

From Universal Service to Universal Choice
Local Fixed Network Competition in Hong Kong

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1. INTRODUCTION

The objective of providing universal fixed local telephone service has been achieved in many developed economies. However, in most cases, it is the incumbent that has accomplished the universal service obligation with the help of cross-subsidization from other services or operators. As the case of Hong Kong has shown, such an arrangement can lead to serious market distortions. For instance, the cross-subsidization of local service from international IDD service has enabled the incumbent to offer the local service at a rate that is about 33% lower than average cost. As a result, despite regulatory effort, competitive entry into the local market has been slow with all three new entrants taking only a 2.49% market share three years after obtaining their licenses in 1995. This slow progress lasted until 1999 at which time the tariff began to be rebalanced.

To guarantee the sustainability of universal service, a competitive local network market is critical. Moreover, enabling ‘universal choice’, that is, enabling individual subscribers, whether residential or business, to freely choose their preferred local network operator from alternative suppliers, is probably the next policy objective of regulators in economies where the objective of achieving universal service has been basically met. But moving from ‘universal service’ to ‘universal choice’ has turned out to be a difficult process in Hong Kong and elsewhere. So far, incumbents in almost all economies have retained at least 80% of the local telephone market. Tackling the barriers to local fixed network competition has become a significant challenge for all regulators.

In September 2001, the authors were appointed by the Hong Kong Government’s Audit Commission to conduct a Value-for-Money audit of Hong Kong’s telecommunications policy. Based on disclosable information, this paper highlights barriers to developing competition in Hong Kong’s local fixed network market, such as incomplete tariff rebalancing, price squeezing, jumper line cut-over, interconnection pricing, and building access. It also reviews government measures adopted to meet the objective of enabling adequate choice of alternative of telecommunications service provider to residential customers. The paper concludes with audit suggestions to help achieve the goal of ‘universal choice’.

2. LIBERALIZATION OF LOCAL FIXED NETWORK MARKET: THE BACKGROUND

The Hong Kong Government considers that the telecommunications market is a vital industry underpinning the services sector of Hong Kong and believes that competition is the best vehicle to protect and enhance consumer interests in the telecommunications

sector¹. However, this pro-competition policy could not be deployed in the local fixed network until 1995 due to historical reasons.

Under the terms of the license conferred by the Government, PCCW-HKT (formerly known as Hong Kong Telecom), the sole operator of telecommunications services, was granted exclusive franchise over local and international telecommunications, until respectively 1995 and 2006. In reality, Hong Kong Telephone Company (HKTC) and Hong Kong Telecom International (HKTI), both subsidiaries of Hong Kong Telecom with separated accounting systems, held franchises for local and international services respectively.

Government intentions to review telecommunications policy followed self-imposed expiry of its rate of return policy in March 1991 and the termination in June 1995 of HKTC's franchise over local telephone service. After extensive consultation, liberalization was adopted as a policy stance in June 1992 with the government announcing abolition of HKTC's exclusive privilege in local telecommunications upon its expiry in June 1995². In July 1992, the government officially published its guidelines for issuing new licenses for local telephone network operation. These could be unlimited in number, subject to an open and transparent application process and under the oversight of a new regulator. By the close of the bidding process on 1st February 1993, the Government had received seven applications and finally decided to issue three licenses to Hutchison Communications Limited (now called Hutchison Global Communications Limited), New T&T Hong Kong Limited (now called Wharf New T&T Limited) and New World Telephone Limited in addition to that granted to HKTC in March 1995. July 1995 marked the advent of true liberalization in Hong Kong's local telephone market³.

Since then, the regulator has taken a pro facility-based competition approach e.g., by mandating unbundling of local loops and encouraging direct access rather than favouring resale-based competition. The so-called 'Type II' interconnection policy, as will be highlighted in next section, aims not only to tackle the barrier of the 'last-mile', but also that of the last 'few meters' due to the specific difficulties in accessing buildings and households as a result of Hong Kong's densely populated residential buildings (which normally have more than forty floors). Hong Kong is also the first region in the world that deployed operator number portability for local fixed networks in 1995.

By December 2001, the three new licensees had obtained 11% of market share. Among the lines obtained by the new entrants, 55% were based on direct access, while 45% were based on Type II interconnection, namely unbundled local loops. Table 1 summarizes the market structure of local network market of Hong Kong, the US, the UK and Australia.

¹ Information Technology and Broadcasting Bureau, "Telecommunications" Policy Objectives, 2000 Policy Address.

² Lam, P.L. (1996) "Transition to Competition in Hong Kong's Local Telephone Industry," *Telecommunications Policy*, Vol.20, No.7, pp.517-529.

³ Xu, Y. and Pitt, D.C. (1999) "One Country, Two Systems: Contrasting Approaches to Telecommunications Deregulation in Hong Kong and China", *Telecommunications Policy*, Vol. 23, No. 3/4, pp. 245-260

Table 1: Market Structure of the Local Fixed Network in HK, the US, the UK and Australia

Type of Access	Hong Kong (Since 1995)	United States (Since 1996)	United Kingdom (Since 1984)	Australia (Since 1999)
Direct Access Line	55%	30.9% (Include 7% TV Cable) *	89.7% including TV Cable	86.25% including TV Cable
Resale	0%	21.6%	10.3%	
Unbundled local Loops (Type II Interconnection)	45%	47.5%	0%	13.75%
Total Market Share by New Entrants	11.0% (By Dec. 2001)	10.2% (By Dec. 2001)	17.4% (By Dec. 2001)	8% (By Dec. 2000)

Note: *Estimated according to Credit Swiss First Boston's data in 2Q00

Source: FCC (<http://www.fcc.gov>), Ofcom (<http://www.ofcom.gov.uk>), Credit Swiss First Boston, Buckettey, (2001) Telecommunications industry Australia 2001, NEW: Paul Budde Communication Pty Ltd

The more active role in providing alternative local telecommunications service played by Cable TV systems in other economies compared with Hong Kong should be noted. On 18 January 2000, the existing subscription television licensee, Hong Kong Cable Television Limited (HKCTV), was granted a license to provide telecommunications services, including voice service, over its hybrid fibre coaxial network, forming the fifth wireline-based local fixed network. It is notable that although Hong Kong Cable is licensed to provide voice service in Hong Kong, it is not doing so. This is disappointing because in Hong Kong (as in many OECD countries) there had been considerable expectation that cable would provide competition for the incumbent using alternative infrastructure to bypass the incumbent control of the local loop. Some analysts suggest that Hong Kong Cable is using the wrong technology (analogue) that cannot inter-operate with other telephone systems. Cable TV is reportedly testing IP (Internet Protocol) based telephone system with a view to introducing this technology.

Table 1 indicates that the performance of new entrants in Hong Kong is comparable to that of the rest early mover economies. If both direct access and unbundled local loops-based access are defined as facility-based operation, Hong Kong can claim that it has a 100% facility-based competitive market.

Although 11% is much lower than the new entrant market share expected by the public, it was achieved only with the considerable effort of the regulator and the new entrants. The entry barriers encountered by the new entrants, and the corresponding measures of the regulator to address them are assessed in following sections.

3. NETWORK INTERCONNECTION

To facilitate competition, efficient interconnection among different networks is of significant importance due to the existence of network externality. To a certain extent, an improperly interconnected new network is not dissimilar to a small isolated network, such as those segmented telecom networks in the US in early 1990s⁴, and network externality remains a concern for subscribers who are searching for demand-side economies of scope. Interconnection is also important to facilitate the new entrants access to subscribers due to the difficulties in duplicating the last mile local loops in certain circumstances. In this case, interconnection is critical for the survival of the new entrants and hence the viability of competition.

