

# **TELECOMS INFOTECHNOLOGY FORUM**

**Interconnection Revisited: Time for a Change or Not?**

Also

**Telecoms and SARS: Any Lessons**

July 8, 2003

Bloomberg Auditorium

**SUMMARY PAPER**

## Telecoms InfoTechnology Forum

Interconnection Revisited: Time for a Change or Not?

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Telecoms & SARS: any lessons?

**Type II Interconnection:** no topic is more important or disputed in telecoms than interconnection, especially at the local loop, otherwise known as unbundled local loop and in Hong Kong as Type II interconnection. This is especially true when the customer access network (CAN) is broadband, defined in Hong Kong as a telecom transmission medium above 144 Kbps. Core network interconnect (in Hong Kong called Type I) is universally accepted, although in the age of the WWW indirect interconnect through Internet is also feasible. Should that be the approach to broadband interconnect? The broadband market is increasingly competitive with low end user rates and over 40 per cent household penetration. Should unbundled loops be unavailable or sold at competitive market prices only? Should they be regarded as an essential facility? Are they a bottleneck? Should new entrants be treated differently from ISPs? In February 2003 the FCC in the USA voted to abolish unbundling for broadband networks on the grounds it discouraged investment by the incumbents and encouraged wholesale buying rather than building by the new entrants. Should Hong Kong now follow the FCC example? If yes, what are the consequences for competition? If not, should the principles of network charging be changed? For example, should there be a shift from LRAIC (long-run average incremental cost) to something closer to FDC (fully distributed cost)? How does Hong Kong compare with other economies? What do the economics of network construction look like? Is the reference model outlined in OFTA's April 1999 Statement *Type II Interconnection Between New World Telephone and Hong Kong Telephone* still relevant?

**SARS:** has telecoms and IT played any significant role in the fight against SARS? Video-conferencing helped relatives keep in touch with patients, and some authorities used digital tags and video to monitor quarantined cases. Companies made greater use of teleworking, while colleges made use of e-learning. SMS and websites were both widely used to spread news and rumours. How effective were these measures, and will they have any lasting effects?

**Venue:** Bloomberg Auditorium, 27/F Cheung Kong Centre  
2 Queen's Road Central, Central

**Time and Date:** 2 – 5.30pm Tuesday 8 July, 2003

### 2 – 3.45 pm - Panel One: Hong Kong's Type II Interconnection Policy Review

- MH Au, Deputy Director-General of Telecommunications, OFTA – Time for a change or not?
- Stuart Chiron, Director of Regulatory Affairs, PCCW-HKT – Time for a change in principle?
- Agnes Tan, Director of Legal, Regulatory and Carrier Affairs, Wharf T&T – Time for a change in practice?
- Ricky Wong, Chairman, HK Broadband Network – An alternative network approach?
- Dumas Chow, General Counsel, New World Telecom – A mix strategy?
- York Mok, HKNET and Chairman, HKISPA – An ISP's view

**3:45 – 4:15 pm – Coffee Break**

**4.15 – 5.30 pm - Panel Two: Any lessons from SARS? Did telecoms and IT help? Can it do more?**

- Sin Chung Kai (Legco) to chair a roundtable discussion, including (i) role of telecoms and IT in the Hospital Authority –Raymond Cheung, Senior Systems Manager, Information Technology Department, HA (ii) role of teleworking (Lawrence Ma, Senior Manager of Operations, HP Services), (iii) e-learning – Dr Nancy Law, Director of the Centre for Information Technology in Education, Faculty of Education, HKU (iv) role of mobile information communications – Henry Wong, Group Director, New Technologies, Sunday Communications)

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QUARTERLY MEETING  
July 8, 2003



