

Telecoms in the Internet Age: Asia-Pacific into the Twenty First Century

Telecoms InfoTechnology Forum, 22 June 2000

Part of the Pacific Telecommunications Council (PTC) Mid-year Meeting

Regent Hotel, Kowloon, Hong Kong

Executive Summary

1. This forum took place as a **Cable & Wireless HKT-sponsored** TIF session with the Mid-Year Meeting of the **Pacific Telecommunications Council (PTC)** hosted by Hong Kong at the Regent Hotel, 20-22 June, 2000. In August 2000, Hongkong Telecom became part of **Pacific Century Cyber Works (PCCW)** in a remarkable instance of a 'New Economy' Internet and New Media and IT development company taking over an 'Old Economy' telecommunications company – echoes of AOL's merger with Time Warner. In fact, the 'Old Economy' HKT has been well on its way to reinventing itself as a 'New Economy' provider of infrastructure and services to electronic marketplaces in the region for one simple reason: liberalization of the telecommunications markets in Hong Kong has seen revenues from the cash cows of IDD and 2nd generation mobile services decline rapidly. Not for the first time Hong Kong is a fascinating case of being in the advanced guard of change, partly out of entrepreneurial drive and partly out of necessity. (See John Ure, 'International Simple Resale in Hong Kong: Not Waving, But Drowning?' *Telecommunications Policy*, January 2000, and pre-publication paper on www.trp.hku.hk)
2. The first panel was introduced by **Rex Chang, Principal Assistant Secretary of the Information Technology and Broadcasting Bureau (ITBB)**, Hong Kong's policy maker, who welcomed the overseas delegates to the PTC TIF session, and introduced the aims and policy framework of the Hong Kong government, including the enabling legislation for the promotion and facilitation of e-commerce. Rex Chang also pointed to mainland China's anticipated entry to the WTO as a development which would further boost trade-in-services, including telecommunications and e-commerce services, to and from Hong Kong.
3. During the 1999 Budget Speech of the **Financial Secretary, Donald Tsang** (who also gave the welcoming address to PTC delegates at the opening ceremony) it was announced that **PCCW** and the Hong Kong government would jointly undertake the development of the **Cyberport** project, designed to attract local and international IT talent and investment in New and Rich Media content and delivery mechanisms and related software. It was appropriate therefore that also on the panel were future colleagues, **Norman Yuen, Deputy CEO of CWHKT**, and **Alex Arena, MD of PCCW** and ex-DG of OFTA, the Hong Kong telecoms regulator.
4. One look at the annual accounts of Hongkong Telecom (now part of PCCW) is sufficient to illustrate the past and indicate the future. Traditional revenue sources are declining, and Internet-related and multi-media revenue sources are rising rapidly

from a small base. **Norman Yuen** details the new strategic focus on electronic marketplaces by reviewing the multiplicity of business models which are emerging along the commercial industrial value chain, emphasizing the point that no one model fits all situations. It varies from business to business and upon strategic positioning, upon the nature and scope of the markets, for example whether they are local, regional or inter-regional. But for Hong Kong he speculates that the most likely model will be something like the Ariba model, the ‘total system economic optimization model together with an emphasis on international trade.’ In Asia there is an equal multiplicity of languages and cultures, but the emergence of market-led standards is beginning and he sees economies like Hong Kong and Singapore as of necessity taking a lead in this area. (See later the reference to **John McCready of Nortel** and the **Broadband Content Delivery Forum**)

5. **Norman Yuen** sees the success of electronic marketplaces ultimately as an issue of scale, but to achieve this alliances between telecom, IT and applications partners is crucial. Revenue sharing between partners will present areas of negotiation, but scale will compensate small margins with volume business. For the immediate future he sees the driving force for this B2B development less in terms of new business opportunities for the market traders (although opportunity is clearly an important ingredient) and more in terms of efficiency, cost savings and productivity. How far is this insight a function of the recent Asia economic recession? Anecdotal evidence suggests many converts among Asian companies to the Internet and web-based business models over the past 2 years were riding a wave of expectations rather than counting the cost. Is he pointing to a new wave of reality?
6. **Alex Arena** corrects the chairperson who called him an ex-regulator. He likes to be thought of as an ex-deregulator. The key to success for future rich media business is broadband. Any kind of broadband, but in economies such as China, like the USA, it may well prove to be cable TV systems. But the real phenomenon in Asia currently is mobile cellular services. More people use them than fixed wireline phones, a reflection of the backward state of the PSTN in many developing Asian economies, but also of the potential to leapfrog technologies. But more intriguing than the means of access is the demand for content. PCCW’s research indicates that, despite the widespread belief that infotainment is the killer application, it may well prove to be educational services. Parents especially are concerned to give their children every opportunity and will be a ready market for broadband. Will Asia prove to be different from the earlier experience of the USA in this regard? PCCW’s strategic approach is an interesting one – to partner with local access providers, such as cable companies and ISPs, providing a revenue-sharing model and the investment to implement (for example, to upgrade the network or install billing software) it where necessary. But on the downside Asia faces major challenges. Alex singles out people skills, an IT-savvy environment and a greater emphasis upon personal creativity as particularly important to, although by no means peculiar to, the Asia region. PCCW’s vision is to contribute to tackling these issues as part of their business dialectic.
7. **Stephen Lau, Privacy Commissioner for Personal Data, Hong Kong SAR**, chaired the second TIF panel. Having the right environment is a crucial part of promoting and

facilitating the use of electronic communications and e-commerce, and Stephen's very active role has made a notable contribution to Hong Kong in this respect.

