Competition and Investment in the Local Loop:
A Hong Kong – China Trade-in-Telecommunication Services Perspective

A paper in response to 'Review of the Regulatory Policy for Type ll Interconnection' Consultation Paper, 23 May 2003, OFTA

John Ure
Associate Professor and Director of the Telecommunications Research Project
University of Hong Kong http://www.trp.hku.hk
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A: Introduction

1. The debate about unbundling the local loop has so far taken place exclusively within the context of Hong Kong's domestic market. In this paper I wish to raise it within a slightly different context, that of the relationship between Hong Kong and China as a trade and investment issue. This is an alternative perspective that I believe will become increasingly relevant in the years to come. It is based upon recent research and interviews conducted in Guangdong with telecommunications operators and regulators. [1]

2. At first sight this perspective may seem divorced from the concerns of the consumer and the TA's Consultation Paper makes it clear that consumer interests should drive policy making in Hong Kong. The premise of this paper is that the consumer in Hong Kong stands to benefit most from a commitment by networks to invest in upgrading not just the narrowband network to broadband, a process already well under way, but more crucially to upgrading the broadband network to support a variety of high definition rich media content and enterprise applications that can be offered at low marginal cost. The achievement of low marginal cost depends upon economies of scale, and these are important both to the operation of networks and to the creation and sales of Web-based and online content and applications. The two go together in a broadband world, because broadband is all about access to, and usage of, content and applications. In the past the local market could drive investment linking network interests to consumer interests. In the future it will be more and more about trade and investment and scale. Trade-in-telecommunication services will be important to Hong Kong because it offers market scale, but this requires end-to-end connectivity and investment in the local loop. Part of that investment may indeed come from Hong Kong's trading partners. Therefore policy towards unbundling the local loop should take these issues into account and be consistent with them.

3. The paper is organized as follows. First, an introduction to the issues of trade and investment in telecommunication services. Second, a review of telecommunication developments in China and competition in the local loop. Third, a consideration of trade and investment in telecommunications between Hong Kong and China. The

[1] I wish to thank PCCW-HKTC for funding this research. They are not in any way responsible for the views expressed. I wish also to thank Jenny Wan and Terry Graham of the TRP for research assistance.

main point to be made is that China may be about to leapfrog Hong Kong in terms of its regulation of telecommunications, and a degree of harmonization of regulation is both a likely and desirable trend.

B: Telecommunications as a Tradeable Service

4. The regulation of telecommunications increasingly needs to take into account two factors, (a) the tradeability of telecommunication services, and (b) the evolving relationship between telecommunications infrastructure and services on the one hand and industrial restructuring, economic growth and development on the other.

5. Tradeability refers to the purchase and sale of services provided by means of telecommunications between Hong Kong and the rest of the world. The Government has long recognized maintaining Hong Kong's role as a telecommunications hub as a central policy objective,[2] and trade in telecommunication services with Mainland China has been of exceptional importance. China's Open Door policy after 1978 was a windfall gain for traffic between Hong Kong and the Mainland and for international traffic to China transiting Hong Kong. Global and regional companies regularly choose Hong Kong as the location for their regional offices and communication network hubs because of easy access to the China market, and because Hong Kong provides a secure, an efficient infrastructure and quality services. This is an ideal combination, with Hong Kong offering everything from basic and enhanced voice and facsimile services to international leased circuits, high-speed data services, virtual private networks and managed data networks.

6. But the picture is beginning to change in very significant ways. The rapid growth of China's own telecommunication networks is offering even greater scope for trade-in-telecommunication services, yet at the same time is offering the rest-of-the-world opportunities to by-pass Hong Kong and go directly into the Mainland. This development is therefore in a double-edged sword, both a threat and an opportunity. The irony of the threat is that it may arise from China leapfrogging Hong Kong in at least two senses.

Will China Leapfrog Hong Kong?

7. First, China could leapfrog Hong Kong in its investment and usage of optical fibre to homes and offices. This is discussed below, but the implication is that as a market in which to invest in advanced broadband services and in which to do business China could become more attractive than Hong Kong. This would be a serious relegation of the status of Hong Kong which up to now has had the reputation of being a telecommunications cutting edge in Asia.

8. Second, and perhaps the greater irony, China could leapfrog Hong Kong in terms of the industry's regulation. This is also discussed in more detail below, but the key point is that China currently has the option of licensing at least four national all-service providers, each of which would have sufficient economies of scale to invest

[2] 'Hong Kong should serve as the preeminent communications hub for the region now and into the next century.' Economic Services Bureau, *Position Paper, January 1994*, para 1.2.

heavily in all areas of the competitive market, including the local loop or customer access network. They would have the right to use a wide range of technologies of their choosing according to cost-effectiveness, including combinations of wireline and wireless solutions, fixed and mobile solutions. To be clear, China has not yet finalized its regulatory framework, but by coming late to the competitive stage China now has that option and it seems likely to use it in some form.

9. On the other hand the opportunity opening for Hong Kong's trade-in-telecommunication services is substantial. The Closer Economic Partnership Agreement (CEPA) will somewhat foreshorten the timeframe under which Hong Kong companies should benefit from China's commitments under the WTO's Basic Agreement on Telecommunications (BAT). These commitments include combined foreign equity up to 49 per cent in fixed and mobile services and up to 50 per cent in value-added services and the latter, for example, includes infotainment, Internet, Web-based, and broadband hosting, management and content services.

10. Many of these services will be created, packaged and sold locally within the Mainland market, but by their very nature they open opportunities for cross-border purchase and sale. This is especially true of enterprise markets where China companies have Hong Kong offices, are part or wholly-owned by Hong Kong companies, or have close technical, management, trading, marketing and financial relations with Hong Kong companies. In particular, as the Government in Beijing promotes the spread of e-Government and e-commerce the opportunities of trading online between Hong Kong and the Mainland will multiple, probably faster than can be imagined.

Pressure on Hong Kong's Local Loop

11. This will place Hong Kong under increasing pressure to invest in upgrading the customer access network, to provide the Hong Kong end of end-to-end connectivity. For example, China will adopt a digital terrestrial transmission (DTT) standard before very long, and then the way will be open to something quite dramatic, streamed video high definition digital content. Driving this from the user end will be the already rapidly falling prices of wide high-resolution flat screen plasma and liquid crystal display (LCD) monitors for computers and televisions. High-resolution digital audio and visual display requires around 20 Mbts of bandwidth to do it justice. In high-rise buildings there maybe 100 households or offices eventually wanting this, so the demand is closer to 2 Gbts of bandwidth.