## **Participant list**

AFX Asia Financial News	Raymond Lo
Alcatel China Ltd	Eric Ng
Alcatel China Ltd	Leo Ko
Alcatel China Ltd	Ricky Ma
Alcatel China Ltd	Venny Tang
Alcatel China Ltd	Wilfred Chiu
Allen & Overy	Anna Gamvros
Allen & Overy	Annie Chung
Allen & Overy	Claire Wright
Allen & Overy	Grace Ng
Apple Daily Limited	Wisery Ho
BOCI Research	Allan Ng
British Consulate - General	Kimmy Lee
China Netcom (HK) Operations Ltd	Li Xiao Yan
China Wireless Communications	Edward Leung
Cisco Systems (HK) Ltd	John Mak
Cisco Systems (HK) Ltd.	Zoe Lou
Clifford Chance	Yvonne Chui
CLP TeleCom	Ha Kam Bo
Commerce, Industry and Technology Bureau	Gracie Foo
Commerce, Industry and Technology Bureau	Linda So
Consulate General of Japan	Hiroyuki Hishinuma
DLA	Peter Tse
Freshfields Bruckhaus Deringer	Connie Carnabuci
Freshfields Bruckhaus Deringer	Jun Wong
Goldman Sachs Asia	Tim Storey

HKNet	York Mok
HKTUG	Simon Chan
HKU	Dr Nancy Law
HKU	Elaine Wong
Hong Kong Baptist University	Georgette Wang
Hong Kong Baptist University	Ringo Ma
Hong Kong Broadband Network Ltd	Daniel Lo
Hong Kong Broadband Network Ltd	Fion Fung
Hong Kong Broadband Network Ltd	Jessie Cheng
Hong Kong Broadband Network Ltd	Ricky Wong
Hong Kong Commercial Broadcasting Co., Ltd	Nicole Lo
Hong Kong Commercial Daily	To Hon Sang
Hong Kong Commercial Daily	Tony Cheng Yiu Chung
Hong Kong Daily News	Joe Lee
Hong Kong Polytechnic University	Dr. Lam Pun Lee
Hong Kong University of Science and Technology	Xu Yan
Hospital Authority	Patrick Chan
Hospital Authority	Raymond Cheung
HP Services	Jonson Yue
HP Services	Lawrence Ma
Hutchison Global Communications Limited	Carrie Chan
Hutchison Global Communications Limited	Charles Yip
Hutchison Global Communications Limited	Louise Lee
Hutchison Global Communications Limited	Mary Cheah
Hutchison Global Communications Limited	Thomas Yau
Hutchison Telecom	Desmond Cheung
Hutchison Telecom	Sang Yip
IBM China/Hong Kong Ltd	Christine Ng

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Infocast	Chui Yee Kwok
ING Securities Limited	Leon Chik
Inroads	Anwar McEntee
Invest Hong Kong	Nicole Yuen
Invest Hong Kong	Vanessa Tang
Kintak Enterprises Limited	Norman Wingrove
KPMG Management Consulting	Jasmine Liu
KPMG Management Consulting	Queenie Chang
Legislative Council	Hon SIN Chung Kai
Lovells	Gabriela Kennedy
Lovells	Michael Robertson
McKinsey & Company	Alan Lau
Merill Lynch (Asia Pacific) Ltd.	Agnes Ho
Metro Finance	Kanas Chan
Ming Pao Newspapers Limited	Frederick Yeung
Ming Pao Newspapers Limited	Ken Lo Yiu Keung
Minji Koo Consulting	Minji Koo
New World Telecommunications Limited	Dumas Chow
New World Telecommunications Limited	Edward Lee
New World Telecommunications Limited	Eva Tang
Nomura International Limited	Kelvin Ho
OFTA	Edward Whitehorn
OFTA	Joy Ng
OFTA	M H Au
Oriental Daily News	Ivan Ho
Pacific Century Cyberworks	Helen Li
Pacific Century Cyberworks	Louis Ting

Pacific Century Cyberworks	Peter Lam
Pacific Century Cyberworks	Stuart Chiron
Pacific Century Cyberworks	Tang Wing Ho
Pacific Supernet Limited	Cecilia Chan
Pacific Supernet Limited	Charles Liu
PricewaterhouseCoopers	Benjamin Azada
PricewaterhouseCoopers	Gloria Ho
PricewaterhouseCoopers	Teresa Chow
Reuters Hong Kong Ltd.	Cyril Chui
Sing Pao Newspaper Company Limited	Chow Wing Hung
Singapore Telecom HK Limited	Michael Cheng
Smartone Mobile Communications Ltd	Eric Lee
State Publications Limited	Edward Leung
SUNDAY Communications Ltd	Henry Wong
SUNDAY Communications Ltd	Stella Wong
Telecom Asia	Robert Clark
Telecom Italia	Andrea Anselmo
Telecom Monthly	Ben Tse
Telecom Monthly	Fu King Wa
Telecom Research - Asia-Pacific	Graham Mead
Television Broadcasts Limited	Wong Hing Hang
The Society of Hong Kong External Telecommunications Service Providers	Cherry Lee
The Standard	Georgina Lee
The Sun	Alton Chi-yeung Yam
TraxComm Ltd	Paul Ho
University of HK	Yip Hak Kwong
Wen Wei Po	Branco Wong
Wharf T&T Limited	Agnes Tan

