by showing that people are willing to pay money for wireless data services. I-Mode, and Docomo's dominant market position, enabled the company to offer a wide range of third-party content and charge a relatively high price for data consumption. I-Mode has been so successful that today it is the world's largest mobile Internet service, with 42 million users. Core areas have been the downloading of ringtones, about 40% of total subscription revenue, and games. I-Mode subscribers send and receive 800 million emails a day, compared to 60 million SMS sent a day in the UK.

Yet Docomo has encountered difficulty in rolling out its 3G service FOMA which debuted in autumn of 2001. To date, only 2 million of its current subscribers have switched over to the new service with a download speed of 384kbps - see Table 2.

Table 2: New Users of Third Generation Services

Operator	November	December	January	Total
Docomo	289,300	255,100	132,600	2,013,700
Au (KDDI)	509,400	593,700	500,100	12,264,200
Vodafone	4,600	18,500	11,100	122,800
Total	803,300	867,300	643,800	14,400,700

Source: Telecommunications Carriers Association (Japan)

On the other hand, Japan's #2 cellular service provider KDDI has been far more successful with its April 2002 launch of a high-speed CDMA2000 1X network, partially because of an easier network migration path. In November last year, KDDI upgraded to an even faster CDMA2000 1x EV-DO network in major cities. KDDI beat out Docomo in net customer additions for the first time in 2003. KDDI offers a service dubbed EZ Channel where video content (including fashion shows), English conversation lessons, and news clippings are automatically downloaded to the user's handset after midnight and can be replayed. KDDI has also been aggressive in offering innovative pricing packages. Again last November, KDDI came out with a ¥4,200 a month flat-rate data service - similar to some South Korean operators - which lets KDDI users send and receive emails, browse the Internet, and download available mobile content to their hearts' content. Docomo has countered with a ¥3,900 package, foreshadowing a potentially margin-eroding price war but making 3G services more affordable and enticing to Japanese consumers. The lesson here maybe is that there is price elasticity of demand when the content is sufficiently compelling. Flat-rate wireless data plans are a departure from the pricing norms that have come to characterize mobile services - time-pricing and volume-pricing (bytes). Flat rate even challenges the emerging notion of value-based pricing.

Overall, content providers in Japan have benefited from the deployment of a uniform standard (Docomo's) and from a uniform business relationship with the mobile network operators who carry out billing functions and share revenue with the content providers. I-Mode's xHTML structure allows the content providers to host the content on their own servers with a leased line link to Docomo's gateway. There are over 3,000 sites that are alliance partners with Docomo and another 55,000 'I-Mode voluntary sites.' A degree of 'homogeneity' in the business relationship between content providers and operators has been important in spurring penetration. The content providers have done well through a subscription-based model although the implication of operators moving to flat-rate wireless data pricing might jeopardize this model somewhat.

Competition is expected to increase further due to the introduction of mobile number portability and the possible issuing of new 3G licenses by the Japanese telecoms regulator. Internet and broadband providers Softbank, NTT Communications, and eAccess have all expressed an interest. Other wireless data developments in Japan include plans by Sony to build a phone smart card (much like having your phone work as

an Octopus card - an electronic wallet), a wireless network by Matsushita that lets users turn on their home air conditioners with their phones while driving, and Toshiba has created the world's smallest hard-disk drive, the first designed to fit handsets. Taken together, it is expected that the mobile data's share of total mobile revenue will rise to 50% by 2005.⁴

On the dark side, a growing number of young Japanese cellphone users have been diagnosed as suffering from Keichu, or cellphone addiction, for which they have had to seek treatment. They have acquired an unstoppable habit of emailing or texting friends, playing games, and downloading pictures and music.

South Korea

South Korea's wireless data market has been marked by effervescence. From mobile gaming (see Box 1) to mobile streaming services for radio and TV, it all seems to be happening first in South Korea. 34 million people, or $\frac{3}{4}$ of the country's population, have a mobile phone. Korea is the world's leader in terms of ADSL fixed broadband penetration. The government's early focus on CDMA development proved effective and has given the country a strong technological edge. These are some of the conditions that make South Korea an ideal test bed for new wireless data services. Content providers benefit from savvy mobile operators and handset manufacturers who are constantly pushing the technological envelope and ramping up penetration of the latest bang-whiz gadget, usually targeted at the youth market.

SK Telecom is South Korea's largest mobile provider with 54% market share. Along with the country's #2 operator KTF, SK Telecom started CDMA2000 1x EV-DO services in 2002. Its 3G subscriber base rose to 6 million by February 2004. Wireless Internet ARPU for SK Telecom rose to KRW7,558 (HK\$51) out of a total ARPU of KRW45,590 (HK\$308) in the fourth quarter of 2003, up from KRW6,288 (HK\$42) in the third quarter, and KRW4,881 (HK\$33) a year earlier. One reason is innovative (and sometimes wacky) applications. SK Telecom rolled out a ringtone it claims can work as an inaudible mosquito repellent. It is working on introducing Moneta, a wireless banking service that features an IC chip embedded in a handset. The 2002 World Cup greatly enhanced SK Telecom's brand position as it was one of the principal backers of the national football team, the "Red Devils." In February, it launched a satellite that will offer digital multimedia broadcasting (DMB) services through mobile handsets.