Experience has shown that network interconnection is normally a protracted and contentious process. Incumbent operators have little incentive to make things easy for their new competitors, and engage in a wide range of behavior to frustrate effective competition. New entrants in telecommunications markets have little to offer in negotiations to remove these barriers to competition. As a result, there is a consensus among telecommunications experts and policy makers that decisive and informed guidance by regulators is required to pave the way for effective interconnection arrangement⁵.

In Hong Kong, the Office of Telecom Authority (OFTA), the regulator for telecommunications in Hong Kong, defined two kinds of network interconnection, namely Type I interconnection and Type II interconnection.

Type I interconnection refers to interconnection between network gateways via point of interconnection, or POI (Figure 1). The purpose of establishing Type I interconnection is to enable consumers subscribing to different networks to communicate each other, e.g. to achieve any-to-any communication.

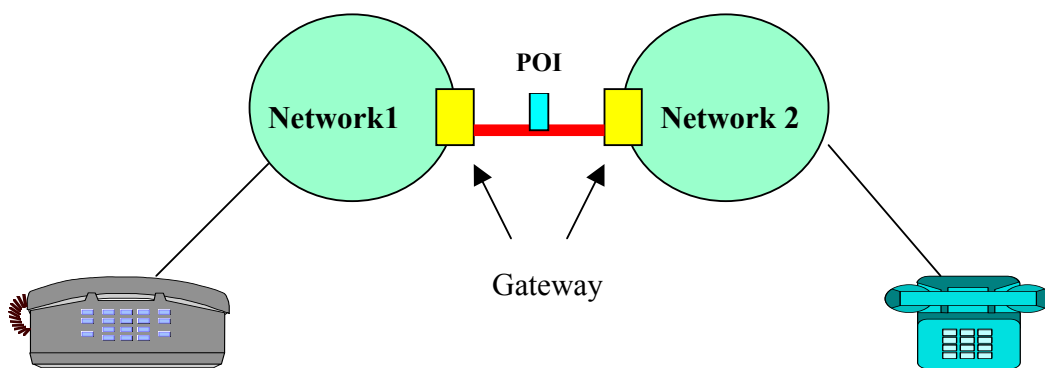


Figure 1: Type I Interconnection

⁴ Mueller, M. L. (1997) *Universal Service: Competition, Interconnection, and Monopoly in the Making of the American Telephone System*, The MIT Press and The AEI Press: Cambridge, Washington, D.C.

⁵ Intven, H and Tetrault, M. (2000) *Telecommunications Regulation Handbook*, Washington D.C. : The World Bank

One of the most commonly met problems for Type I interconnection is the incumbent's reluctance to provide sufficient POIs capacity to facilitate interconnection. In the letter to OFTA on 2 February 2001, New T&T raised the issue of its inability to fulfill customers' orders due to the POI shortage. Consequently, customers' orders were cancelled or moved to PCCW-HKT. The lost revenue of New T&T represents a direct gain in revenue to PCCW-HKT.

In responding to NEW T&T's request for increased POI capacity, PCCW-HKT claimed that:

- New T&T's forecasts in the past had always proved to be over-estimated, PCCW-HKT therefore does not accept New T&T's forecast;
- dial-up Internet access is only a temporary interim service for broadband Internet access and therefore it does not believe the current dial-up Internet traffic will be sustained for 15 years. This concern is due to the fact that the LRAIC historical cost model adopted by the Telecom Authority in the Determination of 21 August 1998 is based on a depreciation life of 15 years for switching and trunk termination equipment. PCCW-HKT believes the depreciation life adopted is inappropriate to compensate it for provisioning capacity for Internet traffic and it demanded commitments on minimum traffic volume before it would provide any POI capacity for Internet traffic.

New T&T projects that 1008 POI links are required for interconnection between PCCW-HKT and New T&T for the period from November 1999 to August 2000, while PCCW-HKT proposed to reconfigure an existing IICG to ICG and would only provide approximately 200 additional POI links and is only a partial solution to the problem. Consequently, New T&T had to seek a determination by OFTA⁶.

On 16 March 2001, the Telecommunications Authority (TA) made a determination of the terms and conditions for the provision of "point of interconnection" capacity for interconnection between the fixed networks of New T&T and PCCW-HKT. The terms and conditions are applied to value added services and external services only but not the direct or "any-to-any" traffic. According to this determination, New T&T is required to make commitments on the level of utilization of the POI circuits, which exceed the "normal" level of POI capacity. New T&T is obliged to pay the difference between the Prescribed Level and actual level of capacity utilization during a year within the Prescribed Period. The purpose is to facilitate the expansion of POI capacity and, at the same time, to avoid unnecessary surplus capacity as a result of over forecasting.

However, there were disputes over OFTA's model for calculating the "normal" level. Understandably, New T&T prefers a high "normal" level in order to reduce its

⁶ New T&T, (2000) *Request for determination under section 36A of the Telecommunication Ordinance on the terms and conditions of interconnection between New T&T Hong Kong Limited ("New T&T") and Cable & Wireless HKT Telephone Limited ("CWHKT") for the provision of point of interconnection capacity*, 2 February

commitment, while PCCW-HKT prefers a low “normal” level so as to reduce the risk of over expansion. On 15 June 2001, the TA invited PCCW-HKT and New T&T to make a representation to him on the methodology that should be adopted for the calculation of the “normal” level of POI capacity. Based on this, the TA published his Preliminary Analysis on 4 September 2001. The original model was amended with the introduction of Paragraph 11A to the determination.

Another kind of interconnection, Type II interconnection, refers to interconnection at the local loops, which is also called local loop unbundling. For Type II interconnection, the interconnection point might lie in the Main Distribution Frames (MDF) of the incumbent’s exchange, or the street distribution point, or the blockwiring in the Telecommunications and Broadcasting Equipment (TBE) room that usually locates at the ground floor of individual buildings (Figure 2). The purpose of Type II interconnection is to help the new entrants to access individual households due to the difficulty in laying extra pair of wires in buildings that have already been wired by the incumbent in the past. In other words, it is used to overcome the “barrier in the last mile”.

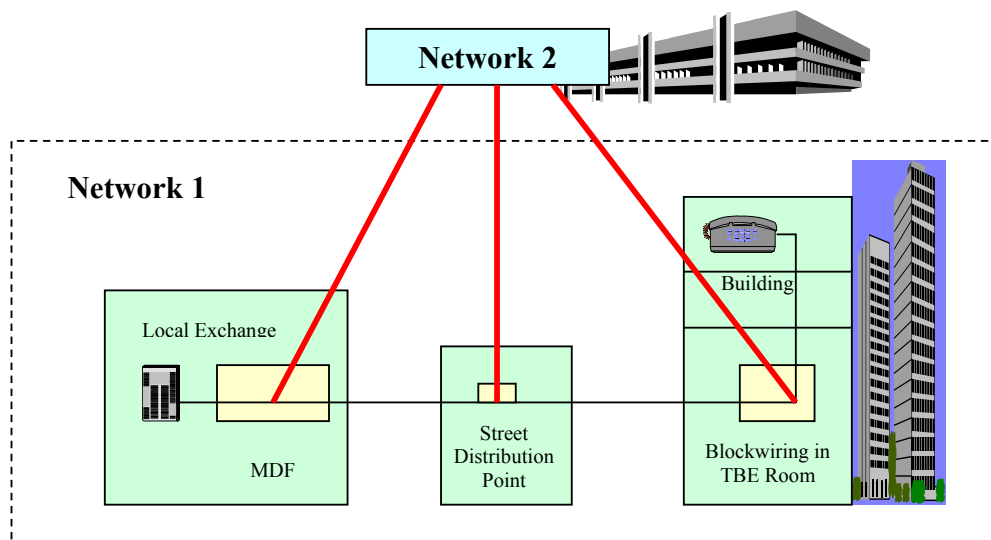


Figure 2. Type II Interconnection

Compared with other economies, Hong Kong’s effort in unbundling local loops was quite early. Indeed, it was one of the first economies in the world to unbundle the local loops to facilitate local network competition (Table 2).

