

Third Generation (3G) Auctions for Hong Kong?
The Lessons from Overseas

9.00am – 12.30pm, Monday 18th September 2000

Bloomberg Auditorium
27/F, Cheung Kong Centre

Bloomberg may video the debate and use it for their online news and information service.

- 9:00 – 10:15** **Guest Keynote Speaker: Professor William H. Melody**, Professor, Delft University of Technology, NL; Editor, *Telecommunications Policy*; Chair, International Advisory Board, Center for Tele-Information, Technical University of Denmark; former Chief Economist at the US FCC; former head of CIRCIT research center at the Royal Melbourne Institute of Technology, Australia, and the Information and Communication Technologies (PICT) Network, UK.
Discussants: Steve McKay, Senior Vice-President, Web Solutions, chinadot.com, Sin Chung-kai, IT Functional Constituency Member, Legco
- 10:15 – 10:45** **Coffee Break**
- 10:45 – 11:30** **Panel: Stephen Brown, Head of Research, Kim Eng Securities**
Craig Ehrlich, Group Managing Director, SUNDAY
John Ure (Telecoms Research Project, HKU)
- 11:30 – 12.30** **Panel Discussion**

The UK 3G auctions raised US\$34 billion against conventional business model evaluations of £1.5 – 2 billion. The German auctions US\$46 billion, but the Dutch and New Zealand auction prices were very low. What are the lessons for Hong Kong? Auction, beauty contest, reverse auction? But

Are auctions really economically efficient?
Do auctions weaken regulation?
Do high auction prices hinder market development?
Are reverse auctions, used for 2G, suitable for 3G?
Where will the 3G revenues come from?
And who will they go to?
Is the DoCoMo model relevant to Hong Kong?

The Telecoms InfoTechnology Forum is pleased to announce that Professor William Melody, a renowned telecommunications economist and scholar will be the guest keynote speaker to lead us into the final round of debate that will be triggered by the publication of OFTA's second consultation paper.

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LIST OF PARTICIPANTS

8 Layer.com	Raymond Wong
Agilent Technologies	Anne Yeung
Agilent Technologies	Michael Chan
Alcatel China Holding Pte Ltd	Ambrose Lo
Alcatel Network	Henry Woo
Alcatel Network	Jean-Francois Pigeon
Alcatel Network	Rockies Ma
Allen & Overy	Jane Ng
Allen & Overy	Stella Cramer
American Consulate General	Geoffrey Pyatt
Apple Daily Limited	Ching Chi Yuen, Dickson
Apple Daily Limited	Yau Sin Yue, Charis
Asia Satellite Telecommunications Co Ltd	Peter Jackson
Asian Information Resources Ltd	Jo Jo Tam
AVITEL Ltd	Eric Spain
Bank of America	Ping S. Lam
Bird & Bird	Howard Womersley Smith
blu spa	Mike Wilder
BT (Hong Kong) Limited	Rick Tang
Canadian Imperial Bank of Commerce	Helen Liu
Canadian Imperial Bank of Commerce	Maureen Kwok
CCT Teligent	Tammy Ng
CCT China Investment Ltd	Amy Shao
CCT China Investment Ltd	Tsang Wai Hong
CCT China Investment Ltd	W. K. Li
CCT China Investment Ltd	Wong Koi Hin
CNBC Asia	Kyoko Altman
cnYES.com HK Ltd	Yvonne Lee
Coast Asset Management	Vincent H. Messina
Consulate General of Canada	Brian Wong
Consumer Council	Victor Hung
Cyber Datalive Ltd	Rebecca Y T Lam
Deacons	Charlotte Kong
Deacons	Peter Burge
Deacons	Piera Lam
Delft University of Technology	William H. Melody
ET Net Limited	Bianca Tse
Far East Gateway Ltd	K W Au
Far East Gateway Ltd	Stephen Lai
Finet Online	Ken Chan
Golin Harris Forrest	Sauw Yim
Hikari Tsushin International Ltd	William Li
HKiMail	Lo Pui Kwan
HKiMail	Roger Evers

HKNet Co Ltd	Johnny Yuen
Hong Kong Economic Journal	Eddie Lee
Hong Kong Economic Journal	Leung Yun Charm
Hong Kong Trade Development Council	Loretta Wan
HSBC Asset Management (HK) Ltd	Paul Chow Man-Yiu
HSBC Securities Asia Ltd.	David Yip
ICO Limited	William Chan
Infocast	Chui Yee Kwok
Information Technology & Broadcasting Bureau	Gracie Foo
Information Technology & Broadcasting Bureau	Linda So
Institute for International Research	Michael Charrington
KDD Telecomet Hong Kong Ltd.	Dora Leung
Kim Eng Securities	Stephen Brown
Kintak Enterprises Limited	Norman Wingrove
Koo & Partners Solicitors & Notaries	Linda Lee NGAN
KPMG Management Consulting	Kevin Mc Guirk
Legislative Council	Sin Chung Kai
Matrix Global Investments Ltd	John Hsu
Matrix Vector Limited	Malcolm Tam
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Merill Lynch (Asia Pacific) Ltd.	Francis Cheung
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Next Media Limited	Howard Hsu
Office of the Telecommunications Authority	Chaucer Leung Chung Yin
Office of the Telecommunications Authority	Christa Leung
Office of the Telecommunications Authority	Desmond Young
Office of the Telecommunications Authority	Elaine Hui
Office of the Telecommunications Authority	Eric Lam
Office of the Telecommunications Authority	Francis Chan Wai Ming
Office of the Telecommunications Authority	Ricky Shum
Office of the Telecommunications Authority	Thomas Wong
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Office of the Telecommunications Authority	Yiu Siu-Keung
Oriental Daily News	Harrison Poon
Pacific Century Cyberworks	Norman Lau
Pacific Century Cyberworks	Eva Chan
Pacific Century Cyberworks	John Lau
Pacific Century Cyberworks	L K Lo
Pacific Century Cyberworks	Stuart Chiron
Paul, Weiss, Rifkind, Wharton & Garrison	Corinna Yu
Pricewaterhouse Coopers	Ajit Rangnekar
Pricewaterhouse Coopers	Ian Sanders
Quam HK Limited	Eric Lee
Radio Television Hong Kong	Alex Lee

Royal Norwegian Consulate General	Kamilla Kolshus
SCMP.Com Limited	Jean Chua
Smartone Mobile Communications Ltd	Andrew Chan
Smartone Mobile Communications Ltd	Ivan Leung
Smartone Mobile Communications Ltd	Katherine Kwan
Smartone Mobile Communications Ltd	Law Kin Kwok
Smartone Mobile Communications Ltd	Luk Kin Keung
Smartone Mobile Communications Ltd	Patrick Mak
South China Morning Post	Ben Kwok Ka-kit
South China Morning Post	Garrige Ho
Sunday	Bruce Hicks
Sunday	Craig Ehrlich
Tai Fook Research Ltd	Patrick Z.Tam
Tai Fook Securities Company Ltd	Grace Cheng
Television Broadcasts Limited	P N Leung
The Frontier	Emily Lau
The Hong Kong Council of Social Service	Edmond Keung
The Hong Kong Polytechnic University	Dr. Lam Pun Lee
The Hong Kong University of Science and Technology	Kar Yan Tam
The Sun	Alton Chi-yeung Yam
Trade and Industry Department	Chow Kun Chun
Trade and Industry Department	Herman Kwan
Transpac Capital Ltd	Simon Wong
Western Asset	Jeffrey T. Katz
	Christopher Slaughter

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Executive Summary

1. The first session of this TIF is devoted to a keynote address by renowned international telecommunications scholar **Professor William Melody**, Delft University of Technology, Netherlands, and Chair of the International Advisory Board of the Center for Tele-Information, Technical University of Denmark. The address is reproduced in full below, with Prof Melody's powerpoint bullet points indicated in **bold**. His address is followed by Q&A led by discussants **Steve McKay**, senior vice-president of **Web Solutions, chinadot.com**, and **Sin Chung-kai**, re-elected IT functional constituency member of **Legco**. The second session is devoted to Q&A with panelists **Stephen Brown**, head of research, **Kim Eng Securities**, with **Craig Ehrlich**, group managing director, **SUNDAY**, and **John Ure**, director of the **Telecommunications Research Project, University of Hong Kong**. TIF wishes also to thank **SUNDAY** who were the sponsor of the forum, and Bloomberg for the use of their auditorium.
2. This TIF followed on from a 3G forum organized by the Telecommunications Research Project in June (also hosted in the Bloomberg auditorium) which debated the pros and cons of auctions, beauty contests and raised the fundamental question of what exactly is 3G and what exactly are auctions auctioning? (A question widely overlooked in these debates.) What is really interesting about the TIF debate (below) is that views began to converge. A broad consensus emerged that (a) auctions did not need to be only about who pays the highest price, but can embrace many other elements, such as commitments to low wholesale or service prices, to network rollout schedules and coverage, and (b) that policy decisions need to start with defined policy objectives, and that in the case of 3G broadband mobile internet access the principal objective should be a competitive market structure.
3. The issue of policy objective was perhaps the most important point of agreement arising from the forum. For example, several speakers, including Stephen Brown, pointed out that a highly competitive market structure is inconsistent with high auction prices for 3G licences, which places the money raising aspect of auctions on a collision course with this objective. This theme is strongly demonstrated in Prof Melody's presentation of the history of the thinking behind the move away from the early 'beauty contest' approach of the US Federal Communications Commission towards the issuing of spectrum to the TV and radio sectors.
4. One argument that has been raised time and again by advocates of the straightforward highest-bid price auctions, as were run in the UK and Germany and which raised US\$34 billion and US\$46 billion respectively, is the claim that licence prices represent sunk costs

which cannot be passed on to consumers in competitive markets. The forum brought out two critiques of this argument, one a price-side or demand-side critique and one a quantity-side or supply-side critique. The price critique, offered by John Ure, suggests the argument only holds water if (a) the market is indeed competitive, and (b) if the market is price inelastic. Initially low prices may stimulate the market, but then licencees are bound, under pressure from stakeholders, to try to factor in cost recoupment of investment. Only if the market were entirely price inelastic would market growth rates remain unaffected. (Note: initially low prices imply, under this scenario, they are below cost-recoupment levels.) The quantity critique is raised by Prof Melody who notes the burden of financing the cost of licences bought under a high-price auction, which in the UK and Germany are estimated to be around four times greater than actual 3G network buildout costs, raises the riskiness of network buildout and will therefore restrict network buildout to higher income/revenue areas and customers. Lower the financial costs lower the risk threshold and increase the scale of optimum rollout and coverage. Prof Melody illustrates his concerns by quoting the equipment manufacturers who have substantially lowered their market expectations subsequent to the auctions in the UK and Germany.

5. Governments who opt for high-price auctions and simultaneously argue for competitive market structures are in risk of ending up with oligopolies instead. Prof Melody points out that effective price competition rarely kicks in in the mobile markets until at least six licences have been issued, and that certainly accords with the experience of Hong Kong in 2G. The argument for a 'slow-fuse' to competition usually relies upon the need to provide an incentive to risky investment, and for 2G a case could be made out (not necessarily a convincing one) for delaying the issuing of additional licences until the first three or four had established their networks. After all, how important was it that everyone could afford a mobile phone when fixed wireless voice telephony was universally available at subsidized prices? But 3G is a different issue. 3G is a broadband mobile Internet access business, not a voice business, not even a content or applications business because no licence is required to provide content and applications over the Internet however it may be accessed. These services are, in effect, unbundled. But, as Prof Melody went on to demonstrate, the 3G licence holders are now out to reverse the unbundling trend.
6. If broadband mobile access to the Internet is to be encouraged, facilitated and promoted (another policy aim!) then pricing is all important, unless, of course, it is believed that consumers will be readily prepared to pay high prices for broadband access. But there are already non-mobile alternatives available, through fibre, through DSL, through cable, through DTH satellite. So the end result of a high-price auction is likely to be oligopoly in the 3G market, and competition therefore has to rely upon what happens outside the 3G market.
7. Even in cases where local markets are competitive, oligopoly arrangements are beginning to appear at the international roaming level. Operators are distinguishing between offering their customers the right to originate a call overseas, and charging them through the nose to terminate a call back home. This is brought about by a cartel arrangement through which each operator charges each other operator high transit fees for roaming, so each one of them can blame the overseas operator for the high charges passed on to the customer. In this way,

extra value is being squeezed out of the voice market, a revenue for operators who may wish to cross-subsidize their entry into 3G. The ITU is currently looking at this particular market distortion, but it illustrates the inefficiencies of the market if 3G access providers are restricted in numbers.

8. This brings us to the question: what should policy be? Consensus seemed to form around the need to promote a competitive market structure, so the question then was, how to achieve it? Prof Melody expresses his own preference for issuing as many licences as can be handled by the spectrum available, including the release of the additional spectrum agreed by the ITU in May 2000, and the right for 2G spectrum holders to use that to offer 3G services as and when the technology permits. In this regard the point was made by Craig Ehrlich that the real revolution in mobile services was the shift between 2G and 2.5G, from circuit to packet switching, whereas the shift from 2.5G to 3G and beyond was really one of speed or bandwidth. But perhaps the crucial question is: will the regulator (in Hong Kong) announce unequivocally that additional licences will be issued? If so, is there really justification for delaying the issuing of additional spectrum for 3 years (as the 2nd Consultation Paper indicates – published 3rd October, after the TIF)? Will the government declare that broadband mobile Internet access should be as competitively available as Internet access by any other means? And will there be clear restrictions on the ability of 3G access licence holders to operate a ‘closed garden’ by locking their subscribers in, and certain content providers out? (Even if the closed garden is unsustainable as a business model in the long run, oligopolists are bound to go for it if possible.)
9. Uncertainty is the name of the game in the Internet business world, as the fate of many dot.coms amply illustrates. This is even truer of the future broadband world where the technologies are evolving all the time. Unless broadband Internet access is fast, cheap, easy-to-use and reliable consumers and businesses alike will be slow to adopt, and this in turn will retard the growth of the content, applications and e-commerce sectors. This is a particularly important issue for Hong Kong as trade-in-services come to dominate the territory’s balance of payments, and opportunities open up to serve the post-WTO membership China market. It may be that, contrary to many market forecasts, the fixed wireline broadband access market will become the more vigorous as a result of more effective competition in that sector. So it seems to be the case that to bring about effective competition in the 3G sector more not fewer licences should be issued, more not less entry should be encouraged, to the point where the estimated rate of return on a 3G access licence is zero above the competitive market opportunity rate.

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Session One: (9.00 am) Professor William Melody, Delft University of Technology, Steve McKay Senior Vice-President, Web Solutions, chinadot.com, Sin Chung-kai, IT Functional Constituency Member, Legco; Chair: John Ure, Director of the Telecommunications Research Project, University of Hong Kong

Session One Chairperson: John Ure I am the Director of the Telecommunications Research Project at the University of Hong Kong. I am also the Director of the Telecoms Technology Forum. My deputy is Peter Lovelock, who is at the back there. Peter will be chairing the second session. As you can see, I am chairing the first. Firstly, let me thank Bloomberg for the use of this splendid auditorium.

The timing of this particular forum is designed to coincide with the second round of consultation on the question of third generation mobile licenses and how to issue them -- whether to do it through some auction process, some beauty contest process or some other means.

The second consultation paper is due to be published shortly. [3rd October 2000 - ed.] I am not 100 per cent clear about the exact date, but I will be surprised if it is not some time this month. [As of 1st October 2000 the second consultation has been delayed – ed.] So this is still a timely point in which to make points and have an important policy discussion on this issue. Clearly, the size of the auction prices in the UK and in Germany has excited a lot of interest in Hong Kong, and I think that probably was the principal reason why the argument that maybe Hong Kong should consider an auction was raised in the first place.

The first session we have is led by Professor William Melody, who, as you can see from your program, is an internationally known scholar in the area of telecommunications policy. He was a senior economist at the FCC and has since held a series of very distinguished research posts. He has also has been an incredibly industrious editor of Telecommunications Policy; a journal which, if you have not already seen it, might be of considerable interest to many of you. We have copies of that journal at the Telecoms Research Project, and you are most welcome to come have a look at it. It has some very current topical issues in it.

Professor Melody is going to give our keynote address for this morning and talk a little bit about the European experience and the role of auctions and the context in which to make a critical judgment about whether auctions are or are not the way forward. Steve McKay will then be invited to act as a discussant and make some short points on Professor Melody's address. Then I will invite Sin Chung-kai to speak. We must congratulate him on his re-election as IT function constituent member for Legco. I think many of us are delighted to see him continue in that office.

Professor Melody, if I could invite you to come to the podium. I will try to get your PowerPoint up.

Professor William Melody: Good morning, Ladies and Gentlemen. Welcome to the advanced information society where we become totally dependent on technologies. It is my pleasure to be with you today. John has asked me to address the issue of spectrum management and the role of auctions based upon my work in the field over the years. I do not have a position to tell you what I think Hong Kong should do in regard to auctioning. My goal this morning is to give you the benefit of some of the research that has taken place on auctioning the spectrum in a number of countries over the years and to point out the benefits and problems associated with the different ways of doing it. So hopefully this will make you more informed to make your own judgment as to what is most appropriate and relevant for Hong Kong.