8. **Charles Kenny of the World Bank**, began the second session with a theme that had been chosen to mark this PTC Mid-Year Meeting 2000 – telecoms and development. The ITU Maitland Commission report in 1984 had targetted the turn of the century to 'bring everyone within easy reach of the telephone', an aim still to be realised. The Secretary of the Maitland Commission, John xxxx, had been a keynote speaker at the PTC the previous day (see www.ptc.org) and Charles Kenny took up the issue of what is the relationship between the two. Stressing that lies, damn lies and economists can't be believed, he nevertheless argues that there is a strong relationship which is best measured in micro-studies, for example in cases where farmers have gained from being able to access intelligence about market conditions. The result shifts income from middlemen back to the producers. Macro-studies, on the other hand, produce contradictory and conflicting evidence. Charles particularly cites the value of the work of Seth Norton at Washington University. But he willingly concedes that economists probably have less to say than futurologists on the subject. What is clear is that where countries encourage investment the results follow, and the opposite is equally true, and this is where he still sees a vital role for the World Bank, and its affiliate the International Finance Corporation (IFC). For example, where economic (that is, social) benefits are clearly available, the right mix of public and private funding is sensible policy in developing economies, and this extends beyond just basic telecommunications services to embrace the Internet and content, and the IT skills associated with that.
9. **John McCready of Nortel** addressed the issue of the market for broadband content and the absolute necessity for market standards to be reached among broadband vendors to facilitate content and applications providers and promote takeup. This is a theme that underlies the discussion topics of the first session. In April 2000 the **Broadband Content Delivery Forum** was formed 'to create standards that will enable the distribution of broadband content to the edge of the network, bypassing Internet bottlenecks and thus enabling the content providers to effectively ally and partner to deliver personalized services.' John stressed the growing important of personalized services as market of the future, and contrasted that with the Internet today which 'is really dumb'.
10. Lack of capacity in the core networks in Asia remained a major constraint as most rich content was coming from California (he sees the AOL/Time Warner deal as pivotal in the development of content for the next generation) and the way forward would almost certainly require major alliances between telecom companies and IT platform and services providers. The vision is core networks with capacity to store subscriber information from the network's edge to allow content providers personalizing the delivery of content to those subscribers by means of a 'personal content tunnel' drawing upon the core network's intelligence. Naturally, this raises questions of data protection, an issue still to be addressed in many Asian economies. But it also raises technological questions about bandwidth, especially as in John's view full motion video and true video on demand will become the 'Holy Grail'.

11. John lists 6 areas in which standards need to be achieved. (1) subscriber logins; (2) how subscribers receive branded content (including, note, advertising material); (3) differentiated service selection through browsers (eg. quality of service requests); (4) personal content tunnels or ways of tunneling through the network to reach the subscriber; (5) development of premium service content able to respond to the browser requests; (6) ways to bill for premium content. The BCDF is designed to meet these challenges and is open to all.
12. We understand that the ability to track the routes of packets from origination as well as to destination is under development by at least two consortia, and this will open the way to tackling the billing standards (see 11.6 above) which could go a long way to offering viable business models for content and access providers. As the door of opportunity closes on narrowband economics it may be just about to open for broadband economics. This will be a topic of a future TIF meeting.

Panel One: Asia's Infrastructure and Services: electronic marketplaces and their contribution to Asia's development

CHAIR: John Ure, Director of the Telecommunications Research Project, University of Hong Kong

JOHN URE: I'm also the director of the Telecom InfoTechnology Forum, which is a quarterly industrial roundtable we run in Hong Kong. We have currently, I think, 45 corporate members of the roundtable. I'm also on the board of trustees of the Pacific Telecommunications Council and I've been working with PTC to put this event on and organise the program.

Just by way of a quick introduction to TIF, basically the bottom line is that the industrial roundtable, TIF, raises the funds through sponsorship and subscriptions, corporate subscriptions, to pay for the public domain research of the Telecommunications Research Project. In return the Telecommunications Research Project publishes briefing papers and industrial papers.

They are also on our website so please do visit the website and you can download all the proceedings papers, the presentations of previous roundtables, the industrial research policy papers, and so forth.

This morning we're organising - TIF is organising this part of the PTC event and our three speakers for the first session are Mr Rex Chang, who will be giving us a welcome and is from the Information Technology and Broadcasting Bureau of Government. I serve on their advisory committee and we've worked very closely with the ITBB, so a warm welcome to Mr Chang.