Wharf T&T Limited

Charles Wong

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Karen Lau

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Patrick Ip

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Tony Cheung

## **Interconnection Revisited: Time for a Change or Not?**

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## **Telecoms and SARS: Any Lessons?**

### Executive Summary

1. Few issues are more contentious between network operators than that of unbundling the local loop, known in Hong Kong as Type II interconnection. Narrowband unbundling has been enforced since 1995 followed by an agreement in 1998 between PCCW-HKTC and NWT, endorsed by OFTA, setting the monthly wholesale price at HK\$42 per month. OFTA declared in 2001 the unbundling of broadband, however NWT's request for a determination of the wholesale price from the TA has been on hold since the start of the current round of consultation. PCCW-HKTC currently charges HK\$198 per month, the same as the retail price charged by its ISP, Netvigator, and OFTA has apparently suggested HK\$95.
2. The issues are straightforward. First, should narrowband unbundling be continued, phased out or capped, and should the cost-based price be shifted from LRAIC + an element of shared costs to one including indirect costs and towards FDC? Second, should broadband be exempt or included? Third, should the essential facilities doctrine and a bottleneck test be adopted by OFTA when determining when and where unbundling is appropriate?
3. In opening the forum **M.H.AU, the newly appointed Director-General of OFTA**, elaborates on these issues. He notes that by July 2003 new entrants had achieved around 20 per cent market share of PSTN between them, around half by Type II interconnection, that is 8.6 per cent of all customer loops. By international standards this is already high. By contrast PCCW-HKTC's share of the broadband market was down to 55 per cent, with cable providing the lion's share of the competition and hardly any Type II interconnection. He raises questions to which the consultation process invites answers, including the possibility of a sunset provision on unbundling, for which there are precedents elsewhere, and how appropriate is the essential facilities doctrine and what are the criteria. For example, (i) is the facility essential? (ii) is it a bottleneck in the exchange and/or in the building? (iii) is the facility a bottleneck for narrowband and/or broadband services? He further questions whether unbundling should be extended to fibres, to ducts for fibre or channels inside fibres, noting that coaxial systems are currently included because they are copper. Where the barriers to entry are economic rather than physical, do they apply to all geographical areas or just to remote and rural areas? The policy review is expected to be complete by early 2004.
4. **Stuart Chiron, Director of Regulatory Affairs, PCCW-HKTC** who sponsored this forum, argues for a competition policy approach based upon the criteria of how competitive a defined market is, how essential is a facility to the delivery of service, and how easily can it be replicated legally, economically and/or physically. This

contrasts with the build-buy decision criteria currently used by OFTA [which logically implies there is a price that would make a network indifferent between building their own facilities and renting circuits from the incumbent. See also the TIF Background Briefing Paper that questions this approach – ed].