Table 2: Time of Local Loop Unbundling in Different Economies

Economies	Time of Implementing Local Loop Unbundling
Hong Kong	1995
US	1996
Finland	1996
Denmark	1998
Germany	1998
Austria	1998
Sweden	2000
Netherlands	2000
Italy	2001
France	2001
UK	2001
Belgium	2001
Spain	2001

Source: Buigues, P. A. (2001) European Policy on Local Loop Unbundling: Competition Law Landscape and Implementation Issues, *Communications & Strategies*, No. 42, 51-66

For Type II interconnection, the major technical barriers lie in the following three aspects:

1) Collocation

To connect with the access lines of the incumbent, the new entrants have to collocate their systems with that of the incumbent at the exchange room of the incumbent. The incumbent might claim to have no sufficient space to accommodate the new entrants' equipment, or no sufficient power and air-conditioning capacity to support the new entrant's system. One of the solutions for the new entrant to overcome this barrier is the so-called 'distant collocation', namely to find an alternative space outside the incumbent's exchange and connect the two systems with trunk lines. In fact, the authors concluded from their own investigations during November 2001 that space does not seem to be a problem for new entrants. For old exchanges, the newly installed digital system has cleared out extra spaces once occupied by the old analogue system, while in new exchanges the regulator has given guidelines on leaving extra space for collocation. The most often used excuse to delay the collocation by the incumbent is that more time and resources is required for expanding capacity of power supply and air-conditioning.

2) Line Cutover

Once the collocation is achieved, the next step is to cut the local access link (LAL) once connected with the incumbent's exchange and connect it to the network of the new entrants upon the request of the subscriber who would like to switch to the new

operator. This process is called ‘cutover’ and is conducted by staff of the incumbent. Figure 3 illustrates the process of cutover between the incumbent’s system and the collocated system of the new entrants.

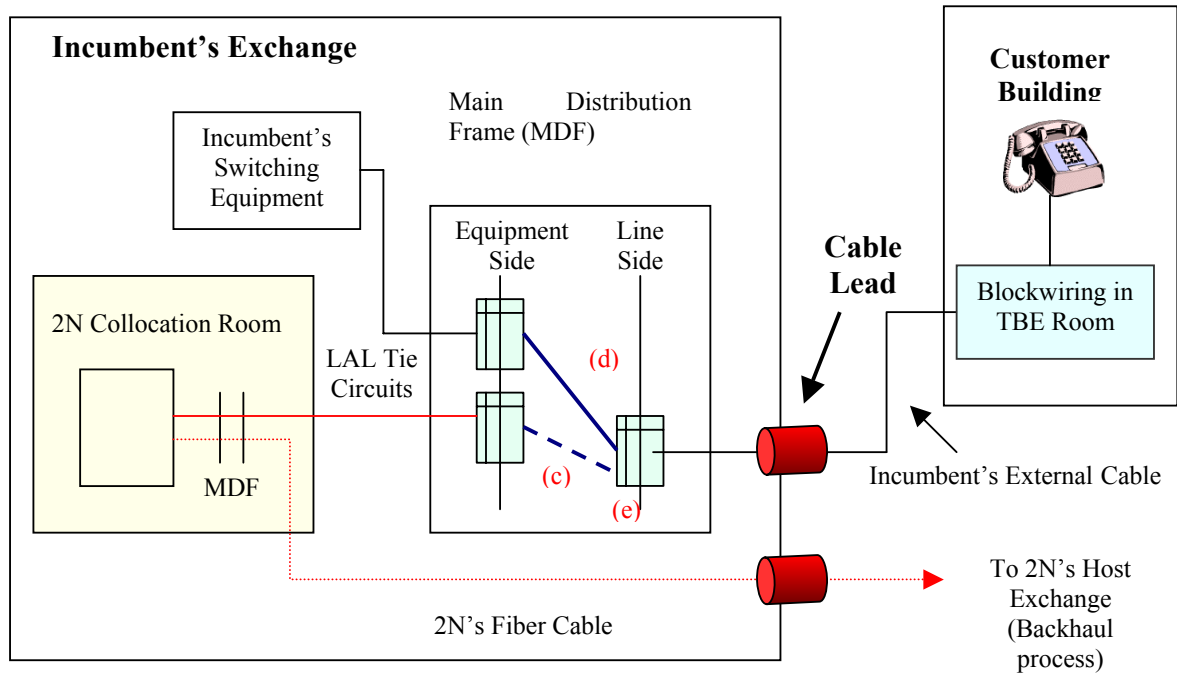


Figure 3. Collocation and Local Access Link (Cutover)

The normal process for local access link provision is as follows:

- a. Service order retrieval & checking
- b. Preparation (e.g. locate physical circuit)
- c. Running “new jumper” from 2N’s LAL Tie circuit side to cable side at the incumbent’s MDF
- d. Disconnection of the “existing jumper ————” “ termination to the incumbent’s equipment
- e. Termination of “new jumper ” at MDF line side for connection to 2N’s equipment
- f. Confirmation of testing after completion of changeover
- g. Service order closing and record keeping

The cutover will take a certain period of time. Previously, PCCW-HKT gave a quota of 9 cutovers per time window (two hours) or 36 cutovers per (8 hour) working day, at each of its exchange for each of the new entrants. Financial compensation is required if extra cutover is requested in non-working hours. The maximum quota of cutover is 60 in total per weekday and 48 on Saturday.

In late 2000 OFTA requested PCCW-HKT to combine the current daily business hour target of 36 LALs for each of the three other FTNS licensees into a single pool of 108 cutovers per exchange. PCCW-HKT rejected this approach on the grounds that it is neither practical nor useful due to physical constraints that prevent the connection of a large number of customers for a single operator at the same time.

New T&T complained that PCCW-HKT's productivity for LAL cutover is too low, which has seriously deterred its market penetration. For example, it has received a lot of enquiries and complaints for the long awaited installation time from the residents at Heng Fa Chuen. To cope with this constraint, New T&T requested OFTA to give a determination⁷. On 10 May 2001, at Kwun Tong, New T&T offered to demonstrate to OFTA how it is possible to carry out cutovers of 30 LALs per 2-hour window⁸.

In response PCCW-HKT invited a consulting firm to provide an independent assessment on the time needed to conduct the cutover during 7 – 12 June 2001. The conclusion was that ranging from 11:10 to 21:39 minutes with the average being close to PCCW-HKT's original estimated average time of 13:30 minutes per LAL giving an overall average of about 9 cutovers per window. The study concluded that the extent to which an increased capacity might result from performance improvements is likely to be relatively small.