My experience with spectrum goes back a long way. It goes back to my stint as an economist with the Federal Communications Commission in the United States, which now goes back almost 30 years, where the question of the

use of the spectrum came up as a matter for policy analysis. The reason it came up as a matter for discussion was that there was increasing evidence that the spectrum was not being managed very well. It was not being managed very well by the United States' government, it was not being managed very well by any country's government, and it was not being managed very well by the International Telecommunication Union, which is the place where all countries get together to agree on common standards with regard to spectrum allocation for worldwide services.

- *Economic Characteristics of the Spectrum:* A major reason why things were not working well is that there seemed to be an enormous amount of wastage -- that is, the spectrum was allocated for a variety of different uses and the allocations seemed to be that for some uses the spectrum was empty; for other uses the spectrum was very crowded. There did not seem to be any easy mechanism for allocating spectrum from one use to another use until after you had significant problems or a congestion. Then, within any spectrum band there was a problem because the spectrum was allocated often on the basis of first come, first serve or some other administrative criteria. Indeed, there were more people sitting on spectrum than there were actually using spectrum. So that raised the question that there has to be a better way of allocating this important resource.

A Natural Resource: So we began by asking the question: what are the economic characteristics of this resource that matter? It is a natural resource; a natural resource in the same sense that land is a natural resource or fish, timber, oil or any of our other natural resources. Natural resources often require certain kinds of special treatment. The spectrum is unique in that it does have certain characteristics that are essential that one recognizes if you are going to allocate it and use it efficiently. The first is *a high interdependence among users*; namely, unless you coordinate things like standards, then one person's use of the spectrum is totally interdependent with other people's use of the same spectrum.

I am a native Canadian, and we had a particular problem dealing with Americans at one stage on the spectrum when the US changed its power requirements on using the spectrum for radio and television stations. All of a sudden, American radio and television stations increased the power, which meant their signals went out further, which meant that the Canadian/US border was moved north a few miles. It was moved north because the point of interference between American signals and Canadian signals all of a sudden was changed because the US signals were more powerful.

In fact, if you look at the history of the spectrum, the spectrum is one of those rare cases where the private sector came running to government and said, "Will you please regulate us?" This was the radio industry in the United States in the 1920s when there were no rules as to the use of the spectrum. Over the air radio stations then would go on the air and have no idea who could receive those signals because it all depended upon who else was on the air and how much power those signals had. So it has always been extremely interdependent. For those of you specifically concerned about mobiles today, we see the obvious example.

Certain mobile standards allow you to roam all over the world. Other mobile standards do not allow you to roam very far at all. This is a lesson that has cost the US of all countries quite significantly. Mobile service penetration in Europe is three times what it is in the United States, largely because Europe paid attention to standards, to the interdependence among users, in developing its mobile sector.

Cooperation among users is essential. If you do not get cooperation, of course, agreement to abide by the rules, whether you are talking about competitors in a country, whether you are talking about different countries, then indeed you can have problems that limit what you can do with the spectrum, how you can use it and ultimately how efficient the service is. One of the items of negotiation now in World Radio Council meetings in May at the ITU was to bring about more harmony because more and more services, particularly those related to mobile, for the future will be global services. So we need some global agreements on the spectrum allocation and how it is going to be used. Indeed, they allocated more spectrum for use in the 3G area.

Negative externalities: I really indicated this with the discussion on interference. Clearly it is fairly easy for one party to interfere with another party unless you pay particular attention to that issue. One thing about the spectrum that is a very good characteristic, that is different than most other resources is that it *cannot be depleted like other natural resources*. You can use up the oil, you can cut down all the timber, you can catch all the fish and destroy your long-term development possibilities. You cannot do that with the spectrum. You can have interference which

reduces how you can use it today, but if you simply turn the equipment off the spectrum can be completely used for something else tomorrow. So we do not have this problem of having to reserve the spectrum today for uses in the future because we need to build up the supply. In fact, the supply in the *spectrum has always increased as a result of technological advance*.

With every new generation we have better technology, which makes better use of the spectrum and there is no better example than the move from 2G to 3G spectrum. Under third generation for voice users by some estimates we use the spectrum three times as efficiently as we have for second generation.

- *The traditional way of allocating the spectrum has been by government administration*: Why has it been used by government administration? It is a **public social resource**. It is not a private resource. Therefore, there are public and social considerations to be brought to bear on the subject. The use of the spectrum is *difficult to define, to measure, to enforce property rights*.

Just what is a unit of output in a spectrum? It is not like producing cars or shoes or most traditional things. Indeed, the spectrum is very much determined by defined agreements and what other people agree to do and not do. So it has been felt that, because of these difficulties, you really cannot give people enforceable property rights, and therefore it is better kept in the control of the public sector.

The licensors confer **limited monopoly rights**; namely, once you have a spectrum license you have the monopoly right over the use of that spectrum. If we are not going to be able to have a competitive market in terms of the use of the spectrum, then perhaps this is best left managed by the government.

Many public needs. We must recognize that, when we are looking at the spectrum as a broad resource, there are some quite fundamental public needs. National defense in all countries has been the biggest claimant on the radio spectrum. Police and fire are clearly more important uses of the spectrum than others. Clearly we do not want the police department not having enough money to bid in a spectrum auction to get spectrum so that they can provide the police service.

If we are dealing with public needs and private needs, then it would seem that this very much must involve administrative management. Finally, **markets would be highly inefficient**. How do you have a market in spectrum? How often can it be traded once someone has the spectrum to use? In fact, in what you call economic terms there is no secondary market in spectrum. Once it is allocated, it is held and used until it is reallocated for some other purpose. So the traditional view has been that the spectrum just does not lend itself to efficient management by the market, and government administration can do it better. This has been the entire history of spectrum management until we have seen gradual changes taking place in recent times.

- *The critique of spectrum administration inefficiency based upon the history*; this is about the inefficiency that I identified at the beginning of my presentation. Indeed, the administrative rules that came to be the basis of the applications, namely, parties would put forward their technical qualifications, their financial qualifications, their personal qualifications as a basis for arguing that they should have the spectrum. It came to be recognized that this process was essentially a beauty contest; a **beauty contest** in that there was no real defensible basis as to why a spectrum manager picked (a) instead of (b) or (c) or (d) as the parties who could get this spectrum.

Let me point out that the "beauty contest" term came about under very different conditions than we have for any of the mobile allocations. The "beauty contest" term came about as a result of allocations for over the air radio and television licenses in the United States, where indeed the licensee was literally just buying a right to take a television signal or a radio signal and broadcast it. So, when you looked at all these allocations, when the US said, "We can now allocate some more radio stations or television stations," and all the bids came in for what was clearly going to be a very good money spinner, and the criteria basically were, "Who has the best proposal?"

Well, there was not much to vary in the proposals. What you were bidding for was pretty clear: a radio license or a television license with very clear, specified technical and market conditions. So the only question was: should you get it or should I get it? So that led to a process that was, in essence, a beauty contest. "I am better than he is. I have the best proposal." What it usually came down to is who has the best lobbyists. So the process was this: if it is

just a beauty contest, then the *rules for distinguishing between (a) and (b) and (c) and (d) were very unclear, very imprecise and very arbitrary*; and, therefore, very subject to backroom lobbying and political influence". So the *selections were not based on maximum economic efficiency* and using the spectrum at all. It was not a consideration at all. *The process did not encourage efficient use of the spectrum*. It led to *banking licenses* -- that is, if you were in the business, why not gather a bunch of licenses just in case you might need them in the future?

That took place not only on a national basis but also an international basis. When the problem of banking licenses was finally faced up to in the late seventies, early eighties, on an international basis the developed countries had to give up more than half the spectrum they had simply because they were banking. They were just holding it in reserve. The end result of that is, for the spectrum that is being used, it leads to *artificial congestion*. It appears crowded and there is no real basis as to why it needs to be crowded. So these are arguments why it is used inefficiently and why the system really needs to be changed.

- *Critique of Spectrum Administration: Market Distortions*: There is another level of critique of spectrum administration, what economists would call market distortions. That is, by going about spectrum management in this administrative way, you did distort the market or a number of other related markets. What about the *substitution relations with other technologies* -- cable, for example? To use the common comparison today, what about the tradeoff between the use of the spectrum for mobile delivery with fiber optics, copper cable and coaxial cable? What about those choices that are made? If, indeed, you take an important resource, a valuable resource, and do not put any cost on it at all, then clearly it biases any decisions anyone would make as to the use of mobile versus fixed line operations in favor of mobile in an uneconomic manner. If we are going to have an efficient allocation between mobile and non-mobile, we need to put a price on mobile. The fixed line pays prices for their land, for other resources, natural and other, that they use.

Secondly, it *encourages spectrum inefficiency in equipment design*. The equipment manufacturers, when they are designing equipment, can of course design the equipment much more cheaply if indeed you use more spectrum rather than less spectrum. There is no incentive for them to economize on the use of the spectrum. In fact, there is a positive incentive for them to be very wasteful of spectrum. If you could send the television signal with half the spectrum that it now takes but it would cost you more, there is no incentive to think about that as an option.

Private licensees capture the economic value of spectrum in profits. That is when a licensee gets the spectrum, they use the spectrum to make profits in their markets. If the spectrum confers monopoly, and if monopoly simply provides the basis for monopoly profits and it is a public resource, should not the public capture the benefit of those profits? Why should you anoint some private interest to get the benefits of these profits?

In this case, the particular concern that we were addressing was commercial television broadcasting in the United States, which one entrepreneur labeled "a license to print money". Indeed, why should the commercial television people not be paying for this spectrum they were using which gave them basically -- it was not a monopoly right but a very limited oligopoly right -- strong access to significant monopoly profits.

The market value of spectrum licenses is traded anyway through acquisitions. You may not be able to buy a new spectrum license to enter a market, but you can buy a company that has a license. Indeed, when you look at the trading prices of television stations, in particular, but also radio stations, we found that the trading value was dictated by the license to use the spectrum. If they did not have a license to use the spectrum, it was not worth anything. This was the driving force of the value. So, if we are looking at this from an efficiency standpoint, it seems that it is the commercial interests that are capturing public benefit.

Finally, *a market-distorting gift by government to licensees was the general conclusion*; that indeed this current way of doing it was wasteful, it distorted markets and it simply handed benefits to the private sector. Therefore, it would seem that alternative ways of addressing the issue should be considered.

- *Market-based Proposals to Improve Efficiency*: So, what might happen and indeed what has happened? Well, we began to look at what we call "market based proposals" to improve efficiency. The first level is fairly simple: simply have *administered license fees* -- that is, make the resource not free. If you put a price on it at all, then at

least someone who is going to have it, if they are not going to do anything with it, is going to have to ask, "Am I really going to pay this fee? Just have a fee of some kind."

The initial justification for the fee was, "If you are going to have a license, you should at least pay a fee to cover the cost of administering the spectrum." That is the minimum level. Indeed, that has been adopted by a number of countries now. It was adopted in the US in the seventies and Canada in the seventies, and it is used by a number of other countries now as well.

The center level is, "Well, let us get a little more sophisticated than that." That does not consider the real value of the spectrum resource. Let us establish what economists would call "*shadow prices*"; that is, estimates of the opportunity costs or market value. Look at alternative uses of the spectrum. If you are going to use it in one area, then its value depends on the value you have foregone by not using it for something else. So, that will give you an indication to estimate an economic value of that spectrum because, if you took it away, you have value in use somewhere else.

This, of course, was a trickier issue because here what you are doing is probably calling in a bunch of economists and market analysts to make a judgment about what the value might be. As most of you will know, the economists and market analysts can give you just about any judgment you would like on any resource. So that is certainly an attempt that would create a lot of controversy.

So then the question came up: "*Why not auction spectrum licenses?*" Well, that is very interesting, but we must then go back to the fundamental question. Spectrum processes two steps. One is allocation. How much are we going to use for mobile phones? How much are we going to use for commercial television? What are we going to use for police, fire, defense, hospitals and on and on and on? These are the fundamental allocation decisions. They are much harder. We do not know how we could use the market to do that. Those are the things we have worldwide conferences about and national conferences about. So the fundamental allocation problem has not been cracked yet even in theory. But once you have made those allocations you could assign -- whoever gets the assignment within an allocation, you could do that on the basis of an auction. So that has led to consideration of research and experimentation on auctions, and we will get to the detail shortly.

The fourth possibility under discussion by the FCC in the US, which it is now trying to implement in a certain way, is to *create a market in freely transferable spectrum rights*. That gets to the allocation question: namely, we can auction a portion of the spectrum, and whoever gets it can use it for anything they want. They could use it for mobile phones, for television, for whatever. The logic here is to get the market to help decide on the larger allocation question. Indeed, the market is likely to bring about an earlier and more effective allocation system than we would find that the administrators do.

Again, a good example: you might ask why have there been only four or five 3G licenses made available in the European countries? The standard answers, "Well, that is all the spectrum we have allocated to 3G licenses." To which you might answer, "Why have you only allocated that much to 3G licenses?" "Well, that is what we agreed on." "When did you agree on that?" "Back in 1992." "What did you expect to happen in 1992?" "We did not think mobiles would grow like this. We just thought it would be much slower."

So we finally got together in May of this year in the World Radio Council and allocated some more spectrum. If you are in the UK or Germany and you have just allocated the licenses you have allocated, and then a month or two later the World Radio Council allocates a whole new bunch of spectrum for use in 3G, what are you going to do? Are you going to say, "Hey, guys, now that you have paid us this fortune, we have discovered a whole bunch of new licenses that we are going to auction off?" So it will be interesting to see what happens there.

What we are talking about here is the possibility of auctioning spectrum licenses -- not the allocation; just the licenses, and only in a particular area where it has been decided that auctioning fits. So we are not auctioning off the police licenses, the fire licenses or the public sector licenses. Ironically, we are not even auctioning off the television licenses, which is where the real money has been historically, primarily because in the US the television lobby is far too powerful to allow this to happen. But the telephone companies are not quite as powerful as the broadcasting industry, and so we have moved into auctioning spectrum licenses in the mobile arena. This began in 1995 by the US and has been picked up more recently in Europe.

- *Establishing the Market Framework Conditions.* So we come to auctioning 3G licenses. What is important and often neglected is that, if an auction is going to serve an economic purpose, the conditions have to be designed to achieve a particular purpose. The circumstances in which people are bidding have to be paid attention to. Here are the list of factors that should have been paid attention to. When you look at the results, I cannot argue they have been paid attention to.

"Liberalization and Competition in Telecommunication Markets." If there is one fundamental policy change that has taken place in almost every country in the world, it is that we will now have a liberalization, an increased competition in telecom markets. That is the driving force behind a whole bunch of changes, not the least of which are the WTO agreements of 1998. All countries are committed to do this. Countries are committed to open up their telecom markets, to allow competition to take place and to promote the use of effective competition to the maximum extent possible. This is the driving force behind policy change. The EU documents over the last 13 years have been moving in this direction. EU countries are all moving in this direction, as is Hong Kong and others. So this is a fundamental framework condition. Presumably you do not want to look at other policies that might compromise this objective.

Secondly, **"Mobile Competitive Access to the Home for Next Generation Internet Services."** The big concern in all developed countries is what is called "the last mile problem". You cannot get competition into the home. There is only one connection for most residences, and this still exists in the United States and the UK. The most recent evidence I have seen is that in the United States something like 95-96 per cent of people still have one access to telecommunications service. In Britain, it is about 90 per cent. This is the dominant policy problem that regulators and policy makers in most European countries and many other countries around the world are facing. How can we get a mobile option into the home so that the mobile option can compete with the wire option, and customers will then have a choice and that will be a way of cultivating the market.

Thirdly, **"The Quantity of Spectrum Allocated for 3G."** That is, how much spectrum are we going to allocate now and later? That is an important issue because this is really the entry right, is it not? Some countries have said that anyone who wants to be a telecommunication company in our country can just walk in the door, fill out a form and they are in. That is the policy of a Denmark company I work with. The main concern in Denmark is they do not have to tell anybody. It is even easier than setting up a corner grocery store. So when it comes to entry the whole question is the number of licenses that are going to be made possible now and in the future. That is going to be important to determine competition. One would think that, if 3G-spectrum policy is going to be consistent with that competitive model, countries would be looking to allocate a lot of spectrum for 3G. As you know from the European experience, that is not so.

"The number of licenses to be allocated." If within a competitive market you would like to have lots of competitors, you would like to have easy conditions for entering and exiting, that would mean that countries would want to have quite a few licenses to be granted.

"Conversion rights for 2G licenses." That is, can those who are already in the market use their 2G licenses to convert for 3G application? It is certainly technically possible. It is more expensive than if you get a 3G license, but that then depends on the cost of the 3G license. Certainly in a competitive market this would be a wide-open choice. It would be made very clear. Anyone with a 2G license can do whatever they want in the 3G area if and when the investment opportunities indicate that that makes it a desirable thing to do.

"Unbundling of the Retailing of Next Generation Internet Services"; which is now being called virtual mobile network services. This is really separating the wholesaling from the retailing side. That is, what are you bidding for? Are you bidding for a monopoly right or an oligopoly right to a physical structure? Are you also bidding for a right for the service supply on that infrastructure? Are you also bidding for a monopoly right to information-related services that would come on top of that? One would think if you wanted a competitive market you would make it very clear. This is a right, not a monopoly right, to provide the basic infrastructure for the supply of these services.