Also Mr Norman Yuen, who is the Deputy Chief Executive Officer of Cable & Wireless HKT. I owe a special debt of gratitude to HKT because in 1993 the Telecoms Research Project was actually founded after the foundation of HKT generously gave a gift to the University of Hong Kong to establish an independent social science research centre into the telecoms and IT industry. Our origins come from that, and we've always had extremely close relationships with Cable & Wireless HKT and so we're particularly pleased that they also agreed to be our sponsor for today. So thank you very much. And you'll find some literature from Cable & Wireless HKT in front of you.

Our third panellist is Mr Alex Arena. Before becoming general manager of PCCW, Alex was the Director General of OFTA, the Hong Kong regulator, and it's in that capacity I first met Alex, and again our paths crossed many times. Now Alex has got the task of transforming a start-up company into one of the largest companies in Hong Kong, and indeed one of the global players in the IT and web-based information industry. There are rumours that Mr Alex Arena and Mr Norman Yuen will be closely involved in joint commercial activities of the future. I don't know if there's any truth to those rumours but that might emerge later on.

So let me first ask Mr Rex Chang to say a few words of introduction. Rex was appointed to his present position as assistant secretary for the Information Technology and Broadcasting Bureau of the Hong Kong Special Administrative Region in September 1999. In this position he is responsible for policy and promotional matters relating to information technology development. Previously Mr Chang served in a variety of bureaux and departments including the Finance Bureau, the Security Bureau and the Home Affairs Department. So without further ado, Rex.

WELCOME: Mr Rex Chang, Principal Assistant Secretary,
ADDRESS Information Technology and Broadcasting, Hong Kong Government SAR

REX CHANG: Dr Ure, Mr Yuen, Mr Arena, distinguished guests, ladies and gentlemen. Let me first extend my warmest welcome to all of you. It is indeed a great pleasure and an honour for me to be invited to speak at today's panel. The organisers have brought together a very distinguished group of speakers to share with us their insights and experience on a wide range of topics.

In the past day or so there have been very fruitful discussions at the council's mid-year meeting on internet and telecommunications issues. In addressing the council's opening, the Financial Secretary and the Secretary for Information Technology and Broadcasting of the Hong Kong SAR Government have already talked about the excellent telecommunications infrastructure in Hong Kong and our most open regulatory regime on telecommunications.

To build on high capacity telecommunications infrastructure is fundamental and is a prerequisite for e-commerce. The emergence of e-commerce over the internet no doubt has been the most significant development affecting business as we enter the new millennium. It transforms the way business delivers their products and services to their customers. It is also changing the way a business works with its partners.

This global network allows vendors and service providers to explore new and overseas markets economically and effectively. It also allows business partners to share critical and timely information electronically. This provides plenty of scope for us to streamline supply chains shorten production cycles, improve efficiency and productivity, reduce costs and, most important of all, reach new customers.

I would like to share with you today our efforts - the Hong Kong SAR Government's efforts in facilitating the development of e-commerce in Hong Kong. To foster the development of e-commerce the Hong Kong SAR Government is committed to providing a favourable environment for promoting the wider adoption of e-commerce in the community. A prerequisite is to instil public confidence in the security of electronic transactions.

The Hong Kong post has already set up a certification authority in Hong Kong to offer certification services via a local public key infrastructure. Supported by the operation of certification authorities and with the use of digital certificates, we can address the issues of authentication, integrity, confidentiality and non-repudiation in electronic transactions.

In order to provide a secure and clear legal framework for e-commerce we have enacted the Electronic Transactions Ordinance early this year. The ordinance is largely based on the United Nations Commission on International Trade Law, ^ law, on electronic

commerce. It gives electronic ^ and digital signatures the same legal status as that of their paper-based counterparts.

The Hong Kong SAR Government has also taken the lead in accepting submissions in an electronic form under the bulk of the statutory provisions in the laws of the Hong Kong SAR after the enactment of the electronic transactions ordinance. To encourage the use of IT the Hong Kong SAR Government will also take the lead and implement the electronic service delivery scheme in October this year.

The electronic service delivery scheme will provide an open and common information infrastructure for the public to obtain government services online. A wide range of services will be available and covered which include submitting tax returns, paying government bills, renewing driving or vehicle licences, and registering as a voter, etc.

Through the internet and other access means like public information kiosks installed at convenient public locations, the community can obtain government services 24 hours a day and 7 days a week. The electronic service delivery scheme will also serve as a catalyst to e-commerce in the private sector through allowing commercial services to be provided via the same information infrastructure electronically.

Our efforts to promote the development of the internet and e-commerce together with our conducive business environment, cosmopolitan outlook, bilingual capability, buoyant financial markets and our close ties with the mainland of China all act to maintain ourselves as a first-class business and service centre in the world and an ideal place to invest, to do business, whether in the virtual or in the real business environment.