OFTA challenged the independence of this assessment and conducted a series of investigations on the procedure adopted by PCCW-HKT in conducting cutover. After a series of discussions and exchanges with PCCW-HKT, the company agreed on 9 November 2001 to improve its productivity by deploying more resources and streamlining its process. PCCW-HKT agreed to increase the number of local loop connections from 9 per 2-hour window per operator per exchange to a maximum of 16, depending on the technical constraints in the telephone exchange concerned⁹.

In addition to LAL productivity, the expansion of subscriber tie-cable is also a barrier for the deployment of cutover. New T&T's application for tie-cable expansion has been repeatedly rejected by PCCW-HKT, even after OFTA published Version 3 of Industry Code of Practice for the Interconnection of Broadband and Narrowband

⁷ New T&T (2001) Letters to OFTA and Mr. Sin Chung-kai (legislative councilor) regarding LAL Cutover Productivity, 11 April, 17 July, 18 July, 30 August, 31, August, 29 September

⁸ New T&T (2001) *Notes of Demonstration at New T&T on Local LAL Cut-over Processes*, 10 May

⁹ OFTA (2001) PCCW Agrees to Improve Productivity for Local Loop Interconnection, *Press Release* (http://www.ofta.gov.hk/press_rel/2001/nov_2001.html), 9 November

Local Access Links¹⁰. OFTA is now requested by New T&T to take necessary action to direct PCCW-HKT in compiling with the procedures.

3) Blockwiring at TBE Room

Sometimes, the new entrants rolled-out their backbone networks directly to individual buildings. To access an individual household, they still need to connect the subscriber lines controlled by the incumbent's blockwiring facility. For public housing, this is normally not a problem, as there is sufficient space to accommodate several operators' system in the TBE room. For newly developed properties, normally all operators would have participated in the planning process and the TBE room is well designed to accommodate several operators' system. The problem lies in the old buildings where the TBE room is small and narrow as it was designed to accommodate only one operator. Additionally, the incumbent's systems in these buildings have not been upgraded and hence occupy most of the space. This has made the new entrants' access to the TBE room very difficult, and innovative solutions, such as using a highly compacted system, fixing the system on the ceiling instead of the wall and ground, have to be deployed.

4. BUILDING ACCESS

It is the Government's policy that all consumers in Hong Kong should have unimpeded access to the full range of public telecommunications and broadcasting services of their choice. Under section 14 of the Telecommunication Ordinance, the TA may authorize a licensee under the Ordinance to place and maintain telecommunication lines in, over or upon any land subject to the conditions stated in that section. The Government policy is to authorize a licensee with "utility" status to have access to the "common parts" of a property to install the cables and equipment necessary for the provision of service to occupiers of the property. "Common parts" means all areas within the property development except those areas which are for the exclusive use, occupation or enjoyment of an occupier.

The TA has already authorized all fixed network licensees, both wireline and wireless, and Hong Kong Cable, to install and maintain telecommunication lines in the common parts of private buildings for the provision of the fixed telecommunication network services and the television broadcasting service.

The network operators are expected to exercise their statutory right of access reasonably, minimizing disruption and inconvenience to the developers and occupiers during the installation and operation of their networks. They are liable for full compensation for any damage suffered by the developers or occupiers in accordance with section 14(2) of the Telecommunication Ordinance

¹⁰ So, P. (2001) Letter to OFTA on 28 September

In practice, if these buildings are public properties owned by the government, there is normally no access problem. However, to access private properties, operators might impose some barriers. The first is demand for some benefits. Under the current legislation, the developers are not entitled to impose an access charge on the network operators for the use of the cabling facilities already provided as part of the property, or for space for the installation of such cabling facilities, for the installation of cables and equipment which are reasonably necessary for the provision of service to occupiers within the property and some incidental functions. However, some developers, Building Management Offices, or property landlords' associations, might ask for some benefits, such as sponsorship, before they agree to open their building for access. For example, when one of the operators was negotiating with the property owners' association for property access, the deal was made after the Chairman of association was provided, as was privately requested, with permanent free broadband Internet connection.

Another barrier is discriminatory treatment. According to the TA's guideline, if a developer decides to provide only cabling facilities within the development, all network operators should be allowed access to the cabling facilities for the installation of their cables and equipment to respond to the demand of their customers in the property. However, as some properties are owned by the same investor as the network operators, favorable treatment to affiliated licensees might happen. For instance, PCCW-HKT complained to OFTA regarding difficulties in accessing the World Trade Square – a property developed by Wharf Group which is also an investor in Wharf New T&T.

Where an access arrangement cannot be satisfactorily agreed upon between the Building Management Office (BMO) and the operators, both parties may approach OFTA for mediation. If after the mediation, the BMO still refuses or delays any operators to access the building, the operators may take the following steps to gain access:

- a) The relevant operator, under section 14(4) of the Telecommunications Ordinance, may apply to a magistrate for an order that the BMO shall not prevent or obstruct it from gaining access the buildings to install the required facilities in the building.
- b) The relevant operator may under section 14(9)(a) apply for a certificate to be issued by the TA to certify that the Operator has the right of access under section 14(1) of the Telecommunications Ordinance and may apply to the court for an injunction under section 14(9)(b) where any BMO of the buildings specified in the certificate does not allow the operator to gain access to the buildings.

5. Interconnection Pricing

In addition to technical barriers, the most critical issue over interconnection is probably pricing. In a fully liberalized and competitive market, pricing for components of providers should not be a problem, but in the existence of market domination by the incumbent, pricing becomes a problem.

The commonly used model for interconnection pricing is the so-called Long Run Average Incremental Costs (LRAIC). It refers to the incremental costs that arise in the long run with a specific increment in volume of production. It is generally calculated by estimating costs using current technology and best available performance standards. This is a theoretically sound model, but has met difficulties when it is deployed.

In the US, the FCC pricing rules utilize a forward-looking economic cost methodology that is based on total element long run incremental cost (TELRIC), the same as LRAIC. These costs are based on the use of the most efficient technology available on the network, regardless of the technology actually used by the incumbent and furnished to the competitor. A number of local network incumbents filed a complaint against the FCC's decision and in 1997 the 8th Circuit Court overturned these pricing rules, stating that the FCC did not have the authority to set them. Later, this decision was overruled by the Supreme Court and sent back to the 8th Circuit Court. To date, more than six years after opening up local markets, pricing rules are still under court review. Nevertheless, the Public Utility Commissions, the telecom regulator at individual states, still apply the TELRIC model¹¹.

Currently, in all states, the price for the unbundled network is above the rate for local basic voice service (Table 3). For the new entrants to survive, they have to provide extra services in addition to the Plain Old Telephone Service (POTS). This high price has significantly frustrated the new entrants and their investors. As a result, the major part of local loops is still in the hands of incumbent operators at present and the new entrants have only managed to obtain a market share of around 3% via unbundled local loops by 2000¹².