Why is this important? It has only been the unbundling of services from the physical infrastructure that has allowed the development of what we now call the Internet. The Internet was not developed by telephone companies. The Internet was opposed by telephone companies. Indeed, if it were not for regulations that required telephone

companies to lease the capacity on their network to other people who wanted to offer services, we would not have seen the Internet exposure. Well, one would think we would like the new mobile market to at least be consistent with and extend these opportunities that are built into the larger policies.

"Beauty Contest Conditions for Local Participation and Market Rollout." If you want the development of these services to promote opportunities in your local area, your country, your city or whatever, then clearly the traditional conditions of a beauty contest can easily be built into an auction. You can just take your beauty contest conditions and say, "Have an auction on the beauty contest conditions". In fact, "beauty contest" is really a misnomer in this field because any case I know of where countries have allocated by administrative assignment, for example, Finland -- Finland was the first country to allocate 3G licenses. They did it in 1999, way ahead of everyone else. The Finnish process is called a beauty contest but, when you look closely at it, it is certainly not a traditional beauty contest. Because, in essence, Finland says, "We will have an auction but it will not be on price. You guys come in and tell us how much you are going to invest in a network, how rapidly you will roll it out, how broad the coverage of the whole country will be, the breadth of the services you will offer and give us maximum prices you will charge customers." As well it must be accessible to retailers and others.

So when you begin to look at that process, you have to ask the question "Was the Finnish process really a beauty contest or was that really a kind of auction where the auction was not on price paid to the government but on commitments to roll out and develop a particular service?"

On the other hand, we can look at a country like France. France has provided a mixture of the beauty contest and the auction. What France has said is, "Here are the requirements. One of the requirements is that you will pay us an enormous fee, almost as high as the Brits. Then we will decide on the basis of our traditional beauty contest criteria who will get the license." Now, to my way of thinking this is capturing the worst of both beauty contests and auctions. They are trying to get the benefit of the auction by saying that everyone will pay a high price to the government, and then at the end of the day they are going to make a traditional beauty contest decision based on undefined subjective criteria made in the back room that they will not have to defend to anybody. So we see these different models suddenly call into question these differences between a traditional beauty context and a traditional auction.

What is happening in 3G is that the traditional beauty contest is not being implemented anywhere. I do not know of any country which is simply throwing it out and saying, "We are going to make a subjective decision on who we think looks the best." Every country is saying, "Here are our requirements. You guys bid to our requirements." Many are then coming back and negotiating and saying, "Okay; you guys have all met our minimum requirements. Now, who is going to give us even more than that?" So the bidding process has been the bidding process but it has not been on price. On the other hand, the French, as we have seen, are calling what they are doing an auction, but it is really a combination of fees and traditional beauty contest.

Another key aspect is **barriers to entry and the desired structure of market competition**. We have to look at this framework as a dynamic framework. Think of how this sector has changed in the last 10 years. Services have been unbundled from network operation because barriers to entry have been lowered and new entrepreneurs have been allowed into the market. You often hear traditional telephone companies talk about their contributions to the new telecommunications environment. When you stop and think about it, their contributions have probably been the least of all. Most of the claims on technology is "Where does the technology come from?" Technology comes from the equipment sector. This is Nokia, Ericsson and Motorola. They are not only telecom manufacturers but also IT equipment manufacturers, and for the future we are talking about information-related services.

Developments in the information society and electronic commerce are going to require that the doors to entry be kept open; that access to new markets be made easy; that this process not come back in the direction of a highly concentrated oligopoly or a monopoly. This is the framework that one would expect all countries to be looking for. This is not only capturing the changes that have taken place over the last decade but also the rhetoric that is taking place right up to the top levels of all countries.

- **"Auction Objectives and Imperfect Market Relations."** What we would like to see is a **competitive market standard: efficiency**. That is what this is presumably all about: if markets work when the market is competitive. What is a competitive market? A competitive market is where you have a large number of buyers and a large

number of sellers. In the 3G auction, how many sellers did we have? One per country: a government. How many buyers did we have? As you can see, depending on the country, we have a few buyers. It is clearly not a competitive market.

"Monopoly Market Standard of Maximizing Profit." Generally what do monopolies prefer to do? They prefer to charge very high prices far above the costs, far above the resource value to capture benefits for the monopolist. Presumably that is a standard that governments would not want to follow. That is one reason why governments are bringing about changes, to bring about efficiency in the use of this resource.

What if we have a situation of a monopoly seller, the government, and oligopoly buyers. For those of you who are not economists, an oligopoly is a few buyers. That means so few buyers that they pay attention more to one another than they do to the marketplace. If you are competitive, you look after your customers and you develop your business plan to serve customers, and you win or lose based on that business plan. If you are an oligopoly, you pay more attention to the other guy. Indeed, what you do depends more on what the other major player in the market does than on its customers directly. Economists generally conclude that this leads to **strategic risk taking, strategic behavior** -- namely, your strategy is based more on beating the other guy in the current battle than on market efficiency necessarily.

Here we are dealing with **one sale, no secondary market**. When markets work effectively, there are lots of purchases and sales going on all the time. Here we are talking about one sale for most countries in the next 20 years. That is what the licenses are being granted for. In economic terms we say that there is clear **path dependency and locked-in bidders**.

What does path dependency mean? It means that, once a firm invests and starts down a certain path, they become locked in; they cannot get out. They have crossed the rubicon in one sense and they have no choice but to go forward. An example of this is Vodafone. Vodafone has grown to be a monumental success in mobile phones in the UK. That is their market, mobile phones. They have made a fortune out of second generation mobile licenses. Now they come to bid on third generation licenses. What happens if they do not get one? Clearly, all the executives will be fired. Clearly, the market price will go to hell. If they are a big winner under the second generation, as long as anyone else is bidding, then they must believe they can outbid them. Clearly that was Vodafone's instructions: to win the most valuable license, the license with the biggest spectrum, at any cost.

What we see here is a principle which in the auction literature would be called **"eliminating immediate regrets"**. Namely, if you do not get the license, you can be fired within a few months. If you do get the license and it turns out you have overbid dramatically by the time the impact hits, you will either have been promoted or left the company anyway. So we have an environment of quite uncertain bidding.

What we tend to see is an environment for overbidding. Interestingly, once the overbidding is made and it is all accepted, we find it is no longer locked-in bidders. All of a sudden the lock-in has shifted, and we now have **locked in policy makers and regulators** because they have allocated the spectrum for an enormous amount of money and they have a certain responsibility to make sure that the rights they have granted are preserved.

Well, what rights? It seems the British and the Germans were not entirely clear as to whether they would issue any more 3G licenses. They were not entirely clear as to whether these licenses carried obligations for providing service to retailers. They were not entirely clear as to the rights of converting second generation licenses to third generation operations. And, indeed, the discussion has already turned to the fact that, because these companies are paid so much for these licenses, the British regulator will not be able to require unbundling and access by retail mobile operators. Indeed, they clearly cannot issue any more licenses. The financiers and bankers are saying that what we are likely to see is a rationalization of the sector; namely, even the existing number of licenses granted may be merged into a smaller number of firms.

What are the **implications of this for innovation**? Innovation comes in two ways. One is the driving force for innovation in the manufacturing sector. Good idea. Why not ask Nokia and Ericsson and these other companies what they think of this? What incentives has this provided them for their innovation? One of the things they have done is they have reduced their estimates of the demand for equipment floating out through the year 2004-05. Why? Because they think the market would develop much more rapidly if it were more competitive. They see

themselves dealing with a few firms in selling the equipment and the rollout process-taking place much more slowly than it would before. They would be much happier if more firms were licensed.

How about on the other side? What about all the firms with bright ideas who do not have telephone companies? All the Internet firms, all the firms who want to provide retail mobile services or information communication services that would then be sold to retail suppliers. The expectations are, "Well, this market is not going to be as open as we thought." We are going to have greater concentration here, and so the net effect is going to be that new entrepreneurs with new ideas are going to find it more difficult and it is going to be easier to sell out to one of these big companies rather than pursue their ideas.

So, if we look at auction objectives in this very imperfect market, we suddenly see that what started out as a very good economic theory -- now, I can prove mathematically that this will optimize resources for society if you will let me have all the assumptions that this is a perfectly competitive market. Unfortunately, as it is turning out, we are a long way from that.

- *Auction Design Options:* So in this very imperfect market we come to auction design options. There are different ways of doing it. There is a vast literature on the subject. The common way we think of is *sealed bids*. What is the reason for not using sealed bids? Interestingly, sealed bids are often seen as having the advantage that firms will bid their business case. That is, they will not be affected by what the other guy is bidding. They will look at their business case. That is good because that is what you want in a competitive market. But *the risk is collusion*. Since they are all just submitting sealed bids, there is no guarantee that there has not been some kind of implicit collusion among the bidders.

That has led many people to say, "Well, then, a better bidding system is one in which you have *open bidding*." But when you have open bidding you have *the risk of strategic overbidding* which I have just described. The bidders bid their business plan on the first round and then say, "Oh, my God, the competitive firm bid more than we did. We are better than he is. He must know something that we do not. So we will overbid him because we know we can beat him." Then we end up with this strategic overbidding.

The bidding system that has been adopted here is actually designed by Stanford University's professor for the FCC in 1994 called "*simultaneous multiple round auction*". That is pretty much what you read about. Namely, it is all public and transparent and you just keep bidding and bidding and bidding until they stop bidding. This can be defended as a very good auction system if it is a perfectly competitive market. The question is: is it a good auction system if it is not a perfectly competitive market?

In a way, when you look at the application in Britain and Germany you can say that this just added to the incentive to take strategic risks of overbidding. Because it was all such a public process and reported in the press every day it became something that was influencing the day-to-day movements in the stock market. It was clear that as soon as anybody dropped out of the bidding the stock price went down. So, clearly, what would be ideal in a perfectly competitive market turned out to be not so ideal under the circumstances.

The Vickrey auction, named after the distinguished Nobel Prize winning economist, is an auction which deliberately recognizes the possibility of strategic overbidding. He makes a very powerful case that you can have circumstances in which you have strategic overbidding. Indeed, the Vickrey conclusion was, "Go ahead and have your auction." Use the auction to give the license or whatever you are auctioning to the winner or winners but then have them pay a price based upon the price bid by the highest loser. So they do not pay the higher price; they pay the price based on the bid by the highest loser. What sense does that make? Well, if you think about the purpose of the process, it is economic efficiency. What happens if an economic market? In an economic market you want buyers to pay the lowest price the market can provide. If I am buying something, I want to pay the lowest price. You cannot just look to the marginal conditions.

This comes out of this analysis which says that, if we are all buying something in the marketplace, some of us would have paid a very high price and some of us would have paid a low price. What is the market price in an open, competitive market? It is the price that the lowest one of us would have paid and got it. That turns out to be the market price. Then there is *the highest price bid or the lowest qualifying bid*, which is a similar idea. You can say,

"We will auction it to the highest price bid," or if there are a number of licenses -- say four, five or six licenses -- then everybody pays the price of the last bidder. That is similar to the Vickrey auction.

The point here is to recognize that there are a number of design options. There are even more than these, but most of the others are variants on these. A number of design options and the design of the auction needs to be fitted to the circumstances under which you are doing the auction. As you can see, having described the imperfect market before and the options here, there is no optimal design. Each design has some strengths and weaknesses.

- *Experience with Spectrum Auctions: the US:* I will run through the history of the experience of US auctions as a point of reference. ***The first cellular mobile licenses were issued in 1992 by beauty contest. Auctions from 1995 are what the US calls "commercial mobile radio service".*** That includes all the mobile services. They adopted ***the SMRA design. They divided the US into many markets and had many bidders.*** I think this is an important factor. They did not say, "Here is a license for the entire United States." In most cases they divided the United States into about 700 different regional markets. They then had bidding for all the various regional markets. They had lots of bidders. By economic criteria, it is much closer to a workably competitive market than we have seen in Europe.

As of the beginning of this year, 24 auctions raised \$25 billion. Now, that is in the United States. The United States has substantially larger and wealthier markets than the UK or Germany put together. Contrast this with the UK (US\$34 billion) and German (US\$446 billion) auctions, which raised significantly more money in all the US auctions over the entire history up to the present time.

That then calls into question "why"? What is it about the circumstances that explains the difference? ***Mobile market penetration is about one-third in the US that of Europe, as I indicated before, but this is not attributable to auction prices. This is attributable to failure to agree on technical standards for using the spectrum. They also adopted a system called "party pays".*** That is, you pay if you receive a call, which certainly has not provided incentive for people to answer the phone all the time, and there have been small developing roaming restrictions.

- *"Experience with and Plans for 3G Auctions in Europe."* I have already introduced some of this. I am sure you already know a lot of it. Incidentally, if you want the details of the UK and the German auctions, they are available on the web sites for those regulators. You can even follow the day-to-day bidding if you are interested. My conclusion in providing an economic analysis of the auctions in the UK and Germany is that it seems quite clear that, out of all the models I have indicated earlier, ***they have followed the one which has provided maximum profit for the Treasury.***

Indeed, they acted like a monopolist. They adopted an auction design designed to maximize the amount of money that could be extracted or, as some people have said, extorted from the market. They have even designed the number of licenses for that purpose. The UK offered five licenses. They did not have to offer five licenses. They could have offered six or seven or maybe even eight. But it was a scarcity created by policy. They allocated four licenses that could be bid for by the four established operators and one new license. You have to offer one new license to stimulate active bidding, but if you allocate two new licenses then indeed you would get a lower price. So you could say that this is entirely designed to extract the maximum amount of money out of the system. The Germans did it in an even more refined way by only allocating smaller blocks of spectrum and then allowing the winners to come back and bid again for some extra blocks so they could provide a better service.

In contrast to this, the beauty contest which has already taken place in Finland and which is now planned for Sweden -- ***Finland and Sweden***, as you know, rank 1 and 2 in the world in terms of both mobile development and penetration and Internet development and penetration. Certainly to call what they are doing a beauty contest is not a correct description. I would say that it is an administratively driven auction that is not auctioning on the price paid to the government but on the development of service. It includes structure rollout, the development of new services and prices to customers. Those are the primary conditions. So those are the major methods under discussion.

As I have indicated, I would say that ***the French model*** is trying for the best or the worst of both possible worlds. I think it is the worst. ***"The Dutch Result"*** I am now working in the Netherlands and it is very interesting. The Dutch auctioned their spectrum after the British and before the Germans. The record is that they did very poorly.

They did not design it properly, they got a bad result, everyone is unhappy and parliament is now investigating it. What is the evidence on which this is a bad result? *It seems that the Brits and the Germans extracted an amount of money from these operators; that is, about three times what they will invest to build a 3G network. The Dutch only exacted a price that is about 50 per cent of what it will cost to build the network. So they should have got six times as much to be on standard with the other two.*

You have seen what has happened in the financial markets. Namely, the bond ratings of all the companies who won licenses have been devalued by all the rating agencies. The profit forecasts of all the companies have gone down dramatically. They are all engaged in the development of restructuring plans because now that the dust has settled they are looking at the debt load they have just acquired, and it has suddenly dawned on them that interest payments start immediately. In fact, the 3G equipment has not been developed yet and they have no control over the development. Indeed, the rollout of 3G may be a lot slower than was thought. That is now calling into question the financial viability of these operators as well as their ability to compete in other auctions of the same type.

If we think about the effects of what a tax of three times the total cost of rolling out a new network means in terms of how the new network is rolled out, there is a theoretical economic case that the answer is zero. That is made by economists, I might note, not working for the financial economy. It is a case that assumes there might be no competition within the mobile network. If you assume mobile might be a monopoly and the only competition that takes place between mobile and fiber and other means of delivery, then you can say whatever they paid upfront will not have any impact on the future market. The whole idea was to create competition within mobile. Mobile provides a lot of services that you cannot get on the fixed mobile network, such as mobile phone services.

We need to consider the rollout effects. The considered and growing body of opinion is that these companies are not capable of rolling out the networks they had planned under the current circumstances, and that is why they are looking for fundamental restructure. Under those circumstances, why should the Dutch government be unhappy? The Dutch government is unhappy because they thought they would get a lot more money. The government did not get enough money. You can see that the objective of the whole process has changed. It is as if the whole object was simply to get money for the government. I thought the whole process was to facilitate the rollout of the fundamental structure of the information society and the economy of the future.

So I think the Dutch may actually win by losing. Indeed, the winners will be able to roll out the service a lot more effectively. Having said that, some of the winners of the Dutch auction are the same people that lost a fortune on the other two actions, one of which is the big Dutch telephone company KPM. So that may be some cause for concern. Another reason for the so-called failure of the Dutch auction was that the Dutch had five operators. Interestingly the Dutch, a little bit like Hong Kong, were late in introducing mobiles -- late compared to Finland, Sweden and Denmark. But once they introduced it they gave away a large number of licenses. The Dutch gave five and Hong Kong gave six. Most countries gave only four. The interesting thing is that, once you get around five or six, you start to get much more effective competition than you do down at three or four.

So what we have seen is a very rapid rollout in the Netherlands. They started late and they virtually caught up. But the Dutch government allocated five new licenses also. They have five incumbents and five new licenses. Then all the potential new entrants -- and there were lots of them -- simply said that under these conditions of strategic bidding we cannot win so we will not even try. So they had five bidders for five licenses and they did not get much.