I would like to highlight in particular the advantages of our close ties with the mainland of China:

- * First, China's succession to the WTO will bring about enormous business opportunities to Hong Kong. With an established partner, with the provincial and municipal enterprises in the mainland there will be substantial room for the Hong Kong SAR companies to further develop, especially for those in the IT and telecommunications sectors, thereby encouraging them to increase their investment in both the Hong Kong SAR and in the mainland, thus further promoting the development of IT and telecommunications industries in both places.
- * Second, the Hong Kong SAR is well positioned to provide services like resource and market matching for mainland IT research and development. For example, our Industry Department provides information through its website on science and technology institutions in the mainland. The Hong Kong Trade Development Council provides information on the mainland enterprises and the Hong Kong Productivity Council has established the Hong Kong Industry online database and

has linked up with the China Productivity Promotion Net database in over 20 productivity centres in the various cities and provinces of the mainland.

- * Third, the sophisticated and sound financial banking system of the Hong Kong SAR can continue to provide capital financing services for the development of IT enterprises in the mainland and in the Asia-Pacific region. The Hong Kong SAR has always been the preferred place for raising capital by mainland enterprises. The majority of mainland enterprises approved for overseas listing have chosen to list in Hong Kong. The growth enterprise market - or we call it GEM - recently established by the Stock Exchange of Hong Kong can act as a intermediary to provide development capital for emerging local, mainland and regional enterprises, especially the IT related enterprises.
- * Fourth, as a Special Administrative Region of the mainland of China, Hong Kong is also well placed to become the internet content hub in the region, especially for the Chinese-speaking communities. We will formulate suitable policies and implement strategies to encourage local development and establishment of innovative and attractive websites, particularly those which can help the Hong Kong SAR to develop into a e-commerce gateway to the mainland.

Ladies and gentleman, with e-commerce the success formula changes. We are talking about real-time truly global competition. There is so much to learn about from each other in this new race. May I wish you a very fruitful exchange of views at the PTC media meeting. Thank you.

JOHN URE: Thank you very much indeed, Rex. Just a point of personal interest. I remember I wrote a chapter of a book that was published in Hong Kong. I actually wrote it in 95 and academic publishing is often very slow; it appeared in 1998. It was about IT in Hong Kong and I was quoting government documents that in fact came out in 1993 and 94 saying that the Hong Kong Government generally doesn't intervene in the market and therefore leaves IT and technology to the free market. So there really isn't much going on from the government's point of view apart from it's own internal use of technology. Of course, by the time that was published it was entirely out of date and Hong Kong will be one of the most government online cities in the world. So it really is a remarkable transformation.

Before I call upon Mr Norman Yuen to give his address, I'd also just like to make an announcement which is that the Telecoms Research Project is going to be setting up a website which will probably be called telecoms research project.org - I should have called it .com but that was six months ago so it's now a .org - which will be acting as, we hope, an information gateway to the whole of Asia on IT telecoms media related issues. We hope this will be as inclusive as possible - that is to say, we hope to work with as many other organisations who are interested in using or providing information so that there is a genuine point - one point where people can begin by searching for information at highly

reduced search costs for information about these industries across Asia, and we hope to build in certain educational training materials.

Again, I'd like to thank Cable & Wireless HKT for being one of the sponsors of this website. Agilent Technology is also going to be a sponsor. Asia-Sat will be helping to sponsor this which we will do collaboratively with CASBAA, the Cable and Broadcasting Association of Asia. And we're talking to one or two other companies. We're hoping to find four or five major sponsors for this and we're hoping to have that website built by the time the ITU 2000 meets in Hong Kong. So again, thank you to Cable & Wireless for that.

And now without further ado –I'll ask Mr Norman Yuen to talk about electronic market places.

While we're setting this up, just one final word of introduction and that is that again you'll find an article I wrote published earlier this year about how the whole telecommunications business is having to go through a transformation. Basically, the narrow band economics of the traditional telco world is rapidly coming to an end and telecommunications companies are having to reinvent themselves.

First in the firing line, for a variety of reasons, has been Cable & Wireless HKT, and if any one wants to see a paradigm case of a company trying to reinvent itself and expand into the 21st century on a new platform I ask you to study very carefully the presentation of Mr Norman Yuen.

KEYNOTE: Mr Norman Yuen, Deputy Chief Executive, Cable
SPEAKER & Wireless HKT (sponsor of TIF June 2000) - Asia's future as an
electronic marketplace

(Presentation slides follow text)

NORMAN YUEN: To correct maybe some possible misconceptions because there are quite a lot of international participants here. Don't get the wrong impression from John's introduction that we are buddy-buddy or that we operate in Hong Kong.

When we first sponsored TIF and TRF projects we did it because we wanted to support academic research and development. If I had the foresight of knowing that John would be the most vocal academic proposing complete market liberalisation, we wouldn't have done that in the beginning. And of course, you know, Alex now is going to be my very close colleague. We were actually trading punches with each other across the table in that few interesting years.

But indeed I think Hong Kong survives by making the value-added differentiation in keen competition rather than surviving on relationships or cronyism. This is how I would look at the topic of this morning's discussion - Asia's future as an electronic market.

Just imagine that in the perfect business world there's no constraint on geographical footprints: we can contact customers and suppliers anywhere in the world; we can transact online via the internet at a fraction of the existing cost; and we operate at real-time mode, very efficiently. We can also imagine that there's the whole world and by definition there should be unlimited opportunities - we can create wealth. I think everybody understands wealth.