Table 3: Pricing of unbundled network and basic voice service

Company	Region	Unbundled Network Pricing (US\$ per month)	Residential pricing – Basic Voice Service (US\$ Per Month)
Bell Atlantic	Maine	26.69-30.55	10.51-15.31
	Maryland	14.01-27.86	5.92-18.61
Bell South	Alabama	31.96-46.19	14.60-16.30
	Kentucky	32.15-47.15	12.17-17.55
SBC	Indiana	13.80	2.55-9.00
	Missouri	14.45-35.76	7.55-12.50
US West	Arizona	21.98	13.43
	Utah	15.30-25.16	14.57

Source: Engebretson, J. (2000), The Losing Macroeconomics of Local Competition, *America's Network*, July, 29-30

¹¹ Hockels, A (2001) Alternative Forms of Unbundled Access to Local Loop: Lessons from Europe and the United States, *Communications and Strategies*, No. 42, 67-88

¹² Engebretson, J. (2000), The Losing Macroeconomics of Local Competition, *America's Network*, July 29-30

Local loop unbundling has also met serious challenge in Europe. Major problems lie in incumbent's unacceptable pricing and provisioning practice for short-distance leased line – the classical bottleneck. Local tail circuits in Europe can cost 75 times as much per kilometer as the international part of a circuit. And the most expensive access leased lines – in Spain – cost nearly three times as much as the cheapest – in Sweden.¹³

As the entry barrier is so high, some new entrants have suggested that the government intervene strongly by separating the incumbent's network and service functions, hence the network operator will treat all service operators equally for interconnection. For example, Energis, one of Europe's most high profile operators, has withdrawn from the local loop unbundling process in the United Kingdom, and demanded the full separation of British Telecom's network in order to promote a broadband network economy¹⁴.

Another suggested strategy is to give up the strategy of facility-based competition and move to “connectionless competition”, namely provide services by accessing to instead of connecting with the incumbent's network. They appealed for more government intervention on the “whole-sale price” of the incumbent.

However, strong governmental intervention might have negative impacts on the healthy development of telecommunications competition. In Netherlands, for example, the regulator managed to achieve favorable network interconnection arrangement for the new entrants. However, the new entrants, together with ISPs, are heavily dependent on the incumbent's network and focus on Internet service only, as for all traffic that is terminated by the new entrants, the new entrants are compensated by the incumbent. As a result, they have no incentive to compete with the incumbent by rolling out their own network, and the less advanced infrastructure of the incumbent remains as a natural monopoly with heavy congestion¹⁵.

The interconnection regime has significant implications to the development of telecommunications sector. The high interconnection price in the US seems to have deterred possible entrants from the market while experience in Netherlands shows that when the rates are too low they discourage investments and facility-based competition, especially where new entrants are not subjected to investment commitment.

To achieve the full benefits of competition, facility (or infrastructure, network) based competition should be encouraged. This is due to following weaknesses of service-based competition:

¹³ Michelle Donegan (2001) European competition in crisis, *Communications Week International*, 10 September

¹⁴ Molony, D. and Donegan, M. (2001) Energis pans broadband Britain, *Communications Week International*, 8 October, 1.

¹⁵ Vlaam, H. (2001) Technology-Independent Regulation of Interconnection, *Communications & Strategies*, No. 43, 115-142

- the monopoly control of the infrastructure gives significant bargaining power to the incumbent, and this will protract all kinds of business negotiations, and strong regulatory intervention has to be exerted. As a result, transaction costs are extremely high for the industry and society as a whole;
- the new entrants are subjected to constraints over service upgrading due to the sometimes relatively poor technology of the incumbent, which might not be able to support new and innovative services;
- service providers need to periodically negotiate the access charge with the incumbents. Also, for whichever new service provided, the interconnection terms need to be revised. This consumes a huge amount of the new entrants and service providers' resources.

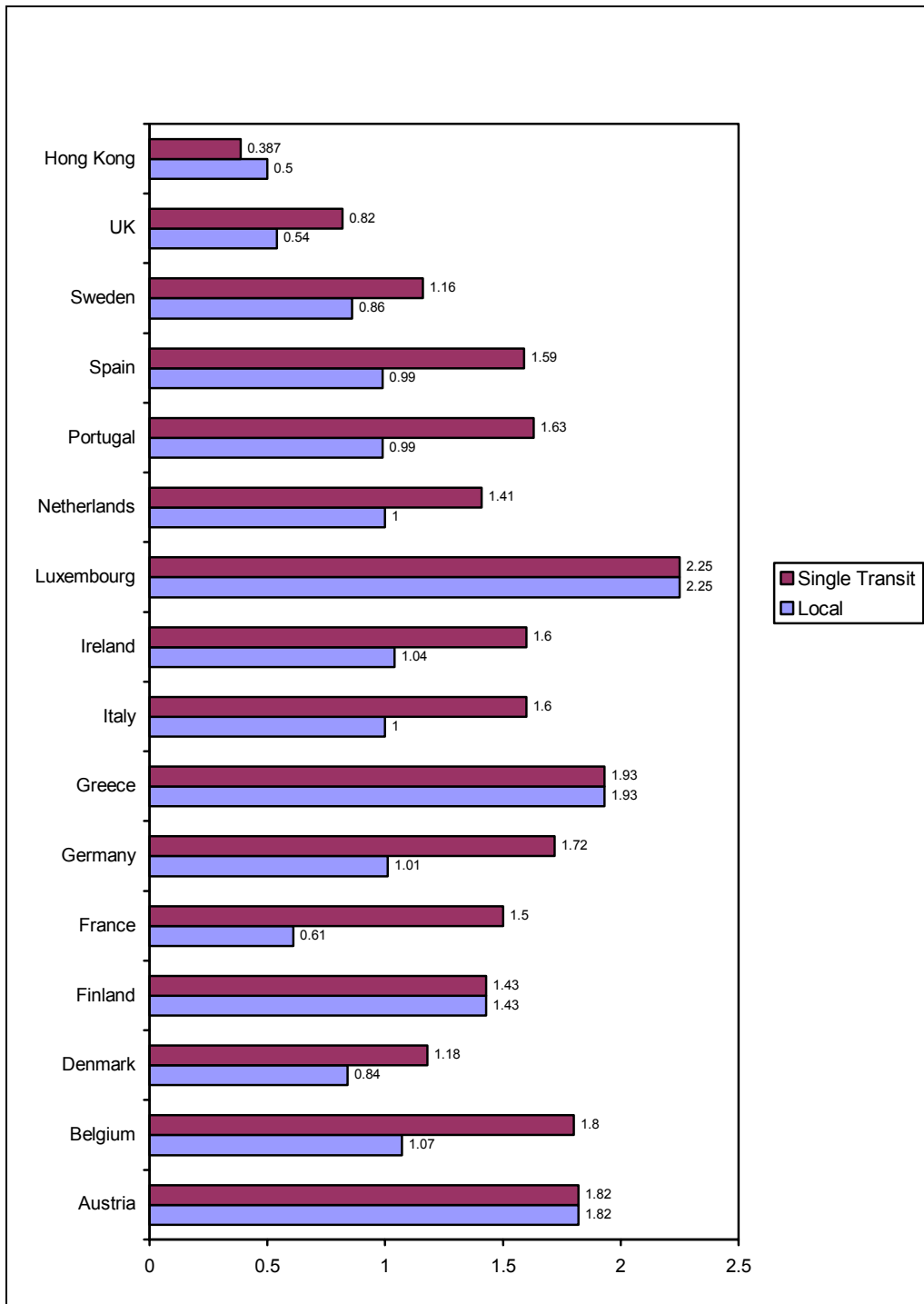
To facilitate infrastructure-based competition, and at the same time to facilitate market entry of the new entrant, an appropriate interconnection pricing scheme has to be determined in a smart way.

In Hong Kong, the incumbent enjoyed certain privileges from the Government due to its universal service obligation. For example, in order to set up switching offices, it obtained the land for free from the government before the market was liberalized. After liberalization, such privileges are no longer applicable to operators, both the incumbent and the new entrants. In this case, if interconnection fees are based upon an LRAIC model, the interconnection can be much higher than those based on historical cost due to the fact that land is very expensive in Hong Kong. This will place the new entrants in a disadvantageous position. To cope with this, OFTA's policy is to calculate the interconnection fee on the basis of both historical costs and LRAIC, and to choose whichever the lowest.