12. In Hong Kong no operator is currently providing anything close to this except through leased circuits, and in this regard Hong Kong does lag behind Japan and South Korea. This may not be such a big issue in 2003, although it does hint at a dangerous slackening of the pace of services innovation in Hong Kong, but quite soon after the combination of China's adoption of DTT and cheap high-resolution screens Hong Kong could miss out on an opportunity. There is a danger of a false sense of security and achievement because Hong Kong has been successful in building out a

broadband infrastructure and has a take-up rate second only to South Korea in percentage terms.

13. The reality is that building the network is just the first step along a road that creates a virtuous spiral of increasing the bandwidth capacity, encouraging high-resolution content and integrated business applications in parallel with cheaper and more versatile end-user access devices. Only with that in place will Hong Kong excel in its ability to offer tradeable bandwidth services, content and applications to the Mainland. If a policy of unbundling the local loop in Hong Kong is likely to discourage the commitment to invest in these network upgrades it should be seriously reconsidered.

C: Telecom Investment, Scale and Development

14. Trade drives Hong Kong's economy. Changing patterns of trade drive the restructuring of Hong Kong's economy, and a flexible market economy has stood the test of time as Hong Kong entrepreneurs respond to these changes. These changes come in different varieties. Some are just cyclical ups and downs, some are secular shifts in geographical markets or product markets, and some are parametric and structural in character. The Open Door policy of China was parametric and overall benign. More recently China's entry into the WTO is symbolic of China's rise as a great industrial and economic force in the world, and poses more challenging structural changes in Hong Kong as noted above.

15. To meet this challenge Hong Kong must be in a position to leverage its advantages, and nowhere is the opportunity more demonstrable than in the area of telecommunication trade in services. But to trade requires something to trade. Hong Kong already trades telecommunication services driven by the economic and commercial relations that currently exist, but the value of these trades is falling as international leased circuit prices and IDD prices and managed network service prices tumble in the face of growing competition. Prices have fallen far faster than volumes have risen.

16. To boost trade Hong Kong needs the capacity to develop new services, essentially content and application services that will find a demand across the border. For this reason the issue of investment in Hong Kong's local network is a precondition for developing a local capacity because without a home market to test content and applications, and without local market makers to promote them Hong Kong will simply plateau at its current level of broadband take-up. A policy to unbundle the local loop at an earlier stage of competition may no longer make much sense in this latter stage when consumers already have a choice of networks, and are now looking for a choice of advanced service offerings.

Scale

17. These are all familiar problems within the industry. This paper attempts to place them in a different light, namely in relation to China and the opportunity trade in telecommunication services offer. The basic premise of the paper is a simple one. It is

that as traditional revenue sources wither and as the industry looks increasingly to broadband, the key issue becomes scale. Scale of the infrastructure to support advanced rich media content and integrated enterprise application platforms – engineering software and hardware to robust standards of operational efficiency is highly challenging – and scale of the market for content and applications.

18. Growing telecommunications trade with China is necessary to achieve scale in both cases. In the case of infrastructure, sales of services to China are one way to justify the investment required to upgrade the network. An additional way will almost certainly involve direct investment by Hong Kong telecommunication companies in the Mainland and equally investment by Mainland companies in Hong Kong. What form these investments take remains to be seen, but they are likely to involve closer cooperation and partnerships between networks on either side of the border to provide end-to-end services. In this case the regulation of those networks is likely to converge over time, and a degree of harmonization is to be expected. The market will be largely responsible for this. For example, the risk involved in these investments will be high in highly competitive markets, especially where the demand for particular broadband services remains uncertain, and the issue of unbundling of the local loop will inevitably become problematic. If Hong Kong is to welcome incoming network investment then the regulation of unbundling will have to change from blanket unbundling to selective unbundling using criteria such as the essential facilities doctrine.

19. In the case of scale for content and applications, the China market must over time become a main focus if not the main focus for sales. Many of these sales will be from servers within the Mainland, but many can be from servers located in Hong Kong. And many will be from enterprise-owned servers using private or virtual private networks or managed networks that extend into the Mainland. Here again is the need to upgrade and continuously upgrade the capacity of the customer access networks in Hong Kong. Consumer interests and the interests of Hong Kong as a small open trading economy are here inextricably linked.

D: Competition Reform in China's Telecommunications

20. In anticipation of entry to the WTO, China reformed its telecommunications sector to become more competitive and responsive to market demand, and in doing so make it attractive to foreign investment. In 2002 the incumbent operator, China Telecommunications was divided into two competing networks groups, the China Telecom Group (CTG) and the China Netcom Group (CNG). China Telecom (CT) becomes the incumbent fixed line network operator in 21 provinces in the south, west and east of China, and China Netcom Corporation (CNC) becomes the incumbent fixed line network operator in 10 provinces in the north of China. CNC also absorbs the JiTong Corporation that runs a mainly satellite based data network and Netcom that offers high-speed broadband network services in various cities across China. China Unicom and Railcom hold other fixed line network services licences. China

Mobile and China Unicom hold mobile cellular licences and China Satellite a satellite services licence. Each of these is a national licence.[3]

21. Policy-making and regulation of the sector resides primarily with the Ministry of Information Industries (MII) and the provincial offices of the MII, known as Communications Administrations. The national coordination of information and communication technology policy lies with the State Council's Informatization Committee, now chaired by the MII minister, Mr Wang Xudong, who also directs the Committee's executive arm, the Informatization Office.

D.1: Competition in the Local Loop

22. The MII has two major concerns regarding network competition. On the one hand, the MII does not want to see the wasteful duplication of scarce resources, and aims to ensure that only those operators who are licensed by the MII to offer network services should do so. On the other hand, the MII states very clearly in the *Telecoms Services Catalogue, 2003* that 'Those who operate the fixed network local telephone service must build their own local telephone network infrastructure.'[4] This seems unambiguous.

23. Competition and new entry in the local loop is occurring in a number of ways, and it would be correct to say that policy is still evolving.[5] At present perhaps three developments are discernible. First, the MII's promotion on an experimental basis of Customer Premises Network (CPN) licences. Second, the MII's rather ambiguous acceptance of fixed-wireless local loop technologies being adopted by CT and CNC, known as 'Little Smart' or *Xiaolingtong*.[6] Third, local agreements between the fixed line networks to lease customer access network capacity.

Customer Premises Networks

24. In June 2001 the MII introduced a Customer Premises Network (CPN) licence.[7] This opens 13 cities for a 'trial' of permits [8] that licence companies to build broadband (usually Ethernet/LAN or WiFi) connections from a central point in a commercial or

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[3] National operators require licences from the MII, as do service providers who operate across provinces. The provincial telecommunications authorities licence services offered only within a single province.