5. Underpinning **Stuart's** approach is a focus on the need not to disincentive network investment, something every incumbent will argue is the consequence of unbundling the local loop. For this argument to hold water he needs to convince OFTA this coincides with consumer interests, as well as raising concerns about the free-rider problem, or the distinction between what he terms 'investors versus non-investors.' Later Wharf T&T, NWT and HKBN pointed to a total of nearly HK\$8 billion of investment between them. So the issue in Hong Kong really seems to be about whether or not the new entrants (a) have had sufficient time to establish themselves and bring tangible benefits to consumers, and (b) should expect unbundling as a right, or as a last resort where the essential facilities case can be made. **Stuart** dismisses the first proposition by pointing out that the language of the FTNS licence conditions sections 36A and 36AA says "may" and not "shall" so in law and policy mandated unbundling is at the discretion of the regulator. In the early years the issues were really about rolling out the networks and overcoming bottlenecks such as road opening for ducts and access to in-building block wiring. Both these problems no longer exist. The essential facilities doctrine would cater for exceptional cases.
6. The fact that Hong Kong stands second only to South Korea in terms of broadband penetration, and that PCCW-HKTC commands only 55 per cent of the market without any effective unbundling to date is cited by **Stuart** as evidence that unbundling is already unnecessary in the broadband market, not least so because of the extremely low by international standards of broadband retail charges. The success of unbundling in the narrowband market requires a sunset provision and a cap on future unbundling.
7. **Agnes Tan, Director of Legal, Regulatory and Carrier Affairs, Wharf T&T** took an opposite view. For Agnes the fact that Hong Kong had achieved so much with unbundling was evidence of the success of the policy and the need to continue it. It is working well for 300,000 non-PCCW-HKTC customers and the idea of denying them choice of service by phasing out unbundling would be anti-consumer. She asks the question: 'why are we retracting from a policy which helped us to get where we are today?' She notes Wharf T&T has invested over HK\$4 billion, and the strategy is selective in terms of build or buy because 'investment we think would be better spent where it is really needed, it is called smart investment.' And she cites Anthony Wong, the ex-Director General of OFTA who recently warned of the dangers of over-investment and falling rates of return.
8. **Agnes** argues that rather than abandon Type II it needs improvement in many areas, such as delays in porting fixed line customers, the time it takes to cut-over local access lines (LALs) when subscribers change their operator and unbundling is involved, and why discounts are not available on wholesale prices for bulk ordering.

One-off installations of LALs in urban areas cost HK\$475 with monthly rental at HK\$42 and in rural areas HK\$680 with monthly rental at HK\$111. Full broadband LAL currently costs HK\$1,491 for installation and HK\$198 monthly rental, yet the incumbent waives installation charges for business customers and charges residential customers only HK\$530. The incumbent retails broadband at HK\$198 so this is a 'classic case of vertical price squeezing.' Under these circumstances abandoning Type II would force Wharf T&T to undertake a laborious review of the costs and benefits of building the last mile to tens of thousands of buildings and hundred thousands customers. 'In practice, I cannot imagine it being done at all. It would present enormous inconvenience to consumers.' To which **Stuart** later replies 'But that is what investment is all about.'

9. **Ricky Wong, Chairman of City Telecom and Hong Kong Broadband Network** represents a carrier without Type II rights. Making a virtue out of necessity, HKBN has pioneered a Metro Ethernet network offering broadband services to around 150,000 on top of City's core IDD business and nearly 50,000 telephone subscribers - [recent estimates of subscribers of other networks are: PCCW-HKTC 3,138k, Wharf T&T 340k, HGC 193k and NWT 124k – ed] – investing HK\$1.2 billion. **Ricky** makes his points very simply. He has found no bottlenecks in any buildings in Hong Kong, new or old, and has photos to prove it, which **M.H.** later describes as 'quite convincing'. But **Ricky** adds it remains costly to wire them. He refers to OFTA's proposal for a broadband Type II interconnect monthly fee of HK\$95. 'I wish MH to allow us to use that broadband Type II arrangement so that we can stop all our investments just using that broadband Type II, I would live to see that. Also I think my share price would go up another 20 per cent...'
10. **Dumas Chow, General Counsel, New World Telecom** joined sides with Wharf T&T as another smart investor, having invested HK\$2.5 billion in the transmission backbone. 'To date half of our local access lines are self-built and half of them are provided under the Type II interconnection arrangement.' **Dumas** emphasizes that OFTA first indicated in November 2000 that broadband unbundling would become policy, yet even now it 'is still not widely available.' He claims that DSL deployment in Hong Kong compared with jurisdictions that started unbundling after Hong Kong is poor 'mainly due to the lack of competition.' This, of course, is competition from telecoms, not from cable.
11. For NWT the real issue is wholesale pricing. NWT support cost-based pricing but doing the sums is difficult because 'it is often very difficult to ascertain the true cost components of the incumbent's service. It is partly because there is no structural separation of the incumbent's wholesale and retail operations in Hong Kong.' So Hong Kong needs to 'develop a stronger wholesale mentality' and structural separation would force PCCW-HKTC to price at cost equally to all retailers. The alternative is to enforce strict accounting separations 'that allows third parties to accurately ascertain the costs associated with the incumbent's wholesale and retail operations.' **Dumas** cites the ACCC in Australia as an example to follow. OFTA's response would most likely be that subject to commercial secrecy, the regulator

undertakes these assessments during a determination, which may explain the HK\$95 Ricky Wong cites above. Stuart's response is "Divestiture, silly, I will not address it."