This approach is designed to be favorable to the new entrants. However, it might send out a misleading signal of 'buying' or 'building', as the new entrants might lack the incentive to rollout its own networks and depend heavily on Type II interconnection. As a result, the benefits of facility-based competition might be affected. Our suggestion is to follow the common approach, namely the LRAIC should be used as a model to calculate the interconnection fee, but the payment should not fully go the incumbent, otherwise it seems the new entrants over compensate the incumbent. The portion of the interconnection charge due to the land usage cost should be paid separately into the "universal service fund"

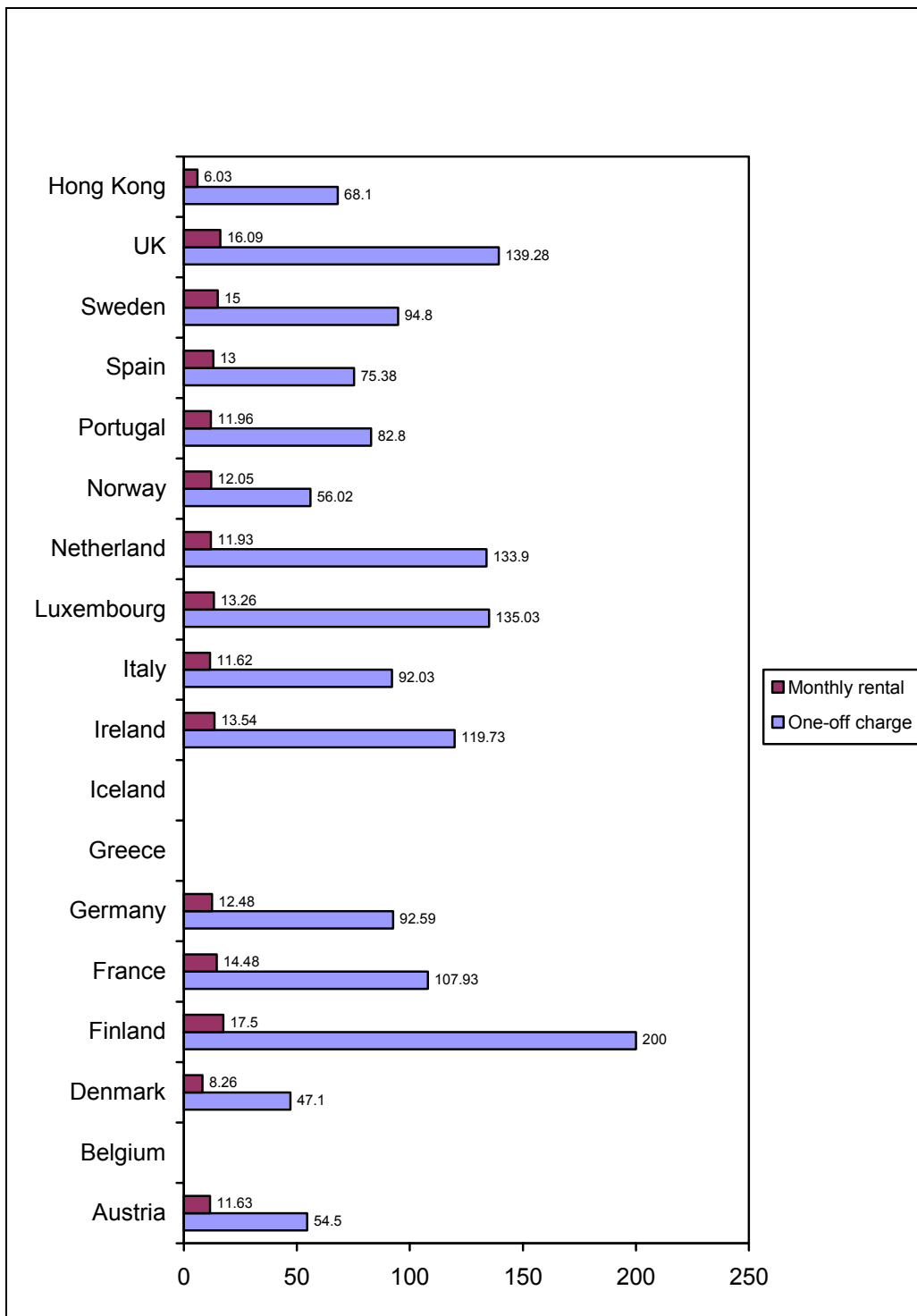
Figure 4 and 5 benchmarks interconnection charges in Hong Kong and several other economies. Hong Kong's new entrants operators appear to have enjoyed the lowest interconnection charges for both Type I and Type II interconnection.

Figure 4: Comparison of Type I Interconnection Charges per minute



Source: European Commission and National Regulatory Authorities, in Euros as on 1 November 1999.

Figure 5: Price of Unbundled Local Loops (Type II Interconnection)



Note: Hong Kong's price is for voice service only

Source: ANALYSYS, in Euros as on September 2001

6. PRICING AND PRICE REGULATION

Successful and sustainable competitive entry by new competitors in the local market depends on the profit margin attainable in that market. This profit margin depends on the level of end-user prices relative to operator cost.

If end-user charges to customers are low (as they are for local service in Hong Kong), and costs are high, the profit margin will be relatively narrow and so too will be the margin for sustainable competitive entry. This will make it difficult for new entrants since, in order to attract customers away from the incumbent, they will typically need to set prices a little below the incumbent's prices (unless they can provide a service of demonstrably superior quality). A narrow profit margin will also make it difficult to earn sufficient profits to be commercially viable in the medium term so that some companies may be forced to leave the market.

A common strategy adopted by incumbents in many OECD countries is to deliberately keep low or lower end-user charges and/or increase costs (including interconnection charges) incurred by the operator, so as to 'squeeze' (narrow) the margin for sustainable competitive entry.

If the 'wholesale' price of interconnection charged to new entrant operators by the incumbent is set *higher* than the price the new entrant can charge to its customers, new entrants will clearly find it very difficult to survive. This is not just a theoretical possibility, and is something that has occurred in a number of countries.¹⁶ Indeed, there are indications that this is occurring in Hong Kong for local service as well as for Internet service.

In Hong Kong, the incumbent has adopted margin-squeezing strategy right after the three new licensees come into the market in 1995. Although the averaged cost per line is HK\$103, PCCW-HKT charges residential users a flat monthly rate of HK\$67 - 68.9, and business users a flat monthly rate of HK\$104.6 - 108.8. It made this possible with the help of a delivery fee and an access deficit charge from its monopoly IDD service. In Hong Kong, until today, for every minute incoming or outgoing IDD traffic, a certain portion of the charges will go to the incumbent as access deficit charge or universal service contribution. Additionally, local network operators are also entitled to the so-called delivery fee that compensates their contribution in generating and terminating the IDD traffic. In circumstances wherein IDD was under monopoly operation, the regulator deliberately proposed a relatively high delivery fee so as to cross-subsidise the local network and henceforth achieve the political objective of achieving universal local service.

Above arrangement has made it possible for the incumbent to charge a below cost monthly flat rate, which leaves almost no surviving space for new entrants except in the

¹⁶ For example, in Australia, Telstra has been charging wholesale customers (the new operators) more than its retail customers. For ADSL, for instance, a retail customer is charged about \$65 per month; for wholesale customer it is roughly equal to \$80 per month.

low cost area. Not surprisingly, the new entrants progressed very slowly in expanding their network, and only targeted business users.