[4] MII *Telecom Service Classification Catalogue, Notice on Readjustment of Telecom Service Classification Catalogue, Section A.1(1).1.Fixed Network Local Telephone Services.* Translated by MFC Insight at: http:www.trp.hku.hk/infofile/china/class-cat.pdf

[5] The more immediate concern of the MII is to ensure the conclusion of core network interconnection agreements (known as Type l interconnection in Hong Kong) between national carriers, both fixed wireline and mobile wireless.

[6] *Xiaolingtong* uses spectrum ear-marked by the MII for 3G. It also brings CT and CNC into direct competition with China Mobile and China Unicom. See below.

[7] See http://www.glink.com.cn/bbs/index_policy_03.htm. Many companies, including building management companies, real estate agents, investment companies from China and Hong Kong, had already constructed such networks before the June 2001 Notice which is an effort by the MII to introduce nationwide standard regulations. Among the better-known Ethernet/LAN providers are China Unicom, Great Wall Broadband, 50per cent owned by CITIC, BlueWave, UnionNet and China Broadband.

[8] Beijing, Shanghai, Guangzhou, Chengdu, Chongqing, Shenzhen, Jian, Qingdao, Wuhan, Nanjin, Hanzhou, Ningbo and Xiamen.

residential building to customers.[9] Although officially classified as a 'basic' service it is regulated as a 'value-added' service to lend the exercise flexibility, but the MII's *Notice* does not make clear whether services are restricted to data or include Voice-over-Internet Protocol (VoIP).[10] CPN licencees are required to lease circuits from fixed line operators if they wish to connect their local Ethernets, and must permit fixed line operators to connect to them, thereby offering their customers the service provider of choice.

25. In effect, this is a form of essential facilities access, although it may not be a bottleneck[11] because CT and CNC always have the choice to build their own access networks to these premises. But in many cases the relationship can be reversed and fixed line operators find it convenient to lease connections from the CPNs to gain access to customers, for example, in suburban city areas where they have no lines of their own. For example, in Guangzhou, CT and CNC both lease local connections from CPNs.[12] This is a form of facilities-based competition where CPN capacity 'unbundling' is being driven by market forces.[13] Although CPNs remain in their infancy - in Guangzhou they represent under 1 per cent of the local broadband access market [14] - they do represent an opportunity to bring new sources of investment into the local loop.

Fixed-Wireless Network Convergence

26. Competition between local networks is blurring the distinction between fixed and wireless. On the one hand China Telecom and CNC are competing head-on with China Mobile and China Unicom by building networks known as 'Little Smart' or *Xiaolingtong*.[15] There were probably around 12 million users by the end of 2002,

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[9] Great Wall Broadband has announced plans to use low-powered laser. Many CPNs are also installing WLAN or 'WiFi'.

[10] This is a cause of dispute within the industry. For example, in Chengdu Telecom has protested against a private company, Tai Long offering voice services. According to the Guangdong Communications Administration, CPNs are experimental with provisional licences to operate value-added telecom services but without business licences. Personal interview, Xiao Jiang, Section Chief, Senior Engineer, 25th July 2003.

[11] Essential facilities are facilities that cannot be avoided if service is provided, whereas a bottleneck implies the facilities cannot be easily replicated for physical, legal or economic reasons.

[12] However it is also the case that CPNs have problems interconnecting with fixed line operators and price competition from fixed line broadband network service providers such as Netcom can be fierce.

[13] The local MII offices are mostly not in a strong position to regulate the unbundling process, for example, the Guangdong Communications Administration has a staff of 25 for the entire province. So market forces operate by default which means that in some cases unbundling occurs by commercial arrangement, in other cases the incumbent may even refuse to connect the CPN.

[14] Personal interview with Dr Liu Jun Min, Vice Manager, Senior Engineer, Guangzhou Telecom, 25th July 2003

[15] In its filing to the SEC in the USA, China Telecom on p.9 notes that 'we face indirect competition in our local wireless telephone services from China's two mobile telephone service providers, China Mobile Communications Corporation, or China Mobile, and China United Telecommunications Corporation, or China Unicom…' and on p.41'Mobile service substitution for our wireline telephone services has been the principal competition to our local telephone services.' This explains why on p.38 'we have developed PHS networks for wireless local telephone access service to supplement our wireless access systems.' China Telecom Corp. Ltd, SEC File 1-31517, 31st December 2002, at: http://www.secinfo.com/dV5Ff.28xw.htm

around 6 per cent of all fixed line users. 'Little Smart' does not offer cellular handoff, but does offer coverage of up to 200 metres using the 1900MHz range at a fraction of the cost of building a wireline local loop. CT and CNC are offering the service in most cities across China, first as a way to stem the loss of customers and revenues to CM and CU,[16] and second as a way to compete with each other directly.[17] *Xiaolingtong* is being treated by the MII as an extension of the fixed line service, although it is not mentioned in the updated Telecom Service Classification Catalogue that became effective 1st April 2003.[18]

27. *Xiaolingtong* is a good example of low-cost entry and effective network competition in the local loop where the market makes no distinction between wireline and wireless access technology. Although it remains a transient technology because of its inability to support full mobility,[19] its true significance lies in the fact that it provides another effective means of competition in the local loop that requires no unbundling.

28. A further example of growing competition in the local loop in China that cuts across the wireline/wireless divide is China Telecom's introduction of a 'Go-to-Home' call-forwarding service that diverts calls from mobile to fixed line phones, avoiding the need for the called party to pay a mobile phone charge. This is direct competition with China Mobile and China Unicom. China Mobile has responded with a *Sui Shen Ting* service that does exactly the opposite by forwarding calls from a fixed to a mobile phone. This is competition in the local loop using competing networks.[20]

Leased Circuits and Facilities Competition

29. Across China examples can be found of network operators leasing access lines from each other where commercial agreements have been reached, or where local authorities have intervened, but it is also true that in many instances agreements have not been reached and goodwill has been lacking.[21]

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[16] China Mobile has hit back with a low priced service known as 'City Smart' (*Dushitong*).

[17] Jiangsu province became one battle ground as Jiangsu Telecom (CT) and Jiangsu Communications (CNC) installed competing *Xiaolingtong* networks in several cities, including the provincial capital Nanjing, Wuxi and Zhengjiang. But several of these networks have been withdrawn following the MII's designation of the 1900 spectrum for 3G. Networks constructed before the MII's directive in October 2002 can remain.