When you look at this process there are two things to think about. One is the objective. Do not lose sight of the objective. This is supposed to be promoting the foundation of the information society. This is not just a ruse to tax an industry for the Treasury. *Denmark* is in a very similar position to Hong Kong. They have always used the beauty contest -- the so-called beauty contest. I say "the beauty contest action" would be a better way of putting it. They have always prided themselves at being a leader in the world at developing all these services. If you look at the statistics, the top four countries in the world on most indicators in market development in mobile Internet, telephones, you name it, are the Nordic countries.

Denmark's problem is that it has always been ranked by most indicators fourth in the world and fourth among the Nordic countries. That makes it very unhappy because, as far as they are concerned, their competition is with the Nordic countries. They have Sweden next-door and Finland next to them, both higher in the rankings and both going the route of the so-called beauty contest. However, the politicians have seen what has happened in Germany

next-door and in the UK -- and the finance minister, in particular, said, "I have a solution to a lot of our finance problems and we are going to auction." So we are now having a big debate in Denmark on whether to auction if they are going to auction and how to design the auction. That is, how many licenses should be offered? The regulator is living in fear because he is under a mandate. The government has just issued a new information society policy document called the network society on how the entire future of the economy in the society is going to be based upon these new electronic services. His job has been to promote competition and it has been difficult. This is not a sector where it is easy to promote competition. Now all of a sudden he is fearful he is going to get instructions on the auction the same way the Brits and the Germans did, and that is going to make implementation of these other objectives extremely difficult if not impossible.

Other countries: as you know, through Europe this is a process that is unfolding. *Czechoslovakia* tried a very interesting idea. I think they actually had a good economist there, probably a poor politician. But someone announced that they were not going to allow any of the 2G licensees to bid for 3G licensing. That would be a good way to encourage competition; probably a good way to get fired. It is not expected that that will survive, but you can see the notion that the whole point here is to open up opportunities and open up access. Should the same firms be allowed to commandeer both 2G and 3G when indeed for a wide variety of services they can be competitive? That is I think the other country that at least has talked about doing something.

- *Assessing the Implications of the European 3G Auctions*: The trend of events is to move more in the direction of adopting the auction. Why? Because you can get a magnificent tax without calling it a tax and without being blamed and you can actually say you are doing something beneficial for the economy. So, assessing the implications of the 3G auctions, it is ***policy created scarcity and locked-in oligopoly bidders***. That is the environment of the UK and Germany.

What is very interesting is that it raises a question as to ***what is the market definition here***. Is it a nation state? Is it Europe? Is it both? What is interesting is that, for the services we are talking about, more and more are about regional, global services. But note the services are not requiring local monopolies. Indeed, 3G spectrum is used only for short signals. This is not satellites spraying these signals all over the place. Indeed, the question then is for your information service. You will set it up in Hong Kong. What you want it to do is be accessible to the world. Whether it is accessible to the world may depend upon whether you have reasonable terms, conditions and competitive access to a mobile network.

"Impact on Cost and Financing Structures and Capabilities of Licensees." I have mentioned that. You can read that in the press any day. It seems everyone is having second thoughts about whether this process is going to work. From my standpoint, it seems that there are two places to look. What are the bankers saying? They are supplying the money. The interest payments have to be paid starting today. That has to have some effect on the capability of the rolling out of the services.

Secondly, look to the equipment industry. These are the guys who are developing the technology and selling the equipment. Indeed, they have toned down their forecasts. So, ***market development rollout in terms of covering services and prices***. That is now called into question all of a sudden. When we look at 3G-market composition in mobile voice, NGI services or universal home connections, I have described some of the implications for them.

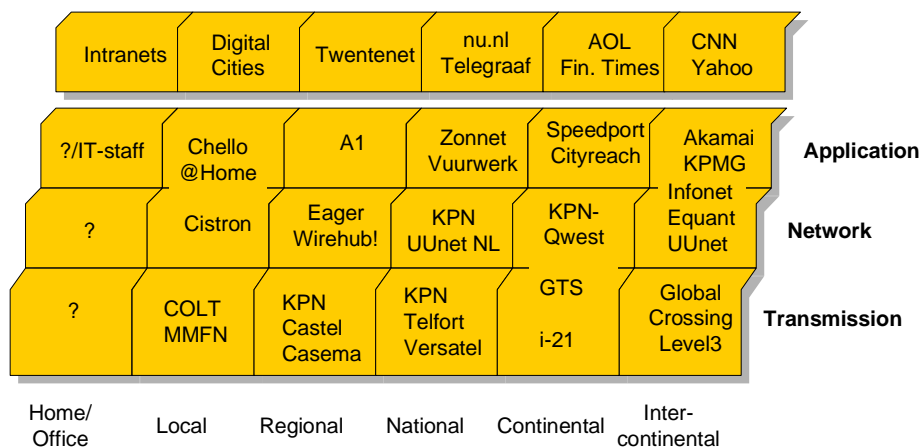
"Competition with other technologies." Fiber guys are wringing their hands. They are so happy about these developments because this basically means, as they view it, you can forget mobile as a serious competitor for any of the sophisticated non-voice messages, not short messages to the home. It will simply make it too expensive. ***Are governments now committed to protecting these investments in 3G licenses at the expense of their competition and information society development policies?*** I would say for the UK and Germany, certainly yes. Those countries that follow, I hope, will provide a clearer foundation on these questions so that, if they use an auction, it will be used to serve the development of the industry, not just to benefit the Treasury.

The purpose of the next slide on the ***Dutch Internet Market*** [see slide 12 in slides files -ed] is to identify the different submarkets in this very large market.

Markets and 3G

**Internet service provisioning operates as a completely unbundled market,
Office and home networking have been mainly a Do-It-Yourself operation**

an non-exhaustive sketch of the Dutch fixed Internet market



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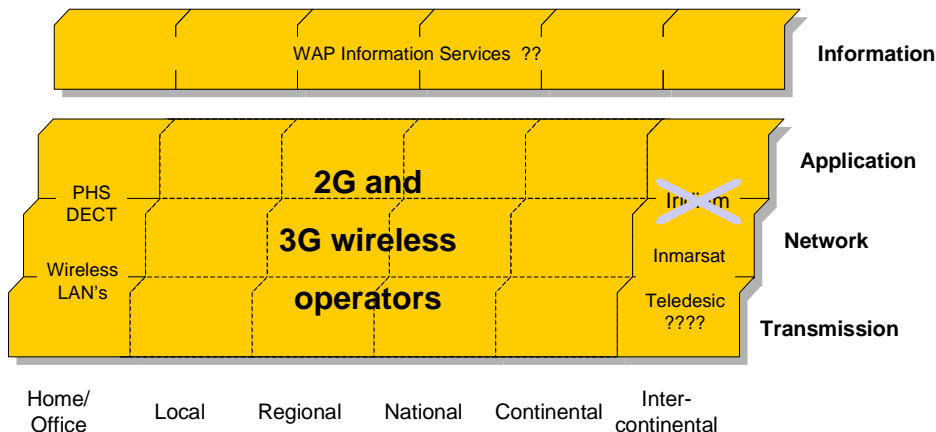
You will see along the horizontal that it begins with the home or the office, the local area, the region, the nation, the continent and the intercontinental service. Then, if you look at the various layers going up, you have the fundamental raw transmission layer, the physical capacity and then the networks design and operation. Then you have the applications and services. On top of that, we could say there are a whole variety of information services. The names in there are simply the names of companies who are operating in the Netherlands.

What is being bid for in a 3G license? Is it only the transmission layer? Certainly in the UK and Germany it is not. Is it the transmission layer plus the network layer? Not in the UK and Germany it isn't. Is it the transmission layer plus the network layer plus the application layer? Yes, that is what it is. They get all of those. At what level? Do they get the home or the office? No, they do not get the home or the office. Do they get the local area? Yes. Do they get the region? Yes. Do they get the national? Yes. Are they going for the continental if they get enough licenses? Yes.

Markets and 3G

The effects of auctioning on the market structure in wireless telecom geographical and technical bundling of the market on a continental scale

Outside the home and office few alternatives exists for 2G and 3G wireless



Stratix

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We can see a process that has taken place if we go back to the beginning days of the US and the FCC over the last 20 years of unbundling these sectors to allow access and opportunity. All of a sudden this is a big case for rebundling the sectors. Basically what we are seeing here is that a big chunk of the middle is being taken out. All of a sudden the competitive relations across the sectors are being compromised. This is not something that was intended by these actions; they just never thought about it. They were too busy designing the conditions to maximize the revenue to the government to think about the implications of these developments.

Finally, just to demonstrate my point with regard to what the equipment manufacturers think, I have pulled together some of the recent statistics. They are probably too small for many of you to read. They are drawn from the basic industry sources that collect these things on the delivery of worldwide cellular telephone shipment expectations. They show the sale of 3G handsets as a percentage of the total market. It is very modest in the year 2004. There is going to be a fair amount of interest paid on those loans between now and 2004.

Markets and 3G

World-wide Cellular Telephone Shipments expectations shows sale of 3G handsets as percentage of the total market is still modest in 2004

	'96	'97	'98	'99	'00	'01	'02	'03	'04
Analog	\$7,835	\$6,726	\$4,618	\$3,178	\$2,706	\$2,680	\$2,136	\$1,577	\$897
GSM	\$6,770	\$11,859	\$19,571	\$26,368	\$31,614	\$33,855	\$36,567	\$36,973	\$40,418
IS-136 TDMA	\$540	\$2,310	\$2,629	\$5,350	\$6,053	\$6,543	\$8,514	\$8,771	\$8,063
cdmaOne	\$531	\$2,926	\$5,080	\$10,373	\$13,430	\$18,580	\$22,820	\$29,193	\$37,205
PDC	\$4,111	\$7,656	\$3,526	\$2,290	\$1,107	\$581	\$349	\$265	\$246
3G				\$28	\$152	\$1,499	\$2,237	\$3,641	\$5,336
Total	\$19,787	\$31,477	\$35,424	\$47,587	\$55,062	\$63,737	\$72,622	\$80,420	\$92,165

(In mill. \$)

N.B. '99 and '00 sales of 3G handset sales are mainly test and trial equipment

Source: Micrologic Research, Wireless 2000

<http://www.mosmicro.com/Wireless2000.html>



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So all of a sudden we have seen these auctions turn a firm like Vodafone, as one of the leading most profitable entrepreneurial firms into the information society, into an almost bankrupt company looking for a savior. British Telecom is thinking of splitting itself up and merging with AT&T. Interestingly, AT&T's investments in TCI, the cable company, are turning out to be almost as good as investing in 3G spectrum. The net effect is that, if you take two companies losing money and put them together, you get one winner.

What is interesting is that these companies and a whole sector were seen as enormously profitable as the industry of the future. Now all of a sudden it is being questioned. When you think back to what is the purpose of public policy, the purpose of public policy is an efficient rollout, an efficient use of this natural resource. The great irony is that this natural resource should be used for the benefit of the people. It has been used in these countries for the benefit of the Treasury at the expense of the people.

Now, what should you do about it? The answer is that I do not know. That is your problem. My advice is that you can learn from this. You can see the strengths and limitations of both sides of the issue. You can look at the circumstances in your country. I think the major point is, think about the results after the action. What will the results likely be after the auction? You want the results to show a more competitive market, easier conditions of entry and access, and active competition on services to customers. That is what you want the action to achieve. So my advice is to go through the lessons that we have learnt both on the defects of the beauty contest and the defects of the auction and design the system that serves Hong Kong best. Thank you very much.

**S P E C T R U M M A N A G E M E N T A N D E F F I C I E N T
M A R K E T S :**

A n A s s e s s m e n t o f E a r l y E u r o p e a n E x p e r i e n c e

P r e s e n t a t i o n t o

*T e l e c o m s I n f o T e c h n o l o g y F o r u m C o n f e r e n c e o n
T h i r d G e n e r a t i o n (3 G) A u c t i o n s f o r H o n g K o n g ?
T h e L e s s o n s f r o m O v e r s e a s*

1 8 S e p t e m b e r 2 0 0 0

P R O F E S S O R W I L L I A M H . M E L O D Y
E c o n o m i c s o f I n f r a s t r u c t u r e s –
D e l f t U n i v e r s i t y o f T e c h n o l o g y
C e n t e r f o r T e l e - I n f o r m a t i o n –
T e c h n i c a l U n i v e r s i t y o f D e n m a r k
E d i t o r – *T e l e c o m m u n i c a t i o n s P o l i c y*



Economic Characteristics of the Spectrum

- A Natural Resource
- High Interdependence among Users
- Cooperation among Users Essential
- Negative Externalities – Technical Interference
- Cannot be Depleted like other Natural Resources
- Can be Enhanced by Technological Advance

Traditional Spectrum Management: Govt Administration

- A Public, Social Resource
- Difficult to Define, Measure, Enforce Property Rights
- Licenses Confer Limited Monopoly Rights
- Many Public Needs – Defence, Police, Fire, etc.
- Markets would be Highly Inefficient

Critique of Spectrum Administration: Inefficiency

- Beauty Contest Rules are Imprecise and Arbitrary
- Selection(s) Not Based on Maximum Efficiency
- Process Doesn't Encourage Efficient Use of Spectrum
- “Banking” Licenses
- Artificial Congestion

Critique of Spectrum Administration: Market Distortions

- Biases the Substitution Relations with Other Technologies
- Encourages Spectrum Inefficiency in Equipment Design
- Private Licensees Capture Economic Value of Spectrum in Profits
- Market Value of Spectrum Licenses Traded through Acquisitions
- A Market Distorting “Gift” by Governments to Licensees

Market-Based Proposals to Improve Efficiency

- Administered License Fees – No Longer a Free Resource
- Establish Shadow Prices – Estimates of Opportunity Costs or Market Value
- Auctioning Spectrum Licenses: Assignment
- Creating a Market in Freely Transferable Spectrum Rights: Allocation

Auctioning 3G Licenses: Establishing the Market Framework Conditions

- Liberalization and Competition in Telecom Markets
- Mobile Competitive Access to Homes for Next Gen Internet Services
- The Quantity of Spectrum Allocated for 3G now – and later
- The Number of Licenses to be Allocated
- Conversion Rights for 2G Licensees
- Unbundling Rules for Retailing NGI Services
- Beauty Contest Conditions for Local Participation and Market Rollout
- Barriers to Entry and the Desired Structure of Market Competition

Auction Objectives and Imperfect Market Relations

- The Competitive Market Standard: Efficiency
- The Monopoly Market Standard: Maximizing Profit
- A Monopoly Seller and Oligopsony Buyers: Strategic Risk Taking
- One Sale; No Secondary Market
- Path Dependency and Locked-in Bidders: Eliminating Immediate Regrets
- Overbidding and Locked-in Policymakers & Regulators
- Implications for Innovation: the Manufacturing Sector

Auction Design Options

- Sealed Bids and the Risk of Collusion
- Open Bidding and the Risk of Strategic Overbidding
- Simultaneous Multiple Round Auction (introduced in US)
- Vickrey Auction
- Highest Price Bid, or Lowest Qualifying Bid

Experience with Spectrum Auctions: the US

- First Cellular Mobile Licenses in 1982: Beauty Contest
- Auctions from 1995 for Commercial Mobile Radio Service (CMRS)
- Adopted SMRA design
- Divided US into many markets and had many bidders
- As of 1/1/2000, 24 auctions raised about \$25 billion (Contrast with 3G auction prices of \$34 B in UK and \$46 B in Germany)
- Mobile market penetration is about 1/3 that of Europe, but not attributed to auction prices – rather standards, called party pays, roaming restrictions

Experience with, and Plans for 3G Auctions in Europe

- Profit Maximization for Treasury: UK and Germany
- Beauty Contest: Finland and Sweden
- Trying for the Best (or Worst) of Both Worlds: France
- The Dutch Result: Bad, Good, or Both
- Denmark's Plan: Auction and Invest in the Sector
- Other Countries