In the case that the PCCW-HKT's franchise over IDD has lead to high IDD tariff and hence high transaction cost of Hong Kong's economy, Hong Kong Government reached a Framework Agreement with PCCW-HKT in 1998 on early termination of its monopoly franchise with a compensation of HK\$6.7 billion. According to the agreement, competition on the basis of International Simple Resale began in 1999 and facility-based competition began in 2000.

Using this opportunity, the regulator has taken a number of steps to facilitate the local network competition including the following:

1). Tariff Rebalancing

Under the so-called Framework Agreement, PCCW-HKT was allowed to increase the tariff for residential telephone lines to \$90, \$100, \$110 per month as from 1 January 1999, 2000 and 2001 respectively. As indicated in Table 4 no price-control arrangement is to be applied after 1 January 2001.

Table 4: PCCW-HKT Telephone's direct exchange line monthly tariff (in Hong Kong \$)

Starting from	1/8/1996	1/8/1997	1/9/1999	22/1/2001	1/1/2002
Business	\$104.6	\$108.8	\$108.8	\$128	No price control
Residential	\$67	\$68.9	\$90	\$110	No price control

Source: OFTA

2). Network Opening

A condition of the Framework Agreement was that PCCW-HKT should make 50% of the Residential Exchange Lines in Hong Kong ready for Local Access¹⁷. In effect, this means that 50% of Hong Kong's residents would have the choice of alternative service provision by one of the three new licensees by the end of 2002 when their moratorium (see below) expires. (However, this does not mean that 50% of residents would in fact switch to the new entrants and that the market share of the new entrants would be 50%.)

3). The Moratorium and Commitment

In May 1999, the government announced its decision to provide a Moratorium on the issuing of local wireline-based licences for the local fixed telecommunications market before January 2003, in return for certain commitments made by the three new licensees in regard to network roll out by December 2002. The government's aim in extracting the

¹⁷ Framework Agreement between Hong Kong Government and Hong Kong Telecom, Clause 6.6(a), 1998

rollout commitments was to provide customers with a choice of an alternative service provider to PCCW-HKT, the dominant local service operator.

In effect, the three new FTNS operators are committed to reaching the following number of exchanges at the end of each year up to 2001 (Table 5 and Table 6).

Table 5: Commitments on number of exchanges reached (by end 2000 to 2002)

	HGC	New T&T	NWT
By end 2000	16	7	9
By end 2001	18	8	12
By end 2002	22	10	15

Source: OFTA

Table 6: New entrants' commitments regarding direct connections to buildings

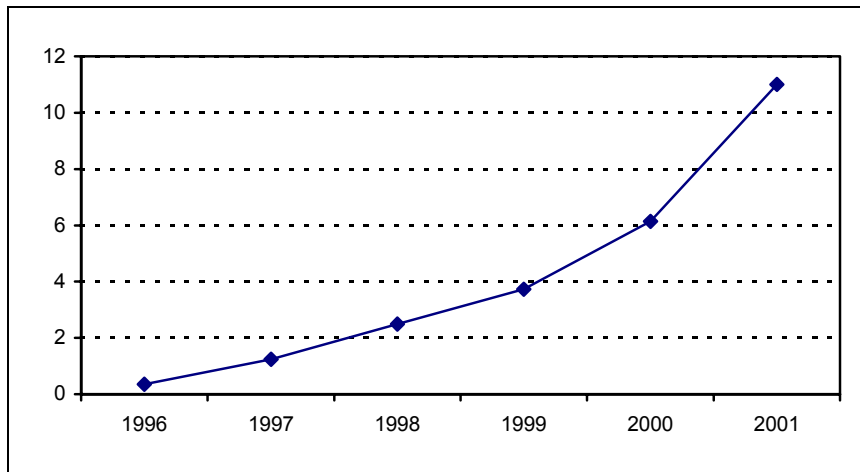
	HGC	New T & T	NWT
End 2002	1,500 buildings directly served	1,200 buildings directly served or by Type II interconnection	260 buildings directly served

Source: OFTA

These commitments were guaranteed by the provision of performance bonds of HK\$50 million per operator. However, failure to meet the interim milestones would not result in enforcement of the performance bonds, although the FTNS operators will be required to comply with directions by the TA to take such action or remedial measures as are reasonably required to meet the interim milestones.

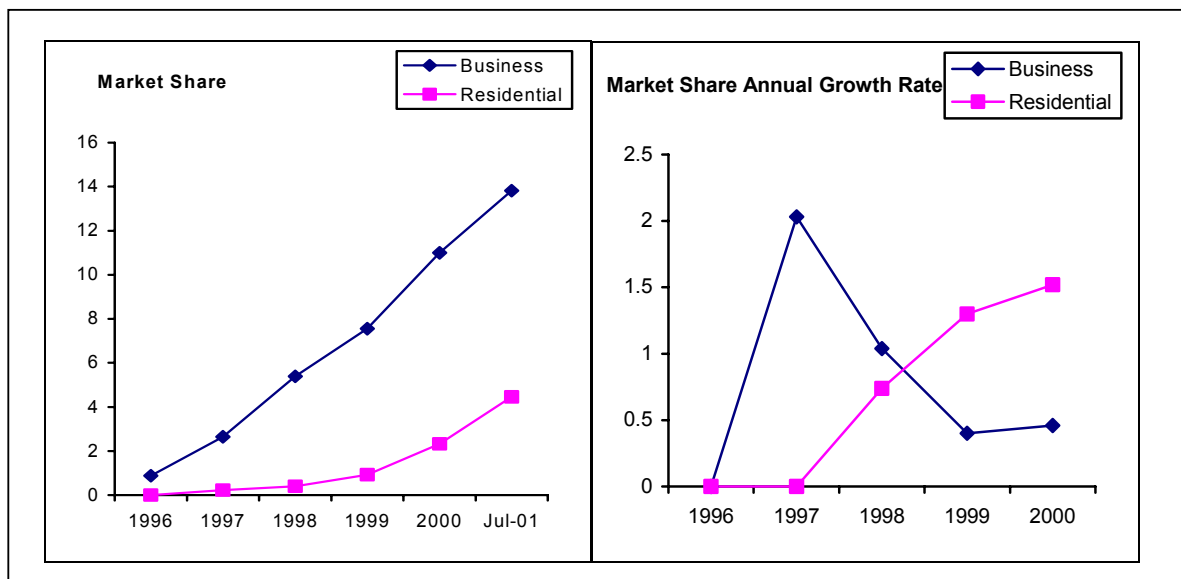
The above re-regulatory schemes have changed the landscape of local fixed network market. The rebalancing eliminated the distortion of the market, the network opening obligation of the incumbent has paved the way for the new entrants to access individual subscribers via the incumbent's local loops despite the existence of technical barriers created by the incumbent during the process of deploying Type II interconnection. The commitments made by the three new licensees have exerted pressure on them to expand their network coverage at a faster pace and as a result, all new entrants have accelerated their penetration into the market (Figure 6).

Figure 6: Market Share of New Entrants in Hong Kong's PSTN Market (%)



The Hong Kong Consumer Council has voiced concerns that new entrants are targeting more profitable users, mainly business users. By the end of July 2001, the new entrants had only served 4.45% of the residential market, by contrast with 13.8% of the business market. This is in fact quite common at least in the early stages of a competitive market. In the US, new entrants had attracted only 6.6% of residential and small business customers by the end of December 2001¹⁸.