[18] The MII was at first reluctant to grant permission to the use of this PAS/PHS technology, but then relented. See , , 10-3-2003 (Zhong Hua Gong Shang Shibao) where the MII is reported as neither 'encouraging nor discouraging' its use. In any event CT and CNC pushed ahead at a time when revenues were being squeezed by mobile. Now *Xiaolingtong* may be regarded as a prelude to granting CT and CNC 3G licences sometime in 2004.

[19] Rather like Cordless Telephone 2nd Generation (CT2) that was tried in Hong Kong in the early 1990s to provide a low-cost alternative to mobile cellular telephones.

[20] China Mobile and China Unicom have also introduced on-net calling that does away with receiving party pays. This may be seen as a first step towards abolishing the mobile party pays system in favour of a calling party pays system. A previous announcement by the MII of abandoning the MPP system was quickly withdraw in 2001 following a dramatic fall in price of China's mobile telephone stocks on the Hong Kong Stock Exchange. Moving to CCP brings mobile call charging in line with fixed.

[21] China Telecom notes the following with respect to its entry into the local loop in the North region of China in its SEC filing in the USA. 'China Telecom Group and China Netcom Group have entered into a number of framework agreements and implementation agreements, including agreements with respect to

30. Both China Unicom and Railcom represent additional facilities competition in the local loop. Unicom has built customer access networks and offers services in Tianjin, in Chongqing and in nineteen cities across Sichuan province and offers services and this means there is already precedence for facilities competition in the local loop.[22] They also represent additional indirect customer access options for CT and CNC [23] and this underscores the point that market solutions are currently emerging in China's local loop.

31. This also illustrates that China has experimented with competitive all-service providers. Both China Telecommunications before China Mobile was spun off as a separate entity and China Unicom offered fixed and mobile services. The further evolution of policy and regulation is expected in 2004 when both CT and CNC are likely to be awarded 3G mobile licences. If China Mobile is also offered a fixed line licence China could end up with at least four competing national all-service providers.

32. From the perspective of service provision such a development, which looks highly likely, would render the regulatory distinction between wireline and wireless competition in the local loop virtually meaningless. If the MII follows this path the China would effectively leapfrog Hong Kong in this aspect of regulation.

33. The incentive of the network operators to build rather than lease is clearly highest in the business districts. For example, the current emphasis of CNC as the competitor in Guangdong is to build their own fibre network to the building (FTTB) to serve business customers.[24] In an interview CNC was clear that the issue regarding build versus buy was not one of price but rather one of strategy.[25] Their competitor, Guangzhou Telecom, claims to run FTTB to 50 per cent of commercial buildings, and confirms that in the North CT has a similar strategy.[26] The area of greatest cooperation between the two will be in sharing the core network backbone transmission capacity, something that will become more necessary when they both become 3G mobile operators as is expected to be the case in 2004.

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the last-mile access… The renewal of these agreements is subject to mutual agreement by both parties prior to the expiration. If, in the future, China Telecom is unable to renew these agreements… we may need to seek alternative arrangements, such as leasing fibers, equipment or circuits from other operators.' (p.10). CT also factors in the growing need to interconnect at the local loop in the years ahead: 'we expect that this increase in interconnection traffic will increase our revenue from local interconnection services and its proportion of our total interconnection services revenues.' (p.59). China Telecom Corp. Ltd, SEC File 1-31517, 31st December 2002, p.10 at: http://www.secinfo.com/dV5Ff.28xw.htm

[22] Despite the fact that the initial intention of the State Council in 1994 was to see Unicom as supplementing rather than competing with the MPT's networks.

[23] For example, the Beijing newspaper *Jinhua Shibao* reported that CT is leasing circuits from CU to gain access to customers in Sichuan province and in Chongqing and Tianjin. (*Interfax 25-31 January 2003*)

[24] Personal interview with Gordon Wu, International Business Manager, Guangdong CNC, 24th July 2003

[25] Personal interview with Gordon Wu, International Business Manager, Guangdong CNC, 24th July 2003

[26] Personal interview with Liu Jun Min, Vice Manager, Senior Engineer, Guangzhou Telecom, 25th July 2003.

34. Two potential bottleneck facilities that may require some sharing of resources are ducting and access to buildings. Both require privately negotiated agreements with the owners, utility companies and other telecom companies in the case of ducts, and property management companies in the case of in-building block wiring. Currently this area remains unregulated.

35. Finally, there are other networks using alternative technologies that could compete in the local telecommunication markets. In 2001 ChinaComm[27] won auctions for 3.5GHz fixed wireless licences in 25 cities, including Nanjing, Xiamen, Qingdao, Wuhan and Chongqing, which appears to entitle the company to offer basic services. China Mobile won the auction for Beijing. Additional auctions are expected in the near future. Digital cable TV networks are the other obvious candidates. The State Administrative for Radio, Film and TV (SARFT) has designated 33 digital cable pilot schemes in provincial capitals and cities to start by 2004, although the only city in China to date to have required convergence between telecom and cable networks is Shanghai. Local loop competition from alternative networks, especially from cable TV, is likely to be a major feature of the next decade.

China's Policy Towards Competition in the Local Loop

36. China is rapidly approaching the situation of having at least four national all-service providers with regulations that embrace the convergence of fixed and mobile, wireline and wireless local loop access technologies. Policy seems to encourage alternative customer access facilities, such as customer premises access licences, and competing market forces are driving customer access arrangements. All of the following methods of local loop entry and competition can be currently found in China.

    (i) Competing local loops built by CT, CNC, CU and Railcom
    (ii) *Xiaolingtong*, including pre-paid cards
    (iii) IP Telephony (digital conversion), including pre-paid cards
    (iv) VoIP (over NGNs), including pre-paid cards
    (v) Customer Premises Network (CPN) network and service providers
    (vi) Leased circuits
    (vii) Call forwarding from mobile to fixed (and vice-versa)
    (viii) Fixed wireless access (FWA)
    (ix) Satellite Vsat
    (x) For the future – digital cable TV networks

37. In regard to licensing and network resources, the 10th 5-Year Plan states the aim is to 'encourage the sharing of network resources among operators, and ensure the customers' right of choice.'[28] This point can be illustrated with the recent case of

[27] Jointly owned by the China Electronic Technology Corporation (CETC) under the Ministry of Electric Power, and the China Communications System Company (CCSC).