**12. York Mok Chairman of the HK Internet Service Providers Association**

**(HKISPA) and HKNet** shares with Ricky Wong the position of not having Type II interconnection prices available to him, but unlike Ricky, York also has no network. The role of ISPs is one that can be curiously under-rated. They are in many respects the market makers, and in driving broadband adoption they could play a significant role in the future health of the market. In Hong Kong most of the handful of tier one ISPs the vertically owned retails arms of cash rich carriers, domestic and foreign, such as NTT in the case of HK Net. Other ISPs are just too small to benefit from the scale required to justify risky investment in services that go beyond basic access, email, etc. For this reason few ISPs in Hong Kong see good reasons to invest, and almost all are reliant on PCCW-HKTC's wholesale network because HGC, Wharf T&T and NWT 'do not have any wholesale model for ISPs.' And with HKBN 'we have to talk with them case by case begging for the support of the service.' This leaves the ISP as 'the meat inside the hamburger' subject to simultaneous pressure from the wholesale and retail sides which are mostly 'under the same company.'

13. **York** suggests 'the industry and OFTA try to make full use of ISPs to facilitate the deployment of the telecom and Internet networks and eventually pass the benefits on to the consumers in the long run.' To approach this issue he asks 'Do we have any plan to wholesale the network to the ISPs? I think that is the question for MH to consider.' In response to a later question, **York** agrees with NWT's suggestion of a structural or accounting separation. Clearly the wholesale issue is one that the review will need to examine, an issue delayed when the determination process was put on hold. If unbundling is abandoned, this does not necessarily imply that PCCW-HKTC isn't dominant in the market. OFTA could even consider whether market makers such as ISPs should be treated differently from FTNS operators.

14. During the debate **Dr Xu Yan** from HKUST argues that OFTA should stick to a 'pro consumer' position and avoid the trap of becoming a 'pro-investor' regulator that could lead to all kinds of controversy. Does this suggest a cold dose of 'a plague on all your houses' response to the networks? Not so suggests **M.H.Au**, 'but we must distinguish between the ends and the means. So there is no policy to encourage investment, to put fibres in the ground, also there is no policy to encourage a service-based competition.' Rather, 'we are trying to answer one very basic, simple question, whether consumers are better off with or without Type II interconnection policy.' Back to the network operators! Can they argue with OFTA that it is in the consumers' interests to pursue investment-friendly policies? The problem is what is investment friendly for the new entrants may not be investment friendly for the incumbent. Exactly Xu Yan's point.

15. Another participant suggests the criteria by which OFTA should judge whether to interfere with the market through a determination, for example on wholesale pricing, could be written into the Ordinance. Legco IT constituency representative, Sin Chung

Kai asks what the operators think would be a fair price for Type II interconnect. **Ricky Wong** would happily pay HK\$60 for narrowband and HK\$150 for broadband on the grounds he could make an arpu of HK\$4-500 a month on services! **Agnes Tan** argues that broadband interconnect should cost no more than narrowband, 'after all, we are talking about the same physical piece of wire'. In response, **Stuart Chiron** suggests Hong Kong unbundled rates are already perhaps half or one third of those in similar jurisdictions, suggesting that although the original narrowband contract was for HK\$60 when the retail price was HK\$69, 'because of political pressure' this came down to HK\$42 per month. Not surprisingly he suggests PCCW-HKTC's competitors should be happy with OFTA's proposal of HK\$95 for broadband. [The TIF Briefing Paper notes that EU average narrowband unbundled monthly rental prices are €12.8 compared to Hong Kong's €5, but the EU average for broadband is a surprisingly low €5.6 compared to Hong Kong's €22, so even HK\$95 would seem high by comparison. But are we comparing apples with apples here? – ed]

16. The unbundling debate in Hong Kong is an important one. It comes at a time when new entrants are making deep inroads into the incumbent's PSTN market, but are surprisingly reticent about broadband, leaving it mainly to cable to make the running. This will change, but it is a complex question involving issues of content and scale of markets in addition to the build-buy decision. The debate also comes at a time when the FCC in the USA has abandoned unbundling for broadband and is split over the issue for narrowband. Finally, there is the thorny issue of consumer benefit and to what extent other aspects of policy, such as private sector investment, Hong Kong's role as a hub and the promotion of a content and applications sector, should be factored into the equation. The regulator is undertaking the review, not the policy bureau, and that may make a difference.