Figure 7: Market Share of the New Entrants in Hong Kong's Business and Residential Market



¹⁸ http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/lcom0702.pdf

Figure 7 indicates that, although the new entrants have a higher market share in the business market, the annual growth rate in residential market penetration has accelerated in recent years and has exceeded that in the business market.

To further facilitate competition in local fixed network, in January 2000, the government announced its decision to issue new licences. As a result, the TA issued five licences for the operation of local fixed wireless networks based on LMDS technology (Table 7) in addition to a licence to Hong Kong Cable TV to provide telecommunications services over its cable network.

Table 7: Local Wireless FTNS

Licensee	Licence Issue Date
Hong Kong Broadband Network Limited	03/02/2000
SmarTone Broadband Network Limited	03/02/2000
Hua Nan-Teligent Co., Limited	10/02/2000
Eastar Technology Limited	16/02/2000
PSINet Wireless Hong Kong Limited	07/03/2000

Source: OFTA

An LMDS network requires building access for installation of antenna. In Hong Kong this was a problem until the amendment of the Telecommunications Ordinance in June 2000, granting the regulator power to enforce building access.

By 2001, of the five licensees, only SmarTone Broadband and Eastar Technology met all commitments on service launch, network rollout and capital expenditure. CCT-Intelligent had to forfeit its HK\$10 million of performance bonds for failing to meet its commitments on cumulative capital expenditure and launch of service. OFTA extended the compliance deadline for Hong Kong Broadband Network, which had met requirements of service launch and the number of hubs, but failed to meet the requirements of network coverage and capital expenditure by one year. OFTA explained that the extension was granted on the grounds that difficulties in accessing buildings had made the company fall short of these two requirements. Meanwhile PSINet Wireless Hong Kong met its requirements of network service rollout and network coverage.

In June 2000, the Telecommunication (Amendment) Ordinance 2000 was enacted to improve the telecommunications regulation regime by streamlining the licensing system, enhancing the competition safeguards, improving interconnection, and facilitating access to land and buildings for the establishment of telecommunications equipment for the telecommunications operators.

In 2002, the TA issued two more new local FTNS licences to Hong Kong Broadband Network Limited and Eastar Technology Limited in order to introduce further competition in the local fixed telecommunications market. The new licensees will be permitted to start providing services in January 2003 after the expiry of moratorium of the three wireline fixed network licensees.

7. THE AUDIT COMMISSION'S OBSERVATIONS & RECOMMENDATIONS

Generally speaking, OFTA has done a very good job in facilitating the local network competition when benchmarked with other early mover economies. Based on our consultancy report and work done by the Audit Commission of the Hong Kong Government itself, a report by the Director of Audit entitled "Liberalization of the Local Fixed Telecommunications Market" was published in March 2002. The purpose of these recommendations is to further enhance OFTA's performance in dealing with competitive issues in the local fixed network market.

Key observations and recommendations of the Audit Commission's report include¹⁹:

1). Government's Measurement and Reporting of the Progress of Competition in the Local Fixed Network Market

"Compared with OFTA, the regulatory authorities of some advanced countries provide much more information for gauging whether competition is working effectively. Notably, the regulatory authorities in Canada and the United Kingdom (UK) conduct periodic effective competition reviews based on a set of effective competition indicators and criteria. Audit considers that there is a need for OFTA to make continued improvements in its measurement and reporting of the progress of competition in the local FTNS market, by drawing on the experiences of advanced countries."

2). Market Share and Availability of Consumer Choice

"It is OFTA's assumption that, once a new operator has co-located his equipment at an exchange of the incumbent, all customers served by that exchange will have a choice of switching to the service provided by that new operator. However, a survey conducted by Audit in November 2001 has revealed that this is not the case. In fact, for 30% of the residential addresses selected for the survey, Audit received a "no service" response from

¹⁹ Audit Commission of the Hong Kong Special Administrative Region (March 2002), *Report No. 38 of the Director of Audit – Chapter 1: Liberalization of the Local Fixed Telecommunications market* (<http://www.info.gov.hk/aud/english/e38ch01.pdf>), Hong Kong

all the three new operators. OFTA has undertaken to follow up the audit findings. Furthermore, even if a new operator tells a customer that service is available, the success of the customer's switching to the service of the new operator depends on the incumbent's acceptance of the new operator's application for interconnection for the residential line concerned. Audit considers that, for management information purposes, there is a need for OFTA to collect, analyze and report on a regular basis, statistics of the incumbent's rejections of the new operators' applications for interconnections."

3). Difficulties Relating to Interconnection Negotiation

"Interconnection is a prerequisite for opening up the local telecommunications market to competition. Audit's case studies indicate that interconnection problems in Hong Kong, like those in other countries, often took a long time to resolve. In the interest of promoting effective competition, Audit considers it necessary for OFTA to find ways of shortening the time taken to conclude the interconnection negotiations. Audit's research indicates that many countries publish relevant particulars of interconnection, in the form of reference interconnection offers (RIOs), which facilitate interconnection negotiations and promote transparency. Some countries also require the operators to publish their interconnection agreements."

4). Streamline the Process of Determination

"The TA is empowered under the Telecommunications Ordinance to determine the terms and conditions of interconnection. Audit's analysis of some completed cases indicates that the process of determination took, on average, about 15 months to complete. Audit considers that there is a need for OFTA to closely monitor the progress of all determination cases to ensure that they are completed as soon as possible. Audit also considers it necessary for OFTA to carry out a detailed post-determination review of the completed cases to ascertain the reasons for the long processing time. Audit notes that, for cases received in or after September 2001, time limits have been set for their completion (i.e. 4¾ months for normal cases and 6½ months for complex cases). Audit welcomes this improvement. Audit considers that, for those in-progress cases received before September 2001, time limits should also be set to ensure that they are completed as soon as possible."

5) Need to closely monitor compliance with the 1998 Framework Agreement

"According to the 1998 Framework Agreement, the incumbent should not increase the monthly rental charge for his residential lines until exchanges that served at least 50% of the residential lines were made ready for access to the new operators by 1 January 1999. The Framework Agreement also specified certain circumstances under which the incumbent would be deemed to have fulfilled this "50% requirement". However, Audit could not find documentary evidence in OFTA's records indicating that OFTA had verified that the incumbent had fulfilled this requirement, before the TA approved the increases of monthly rental charge in August 1999 and December 2000. Audit also noted that there was evidence of delay in the co-location of the exchanges in question. In response to OFTA's enquiry, in January 2002 the incumbent indicated that he had

discharged the obligations under the Framework Agreement, and that he was not responsible for the delay. Audit considers that there is a need for OFTA to conduct a thorough post-implementation review of the Framework Agreement, in consultation with the parties concerned, so as to establish whether the incumbent had fulfilled his obligations and to identify lessons for future reference.”

8. CONCLUSION

This paper has provided a review of the liberalization of Hong Kong’s local fixed network market, from a heavily subsidized sector due to efforts to fulfill the government’s political objective of achieving universal service to a increasingly competitive market aimed at providing universal choice – a more aggressive policy objective crucial to guarantee the sustainability of universal service. Experience in Hong Kong indicates that installing local network competition is a feasible policy choice as long as the market distortion is eliminated and the regulator is effective in tackling bottlenecks, such as Type II interconnection. This Audit project might be the first one on local network liberalization, and the observations and recommendations resulting from this project reported on in this paper may have implications for regulatory policy elsewhere in the world.