[28] China's 10th 5-Year Plan, para. 3.5.1.3, , 7th September 2001. See also TRP translation at: http://www.trp.hku.hk/infofile/china/2002/10-5-yr-plan.pdf

Fibrlink, a Ministry of Electric Power associated company, that has built a network using electric cables offering value-added services to residential buildings on what it designates an experimental basis. Questioning its lack of a telecoms licence, the MII has proposed instead that Fibrlink leases capacity directly from CNC.[29] The MII's position perhaps reflects concerns over the entry of networks from other ministries,[30] or it may be just a concern over too much competition that could eventually dent investor enthusiasm. Investment in the local loop is the key issue here.

D.2: China's Telecommunications Growth Targets and Investment

38. According to China's 10th 5-Year Plan, by 2005 telecommunications should account for 920 billion yuan and the revenues of the communications and IT sectors together should reach 2,500 billion yuan or more than 7 per cent of GDP, double the figure for 2000. This implies telecommunications on its own by 2005 should account for 2.6 per cent of GDP.

39. Fixed line capacity, which currently supports over 200 million users, should exceed 300 million by 2005 and support 240-280 million users. But this figure already looks conservative. According to the MII's monthly statistics,[31] by June 2003 there were 237.61 million fixed line users, [32] and according to the MII's *China Telecom Market Development Guide, 2003* subscribers to the fixed networks are forecast to rise by 32-35 million annually to 2006.[33]

40. These figures refer to copper-based narrowband public switched telephone network circuits, that can be upgraded to support broadband connections for fast Internet, rich media and data content. The Plan's targets for the data, multimedia and Internet sector is 200 million users by 2005 or a 15 per cent penetration rate, up from the current 5 per cent according to the MII's monthly statistics.[34] The China Internet Network Information Centre's *Survey Report on China's Internet Development, July 2003* shows 68 million Internet users.[35]

41. These targets can no longer be met by reliance on monopoly revenues to China Telecommunications. In a competitive environment the MII is looking for ways to sustain levels of investment, and besides core network interconnection (known as Type l in Hong Kong) the ministry's main concern up to date has been to discourage mutually ruinous price wars for market share. These have occurred principally in the cellular mobile market, with spill over into the fixed wireless segment of the local loop, and in the long distance telephony market, especially with the growing use of Voice over Internet Protocol (VoIP) calling cards. Falling prices do not offer much in

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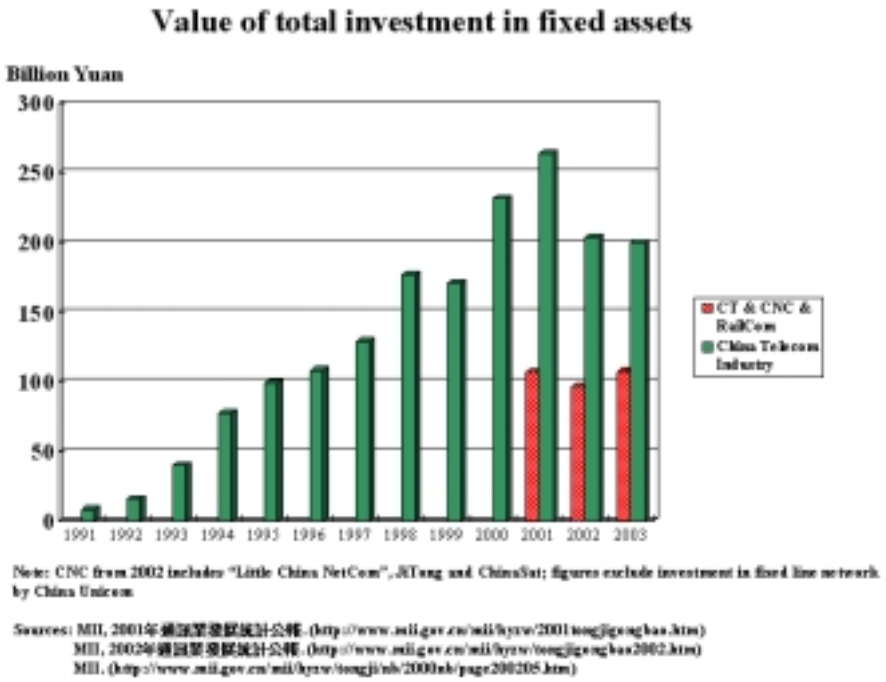
[29] *Interfax*, 5-11 July 2003
[30] Besides the Ministry of Railways, SARFT and the Electrical Power ministries clearly have interests.
[31] MII *Monthly Telecoms Statistics*, http://www.mii.gov.cn/mii/hyzw/tjxx.html
[32] This figure includes roughly 12 million users of the fixed-wireless Xiaolingtong networks. By comparison in June 2003, there were 234.47 million wireless network users. Wireless network capacity is targeted to support 360 million users by 2005.
[33] (2003), , cited see South China Morning Post, 27 March 2003.
[34] MII *Monthly Telecoms Statistics*, http://www.mii.gov.cn/mii/hyzw/tjxx.html
[35] http://www.cnnic.cn/develst/2003-7/4-1.shtml

the way of incentive to new entrants to build a fixed line customer access network and unbundling would most likely to seized upon as a cheap alternative mode of access, and one that substantially undercuts the incumbent. Under these circumstances a wholesale mandated unbundling of the local loop in China would seem very unlikely if the principal issue is to encourage facilities investment.

Investment in Telecommunications in China

42. The 10th 5-Year Plan envisages cumulative total telecommunications investment in China reaching 1,250 billion yuan by 2005. This looks likely to be close to the mark or even exceeded slightly despite the effects of the post-dot.com burst bubble that show up in Chart 1 for the years 2002-2003. However fixed asset investment in the fixed line networks has held up even during these years as the Chart also shows in the annual investments of the restructured China Netcom, China Telecom and Railcom, and these figures do not include China Unicom's small but positive contribution to fixed line investment.

Chart 1



Note: CNC from 2002 includes "Little China NetCom", JITong and ChinaSat; figures exclude investment in fixed line network by China Unicom

Sources: MII, 2001年通信業發展統計公報. (http://www.mii.gov.cn/mii/hyzw/2001tongjigongbao.htm)
MII, 2002年通信業發展統計公報. (http://www.mii.gov.cn/mii/hyzw/tongjigongbao2002.htm)
MII. (http://www.mii.gov.cn/mii/hyzw/tongji/nb/2000nb/page200205.htm)

43. According to a report in *China Daily, Business Weekly*, 25-31 March 2003, in a closed-door briefing Qian Tingshuo, deputy director at the Department of Planning under the MII, announced that the 200 billion yuan fixed asset investment in the fixed line networks for 2003 comprises 61 billion yuan by CT, 41 billion yuan by CNC, and 5.7 billion yuan by Railcom.