### Telecoms and the Fight Against SARS

17. Unusually the forum hosted two debates in one afternoon, but SARS was an unusual event and the role of telecoms and IT in helping combat the disease and its effects on the community are a topic of special interest. Legco IT Constituency member **Sin Chung Kai** chairs the session, pointing to the rapid rise in the use of the Internet and other forms of online communications during the SARS outbreak. And one participant noted that China had been washing bank notes to combat SARS, giving a new meaning to 'dirty money'. In Hong Kong the Octopus card avoided that problem.
18. **Raymond Cheung, Senior Systems Manager, IT Department, Hospital Authority** was the first panelist. He describes the complex and large IT systems run by the HA and how they were used to help medical staff, patients and their close friends and relatives during confinement. About the future Raymond explains 'right now we are feeding SARS clinical data into our data warehouse facility to support further research and investigation.'
19. **Lawrence Ma, Senior Manager of Operations, Hewlett Packard Services** explains how HP was already using a 'Next Generation Office' concept alongside a highly integrated IT communications system that well prepared the company for the

emergency when one staff member caught SARS. Lawrence gave four valuable steps of advice. First, 'a regular review of the Business Continuity Plan is a must. Secondly, a scalable and adaptive infrastructure that can expand in a timely manner is also critical. Thirdly, communication with the people is very important too so that we can stop the rumours before the spread. Finally, get ready before it is too late.'

20. **Dr Nancy Law, Director of the Centre of IT in Education, University of Hong Kong**, follows with a look at how going online with e-learning became more widespread during SARS. But her message echoes the lessons from HP in that she argues IT does not play the role of a catalyst to kick start going online, but 'can increase the momentum' of previous initiatives and preparatory steps. Teachers who have already experienced the use of e-learning are better able to adapt to the situation, so the key is not the IT side but the people side.
21. She offers three observations in this regard. First, the conditions must be right in colleges and schools to encourage staff to experiment with e-learning methods. This could refer to the culture of the institution and to the organization of IT support for staff unused to going online. So 'IT readiness is one key condition for the technology to be used.' Second, a paradigm shift needs to take place if schools and colleges are really to make e-learning an integrated part of the educational process. For example, e-learning can offer new ways of learning but mostly teachers use Web sites and platforms such as CT Web simply as an extension of their existing ways to deliver lecture notes and assignments to students. In a paradigm shift e-learning should embrace a more interactive approach. Third, online education poses new problems, for example is it possible to examine students online? How would the examination be authenticated? One school in Canada used online communications to ask the students how they would deal with this problem which is a good example of learning as you go.
22. Finally, **Henry Wong, Group Director, New Technologies, Sunday Communications**, outlines the experience of the mobile phone operators and gives three examples of initiatives taken by Sunday. The first was real time information about SARS to keep the public in the picture. Second, as SARS became more serious, a log of infected buildings across Hong Kong. Third, Sunday donated handsets and SIM cards to hospitals to keep patients maintain contact from their isolation wards, a service called 'Family Watch'. On the corporate side Sunday saw more small companies wanting to organize work from home using a VPN for mobile communication rather than using a computer.
23. During the discussion period the panelists were asked how permanent any of the changes might become. **Lawrence Ma** confirmed that many companies have been asking for VPN facilities and it is therefore interesting to speculate that while larger companies may consider the Next Generation Office or mobile office or virtual office concept, SARS may have the effect of encouraging smaller companies to go online and network for themselves. **Dr Nancy Law** suggested that while business changes

were driven by the compulsion of the marketplace, in education change came about more by changing people's conceptions.

24. Either way, it seems that the processes are not too different. Stage one is preparation, readiness. Stage two is managing through the crisis by using IT to do the same things as before. Stage three is realizing that IT can allow you to do more things. In education it is using IT to promote interactive learning. In business it may be migrating towards small VPNs and integrated networking. And all through the important point is people and information, keeping people well informed. That is perhaps the most important lesson of all, using telecoms and IT to give people access to information that can be verified and supported by independent searching. At least SARS has taught us that lesson, and we can only hope that it does become a lesson learned.