KTF is the mobile unit of fixed-line giant KT Corp. It has captured 32% of the market and has been aggressively poaching customers from SK Telecom since the Korean telecoms regulator unveiled a staggered portability plan at the outset of 2004.⁵ Through an alliance with Skyclife, KTF will be offering a digital TV service for its high-speed cellphone subscribers from May onwards, called First in Mobile Multimedia (FIMM). KTF works closely with Qualcomm and BREW technology, and has already come out with a flat rate wireless data plan (like KDDI in Japan). KTF subscribers can download

⁴ See Lawrence Cheung, HKPC, 'A Perspective on the mobile markets in Japan and Korea' at <http://www.trp.hku.hk/papers/2003/japan3.pdf>

⁵ KTF's subscribers will be able to port starting July 2004, LG January 2005.

an unlimited amount of data for 5 months for KRW20,000 (or HK\$135) a month, less than half the price offered by its rivals.

LG Telecom is the third wireless player in South Korea. It is focusing on installing a CDMA2000 1x EV-DV platform. It was first to market with a chip-based mobile banking service. Its 'BankOn' service is the fruition of an alliance with Kookmin Bank, Korea's largest lender. Unlike WAP-based mobile banking, users don't have to go through a cumbersome identification process. The phone can also be used to withdraw cash at a teller. LG signed up 300,000 people last year to this service.

Box 1: Mobile Gaming, Asian Phenomenon

A particularly Asian development in the global mobile market has been the emergence and rapid growth of mobile gaming. In July 2002, market analyst Datamonitor reported that there were a total of 70 million mobile gamers in Asia. This includes 49 million in Japan and 10 million in South Korea out of a total mobile phone user population of 119 million. Three years earlier, the concept of mobile gaming was virtually unknown. Datamonitor has predicted that China will surpass Japan as market leader in mobile gaming, increasing from 5 million gamers today to 90 million by 2006, driven by the sheer size of its population. The research company put mobile gaming revenues in Asia in 2002 at US\$1.1 billion, with US\$920 million being generated through pay-per-play. Source: Paul Budde Report (2003)

China

China is the world's largest wireless market, with 269 million mobile users by the beginning of 2004 and a penetration of 21%. The 3G picture remains unclear as the government has apparently not yet decided how many licenses to issue, or when. It is expected the two current mobile network operators, China Mobile and China Unicom, will both get one. It is probable the 2 fixed-line carriers, China Telecom and China Netcom, will also get 3G licenses. At present they are offering their own 'mobile' services – 'Xiaolingtong' or 'Little Smart' - through PAS technology. Further complicating matters, China is trying to develop its homegrown 3G technology, TD-SCDMA.

The wireless data story in China so far has been the amazing success of SMS-based applications. Apparently 9.8 billion SMSs were sent during Chinese New Year in January 2004 alone. At RMB0.10 per SMS, this translated into around RMB980 million in revenue over the span of 8 days. 80% of SMS messages are peer to peer, with all revenue going to China Mobile or China Unicom. In March 2004, China Mobile reported an annual doubling in revenue from SMS to RMB9.91 billion up from RMB4.24 billion as the number of SMSs sent during 2003 increased from 40.41 billion to 93.51 billion. Non-SMS data business revenue also doubled from RMB1.34 billion to RMB2.85 billion. China Mobile's wireless data service is called Monternet and its closed content garden M-Zone. China Unicom's wireless data service is called Uni-Info.

But the remaining 20% of SMS have really been a lifesaver to China's three Nasdaq-listed Internet portals: Sina, Sohu, and Netease. Their stock prices have risen to all-time highs fueled by better than expected earnings, largely a windfall from SMS services - examples of which are news alerts, sports scores, horoscopes, stock prices, downloading of icons and ringtones, dating services, and lots of spam. Users go online to a portal's website to order content and download it to their handset via SMS. Billing is handled by China Mobile or China Unicom who keep 15% of each transaction and take another 15% for transmission costs, leaving the remaining 70% for the portals. Sina, Sohu, and Netease, in turn, have revenue sharing arrangements - called SMS alliances - with smaller specialized content providers who get access to the portals' larger customer base. Hong Kong's own Green Tomato signed a deal with Sina to distribute one of its wireless games in Mainland China. There have been recent problems with spam SMS, pornography, licensing, and payment disputes between the content providers and the mobile network operators, resulting in SMS services being temporarily suspended. But that has not stopped several Chinese Internet companies from capitalizing on SMS's success and seeking overseas listings - see December's Nasdaq debut of Ctrip, an online travel company. In the pipeline are Shanda, an online gaming operator, and Tencent, an instant messaging service provider,

WTO provisions which open China VAS telecom services market could also provide a boon to wireless data service providers. South Korea's SK Telecom has just received approval for its JV with China Unicom. France Telecom is planning to set up an R&D center in Beijing.

Hong Kong

Hong Kong is blessed with an ultra-competitive mobile market, with 6 operators running 11 networks. This has resulted in a mobile penetration by 2004 of 100%.