44. In Guangdong, CT is the incumbent network, owning 70 per cent of the core network infrastructure, so the question of investment by new entrants focuses on CNC, Railcom and China Unicom. According to the Guangdong Communications Administration, the provincial office of the MII, Guangdong Telecom's market share of fixed lines is 99.03 per cent, Railcom has 0.95 per cent and CNC 0.02 per cent.[36] In July 2003 China Unicom also announced its entry into Guangdong's market through the launch of a CDMA fixed-wireless access service targeted at enterprise users in Guangzhou and Shenzhen.[37] As the investments by Railcom and Unicom in fixed network assets remain low at this point in time the focus in the South falls on CNC which plans to devote around one-quarter of its national investment budget, 10 billion yuan, in Guangdong province building up its backbone and local loop network assets.[38]

45. As the table shows, the Pearl River Delta (PRD) and Yangtze River Delta (YRD) regions, along with the combined city region of Beijing and Tianjin, stand well ahead of others in terms of rates of telecommunication development and penetration.[39] The coastal province of Shandong connecting the YRD region to the Beijing-Tianjin conurbation completes the East Coast corridor, while Liaoning province extends the corridor to the industrial North East. Fujian province represents an adjacent area of industrial and commercial growth to the immediate South of the YRD region.

Table 1
Fixed Line and Mobile Telephone Users by 30 June 2003
(Listed in descending total penetration rates)

Provinces and Municipalities	**Fixed lines & penetration rates**		**Mobile lines & penetration rates**		**Total combined circuits & rates**	
	Millions	**%**	**Millions**	**%**	**Millions**	**%**
Beijing & Tianjin	9.1	*38%*	13.6	*57%*	22.7	*95%*
Guangdong (incl. PRD)	21.8	*25%*	35.9	*42%*	57.7	*67%*
Shanghai, Jiangsu, Zhejiang (incl. YRD)	40.8	*30%*	44.1	*32%*	84.9	*62%*
Fujian	10.6	*31%*	8.3	*24%*	18.9	*55%*
Liaoning	11.1	*26%*	9.8	*23%*	20.9	*49%*
Heilongjiang	7.7	*21%*	7.6	*21%*	15.3	*42%*
Jilin	5.4	*20%*	5.5	*20%*	10.9	*40%*
Shandong	19.4	*21%*	13.3	*15%*	32.7	*36%*
Hainan	1.6	*20%*	1.2	*15%*	2.8	*35%*
Shanxi	6.2	*19%*	4.8	*15%*	11.0	*34%*

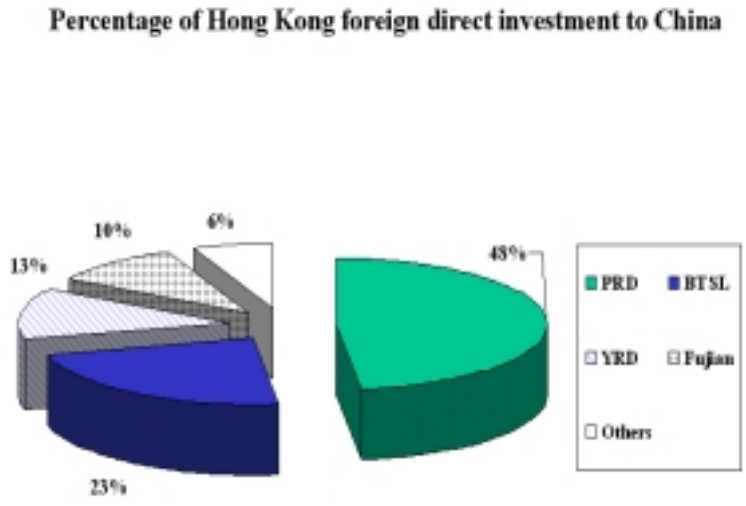
[36] Personal interview with Xiao Jiang, Section Chief, Senior Engineer, GDCA, 25 July 2003.
[37] Reported in the *Interfax* online newsletter service, 19-25 July 2003.
[38] Personal interview with Gordon Wu, International Business Manager, Marketing Department, Guangdong China Netcom (CNC), 24th July 2003.
[39] The total penetration rate combines the total number of fixed line and mobile circuits in use by population. It does not attempt to account for the distribution of circuits between users. Clearly some people will have both fixed and mobile phone lines and others neither.

Hebei (Tangshan)	12.4	*18%*	10.1	*15%*	22.5	*33%*
Inner Mongolia	3.7	*16%*	4.1	*17%*	7.8	*33%*
Chongqing	4.6	*15%*	5.0	*16%*	9.6	*31%*
Anhui	9.1	*15%*	6.4	*11%*	15.5	*26%*
Jiangxi	5.7	*14%*	4.8	*12%*	10.5	*26%*
Hubei	8.1	*13%*	7.0	*12%*	15.1	*25%*
Hunan	8.8	*14%*	7.4	*11%*	16.2	*25%*
Yunan	4.7	*11%*	5.6	*14%*	10.3	*25%*
Henan	12.6	*14%*	9.0	*10%*	21.6	*24%*
Sichuan	10.0	*12%*	9.8	*12%*	19.8	*24%*
Guangxi	5.9	*13%*	4.6	*10%*	10.5	*23%*
Guizhou	3.0	*8%*	3.0	*8%*	6.0	*16%*

Note: fixed wireless subscribers included in fixed. Sources: MII Monthly Statistics and Population Census, 2000 at http://www.stats.gov.cn/tjgb/rkpcgb/qgrkpcgb/200203310084.htm

46. These conglomerations of industrial and commercial development in Mainland China are also those with whom Hong Kong has the closest economic and financial links. For example, according to Chinese sources, 48 percent of foreign direct investment coming from HK to China in 2000 went to the PRD region, around 23 per cent to the Beijing-Tianjin-Shandong-Liaoning corridor, 13 per cent went to the YRD region,[40] and 10 per cent to Fujian province.[41] (See Chart 2)

Chart 2



[40] Note the figure for Jiangsu province was estimated as the average for Shanghai and Zhejiang province.
[41] Calculated from China Statistical Yearbook, 2002, and Statistical Yearbooks for various provinces, 2001.

47. In telecommunications terms, these regions and the Hong Kong-invested companies located in them and the personnel associated with them represent a 'community of interest' that will generate a demand for traffic.[42] With the spread of the Internet the potential 'community of interest' widens and in principle embraces anyone in China who can log on to the Web, but these regions are likely to generate most of the heavy commercial data-oriented traffic.