But when we finish the blue-skying we had better keep our heads down and really have a good look forward at what can be done.

There are quite a number of questions we have been pondering in our transformation process. Are we ready as a company, as a geographic region? Are we ready to take up that change? What are the industries? What are the trades that are most appropriate to be engaged in the electronic marketplace? Do we have equal opportunities? I have a great doubt about that. Who are your best partners - best partners in terms of partners who can bring you the most value on a sustainable basis. Or are there different partners - some partners for a short-term start-up, partners for a mature phase?

What is the business proposition? What are the value potentials? Do we have the ability to sustain on a burn rate basis? And then what is the relation, what is the attraction between Asia and the rest of the world? I would like to use a bit of time to examine all of these together.

This is known as a butterfly model. Basically, it's very simple. We have the buyer on one side and the supplier on the other side. More important is the guy in the middle. The e-market brokers are defined as the B-2-B intermediaries who enter, force themselves into the supply chain. In vertical and horizontal industries the key selling point is the introduction of new efficiencies and a new way of selling and buying products or services via the electronic network or Internet.

Well, I think Rex already said of these developments there are several prerequisites: e-commerce standards; the technology, the middle ware tools; and the interfaces, the translators that enable inter-operation between the back office system and the front-end system of the buyer and the supplier. I think this is a pretty well established definition of how the e-market brokers are going to operate.

However, we will go into something more interesting. There are a whole host of models. Just like the value chain of normal trading, there are lots of roles that different people can play. Here, in the bar across, I would like to summarise three broad categories: to the left is the information focus. We have the integration of various information into one site, one place, so that people can have access to that. In the middle layer there is a simple proposition. We will lower the electronic marketplace purchasing costs. So it will give productivity enhancement. Typically it's in the region of around 35 per cent.

Moving further right it's really an opportunity to create further value. You basically improve the economics of all the players, including the buyers, sellers and the intermediaries in the electronic marketplace. There are many business models including the infomediary model, the aggregator model, the auction model, and so on.

In addition to all of those, there is also an opportunity for the e-marketplace practitioners to integrate or convert some information inside that marketplace, for example, a simple one is that you have the credit information included in that marketplace so that people, when they want to transact business, can immediately online assess the creditworthiness of your potential buyers or sellers. However, this is not a fully integrated model. You more or less have to click in and out in order to get the information.

In the blue circle - business process facilitation - you have a higher degree of integration in the business process so when you transact you get around within the same process without having to log in and out. And at the far right is where you can add value. It's a total optimisation model. You have everything integrated - front-end, back-end capabilities, decision support too, the CRM, everything included in that one. So there are various models and basically if we want to be successful then more important is you need to understand what is the value proposition of individual models.

I think the key is individual practitioners need to choose their most appropriate model, taking into account the existing market position, the capability, the technology they deploy and more importantly the partners that they will select in this electronic marketplace.

Now, of course, we need to look at the market. I think it's anybody's guess, but the market is going to be huge. According to Gartner Group, it will be growing at a compound average basis of 100 per cent per annum..

The way I look at it is that the market includes two segments. One is the new market, new horizon, the next delta improvement. Actually, more important is the existing market, the traditional market. What we have been doing - not on the internet, not in the e-marketplace. We need to web enable it so that it can touch more people, we have more productivity and on that basis I think Hong Kong, being a representative trading hub in Asia, will have the biggest of opportunities to be successful.

It's also important to examine the inter-regional trade relationships so that we can pitch whether we should devise our business systems to cater for international trade between Asia, North America, Europe, or we can develop a trading capabilities marketplace to cater for just the inter-regional basis. So this web diagram demonstrates this pretty well. The yellow line back to the core is what I call the inter-regional trend. Hong Kong has 61 per cent, for example. Actually, it's quite interesting. India has only 9 per cent because it's at the far end of Asia and how we draw the boundary I suppose. But on average you can make the assumption that around 50 per cent of our trade will be inter-regional. The other 50 per cent would be international trade.

I think from this together with the various e-merchant different models, we can devise where we should be. Just an off the head comment for Hong Kong - it looks like to have a total optimisation system - total system economic optimisation model together with emphasis on international trade. It's a pretty good model for us to follow.

Another study by Forrester also demonstrates that the total B-2-B marketplace, which is more than the electronic marketplace, is growing at 135 per cent per annum - so its very reassuring. I think Forrester's analysis of the online population in Asia growing 36 per cent is a bit pessimistic. My personal belief is that there is evidence in our key markets that the growth is much higher than that and therefore the opportunity, together with the quantum increase in the trade transaction value, again proves that this is a good business opportunity.

There are some favourable advantages for Asia to operate electronic marketplaces. Hong Kong as of now is not yet pioneering - and I don't think it has an edge at all in pioneering the development of technology. But I think, just like Taiwan, Hong Kong is one of the quickest adaptors of US technology. More importantly is its ability to develop real applications, to put in place, the means of building up the support platform which also means educating the customer, on both the seller side and the buyer side, that this is viable and to give the hope that it's going to create value. I think this is Hong Kong's edge.