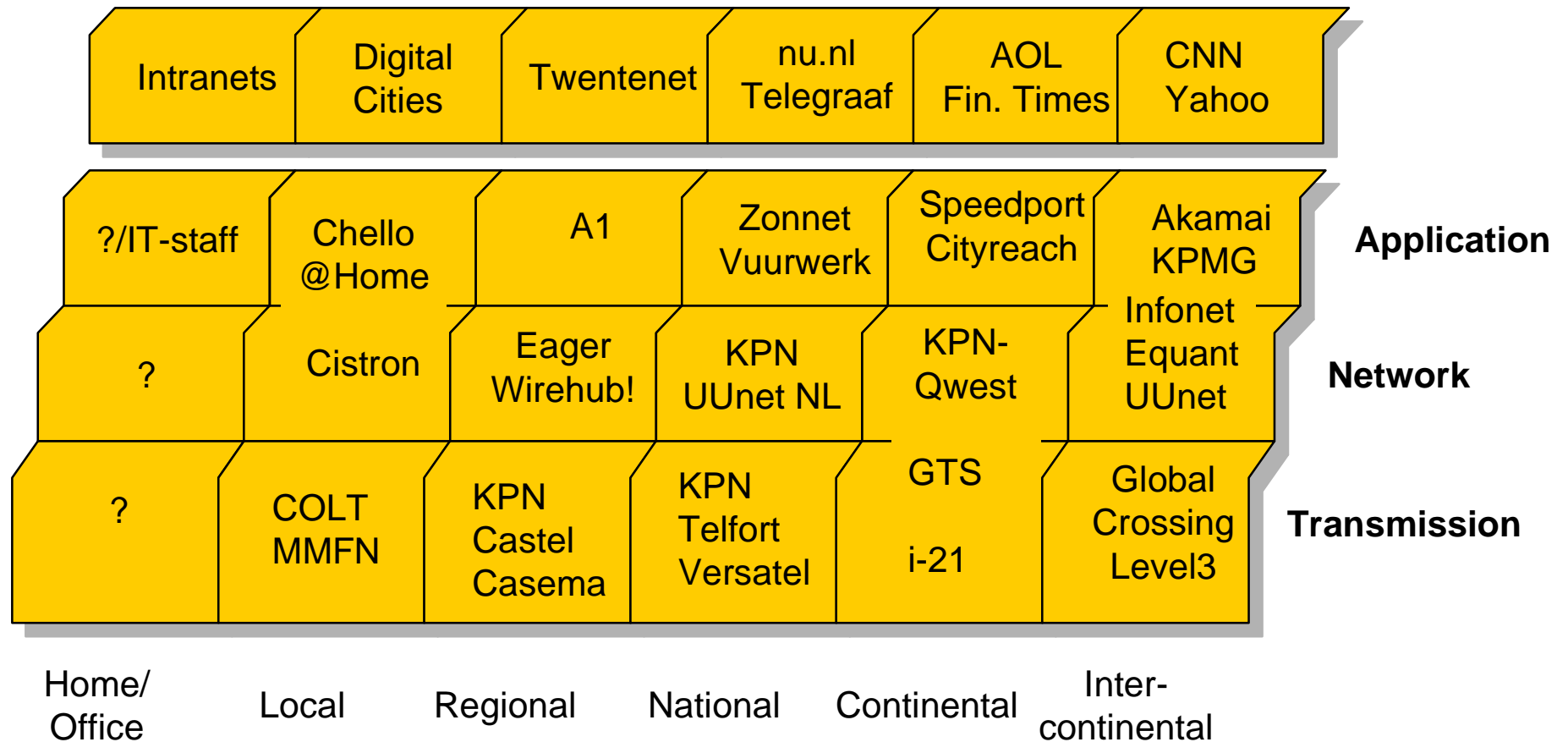
Assessing the Implications of the European 3G Auctions

- Policy Created Scarcity with Locked-in Oligopoly Bidders
- Market Definition: Nation States, Europe, or Both
- Impact on Cost and Financing Structures and Capabilities of Licensees
- Market Development: Rollout, Coverage, Services, Prices
- 3G Market Competition: mobile voice, NGI services,
- : universal home connection
- Competition with Other Technologies
- Are Governments Now Committed to Protect These Investments in 3G Licenses at the Expense of Their Competition and Information Society Development Policies?

Markets and 3G

**Internet service provisioning operates as a completely unbundled market,
Office and home networking have been mainly a Do-It-Yourself operation**

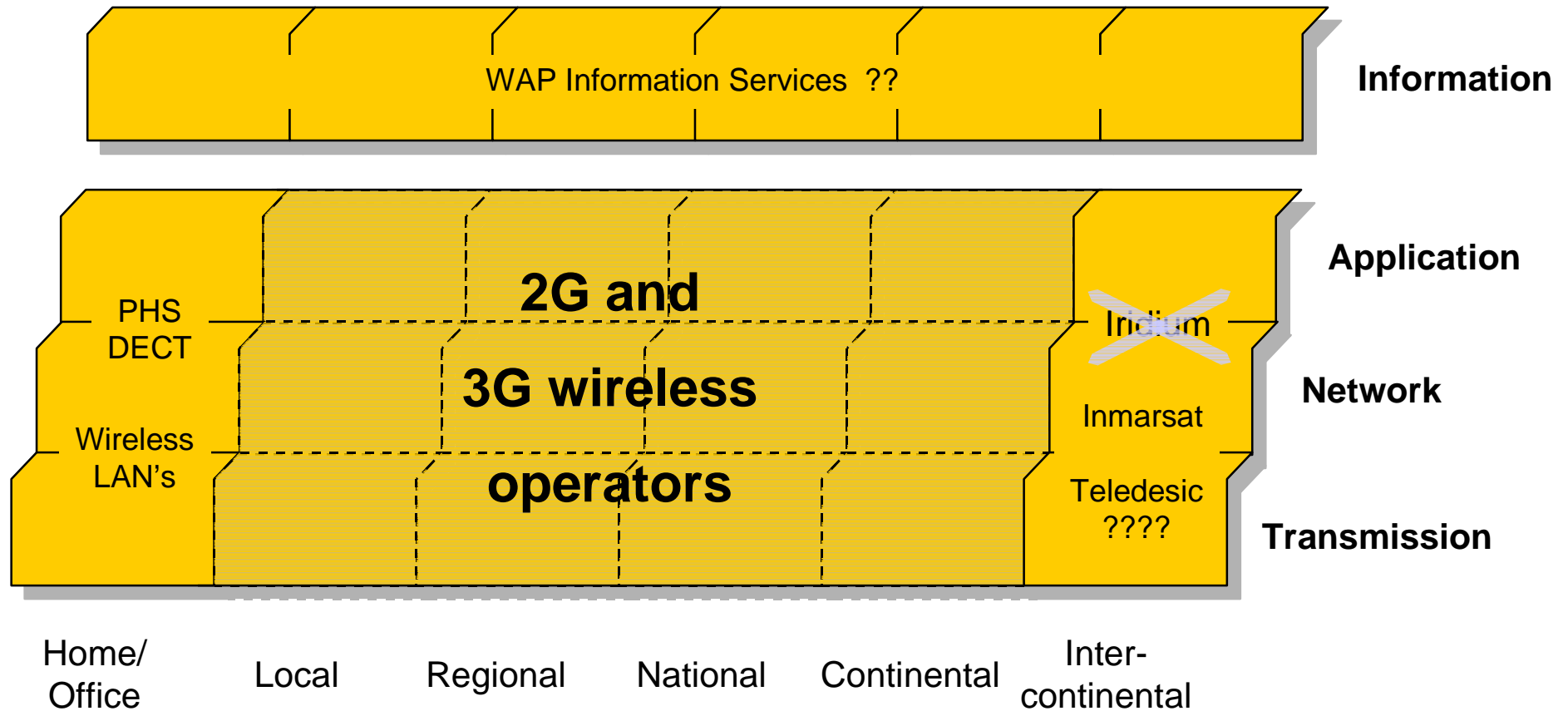
a non-exhaustive sketch of the Dutch fixed Internet market



Markets and 3G

The effects of auctioning on the market structure in wireless telecom geographical and technical bundling of the market on a continental scale

Outside the home and office few alternatives exists for 2G and 3G wireless



Markets and 3G

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Source: Micrologic Research, Wireless 2000

<http://www.mosmicro.com/Wireless2000.html>

Chair: Thank you tremendously for that presentation. I think it is fair to say that we rarely get an opportunity in Hong Kong to have anything as well informed, as well grounded and as well presented as that presentation. So truly thank you very much indeed. We are running a bit late, but I think rather than have a coffee break now and then reassemble we will keep the momentum going until about quarter past eleven. I will ask **Steve McKay from Web Connection** to make some comments and observations, and then **Sin Chung-kai**, and then we will have perhaps one or two questions before the coffee break and then go on to the second session.

Steve McKay: I have done a fair amount of guest speaking and participating in panels. I have certainly never had the role of "discussant" before. So last night and this morning I was thinking about what on earth does the role of discussant entail. I assumed it was going to be asking questions, so I am afraid your job is not over yet because I have more questions than I do observations. But I have a leading question, and that is: I think I can represent probably two constituencies in Hong Kong. One would be, from a **chinadot.com** perspective, certainly content providers. Content providers are very interested in the results of the 3G actions and what that may mean for us, and whether that is good news or bad news for us and good news or bad news for the consumers of Hong Kong.

I also represent the integrators. **Web Connection** spends a lot of its time helping companies integrate mobile data services and leveraging the networks across the region. So my first question to you is: would you say that the highest bidders in the UK and Germany won or lost the bidding contest?

Prof. Melody: They won the bidding contest.

Steve McKay: Are they winners or losers?

Prof. Melody: It remains to be seen. They won the bidding process. They got the license. The question whether that turns out to be a good investment may well depend upon who buys the company. So I would say it was an inefficient investment. But whether the companies end up benefiting or losing probably depends upon whether we have a competitive market or not. If they can use this leverage, and if the industry settles down to three suppliers, then they have enough oligopoly power to keep prices high to make it a success. If the market turns out to be competitive, then the chances are not so good.

Steve McKay: In terms of keeping prices high, I believe -- and I have no pretensions of understanding the economic fundamentals of all of this -- the fundamentals of economics would say that, if you are an investor in something like networks or integration services, ultimately somebody else has to pay for you to recover that investment, for you to achieve anything resembling a profitable return. So the question I keep struggling with, especially in looking at Germany and the UK, and depending on what happens here in Hong Kong, is who in the end is going to pay for all of this? There seems to be a great deal of uncertainty about the economic viability of the auctions that took place in Europe. Certainly in Hong Kong I would have a lot of questions about the economic viability of the costs to the network operators that they would incur through an auction system or any other system. So, ultimately, if I am a shareholder of any of these companies, I want to make sure that somebody else is footing the bill eventually.

This morning on TV I saw an analyst who was saying that he thought it was at least five years before technically even some of the advanced rich media services, which are meant to be leveraged by the 3G networks, would be ready for prime time. And even then, there are going to be gigantic advancements in technology between now and then that could render obsolete some of the notions behind 3G. So, my question is: who pays in the end? Is it the consumers? Is it the content providers? Is it the mobile operators or is it the network operators in the end? If it is the network operators, is it then a matter of survival that they have to do this or is there really a viable economic scenario for them?

Prof. Melody: You have put your finger on the answer. The answer to the question is that is there a market? How fast will it develop? What will the competition look like in developing it? Can we get beyond the hype? We have seen a number of scenarios. One is that the information society, the E-commerce development, the entire economy is going electronic. We are going into information societies. That is going to drive the world economy.

So we have that scenario. Mostly global betterment policy makers and academics. On the other hand, we have this experience that mobile has just exploded at a far more rapid growth. It has been much more profitable than anybody ever thought. Everyone wants mobilities. What happens when everyone wants mobility? We merge mobility and the Internet. This is what 3G is going to give us. Now we are getting beyond the hype on the big picture.

On Hong Kong television yesterday I saw the World Economic Forum in Melbourne. The chief executive officer of Siemens was being interviewed by some Hong Kong journalist, and he was painting this picture. The Hong Kong journalist said, "But your handset keeps getting smaller and smaller and smaller. Are people really going to watch television on an ever declining sized picture? Would they not prefer to see it on a television set?" The answer was, "You know, we just give people what they want. So the question then is that there is a very good chance the decisions customers will make is mobile. The advantage of mobile is that it is mobile. It is essentially voice. It is short messages. It is things that are convenient to mobile. Most of the Internet revolution will be going through computers, through advanced television sets. We will have fiber connection to our homes, and that will be the scenario. If that is the scenario, then this whole pipedream is called into question. There will be a lot of losers, not only these guys.

The second scenario is: when will the services be developed? In which case the allocation of this spectrum more than any other spectrum is way ahead of the game in the sense that there are no 3G services. There is no 3G equipment. Those bidding for the licenses have no control other than their buyers of equipment which will be developed by the equipment industry. That is why I put up this forecast here. If you take that forecast, there are going to be a lot of 3G licensees in financial trouble by 2004. So they individually are being called into question. Hutchison is looking pretty good because they pulled out. They may be able to pick up these same licenses at a tenth of the price eventually. So the whole scenario will develop, but it will develop lower and these guys will lose.

Also, whether these firms will lose depends a lot on the state of competition. For example, in the US the policy that separated services from facility supply was actually implemented in 1976. Nothing much happened until after AT&T had broken up in 1994, until after competition had developed at a number of levels, and it was really the 1990s that the Internet took off. Why did it take off? It took off because all of a sudden all the bright guys from these industries that we have talked about could not only get access but they could actually get a supplier who wanted to have them on the network. They were not trying to make life difficult.

My concern is that, for British Telecom, Vodafone and the other big companies to preserve their investment, they have to get oligopoly control of the market so they can control the market. Then they can roll it out at a price high enough to make it profitable. If they cannot do that, then I think these investments will turn out to be very, very bad investments.

Steve Mackay: I had some questions pre-prepared but your presentation was fascinating. So I found myself wondering a few things, one of which concerned your discussion of unbundling applications and services from the underlying network. I think any of us in the room -- I should be careful here; I think there are a lot of telcos in the room. Over the last few years we have seen the telcos charge up the value chain to get into the content business and to become movie producers, program directors and everything else. I would suggest it has been an abject failure for the industry. I think hundreds of millions of dollars of shareholder value has been destroyed by telcos in communications industries pretending that they can also be in the content and services business. I am probably going to get several darts thrown at me after the session or at any moment now. I have worked on a lot of those. So I can wear the badge of honor for having worked on a lot of these failed efforts of combining the network operator with advanced rich media interactive services. I even worked on the video demand trial in Orlando, Florida in 1992 with Warner.

So it certainly makes sense, I feel, to unbundle content and services in applications in the underlying network. If you are a telco, you are constantly under pressure to launch highly value added services. If you are in the "wholesale business" and you continue to be a network operator and you have spent a fortune on spectrum and on equipment for rolling out the operating capability, again, what is your viability going forward? I would wonder why

I would not just be a virtual mobile operator. Let these guys spend a fortune rolling out the technology, creating the consumer demand, if it ever exists. In

the event that it does exist, then leverage somebody else's costs of capital and come in and operate as a virtual mobile operator and not carry that same risk.

Prof. Melody: Your big risk is that these companies will get all the control that they are after here. You will be dependent on them, and they will be able to charge you whatever price they want for access to the network. And the profits of your activity will go to them. Your big risk is whether or not that market is actually going to be competitive. That is the big debate in the US right now. Is AT&T going to unbundle its cable network that it has bought from TCI and others? Why has the FCC not made them, because it has required unbundling of everybody else up to this point of time? The concern of the content people is that this takes away our competitive option. So here the big reason for going across the boundaries is that you have real concerns about the terms and conditions of your access.

Your point on telephone companies getting into things they are not very good at is demonstrated historically. The best example is AT&T. It has gone into almost everything and it has lost money on almost everything except basic telephone services, where it has made a lot of money. The other thing to keep in mind is: where is the money in this sector? The money is in voice phone calls. That is the profit. It is no longer bribing the investments. Now I think it is less than 50 per cent of the use of the total networks, internationally and in most countries. But look at the forecasts of revenues. You take those equipment orders, factor those through some models and ask, "What does that mean for the revenue?" In 2004-05 what will be the breakdown of the revenues of mobile operators? Well, 80-90 per cent of revenues will be coming from voice phone calls and short messages, the same way they are now. Most telephone companies in the world still get 70-80 per cent of their revenues from voice phone calls.

The whole question then is: where is the money and what is driving the system and the development of value-added services? Probably the key policy issue for the future is whether the value-added people -- the people developing the web site access, the content services of all kinds -- will have competitive access to the network. So your response is the response of someone who expected an actively competitive dynamic market that you can assess and deliver. If you only have one potential buyer of the content, then they can make you pay for the costs that they paid for the spectrum.

Steve Mackay: I guess I will end my part here with a couple of questions. I think a fascinating question that emerges is: who pays who in the end? From a content provider's perspective, we have no intentions of ever paying the carriers. From the carrier's perspective, there will likely be no intention to ever pay us to carry content. From an integrator's perspective, the good news is that hopefully there will be a lot of value created in building the online and interactive services that leverage these networks. But it is still an absolute puzzle to me who in the end will pay for it all. I would love to find out as things emerge over the next couple of months. Thanks, John.

Chair: Thank you, Steve. In the second session, some of the panel discussion will try to pick up some of those points, and we will have more Q&A in the second session. Bill mentioned the question of cable and AT&T in the US. I noticed that it is not the FCC but the Fair Trading Commissioner at the moment who is pushing that issue faster. In Hong Kong we do not have a Fair Trading Commissioner or competition law.

Let me finally invite **Sin Chung-kai**, who might want to make a comment on that. I congratulate him on his re-election as IT function constituent member of Legco.

Sin Chung-kai: Although I did voice my support for a beauty contest in Hong Kong for distributing the license, I must admit that auctions appeal to politicians and to government especially. Sometimes the question asked is, "Do you want auctions or do you want VAT or sales tax in Hong Kong?" So it is quite tough for anybody, especially the government or politicians, to argue that auctions are not as good as a beauty contest in Hong Kong.

I want to pose a question to Bill. In his presentation he talked about the US and Europe. I think Japan will definitely be a very important player in 3G. Europe has been leading in the mobile business for many years. Although America has been seen to be technology leaders, they have not been leading in the mobile business. Because of your presentation, I understand it is not because of auctions but because of the standards and restrictions of rulings. I understand Japan has not been leading also in the second-generation business. But obviously Japan has already decided that they will use beauty contests. They have chosen beauty contests in Japan for distributing the license.

So my question is: within four or five years, will Japan have a better chance to win because they do not need to pay the bank money to the government? Do they have a better chance to win because they can have more investments on innovation, on manufacturing devices, on new applications. So my question is Japan.