The biggest make-or-break move in the market so far has been Hutchison's introduction of W-CDMA service, called "3." Handsets are priced as low as HK\$998 and there are low-cost 3G tariff plans as low as HK\$183 and HK\$263. One service that could prove to be popular in HK is the ability to view horse racing video clips for HK\$28 a month. Hutchison's pricing strategy is rather unique and it will be interesting to see the market's reaction.

The other three HK operators with 3G licenses are Smartone, CSL, and Sunday. In its most recent financial statement, Smartone announced that roaming accounted for 25% of the company's mobile services revenue for the six months ending in December, while data services made up only 5% of the total. CSL's chief Hubert Ng was quoted in *The South China Morning Post* as suggesting that 3G services might not yield a return for 10 years. He also mentioned in a recent article in *The Standard* that 'data' accounted for between 5-10 per cent of CSL's mobile services revenue. Sunday is offering a HK\$38 unlimited time GPRS package. Sunday's recently announced 3G equipment and financing deal with Huawei, the Chinese equipment manufacturer, is an interesting example of cross-border collaboration that could grow on both the equipment and services sides. Sunday already operates a calling centre from Mainland China.

The two mobile operators without a 3G license, People's and New World Mobility, look likely to get a chance to compete for one, along with Wharf T&T, City Telecom, China Unicom and other interested parties. OFTA announced 19th March that it was recommending issuing a new 3G license reserved for a CDMA2000 network by reclaiming spectrum previously allocated to CDMA and TDMA.⁶ People's has been deploying EDGE technology in its network.

For content providers in Hong Kong, the business environment and business models have been more heterogeneous than Japan's. SMS in Hong Kong, unlike China, is not favorably priced, being more expensive than a voice call. While Hong Kong operators were slow to adopt inter-operable SMS systems, they were the first to adopt inter-operable MMS systems, but by January 2004 only 11 per cent of phones were 2.5G or 3G.

Conclusion

This paper has looked mostly at consumer-driven, mass market applications. There are also major opportunities for wireless enterprise solutions that utilize handheld palm devices and WiFi, 2.5G and 3G, and RFID technologies. These will be of particular importance to Hong Kong's logistics, financial services, and tourism industries. One of the key factors in driving the fixed line Internet market has been the availability of off-the-shelf enterprise software packages, for example accounting software, stock-keeping software, scheduling software and the like. Similar packages need to be developed for the mobile wireless environment, including security software and anti-spam software. This is a far more productive approach than relying upon laws to ban spam (although these are necessary to give legal authority to the regulator and the courts) and trying to enforce non-enforceable and sometimes dubious IPRs.

Some of the lessons that can be drawn from the above are:

- The structure of the market matters. Docomo was able to leverage its dominant position early on, and SK Telecom has been a clear leader in Korea, and both stimulated the market as a result, but competition had since driven these markets.
- The ability to roll out ubiquitous broadband networks quickly, for example using CDMA2000, has driven consumer acceptance, and where network coverage has been poor this has dampened market demand, for example see DoCoMo's FOMA 3G.
- Stimulating market demand by adopting business models that encourage developers to enter the market has worked very well in both Korea and Japan.
- Shifting the emphasis from handset to products and services is important when operators want to encourage customers to experiment with the use of 'data'.
- SMS and 'trivial pursuits' such as downloading ringtones, horoscopes and wallpaper generate large revenues in the short term, but can mobile Internet be sustained on such a basis long term? There is a need to grow the market incrementally towards streamed music and video, and Web-based and location-based services.

⁶ See <http://www.ofta.gov.hk/report-paper-guide/paper/consultation/20040319.pdf>

- Given the structure of the Hong Kong market, there is a need for operators and vendors to work more closely together to help and encourage developers. This may involve a less closed-garden approach and a more pro-active marketing and billing approach. Exploring areas of common interest would also set a good example to sectors of the business community, for example to the banks and financial institutions to collaborate more closely in searching for common standards and services, such as m-banking.
- Over the past year the Hong Kong government has raised the policy profile of the wireless sector, with the most important step being the setting up of the Hong Kong Wireless Development Centre. The government can be proactive itself as a user of m-government.
- The important role of the HKWDC cannot be overstated in promoting the existence of a developer ‘community’ in Hong Kong and building regional international support and collaboration for the industry.

Table 3: Drivers and Brakes for Wireless Data

Drivers	Brakes and issues requiring attention
Sale of phones with colour screens, polyphonic sound and high-resolution	Undersupply of new-fangled handsets, poor resolution screens, low battery life
No massive 3G licensing fees to pay in HK	Bursting of telecoms bubble
Wider coverage of 2.75G and 3G networks	Patchy high-speed network coverage and unreliable compatibility with 2G network
MMS	Interoperability and harmonization
Flat rate wireless data	Compelling content and exciting the market
Wireless data roaming based on regional and global alliances	Software battle for dominant smartphone OS: Linux, Nokia-controlled Symbian, Microsoft, Palm, etc
Fixed-mobile convergence	Separate licensing
HKWDC international collaboration	Harmonization of business models