I've talked about strong inter-regional trade which means speed - speed to market - because you can access the market. In the same time zone there is a wealth of transactions of different types so they can create a real market. Of course, there's no need to mention the entrepreneurial spirit in Hong Kong. I have met quite a number of my ex-colleagues and all of them are now very successful entrepreneurs of their own so I think this has been vindicated. And I think Hong Kong is particularly proud of its very strong telecommunications infrastructure.

There are some aspects that we need to take into consideration before the e-marketplace is going to flourish. If we aspire to inter-regional trade, of course English is the international trading language. However, the different languages used in the culture within the Asia-Pacific region, I see that as a stumbling block. "Culture" means not just the social culture. It's a business culture too. I think this is what we have to do and maybe more forums like this, which promote cross-cultural interfaces will be helpful. Lack of common standards - Rex talked about that, and I think Hong Kong should be in a leading position of establishing e-commerce standards and legislation so that our neighbours can take reference to or, if they wish, replicate the system. I think somebody needs to take a lead and Hong Kong, Singapore, among the leading economies in this part of the world, need to take over the leadership of that.

What are the other critical success factors for it to happen? The network - the physical link - is definitely a key and I think we are on a good path to it. Hong Kong Telecom and also our various colleagues working on international services and local services are investing money to expand the network coverage. Network, in addition fibres and things like that, and also the 'points of presence' - you know, having switches or nodes or routers in various regions so you form a virtual network to support people. Network also in the sense of putting applications, putting content on a regional basis so you tie the people together into a closely knit community. So the content's softer side is also as important.

The second point is that we need to devise a mechanism to fully satisfy the needs of all participants by enhancing the total system economics so everybody needs to find benefit in doing that. It's more easily said than done. I've talked about we are the adopters of technology and therefore by definition our technology partner would take a part of the cake. So sometimes it will be very difficult to thinly slice it so that everybody can have benefit. The answer to that question is that you keep growing very fast so that the pie is getting bigger. So the momentum for growth is absolutely important.

The Regulatory environment - we have talked about that. Open market - I think Hong Kong has the benefit of driving that through ahead of anybody else in the Asia-Pacific region.

The aggregation of big players I think is very important. Actually the e-marketplace, e-commerce, I really see it as a scale game. You must have the scale or you must have the mass, and therefore when you have good partners people need to buy into the principle of

co-operation. Sometimes you put your leverage, whatever you got, and join hands to get the total system economics. Sometimes at the service level you'll be competing against each other. So rather than holding everybody back by not agreeing to co-operate with each other, I think this is what, on a psychological and social basis, we need to work on.

Now, allow me to do some advertisement. What can we do, Hong Kong Telecom? I don't know what it looks like, our director of business development, e-commerce, drew that up. I don't know what was in your mind when you drew this one. It looks like a cross-section of a caterpillar to me. But anyway this is what we are doing. We want to play the part of the group. We are in the process of doing architecture of an e-commerce model which I will explain later. We are in the process of pulling in partnership together with Alex's Pacific Century Group.

We are investing in developing the electronic marketplace. We are acting as venture investment to bring in technology and also we are incubating technology development, application development particularly in Hong Kong. So hopefully we can contribute to the development e-marketplace in Asia.

This is our model. We are working with our various partners actually to provide consultancy, the e-strategy of how people can web-based their existing organisation or start-up new web-based organisations.

We provide support for web solutions and also applications. We are working on system integration. Right now we are moving right up the value chain in providing e-solution type of system integration. One of our examples, we have done a pretty big project for the Stock Exchange for the automated matching system version No. 3, which is Internet-based - you trade directly through real-time basis. This was a very challenging project involving 1,500 stockbrokers and therefore the routing system is one of the biggest in the world in mission critical transactions.

In the infrastructure, basically I think we have unparalleled international conductivity and local broadband connectivity. All the IP backbone infrastructure has been developed. We have a pretty elaborate capability sophisticated data centre services and we provide intelligent network services, such as video, disaster recovery systems, and 7x24 - all those nice things.

ASPs - there are actually quite a lot of interesting developments here. We have a joint venture with Computer Associates to offer software applications on the net and then we work also with Jardine Fleming in operating an electronic stockbroking service and, quite recently, I'm pretty excited in working on data mining and CRM systems. We are going to put them on the Net through the ASP system. So I think this is one of the recent developments that we will be working on. Even our SME customers can have the CRM capabilities comparable to larger enterprises. They can get them through the Net, on a pay-on-demand basis. I think this is very exciting.

E-logistic is the last leg, the logistic order fulfilment system. We have built that and ECRM is what we talk about. The procurement - we are working with Oracle in launching a service in a couple of days time. You'll be hearing about that and I've already talked about the e-marketplaces.