Prof. Melody: I am not an expert on Japan. My perception from what I know and have read, including from Japanese colleagues whom I have talked to, is that Japan is liberalizing at the pace the WTO and the Americans make them liberalize. The whole liberalization process is not one Japan has been anxious to undertake. They are not alone. Most countries in Europe had to be forced by the European Union.

I find it useful to look at the different segments of the industry. There are equipment manufacturers. Then there are the operators who provide the infrastructure services. Then there are the content people who provide the content that goes over the network. What has been driving the success so far? Primarily the equipment manufacturers -- everybody in telecommunications, computing, hardware, software, computer electronics. These are the people who are basically moving the computer revolution into the equipment that is used in the telecommunication sector.

On the services side, it has been the Internet people who have provided the content on the network. The barrier has basically been the telephone; the inherited telephone monopoly companies. The telephone monopoly people -- this is not a personal indictment; this is simply a description of the way monopolies have behaved since the beginning of time -- they do not like competitors, and they do what they can to block them. They have never been very innovative. So that has been the difficult structure. So, when I look at the future, we say what is likely to happen is that the Japanese equipment manufacturers are going to do very well.

How well are they going to do in relation to the Europeans or the Americans? I have no reason to believe they will do any better or worse. Each will do reasonably well in different sectors. It will be a rapidly growing sector, and that may actually be the best place if the prices are not already too high in most equipment manufacturers. Then the usage gets driven from the other end. This is where the question being asked by Steve McKay a minute ago about opportunities comes into play. Where would we expect the opportunities to be over the next five to 10 years? I think one of the big changes that is going to develop as the Internet develops is languages other than English are going to start coming seriously on to the Internet. The US and English language had a big lead in terms of the development of Internet services, both because of the infrastructure and the early redevelopment. So, if you look at the rates of growth, there will be all kinds of new services in non-English languages, such as Japanese and Chinese. We are going to see local, national and cultural markets start to really blossom.

In terms of infrastructure supply, I think the reason there is great popularity here now is that it involves an awful lot of investment, and there still is this traditional belief that we are handing out a monopoly right. If you are one of three or four or even five, you are in a fairly protected environment, if you compare that to what you are doing on the Internet or the competition equipment people have to offer. A lot will depend upon whether Japan or Asia can crack that monopoly; that is, open it up to people in their own countries who have the good ideas. If I have to bet, I suppose it depends how far you look into the future, but in terms of 3G applications, I would not write off China or Korea in terms of playing major roles, certainly on the equipment side. When you look at the rollout in Hong Kong, you may have had the fastest rollout in the world over the past four years. The Scandinavians are ahead of you but we started earlier.

The other thing to keep in mind is the point I made earlier. What is going to be the biggest money-spinner over the next five years? Voice phone calls. That is going to be the biggest money-spinner. Where are the faster growing markets going to be? Asia, no question. Why? Because Europe and North America have had a big push. Europe and North America have much better developed fixed networks than Asia has. So, if I were a betting man, I would be looking at Asian mobile phone companies as a good investment in a whole variety of countries, and mobile phone investment primarily for voice phone calls and short messages.

Chair: Before we let Bill take a break, I am sure there are lots of people who want to ask questions. We will take two or three questions before having a coffee break, then we will have a panel and then come back to Q&A. You can use that opportunity to ask Bill questions also.

Participant: I think you have fairly well established, given that there has been over US\$50 billion of investment in 3G spectrum rights, and given that there is only going to be around \$5 billion of equipment sales by 2004, that the bank is assuming these companies are not going to default and are the ones that are going to make money. One of the interesting points that you have made is that Hutchison had what you can call a vision in not investing in 3G. Given that there has number not been a killer apps. that have been identified for 3G services, and given that the equipment has not really been developed to offer 3G services, would it not make sense as an investor to look at services like 2G, like GPRS and Edge, which go up to 384ks per second, which is already faster than my 300 kilobytes per second. Would it not make more sense to look at these companies? I am going to play devil's advocate. If I am a regulator, given that 3G is maybe a dead industry simply because of the money that has been wasted in spectrum allocation, why would I not try to bleed this to death?

Prof. Melody: Certainly if I were a regulator doing an auction, before I did the auction I would announce a number of things. I would say, "Everyone who has a 2G license has full, open, complete rights and our full cooperation to move into 3G services if and when they want to." Secondly, I would say, "You have to unbundle so the retailers can get access to that network." Thirdly, I would say, "We may issue additional 3G licenses any moment. Right now we are going to issue a larger rather than smaller number." All of those things are to get the action price more realistic.

You raise a very good point in terms of what I would invest in. I would not invest in 3G services now at any level. It is too far into the future and it is too uncertain. It may not develop at all. Certainly, if you take Edge and the 2.5G services, if you ask under current plans about what they can do with the bandwidth available to them, you can say, "Now, what is it that a 2 megahertz service, which is what a customer will be getting under 3G, requires that cannot be provided on the 2.5?" What services fit that narrow band? The answer is that I cannot even think of any because most of the broadband services I think about are film related and you can not get them over 2 megabits to the home. So I will go directly to fiber. I would say that you can certainly make a big case for bidding for every spectrum in competitive market terms; whether that makes sense...

Now, what were they bidding for? They were bidding for market position. They were bidding for a monopoly right. For the reasons I indicated, I think in a sense they were locked into that. But, from the standpoint of an investor, there are major risks here. If you think historically, there are a number of good historical studies that have been done. What has happened in many industries is that we have seen some competition develop, and the dominant firms drive out many of the competitors and buy up the rest.

You then end up with not necessarily a pure monopoly but a highly concentrated industry, what we call a tight oligopoly. Three firms operate the market with maybe a fourth one hanging around on the fringe so they can argue that it is competitive. Then they can control the developments. If they are in the 2G field, what you see is that they have bought their way into the control of the future market. That is my concern. These companies are buying their way into the control of the future market development. I think it is the responsibility of policy makers and regulators not to let that happen, particularly because it runs directly contrary to all the other policies they are making. That is probably the most significant issue: this spectrum issue has been treated as if it is totally unrelated to all the other telecommunication policies that have been developed.

Participant: Before I ask my specific question, my name is **Stephen Brown, Kim Eng. Securities.** {Panel speaker, second session – ed]. The interesting thing to me is that auctions would only exist if markets in spectrum were uncompetitive. If they were completely competitive, your returns on capital would be exactly in line with your cost to capital and no company could afford to bid anything. So there is a fundamental presumption here that there is an uncompetitive market or else an auction would not have any value.

What you have not done this morning is you have not suggested how you could make markets more competitive, which I think is much more interesting. It strikes me that most of the public policy has really come from stuff written in the fifties and sixties, picked up by politicians like Reagan and Thatcher in the seventies and has really missed out on the next generation of thinking. It strikes me as something like the electricity pools, whereby you have a generator of power and a distributor separated that way with private capital buying the spectrum and pricing it to virtual operators. Obviously the value of spectrum at 2 o'clock in the morning is not what it will be at 2 o'clock in the afternoon. Would you like to comment on the perfect competitive environment?

Prof. Melody: I would disagree with you that I have not addressed the conditions for an auction. That is what my unbundling comment is about. If you make them unbundle retail from wholesale, that is a way of promoting competition. If you tell them 2Gs can move in any time, that is a way of promoting competition. If you tell them you might license somebody else at any time, that is a way of promoting competition. And, if you allocate lots of licenses now rather than fewer, all of those are ways of making the auction closer to what you would find –

Participant: But would you advocate that? Is that how you would improve it from your experience over the years? I am looking for guidance.

Prof. Melody: We can talk afterwards. It depends on circumstances. As a conceptual matter, not knowing anything about the distinct circumstances, we would say, "Yes, use an auction. In using the action, have an unlimited number of licenses." In a competitive market we would say, "We will not tell you how many licenses we are going to issue." If you take all the spectrum that has now been allocated that can be used for 3G, including those allocated last night, there was quite a bit of spectrum there. So you would say, "We may allocate 15 or 20 licenses, we are not sure. You make your bids based upon all of these conditions for a competitive market. We will lay down our beauty contest conditions because we do want to make sure the market is rolled out with the guarantees of severe financial penalties if you cannot meet these."

I think I would be inclined to put in another condition which said that you cannot resell it. If someone wants to buy your company, spectrum comes back to us for reallocation. All of these are ways of making the market work better. So I would have all of those and try to think of some more to make it more flexible. Then an auction may make sense. I would then look at it in terms of what that is likely to do to your other policies, the market structure and your other objectives.

I would be concerned, frankly, if someone was going to pay as much or more for the spectrum as it costs to develop the whole system. Clearly the spectrum is not that valuable. So that result to me would be an unsatisfactory result and I would want to think about the imperfections created by the external market environment. I should point out that I was a major mover at the FCC to get away from beauty contests. I want to use the market in the system to the greatest extent possible. But it basically concluded in an article I wrote in 1980 that the market must be a tool of spectrum management and allocation. It is not a substitute for spectrum management and allocation. So we should push the market as far as possible.

Perhaps the next step will be secondary markets, which will be a way of making the market system work better. Then the real tough problem: if we can get into markets to determine how much spectrum is allocated to mobile versus television versus other things, then we can begin to make this process work. So you should not interpret what I said as against auctions in principle. I am against auctions that pervert the objectives of communication policy.

Participant: You touched on a subject that has gone largely unnoticed, I think, and that is that the World Radio Council has extended the allocation of 3G spectrum quite considerably. I think that was done in April or thereabouts. There is actually a lot more 3G spectrum out there than the world is aware of when they started the process of allocating licenses in the UK. I think it came before Germany. Why has that gone unnoticed? How is that going to affect the values that people pay for future 3G licenses?

Prof. Melody: It depends entirely on policy-makers. The limitation on spectrum licenses historically has always been driven by the limited capacity of the spectrum. In fact, this is the major rationale for regulating the spectrum; that you have limited capacity in the spectrum. The beauty of technological change is that it has opened up so many new possibilities. So the great irony is that, as we use more and more of the spectrum, in some cases it gets less and less scarce. An example I cited is probably as good as any. What is the difference between 2G and 3G? In 3G you can put three telephone calls over the same spectrum as one telephone call in 2G, and 2G was better than 1G. So we have this increased efficiency. I would raise this question for any policy-maker: why have you not taken the total capacity made available for 3G and allocated it all, if it is turning out that 3G is this valuable? We know from these experiences that no other part of the spectrum is this valuable.

If we just think of the economics of valuing the spectrum, if this is so valuable, we need more and more spectrum. Since we have already allocated this amount, what is it that creates the shortage? It is a policy derivative shortage. Even though the Brits did theirs before -- at least they had it all set up before the May World Radio Council

decisions -- the Brits participated in those decisions. They certainly knew it was coming. They even knew they were going to allocate some more spectrum. So a good question for policy-makers is why they have limited it. What is the reason to limit it to five licenses in the UK? There was a possibility of six in Germany, but the bidding process was designed so that there could really be only five, and that is what they got. If you think of the competitive market implications, as I told this gentleman, why not say, "We are looking for bids for the third generation. We do not know how many licenses we are going to issue. We are going to see how many bids we get. We are going to license as many as possible." That is what a competitive market would do.

The number of licenses is an entry restriction. Most countries have said, if you want to come in and provide value-added network services, you can come in. If you want to provide telephone services, our only concern is that we do not want 15 companies digging up the streets. So you would say here is a perfect case to say, "Let us open the door as wide as possible." No policy-maker has ever explained that. They have always answered that there is a shortage, and in fact there is not a shortage. As you rightly point out, the May decision made a lot more spectrum available. Since the purpose of the process is to allocate spectrum where it is most valuable, we would say after those actions that, clearly, this spectrum is more valuable even than commercial broadcast stations in the United States. In fact, some of the new spectrum was allocated to accommodate the United States for the 3G licenses. So I would say, if you are going to auction in Hong Kong, I would challenge the auction. Do not tell them how many licenses you can issue. Issue as many as possible. That should bring the price down to a reasonable level.

Chair: In light of the time, please thank Professor Melody. I suggest we take a maximum 15-minute break. There is coffee and tea available. (11.33 am)

Session Two: Panel Discussion (11.53 am) - Stephen Brown, Head of Research, Kim Eng Securities, Craig Ehrlich, Group Managing Director, SUNDAY, and John Ure Telecoms Research Project; Chaired by Peter Lovelock, Deputy Director of the TRP

Peter Lovelock: We are going to change the format slightly. Each of our panelists are going to rip into the issues in 120 seconds. Then we will get straight into Q&A. We are very grateful to have SUNDAY as the sponsor of this session. So, towards the end we will allow Craig Ehrlich to wrap up what he thinks are the major issues. I will not waste people's time, given that we are running behind time, with the usual introductory session. To my right, as you know, John Ure, Head of the Telecoms Research Project. We are very grateful to have Craig Ehrlich from SUNDAY and Stephen Brown, who is Head of Research, Kim Eng. Securities. Craig, do you want to lead off?

Craig Ehrlich: Sure. The first thing I want to say is that I am very appreciative of Sin Chung-kai for spending time on this issue, in particular. To Emily Lau, who is sitting up the back, congratulations on your election also. I think we should pay a lot of respect to the two Legco members who have taken the time to study this issue and take it so seriously. It is not an easy issue. That is very clear. What Bill has done is probably complicated it a bit more, although I think that is part of the process. I think he did an excellent job of looking at all sides.

Hong Kong is one of the best markets in the world for wireless. We are one of the best known cities in the world, primarily driven by, in my opinion, a regulatory environment and a regulatory process that has worked extremely well. I am not suggesting it has worked extremely well necessarily for the operators, because five out of six of the operators today are reporting losses, but it has worked very well for the consumer. It has worked very well in positioning the government as being very progressive, as having a lot of foresight.

The issue really remains, as we get into 3G, where is Hong Kong going to fit into the whole picture for China? Hong Kong is very important to the future of China. We are trying to reorient our economy in this market. We have a tremendous amount to add to China, but the fact is that, if we do not get the policy right on this issue, we are going to lose an edge for creating a lot of entrepreneurs, creating a lot of content that will influence a lot of Chinese across the border. I think that is an important point we must focus on in whatever decision this government makes. It should think about the impact it has on employment, on the consumer and on innovation. Based on question and answers, I can go very specifically into what I think that position should be.

Stephen Brown: I do not think I have any disagreement with Craig on that at all. I became involved slightly in this area simply because over the last three or four years I have done some work for Christine Lo [ex-Legco member – ed.] on land policy and related areas. It has been quite evident to me -- and I think it is fair to say to Christine; I think she is on the public record -- the dearth of Hong Kong government's ability to create policy and discuss policy. The sort of forum today we are having I think we should have had 18 months ago. We should have had similar global experts over a period of time so we could have had a proper and full consultation.

What we were left with in March, which is the day before the spectrum was expanded, was a small consultation document from OFTA, which myself as a man in the street read along the lines of, "Here are the disadvantages of auctions 1, 2, 3, 4. So we will have a beauty parade and I will decide the future of the industry." If there is one thing that comes out of today, it is quite how uncertain the development of anything is, especially in this area of wireless telephony. There are competing systems and protocols out there where people are not paying for spectrum. There are all sorts of issues.

I believe Hong Kong should start to pursue a free market approach wherever possible -- and I mean "start" because there has been very much mouthing and expressions of intentions to us being a free market economy, but I am afraid we are not. Government intervention in the property market, government ownership of the airport, government ownership of the MTR, government control of the stock exchange and the prospect of group 3 UMTS spectrum being allocated by a civil servant, I am afraid was just overwhelming. There are specific arguments for and against, and I think we can go through those. I do not think in many ways there is difference between anyone in the room in the sense that what we want to see is a competitive market. As I said earlier, you cannot auction the spectrum in a truly competitive market because it has no value. That is where I come from. I believe in free markets. I do not believe in following socialist governments such as Sweden and France. I believe success is generated by free markets and I want this to go a free market route.

Chair: Can I just reinforce a point that came up from both of those comments. I have just come back from Beijing and the policy-makers out there are watching very attentively how Hong Kong deals with this issue at the moment.

John. Ure: Since I am chairing the meeting on this subject in Beijing next week, I will take that into account. I would just like to pick up a point that Stephen made just now, which is that in a truly competitive market the value of auction of the spectrum would be very low, to say the least. Looking at that the other way round, it reinforces a point that Bill made, which is essentially that we are facing a tradeoff situation. Either you are raising money for the government or you are trying to develop a competitive market structure. I think that has come out rather starkly and much more sharply from this briefing than from previous meetings. I think that is something we have to take on board.

Policy making, in other words, in this area, because 3G is not 2G, because of the uncertainties of what exactly a 3G business is -- is it access? Is it content? Is it broadband Internet in its widest possible context? What is the market? Who can bill the customer? Can you ensure a closed garden policy or is unbundling fundamental to the creation of a competitive market environment? If it is, what value does that then place upon the access license? Because you do not need an access license to provide content and applications and to make money from mobile Internet. These questions are obviously much more complex than the issues that surrounded the allocation of licenses in 2G, which was a simple voice play.