D.3: Demand for Tradeable Telecom Services

48. The argument in this section is first, that at this stage of development the market for broadband services is very uncertain in China as well as in Hong Kong, which renders network investment as well as investment in rich media content and applications high risk. But second, if potential market demand for content and applications is measured by the demand for access then the opportunities look good.

49. The future demand for high value trade in telecommunication services between Hong Kong and China will largely depend upon the rate of migration from narrowband to broadband access and the rate of usage. Traditional voice traffic remains strong despite substitution of emails, instant messaging and SMS, but its revenue value is falling. Peer-to-peer communications (usually people-to-people, but also people-to-machine and machine-to-machine) demonstrate a high level of adoption, as do content and applications that are easily manipulated by users for their own requirements, such as Web-based information and entertainment.

50. The challenge for the operators and service providers is to market fee-based content and applications, both to cover the cost of the network capacity involved and to create new revenue streams. The collapse of business models tried during the dot.com bubble illustrates just how much risk and uncertainty is associated with investment in these services, and in the infrastructure required to support them. In their filing with the SEC in the USA on 31 December 2002, China Telecom highlights uncertainty of demand and technology, and by implication returns on investment, for new high-speed broadband services.[43]

> We are pursuing a number of new growth opportunities in the broader telecommunications industry, including advanced data and broadband information and application services. These opportunities relate to new services for which there are no established markets in China. Our ability to deploy and deliver these services depends, in many instances, on the development of new applications, which may not be developed successfully or may not perform as we expect.
>
> In addition, the success of our broadband Internet services is substantially dependent on the availability of content, applications and devices provided by third-party developers. If we are unable to deliver commercially viable new

[42] A 'community of interest' is any network of people or organizations likely to communicate with one another on a regular basis.
[43] China Telecom Corp. Ltd, SEC File 1-31517, 31st December 2002, p.34 at: http://www.secinfo.com/dV5Ff.28xw.htm

services, our revenue and profitability will not grow as we expect and our competitiveness may be adversely affected.

51. Between 2000 and 2002 China Telecom's revenues from domestic long distance and international long traffic stagnated as prices fell, falling as a proportion of total revenue from 87.9 per cent to 84.6 per cent. By contrast, driven by a growing number of subscribers (CT's local access line increased from 40 million to 57 million), local wireline (including fixed wireless) service revenues rose 24 per cent, and as a proportion of total revenue increased from 40.6 per cent to 47.5 per cent. (Minutes of usage surged from 142 billion to 200 billion.) A very strong growth in Internet subscribers also pushed revenue growth from this source by 345 per cent, from 1.6 per cent of total revenue to 5 per cent. Many of these Internet users switched to broadband as CT's ADSL customer base grew from 5,600 end-2000 to 1.1 million end-2002.[44] Other broadband users, including FTTB and Ethernet users, increased from 4,300 to 257,000. The latest statistics from the MII's official newspaper, the *Renmin Youdian*, suggest the acceleration has continued. By May 2003, China Telecom's overall broadband subscriber base rose to over 4 million.[45] This fast pace of development in the local loop in China, in the number of Internet users and in broadband users is creating a vast potential 'community of interest' across the border for end-to-end broadband connections and Web-based services from Hong Kong.

E: End-to-End Traffic from Hong Kong

52. Voice traffic between Hong Kong and Guangdong seems to be closely related to Hong Kong investments in the province and to China companies with a branch office in Hong Kong. According to Guangzhou Telecom, the bulk of cross-border voice traffic is generated from such companies involved in the manufacturing and commercial sectors in Guangzhou, Dongguan and Shenzhen, while the financial services sectors in Guangzhou and Shenzhen are anticipated to generate a major volume of end-to-end traffic in the future.[46] The great bulk of non-voice traffic seems to follow a similar pattern.[47]

53. For these reasons Guangdong Telecom believes that CEPA is likely to have a significant impact on voice traffic volumes between Hong Kong and Guangdong which have tended to plateau in recent years. CEPA should encourage more Hong Kong direct investment in setting up companies and in investing in existing China registered companies. Recent examples include Hong Kong banks that may be able to offer deposit-taking and remittance, credit card and foreign exchange services on the Mainland to local customers. The telecoms sector itself should benefit from both CEPA and the WTO agreement, investing in Mainland value-added services

[44] China Telecom Corp. Ltd, SEC File 1-31517, 31st December 2002, pages 34, 50, 53 at: http://www.secinfo.com/dV5Ff.28xw.htm

[45] " 10 ," , July 2, 2003
China Telecom signs contract with nine manufacturers for 1 billion Yuan to expand broadband service, *Renmin Youdian*

[46] Personal interview with Liu Jun Min, Vice Manager, Senior Engineer, Guangzhou Telecom, 25th July 2003.

[47] These three locations probably generate well over 80 per cent of Guangdong – Hong Kong data traffic.

companies offering Internet, data, hosting, content, applications and information services. Both Guangzhou and Shenzhen have been selected as test locations for CEPA.

54. The tradeability of telecommunication services was recognized in the WTO's first services agreement, the Basic Agreement on Telecommunications, but Hong Kong's early advantage in having the world's first fully digitalized city network is now challenged by other economies in the region, such as Australia, Japan, Singapore, South Korea and Taiwan now also have fully digital systems. Now Hong Kong's advantage lies primarily in upgrading the core network elements to Next Generation Network[48] standards and the local loop to high capacity broadband.[49] Technology continues to progress and the commitment to invest, especially in the local loop as the most expensive part of the network, is vital if Hong Kong is to take full benefit of the opportunities offered by China's rapid industrialization and development of the market economy.

E.1: Hong Kong - China Trading Opportunities

55. The WTO agreement, assisted by the inclusion of telecoms in CEPA, adds enormously to the trading opportunities. Value-added service providers are able to offer end-to-end services between Hong Kong and China as well as local services. End-to-end services are particularly significant for a range of Hong Kong based companies. These include trading companies who arrange shipment, finance, marketing, legal and other management services to manufacturing and exporting companies in China, and companies offering services on the Mainland, such as banks, finance and insurance companies, business services and travel and entertainment companies. In addition there are the multinationals in China with regional offices in Hong Kong.