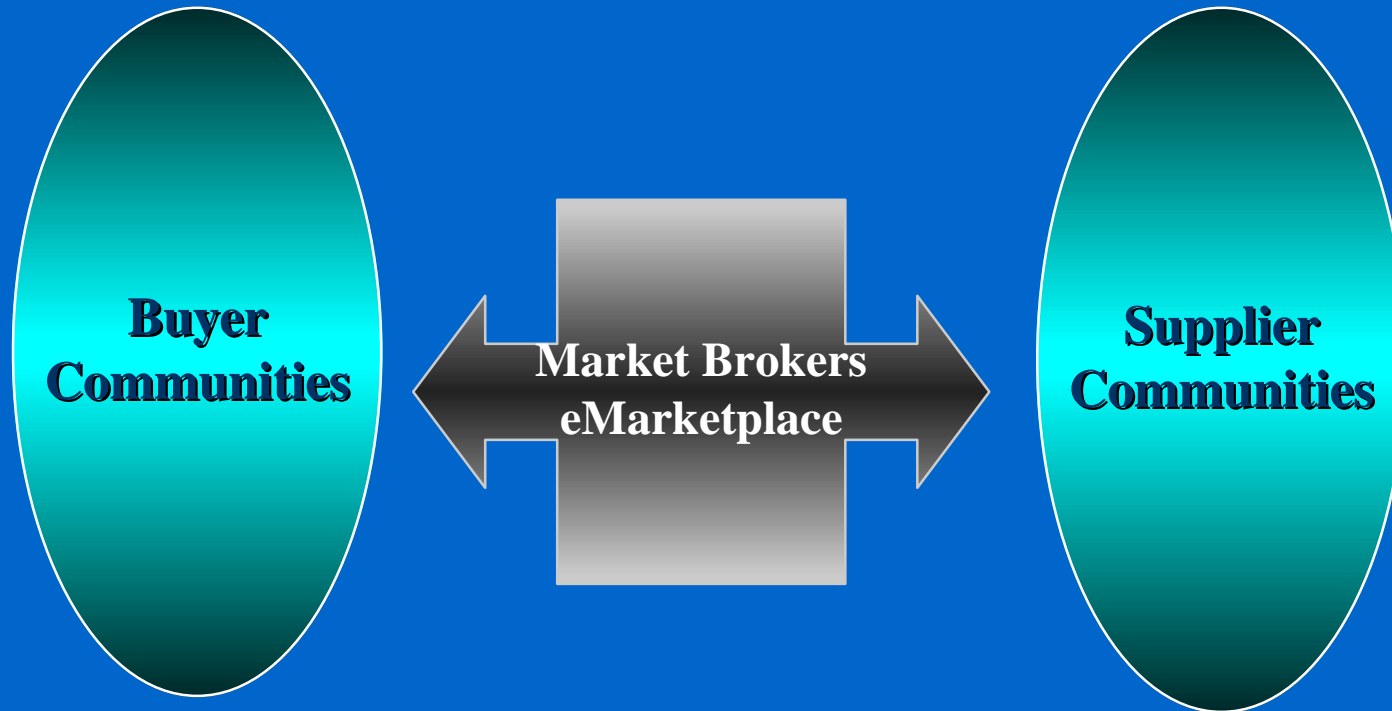
So this is what we are doing. But the most gratifying is that we have around more than two dozen sizeable organisations in addition to HK Telecom operating in this value chain as we speak. I think this is the most important note. It's not just HK Telecom. The whole of Hong Kong is investing a lot of money and people resources into that. It's because of that drive and momentum that I'm very positive in the development of the electronic marketplace in Asia. Basically it's in our hands and on our shoulders. Thank you.

Asia's Future as an Electronic Marketplace

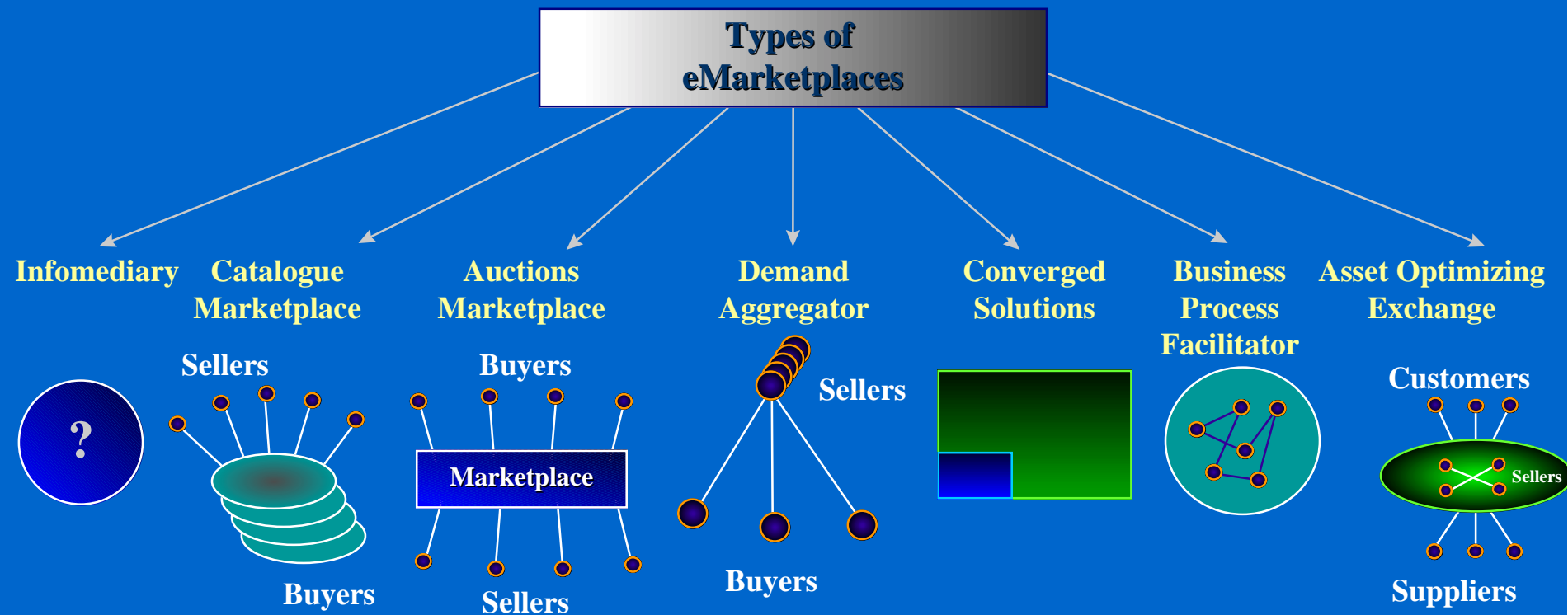
*Presented by Norman Yuen,
Deputy CEO of CWHKT*