I think that is something which has come out of this meeting already. The degree of complexity requires us to think of the policy implications much more seriously than has been done in the past. I think there has been a very slow but gradual recognition that we are now dealing with a very different world. The implications for Hong Kong I think are quite fundamental. Hong Kong can produce content and applications which are country specific and language specific. There are enormous opportunities, and I think implicit in the regulator's consultation paper the first time round there was a hidden industrial policy agenda saying that Hong Kong has to find a way of developing these sectors. Yet on the actual issue of how many licenses will be issued and how they will be issued, it seems to me that implication has not been taken on board. The competitive structure; the structure that is going to generate most content applications business in which Hong Kong can probably do quite well in the region.

I will not elaborate my views more because you have all seen the paper that has been circulated. To a large extent I think, although far less elaborately than Bill has done, my paper basically corresponds with Bill's. To make one

final point, Bill made the point that voice revenues will be still the driver for many years to come. At one level I agree with that. I think that is true. That is the one service that people will always want to use and you can plan on the volumes that are involved in that. But the other side of that coin is that charging for voice is going to become more and more difficult. Ultimately voice will be bundled with other services and there will not be a sure clear way of charging for voice at all. It is precisely that project that all telcos are having to face and try to reinvent themselves.

The traditional way of a telco to reinvent themselves is to have a closed garden so they can control the broadband mobile Internet business. I think that runs against the logic of a competitive market structure. So I very much like the idea of having licenses on demand in this area, letting the market decide as far as possible. But what it does require at the end of the day -- because if you have licenses on demand and if anybody can have a license subject to minimum qualifications, there is no reason why there should not be industry consolidation subsequent to that. So the question ultimately comes down to what are the powers of the regulator or what are the powers of anti-competitive legislation in Hong Kong? I think this debate raises very serious questions about how strong is Hong Kong's ability to regulate and ensure a free market in practice. That is what is fascinating about the 3G debate that perhaps did not come out of the issue of the allocation of 2G licenses.

Craig Ehrlich: Can I just say that I agree with a lot of what Bill said. I think there is one stark difference, and maybe that is the difference between somebody who comes up in a competitive environment, an entrepreneurial environment like those of us at SUNDAY. We do not view voice as having a dominant role in the future. We see it being minimized. We think what 3G represents is an entirely new environment. We have been working on applications and services. I think what is revolutionary is 2.5G compared to 2G. I think 3G is evolutionary to 2.5.

For those of you who are not up on that, basically all I am saying is that, when you have moved to packet switched technology, the difference between 2.5 to 3 is really about faster speeds and a larger bandwidth. That is evolutionary. Whether it is Stephen at Smart Tone or us at SUNDAY and some of the others, we are all trying to sit and figure out ways to change our industry. I think there is a great deal of confidence we are going to be able to do that. But obviously there is uncertainty about the cost of 3G and whether we will have enough demand for all these services. I would tend to agree that there is some uncertainty about that.

Prof. Melody: I do not disagree with that, and I would not want people to interpret my remarks as meaning you can forget about the non-voice services. My response was in response to the question about growing markets in different countries. The major reason behind voice is not that the new services are not going to develop; it is that most of the world and most of Asia does not have telephone services -- any kind of telephone services. So what we are going to see is mobiles -- we are already seeing them in countries where people have not had any telephone service. Mobile is making universal telephone service possible.

It occurred to me in the discussion that, if you think of Hong Kong, universal service is not a problem. Hong Kong is at the frontier. If you look at Asia, most of Asia does not have access to any kind of telephone service. That is the explosion that is going to drive the future of the world's telephone businesses: raising the universal service penetration rate of the world from 30 per cent, where it is now, to 60 per cent. That is doubling the number of people in the world who have telephone services. What they want in the first instance is voice. That is going to be the major driver for mobile. If I was making mobile handsets, that is where the biggest demand is. That is where all these companies are setting up manufacturing plants to China. When you look at the revenue streams in 10 years, I hope Craig makes a fortune on his new non-voice services. But it will pale into insignificance compared to several hundreds of millions of Asians coming on to the system for the first time to get voice services. That is the context I was talking about.

Emily Lau, Legco: I want to thank the organizers for putting together today's forum, which is of course very timely given that the second consultation should start next month, I guess. So it is extremely timely. I come in great humility because I understand this is a very complex process, and most legislators are not that well informed in many of these difficult areas. But we have our part to play. When the administration puts out its second consolidation paper, it will come to the relevant part of Legco to ask us for our decision. For us to be able to make the right decision, I think we should listen to the industry and to the public. So I think this is very useful today; the discussion we have had so far.

The question I want to put to all of you is, when the first round of consultation was launched earlier this year around summer, we had one or two meetings in Legco. But we have heard very little from the industry. So far the only thing I have read in the newspaper comes from the Li family. The young Li prefers the beauty contest and Li senior prefers auction, saying he does not want to be badmouthed by the politicians again.

From my point of view, I prefer an auction because I do not see anything wrong with using the process to maximize revenue collecting. After all, the money collected should be spent on the community anyway. But I also want a very competitive environment, maximum access for entrants and the incentive for the people to develop. I do not want them to bid and then become bankrupt. That is not my point.

What I have heard today is very interesting. What Professor Melody has said has given us food for thought. But I want to ask representatives from the industry: why is it that you people have been quiet? Maybe you have said certain things behind closed doors. But for us in Legco we need to hear your views loudly and clearly. I hope to be able to invite you to come to Legco to put forward your arguments. Because, apart from speaking on behalf of your companies, there is a thing called the public interest too. When we make our decisions, that is what we try to balance. Can you tell me why is it that -- maybe you have spoken a lot but we have not heard. As I can recall, a few months ago in Legco very few views from the profession or the industry have been put forward. Will you be prepared to come to Legco next month to put forward your views?

Craig Ehrlich: As Emily knows, I came to see her a few weeks ago to talk about this. The timing may have been an issue because of the elections. We have all been very active in trying to talk to people, but it has probably been very poor timing this summer with the elections. We would love to come visit with different Legco members.

What SUNDAY has done, not so much on behalf of its own company but in terms of a viewpoint, is we have met with the Central Policy Unit. {Government think-tank – ed.} We have met with the Treasury. We have met with OFTA repeatedly. Whenever we can bring resources to this issue, we have done that. And we will continue to do that. I have been talking to Mr. Sin quite a bit over the last four months on this issue. I feel bad that you have the impression that we have not talked a lot. Maybe we have not talked as much as we could, but we would like to. Any invitation you provide to any of us, I am sure we will be happy to come see anybody.

Stephen Brown: Emily, you know better than I do how Hong Kong works. I am not sure if this will be a misguided sleight at Craig but, if you look through the advisory committees to OFTA, there seem to be an awful lot of people on the Telecoms' business side in there and no legislators. They occasionally have somebody from the Citizens' Advice Bureau who I am sure is an expert on spectrum allocation. So I presume the public consultation as far as most Telecoms operators are concerned does not really need to exist because they are meeting so often with the regulator anyway. As with many public consultations in Hong Kong, it appears to me to be a *fait accompli* for a decision made when something is published on the Internet surreptitiously. I recall the main consultation to the Urban Renewal Bill was held at 11 o'clock on a Saturday morning in North Point in a small room, which, considering they are setting up the largest commercial developer in the world, was quite an achievement, I thought, in public consultation but anyway.

John Ure: Emily, I will do a quick plug for TIF. We normally invite many Legco members. Sin Chung-kai is a regular attender of TIF. We will make sure all Legco members get full notices of all future TIF meetings if you are not getting them.

Emily Lau: I think you have missed the point. My point is to come to Legco, where it is a public committee meeting and you come with your formal presentations so everybody can share, instead of you meeting behind closed doors with one group here and there. I think that is fine, but that is what the legislature is for. It is for people to come and present their views, and if it is not good enough you get into argument. But it is all done in public. I do not mind discussions taking place behind closed doors with all your vested interests and how you protect yourself, that is fine. But we want you to justify your case in public too. Are you prepared to come to Legco to present your case, whether it is collectively or individually?

Craig Ehrlich: Emily, please invite us. Seriously; we will come. We came before on the Telecoms Bill last year. It was a fantastic opportunity. There were about 20 of us there. I would love to see that.

Sin Chung-kai: Emily, I would suggest we have a public hearing after Legco has finished our formal business, because I think in the first round of consultations our panel did not consult with everyone. I have had a chance to read all the submissions. There are 40-something submissions to OFTA. When I print it out, it is that thick. It takes several evenings to finish that. But I promise, together with Emily, we will invite you guys to come soon after our swearing-in ceremony in early October.

Craig Ehrlich: But invite Stephen too; all views.

Sin Chung-kai: When I say "invite" I mean invite in public, not only for the operators but also for economists like Mr. Lam, who has always supported auctions. He can also come to have a severe debate so the public can understand the issues more deeply.

Stephen Brown: Can I have my final one tuppence while I have Emily's ear. When you are talking about Europe, bear in mind a lot of these, like NTT, national television companies, are government owned. The argument against auctions in Germany is quite simply that Deutsche Telecom were paying money to the German government who controlled them, and the German government were losing money because the value of the equity went down. So do not necessarily draw direct comparisons.

The issue to me is competitive markets. If there is a competitive market, there is no value in an auction. Auctions are held because regulators are not sure that the market is competitive. If we do not auction in Hong Kong and the market is uncompetitive, however marginally, bear in mind that in Britain you have competition policy; we do not. In Britain you have 40 per cent corporation tax; we do not, we have 16 per cent. So the returns to shareholders in Hong Kong are massive, irrespective in relation of other countries who are already trying to extract the value up front. Because five operators here are losing money at the moment -- I suspect because of predatory pricing by one large operator, which would be illegal in a society with competition policy -- do not presume that operators are going to lose money *ad infinitum*.

Craig Ehrlich: I think Bill touched on a subject that is very important, particularly as it gets stuck on the English word "auction". "Auction" means many things. When Emily says she is for an auction, I may agree with her. Where we may differ is that I do not believe an auction process is correct if the purpose of that auction is cash. I think that is bad public policy. If you are talking about an auction which, if you substitute the English word "competition" or "bid" and then you have to bid for coverage, how fast you perform, your performance bonds, how much you are going to invest, what kind of innovation you have, that is what Hong Kong has used in the past -- and that is not free. So when people say someone ought to be paying for this, Hutchison, SmartTone, SUNDAY, all of us have invested over \$2 billion in the last couple of years on the recent licenses. So this is not a matter of giving us anything for free.

There are no guarantees for any of our businesses. I would argue that, as we look at the whole concept of auction, whenever you are debating with a friend or a colleague, define what you mean by "auction" because you may find that you are on the same wavelength or you may find that you are on an opposing position. But I definitely think it is a mistake to do an auction process that is based simply on cash. We have the fourth or fifth highest reserves in the world in Hong Kong. We may have a bad tax policy in Hong Kong, which we can get into, but when you see Czechoslovakia or Slovenia talking about filling their budget to build schools and social welfare on 3G licenses, something smells. That is not good public policy. That is certainly not the way Hong Kong should go.

Prof. Melody: The terms "auction" and "beauty contest" have come to be misrepresented. The beauty contest term actually came from a circumstance where the administrators had no real basis for distinguishing. Allocating a radio license; everybody means the technical criteria, the financial criteria and how you decide. You could not justify it, so it was to get away from that.

In mobile licenses, I have not seen that process used anywhere. What is called a beauty contest is a contest in which there is usually bidding but not cash. Let me give you an example of something which I was involved in in Alaska. Thirty years ago Alaska did not have a communication system. They just had some communication among military bases up there. The civilian population had grown to a level that they needed a communication system. How do you get a communication system to Alaska? Some 200,000 people over a land area that is probably 10,000

times the size of Hong Kong. In snow, mountains, bad weather and no roads, how do you do that? They said, "How can we best design something?" We said, "Well, let us have an auction."

We did not action for price. We said we wanted to propose a system that would cover the state. So it had to be a satellite system. We wanted to propose a system where you have a rollout plan. We wanted to propose a system where you tell us the prices, and we wanted a bond to make sure you will meet the plan. So those were the criteria. It was put up to auction. All kinds of parties made bids. Eventually somebody won, but no price was ever collected.

Finland does the same thing in what is called a beauty contest but this is for 3G licenses in Finland. They set essentially similar kinds of criteria. So, in a sense, what we are talking about is not a beauty contest versus auction; it is, "What is the bidding going to be about?" Is the bidding going to be on cash to the government, on rollout to the network, on low prices or future service offerings to customers? Or is it going to be some combination of this? I come back to the point of competition that I and several others have raised. The key question is: is the bidding going to be on conditions designed to promote competition and promote competitive opportunities in the future or restrict them? Clearly, we have seen in the UK and in Germany that this has severely restricted the potential of future competition. If you can design the best of all possible worlds as some middle ground, then that is fine. But I think it is important not to get hung up on the extremes of a beauty contest being an arbitrary decision and an auction being the grant of a monopoly right, like the Brits did.

My mission here is to get you to understand clearly the range in between so you can design what is best for Hong Kong. If you design a system that gets you the end result, it does not really matter whether that design was called an auction or a beauty contest. What matters is the end result.

Stephen Brown: The difference in Hong Kong is that, if we get that competitive environment wrong and all the companies make massive excess returns – Orange was a US\$50 billion company from a free gift of a spectrum -- we need as a community a clawback mechanism. It does not have to be an auction, but it needs to be the community -- as Britain has done with North Sea Oil, with retrospection even, as they have done with returns on the water companies. If SUNDAY are making a 100 per cent return on capital every year because these services are so wow, we as a community only get 16 per cent corporation tax and no capital gains tax. We at least have to have some clawback system which is part of that bidding process. If you are going to make a 40 per cent return on capital, which is still very handsome and significantly more than the Hang Seng index, we as a community are going to start participating in the access returns.

Craig Ehrlich: If you guarantee me that capital, I will let you claw back a lot.

Stephen Brown: US\$200 million for a network; you have no capital requirement.

Chair: Let us take the next set of questions. Just to wrap up where that came from; Emily, on behalf of the operators, I would like to thank you for the invitation. That is precisely what we use the forums for: to try to increase the transparency. To be fair to Stephen and Craig et al, this has been a fairly public debate that is being played out, and I figure they will probably jump at the offer. So thank you very much.

Bruce Hicks (SUNDAY): I just wanted to reiterate the point about public consultation. I do not think the world industry had any idea what they were dealing with until very recently. The implications of the level of bidding that occurred in the UK and in Germany and the possible ramifications of that is now just being understood. Hong Kong is now in the process of deciding how they are going to issue their licenses. We have a very strong nascent industry here, not just Telecom's operators but also the software developers, all of the technology that is behind delivery of 3G services. You have a nascent industry here. With correct policy, you have an opportunity of stimulating that industry.

If an auction process is run here, it is absolutely my belief that you will find a situation where you will have overseas operators come in, pay a very high price and Hong Kong will become the recipient of overseas technology to a large extent. This is still a very dynamic marketplace. There is still a lot of innovation here, but we will be primarily importing technology that is being used for a global strategy for the big operators rather than having an opportunity to stimulate our industry and perhaps become a significant regional and world player in the

development of wireless Internet services and technology. That is what I think the essence of a lot of these decisions are. We are only starting to understand now just what is happening.

Stephen. Brown: I presume you would like to ban Nokia handsets and Motorola handsets as well. I believe the economy should be able to buy from wherever they want in the world to get the best. If we have second-rate technology here -- and some of the broadband mobile technology I have seen being introduced off the back of a military research program in China is very sophisticated and very cheap. I do not think we should be in the hardware side. I do not think if we buy base stations from Nokia -- which we would end up doing anyway. I think if we have a competitive environment the software developers will come. If we have as many licenses out there as possible, then they will come anyway.

Craig Ehrlich: I think Bruce probably did not clarify it. He did not have an issue with technology as in hardware. He was referring to three or four of the biggest players in Europe -- British Telecom and some of the others -- who will bring in their own philosophy, and then we will be stuck on the wireless Internet with their controlled content. Whereas what we are trying to do is create a software industry here. I do not think he was referring to hardware at all.

Stephen Brown: But, Craig, let us look back. SMS has not taken up here. Because, if I have a SUNDAY machine, I cannot talk to a Hong Kong Telecom machine. You have already on 2G a WAP phone; Hutchison make me go to their portal. We already have these problems in the market. Our next group three to me, this bit of spectrum up from 1,900 megahertz, is a chance to change all this and to create those openings for software people.

Prof. Melody: The regulators should change that right now.

Stephen. Brown: Hold on; the consultative document said that what we have been doing is fine. We are going to have a beauty parade in the traditional sense of it, but with some performance criteria. But none of these issues of open access -- a great guy with a great idea and some great content in his garage being able to get on to the network and sell me these issues -- were addressed in that consultative document.

Craig Ehrlich: That is true, Stephen, but in fairness to Mr. Tony Wong [Director General of OFTA -- ed.], who is not here to defend himself, he is implementing cross-border SMS. A couple of the operators are trying to stop it, two of which may be sitting here, but those four of us are going ahead with it. So those kinds of issues are going away. I think Tony Wong is very much opposed to anybody who controls content or access.

Stephen Brown: It is a great shame that he did not point it out in his official document to the public.

Craig Ehrlich: That is an issue I cannot respond to.

John Ure: By the way, Tony has a senior management meeting this morning. That is why he is not here. But I believe there are some OFTA representatives here, if they would like to pick up on that issue.