Hong Kong Telecoms in China

56. Although until now Hong Kong companies have faced the same set of restrictions on providing services in China as other foreign companies there have been significant developments in recent years. For example, four Hong Kong based telecom services companies (China Motion, CTI, NWT, PCCW) now operate call centres from Guangdong and one (Hutchison) from Macau, providing end-to-end connectivity to customers in Hong Kong. HSBC bank also runs a call centre from Guangdong connecting to customers in Hong Kong. PCCW has a value-added services joint venture with China Telecom in Beijing offering services to the financial sector. There is every reason to see these types of commercial activities expanding in the future. They either save on costs, as in the case of call centres, or they generate new sources of revenues from the services offered directly to Mainland companies and from the end-to-end voice and data traffic they set up between Hong Kong and China.

[48] Next Generation Network (NGN) is an industry term for a network running on Internet Protocol and compatible protocols.

[49] China Telecom announced it would open China's first Next Generation Network in Shanghai by the end of 2003, according to *Interfax*, 19-25 July 2003.

Broadband in the Local Loop

57. Many data services will require broadband, either because of the bandwidth required, for example to video-conference or to send streamed content, or because of customer demand for high speed connections, for example fast Internet connections to Hong Kong websites and databases. The same will be true of voice traffic as Voice over IP (VoIP) increases in popularity because it is a cheaper way to make international calls and its quality is now assured.[50] Over time Next Generation Networks in both China and Hong Kong will supplement and eventually replace the ATM digital PSTN and then most traffic will be by IP Telephony which provides end-to-end IP connections using IP phones at the customer premises. This again requires a commitment to invest in both core network equipment and the local loop, a commitment that runs the risk of timing. Premature investment leaves an overhang of higher costs, while investment too long delayed risks losing market share. These are commercial judgments that are not easy to make when billions of dollars are involved and the pace of development in demand for both local and cross-border high-speed data traffic remains uncertain.

58. Under these circumstances the question for the regulator is what is in the consumer interest? Is it intensified price competition today, where local loop prices are close to or even below marginal cost, or is it an environment in which investment in broadband upgrade is a justifiable risk for networks? This is a different question from ten or even just five years back when it was how much choice does the consumer have? Put another way, the issue for the past decade has been having a choice between narrowband networks, and having a choice between narrowband and broadband access, whereas tomorrow and beyond the choice has to be between 1.5Mbps and 20 Mbps.

Leased Circuits and Local Loop

59. Data traffic between Hong Kong and China has been dominated by global and corporate companies, often headquartered in Hong Kong, such as banks and international IT companies, pharmaceutical companies, toy manufacturers and the like, and these companies purchase private international leased circuits (IPLCs) to carry bulk traffic securely. Yet the vast majority of Hong Kong companies with investments in China, and in the Pearl River Delta especially, appear in Hong Kong as SMEs, sometimes with nothing more than a representative or trading office in Hong Kong.[51] These companies in general do not use IPLCs. In between are large local businesses that typically account for between 10-20 per cent of a carrier's IPLC market. The falling price of bandwidth and the growth potential in the market for high-speed data connections and 'rich media' content will entice many large local businesses to switch from IPLCs to broadband, especially where virtual private networks (VPNs) are offered by the carriers. These are dedicated end-to-end local and international broadband connections supported by service level agreements (SLAs) to guarantee quality and security. Low prices will also induce an increasing number of

[50] According to *Intefax*, using data obtained from the MII, long distance voice traffic over IP accounts for more than 40 per cent of the total. *Interfax*, 19-25 July 2003.

[51] For recent estimates see *Made in PRD: The Changing Face of HK Manufacturers*, Federation of Hong Kong Industries, 2003.

SMEs with cross-border investments to adopt broadband. This development is the next essential phase in the spread of high-speed data networking between commercial entities in Hong Kong and Mainland China, and will be driven on the supply side by availability and price in the broadband local loop.[52]

Local Loop Partnerships

60. An important consideration for the future as the economies and the telecommunication markets of Hong Kong and China draw ever closer is the possibility of Hong Kong and China operators reaching agreements to share each other's networks, including the local loop customer access networks, as a means of doing direct business. So China Telecom or China Netcom may be providing services to Hong Kong customers, or Mainland customers in Hong Kong, while Hong Kong telecom companies do likewise in China. This can only happen if the Hong Kong companies have invested sufficiently in local loop broadband capacity and in intelligent network (IN) software upgrades and have sufficient control over their networks to be able to strike meaningful commercial agreements with their Mainland counterparts. A key determinate of investment will be the extent to which the access network is available to competitors, and on what terms.

F: Conclusion

61. Taking advantage of Hong Kong's opportunities to exploit the tradeablility of telecommunications services in Mainland China requires policies that provide incentive to local Hong Kong telecommunication network service providers to invest in the latest broadband technologies in both the core network and in the most expensive and high risk part of the network, the local loop.

62. It is apparent that in Mainland China a commitment to invest is being made in the absence of a policy to unbundle the local loop. Investment decisions are being made for strategic development and marketing reasons rather than price points to determine a build-buy decision, although the latter, which arise from private commercial negotiations, may affect some of the marginal investment decisions.

63. Hong Kong seems to have reached a crossroads. Domestic network investment and transparent regulation has delivered a first class telecommunications network that gives Hong Kong an advantage, but a diminishing one. The next phase for the industry is far riskier and uncertain than the narrowband phase, and scale becomes more important that ever. Trade in telecommunications services involving end-to-end enterprise and consumer services within the region, but especially cross-border with Mainland China will be the key driver of the industry. This will stimulate investment

[52] An indicator of the growth in demand for data and high-speed connections is the growth in the leased line business from China that also eats into voice traffic over the PSTN. In its filing to the SEC in the USA, China Telecom notes that 'The usage of our international, Hong Kong, Macau and Taiwan long distance services has also been adversely affected by the increased use of leased lines for international communications.' China Telecom Corp. Ltd, SEC File 1-31517, 31st December 2002, p.28 at: http://www.secinfo.com/dV5Ff.28xw.htm.

not just in the infrastructure but in the content and applications sectors as well because they go hand-in-hand in a broadband world. Hong Kong needs to migrate to the next level of broadband development and that means high-risk investment in the access networks.

64. The opportunities for cross-border investments by networks in networks and value-added service providers should drive the need to harmonize regulations governing local loop access. The rules and regulations in Hong Kong and China must converge if investment opportunities are to be maximized. I have suggested in this paper that in some areas of regulation and policy, namely in licensing all-service providers to compete in the local loop and allowing for fixed-mobile and wireline-wireless convergence, China will actually leapfrog Hong Kong. All this is happening in China today without unbundling of the local loop. This is not to say that China will not eventually regulate unbundling in some form, but it would seem to make sense for Hong Kong to adopt a model of selective unbundling, drawing upon essential facilities doctrine. This would at least be conducive to cross-border investment and exploiting the opportunities that are sure to arise.