Participant: I agree with Emily and probably everybody in the room that the community as a whole should benefit from however these licenses are issued, whether it is auction, beauty contest or whatever. But perhaps for the government to go ahead, as we have seen in Britain and Germany, they went entirely the wrong way about it for the future of competition and therefore the future of public benefit. Perhaps the answer is not to try to get the money up front but, as Stephen just now suggested, some sort of sophisticated clawback mechanism. Because the government in Hong Kong from Tung Chee Hwa [Chief Executive of Hong Kong -- ed.] down has staked its reputation on Hong Kong being an information center. If the price of the licenses is so high that the same situation occurs that has happened elsewhere, that companies are in danger of going out of business, straightaway the development of Hong Kong's information structure is hobbled. So the answer is not to grab money for the Treasury right at the beginning, but to accept that over a long period they will probably get much more anyway if they take it after the benefits have started to accrue.

John Ure: Can I just comment on that, Peter. I entirely agree with that. I was going to come back to Stephen's point earlier. There are other effective mechanisms for creaming off any monopoly rent that may appear. I am

personally skeptical about whether it will appear, but maybe that is because at the moment I am having difficulty in seeing precisely how the 3G business will develop.

If one takes the most optimistic view, and if there is a restriction on the number of licenses and the licenses get high prices, then monopoly rents may well appear. In which case there is a mechanism – I have suggested one potential mechanism in my submission to the OFTA consultation paper -- whereby you can cream off monopoly rents as and when they appear. You can give the operator the choice: either hand the money over to the government or hand the money back to the consumer in lower prices. You can even have an auction, a bid, in the licensing process where people actually bid what tax they would pay on the monopoly rent. There are a number of ways in which you can do it.

An alternative mechanism entirely is simply to have a fee on the number of handsets issued. You can have sliding scales. I think at least in theory that is not so satisfactory, although in practical terms it might be easier to implement. So there are ways of achieving that. I think there is a related problem, and that is if the government-- and I think Bill touched on this in his presentation -- gives a small number of licenses at humungous prices that will inevitably reduce, in my opinion, the effectiveness of a regulator for them to subsequently regulate that business. Because you are having to tell people you have spent billions of dollars, and now we are going to tell you how you should act. There will be an enormous resistance to that, especially if it is a BT or a Vodafone. I do not think a Hong Kong regulator in the Hong Kong government with the best will in the world would find themselves in a strong bargaining position.

Stephen Brown: But, equally, do not think that the auctioning process and these large sums in Britain are causing companies to consolidate. I disagree with that. As Adam Smith said, when men of business hide in a corner, they are up to no good. If you give Craig 15 meg of spectrum, there is no guarantee -- and I am sure he would not guarantee you today that, if Vodafone bid him \$5 a share, Vodafone would not become the owner of the spectrum very quickly. That is a very strong argument for proper, consistent competition policy in Hong Kong. We are arguing at a quite sophisticated level about some of the niceties which Bill has been dealing with around the world, but we have a vacuum under us, which is no competition policy. Therefore, there are some real issues at a macro and a micro level.

Craig Ehrlich: It is because we do not have predatory pricing rules, because we do not have competition, we do not have anti-trusts, which I think all of us would agree is a problem; I think that is where an auction based on cash is a huge mistake.

Stephen Brown: Yes, I think so.

Craig Ehrlich: I might change my position somewhat if there was a way to stop one of the players in this market who does price to push people around, but there is no way to stop that.

Prof. Melody: You would be interested to know that in the new UK competition law, which was developed within the last year or so, the enforcement of the competition principles is delegated to Oftel. That is, the regulator has been empowered to apply the competition principles from the competition law. This goes directly against the theoretical trend that people thought would happen in this industry: namely, we have regulators for a few years, then the regulators would fade into the sunset and the whole industry would just move under the competition authority. That is what has happened in Australia, for example. But in the UK, given the experience with the regulator bringing about a transition from monopoly to competition from 1984 to the year 2001, that is 17 years, on the basis of that experience the Brits have decided to go the other way primarily because not much competition has developed in any of the markets.

Craig Ehrlich: But, if you look at the Oftel situation, the finance ministry is saying, "Do you not dare regulate them." In other words, what has happened is that Oftel supposedly has some strength, but the finance ministry, who is now going to be elected Pope of England because he has raised so much money, is saying "hands off".

Prof. Melody: Oh, yes.

Craig Ehrlich: So it is a real problem.

Stephen Brown: But you have resort to the EU. Britain is not a sovereign state in competition law, but anyway.

Chair: Before we take one or two final questions, let me throw up a naive question to each of you. There is one part of the argument I do not think was necessarily addressed in Bill's presentation. 2G came along, as Bill showed, at the time when competition and liberalization were really beginning to gain some traction. It allowed competitors to come into the marketplace and offer an alternative, which did come but got sidestepped by in many, many cases.

Now, 2G as you kept stressing, caught people by surprise. No one predicted the growth, nor the growth of revenues. I ask the question because I do not quite understand the business model of 3G yet. We are seeing average revenue per user go through the floor at the same time that we are still seeing subscription levels go up. I am not sure how you cover that gap. The build-out costs for 3G amaze me. On the other hand, the basic way anyone makes money from these services is by having as many people as possible on the network.

All of the monopoly talk has the implicit assumption that people are going to attempt to play the monopoly position and attempt to go back to the old Telecom model of premium pricing and stagger the entry into the market so they can sell high cost onto the consumer. That does not play out in the network world. You want as many people on the network as possible. That is compounded by the chart, which I thought was terrific, that you put up towards the end that says we are seeing the reversal of unbundling. We are seeing the network guys realize content; what is going to sell it to them on 3G networks, but we do not know what those services are. They are going to want as much as innovation as possible happening as they try to work out what makes money and does not, are they not? That means as many people as possible playing on the network. So is the incentive with the 3G networks not to roll them out as cheaply as possible and as quickly as possible for the operators?

Stephen Brown: That is the classic British submission to the EU and the classic, in simple terms, economic case for auctions. Because of sunk costs, if you have spent some money up front, you are going to roll out your network and the economics would argue –

Craig Ehrlich: I hear this all the time from him.

Stephen Brown: I am just putting it simply; I am not giving the 50-minute explanation. The logic of this is simply, if every time they bid a higher price then the value of my license would go up because I am saying I can pass on my revenue. So you would get perpetual auctioning. So that is the economic case for it. I think, from listening to Bill this morning, we still have a long way to go to create the competitive environment within which auctions fit. As I say, the only thing I have is I have a complete horror of the prospect of a civil servant in a broadly undemocratic society sitting in an office making a decision about the future. He can see the future better than Craig, as managing director of an operator who has to use shareholders' check book. An auction is the worst alternative bar one, and the other one is a civil servant.

Chair: I am not trying to mount a simple auctioned argument, although I was trying to tease that out and get that out of the way. What I am asking about is the new world of supposed network economics which is driving it, which has nothing to do with the 2G model. Are we not in a new equation there which says that operators will have to get as many people on the network as possible as quickly as possible, particularly if they are going to write out a contract?

John Ure: I will comment on that on one level. I totally agree that the economics of broadband are fundamentally different from the economics of narrowband, even with the proviso that Bill mentioned about many people not being on voice yet. What is the basis of revenue from a broadband play? Nobody truly knows. There are all kinds of models out there in the market. There is one technology which is in the wind, which is how to trace packets from origin as well as to destination. When that matures, there may be some interesting billing models that come out of that, and that could become fundamentally important to broadband content and application operators. But that is all in the future at the moment.

So, how do you make a business? It is basically a leap of faith, it seems to me. Indeed, implicit in what Peter was saying, when one tries to commoditize broadband from the outset, commoditize access. So you maximize the

number of people who can access content. Whether they will actually want to use it, whether the content will be there, *et cetera*, that comes later. It is almost an act of faith.

That means doing exactly the opposite of what you do in a narrowband market, which is premium price a new premium service. The first thing telcos have to do is sack most of their marketing people, because it will take a complete mindset shift to do that. It also means that you have to put a lot of money up front with a little degree of certainty as to how much you are going to get back and when you are going to get it back. It seems to me to be pretty commonsensical that, if you have already spent a humungous amount of money on licenses, you are going to have some difficulty in financing another humungous expenditure on rolling this stuff out. But let us suppose it is found. You sell off other bits of your business, for example, which is what BT and Vodafone have done in order to do this stuff.

It comes to a final argument, which has often come up in this debate: a sunk cost 3G license cannot be passed on to consumers if the market is competitive. Now, it seems to me that argument, strictly speaking, is nonsense unless one assumes that the market is entirely price inelastic, totally uninfluenced by price, or that sunk costs are going to be literally sunk and never recovered at all. Obviously operators want to recover those costs. How will they do it? Initially if you commoditize, they cannot in phase 1 recover the costs. But if, successfully, that market does grow, then of course they will start trying to recover some of those costs by edging up prices. Of course they will. Unless the market is totally price inelastic, in which case it has no impact, then that is bound to influence the speed at which the market develops. The results would be exactly the opposite of the ones which policy presumably is intended to create. So that is my problem with the economics of the argument. That is one of the reasons why I am against auction processes which have, as their objective, the raising of large sums of money.

Prof. Melody: The point has some value but not what is claimed. Namely, if you have made an enormous upfront payment, then clearly you have a very powerful incentive to make that investment pay off. On the other hand, you do not have a powerful incentive to take high risks in terms of how you spend your future money. In particular, the bankers who are supplying you with money and who are collecting interest on the money you have been loaned are not inclined to take risks.

So, when you look at the market rollout in each of these sectors, they are as we would expect. In the early period, investment takes place and firms lose money. Fine; they are rolling out the network and developing the market. Now, at what pace do you roll it out? At what pace do you require that the risk actually be resolved; that the money starts rolling back through the revenues collected and the services developed? Are you willing to take a big risk and roll out a whole network and see it roll back? Or are you going to take a small risk and say, "We will roll it out to the rich. Now we will roll it out to the not so rich, and then the people who are not so rich."

How fast will you go through that rollout process; normal market development process? As fast as competition makes you. As fast as it is profitable for you to do it. So they will do a profit maximizing rollout under either condition: if they pay nothing for the license or if they paid a fortune for the license. The profit maximizing rollout will be very much affected by their access to capital, the cost of capital and the market risks. So it seems inevitable that we will see a slower market rollout.

The argument about it not affecting anything, I think, only makes sense if you assume a mobile monopoly. Then you can say the future development is based upon the competition. What is the competition? The competition is fiber into the home. The competition is ADSL. The competition is cable modems. In other words, mobile cannot go above the parameters set by those developments in the marketplace. But that is basically subverting the whole mobile policy that has been established to begin with -- namely, we will have competition in mobiles. Big chunks of the mobile market are services that can only be used in mobile. So it could well lead to a milking of the mobile voice market. This may be the end of price reductions in mobile voice because the money is needed to maximize profit in the development of the other services. Is this happening? Unfortunately, I have to rush back to Geneva for a big ITU workshop on what is called the fixed mobile interconnection problem. What is that problem? The mobile companies -- I do not know about the mobile companies in Hong Kong, but the mobile companies in Europe have discovered that you can actually separate origination from termination. What you sell customers is the right to originate calls.

You take away the right to terminate the call. You say, "You have to pay extra for that." You cannot do that if they terminate the call on your own network. But supposing they terminate the call on another network in another country. Then what do you say? "Well, I think it will cost you 15 times the price it cost you to originate the call if you want to terminate the call on my network in another country." You say, "What is going on here?" "Well, there is no competition in terminating calls in other countries. That is a deal between the mobile operators." In Europe the mobile operators have decided that this is not regulated. So let us charge one another outrageously high termination prices and we can each pass them back to our customers and say, "You know, it is that guy in the other country. He just charges outrageous termination prices. For those calls you made months ago that are finally coming through the bill you have to pay today."

So you can say it will lead to a market fragmentation to pursue things like this as a way to maintain the financial capacity to roll out the system. This is why I think the key ultimately comes back to competition within the mobile set. That is what we are talking about. You want the 3G auctions to expand it, enhance it and own the doors of competitive opportunity. That is what will bring consumer benefits. How you design it -- as we have indicated, there are a number of ways to do it, but make sure that that is the end result. Then the actual design I do not think matters.

Stephen Brown: Can I ask a question of these two people, seeing as we have legislators here, who people listen to, I think. I am not in the game so I am not going to express an opinion. We have heard various noises from the regulator and it looks to me like he is going to come out with a criteria based beauty parade with various parameters with perhaps -- and I strongly do not like this -- a maximum charge per unit of service, when you cannot even see what the services are. Can I ask you a very simple question: if -- and do not give me, "Oh, it is hypothetical; I will answer it later" -- in this closed forum that were the suggestion for the way that group 3 should go in Hong Kong, would you agree with that or would you have problems with it?

John Ure: I would propose an alternative.

Stephen Brown: And you?

Craig Ehrlich: I am not sure. I would have to see it all.

Chair: Oh, Craig, obfuscation.

Craig Ehrlich: No, no. I am not sure. I have to see everything.

Participant: I have a comment and a question. My comment is that our group, from a user perspective, is quite against auctions in the way that the normal word "auction" means in the general public. No condition, just bid for the money. That is bad. From what you have explained to us today, Bill, it is very good in terms of setting a scene for more competition. I think that is good. We should avoid use of the word "auction" because a lot of people take auction in the general sense. Auctioning land is very common in Hong Kong. I think, if that is being put another way, I would accept that type of auctioning.

The question I have is that, in John's paper talking about work revenue per user, he is talking about if you take the UK and the German path of such a high price compared to the revenue dollar that is spent, Hong Kong as a user has to spend \$900 per month in order to have that level of pricing whereas now we have only about 300. So there is no way for us to go to that in the short term. Maybe there is some killer application that can bring us to that level, but it is quite expensive for us. All of the operators, five of them, are losing money. They are now bidding \$100 or \$88 for 300 minutes for voice. So it is very cheap. What services or what killer application might bring us to that level of money? That is why I am quite doubtful about auctioning.

Chair: Given the time, can we get you each in turn to perhaps take that and provide a wrap-up at the same time?

Stephn Brown: There will not be any services 900. I just think you will end up paying \$300, and he will have to put down better content every month, and somebody else will put down better content and you will be able to do more things with it. You will pay \$300 and the value of the service will go up. If we had a cash auction in Hong Kong, if anybody wanted to pay \$900, fine they will go bankrupt and that is the bank's problem.

Craig Ehrlich: I do not think I am going to do content because that is not our strategy. Software people who are sitting out there will do the content. I disagree; I do not think it will be \$900. But there are probably some fund managers out there, and they have heard me speak *ad nauseum* about SUNDAY's position in the future. I think ARPU's [average revenue per user – ed.] is going to go up, basically under the premise that I think people are going to use their devices a lot more. We are going to access the Internet a lot more. We are going to see a lot more applications that were never created.

I like to use the analogy that I got into the cable TV industry before MTV and CNN were launched. The whole concept of paying US\$50 a month to pay for television 20 years ago; everybody said, "Why would anybody pay for television in the US? You have 17 channels." Even here in Hong Kong I think the theory was, "Why would anybody pay \$US30 or \$US40 for cable TV. We already have ATV, TVB, video cassettes, *et cetera*." All I am saying is that you have to stretch your mind to see that there are a lot of creative people out there and a lot of creative companies who are going to create things that you cannot even imagine you are going to use, and you are going to pay for it.

John Ure: I suspect the content and applications will come along. I have no idea what they are going to be. I can make a few guesses. The question for me is, "Who is going to make the money out of them?" I foresee 2G spectrum, lots of more 3G spectrum, other ways of accessing the stuff. I think the people who have bid high license fees for access will lose their money. I am thinking about the UK and Germany. I do not think they will ever get that money back. I think it is money down the drain, unless they can tie up the regulator, have the monopoly that Bill mentions and close garden everybody so they have the stranglehold over content and applications. But in an Internet world, I do not think that is a sustainable model.

Prof. Melody: Two interesting observations. There have been some studies that have shown that basically consumers are not going to pay much more as a percentage of their real income for these kinds of services. So, part of the argument is that the real income of people is going to be driven up, and there will be a significant portion of people's real income will then go for the new services. Those kinds of numbers are really looking at what is called the "paradigm shift". That is the transformation to the electronic economy. You are doing your electronic banking and shopping. You are working from home a portion of the time. People are getting their education from home. The things that happen when we change in a fairly significant way the way we conduct our lives. That is the premise of that. Is that a short-run issue? No, it is a long-run issue. In the short run, the only way to survive is to raise the prices on the service you are getting now, and you need a monopoly to do that.

Chair: Craig, do you want to say a few final words to wrap up the whole session?

Craig Ehrlich: I would like to thank each and every one of you for attending. You all have your own interests for being here. This process is not yet over, as Mr. Sin is nodding his head. I think Emily's point is that Legco is going to get involved. Contrary to what maybe OFTA may want, this may stretch out a bit. But I want to thank each of you for coming. I want to thank Bloomberg for letting us use their auditorium. They allow us to do this for free. It is very gracious of Bloomberg to do that. I thank everyone for being involved.

John Ure: I also want to thank everybody here. The presentation and proceedings of today will go on the TIF web site. The web site is on the paper that is circulated. We hold these forums quarterly. If any companies want to join TIF, please email me and we can discuss that. Finally, I thank Craig, Stephen and especially Bill for coming over and giving us such a splendid talk, and also Steve and Sin Chung-kai for being discussants. Thank you very much.

Forum adjourned (1.00 pm)