eMarketplace

CABLE & WIRELESS
HKT
香港電訊



eMarketplace Models



Market Valuation

CABLE & WIRELESS
HKT
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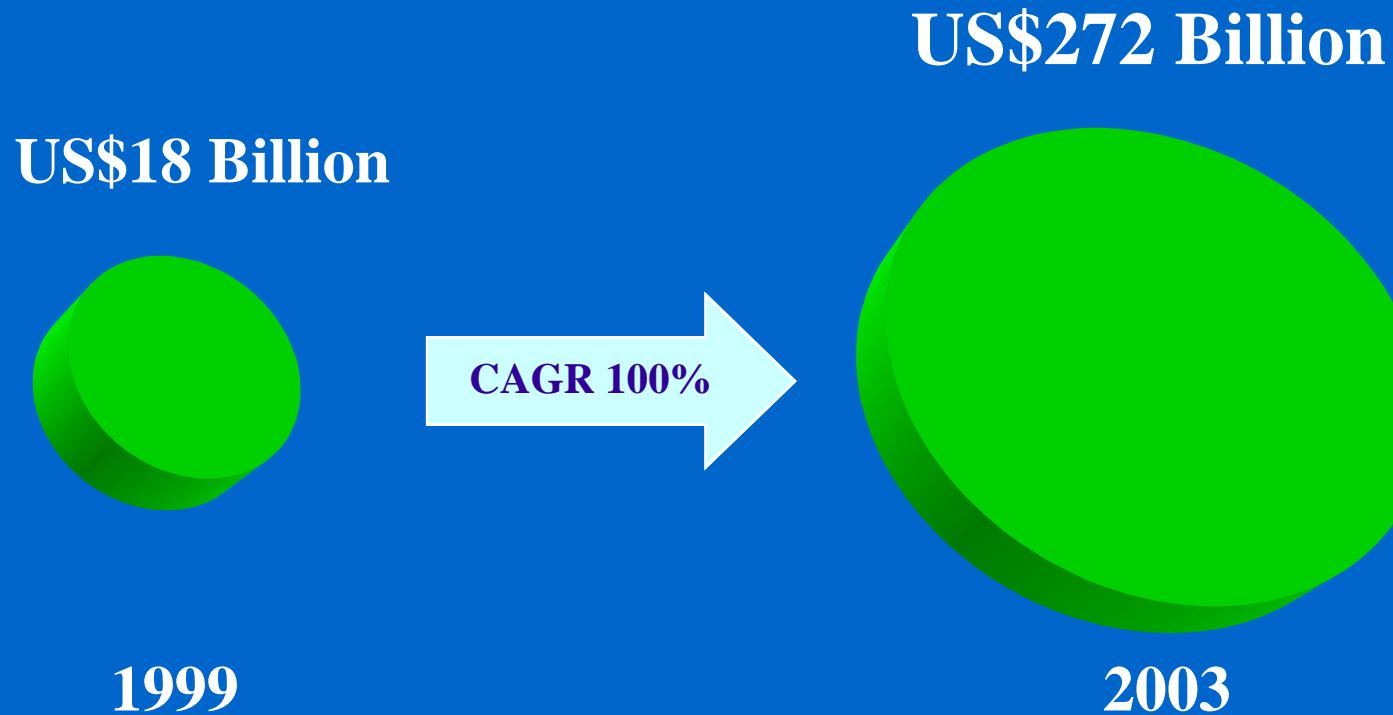
The vertical business design pursued can result in dramatic variances in revenue multiples.



Market Value is based on closing price of 6 June 2000. Revenue is referred to 1999 accounts.

eMarketplace Size in Asia

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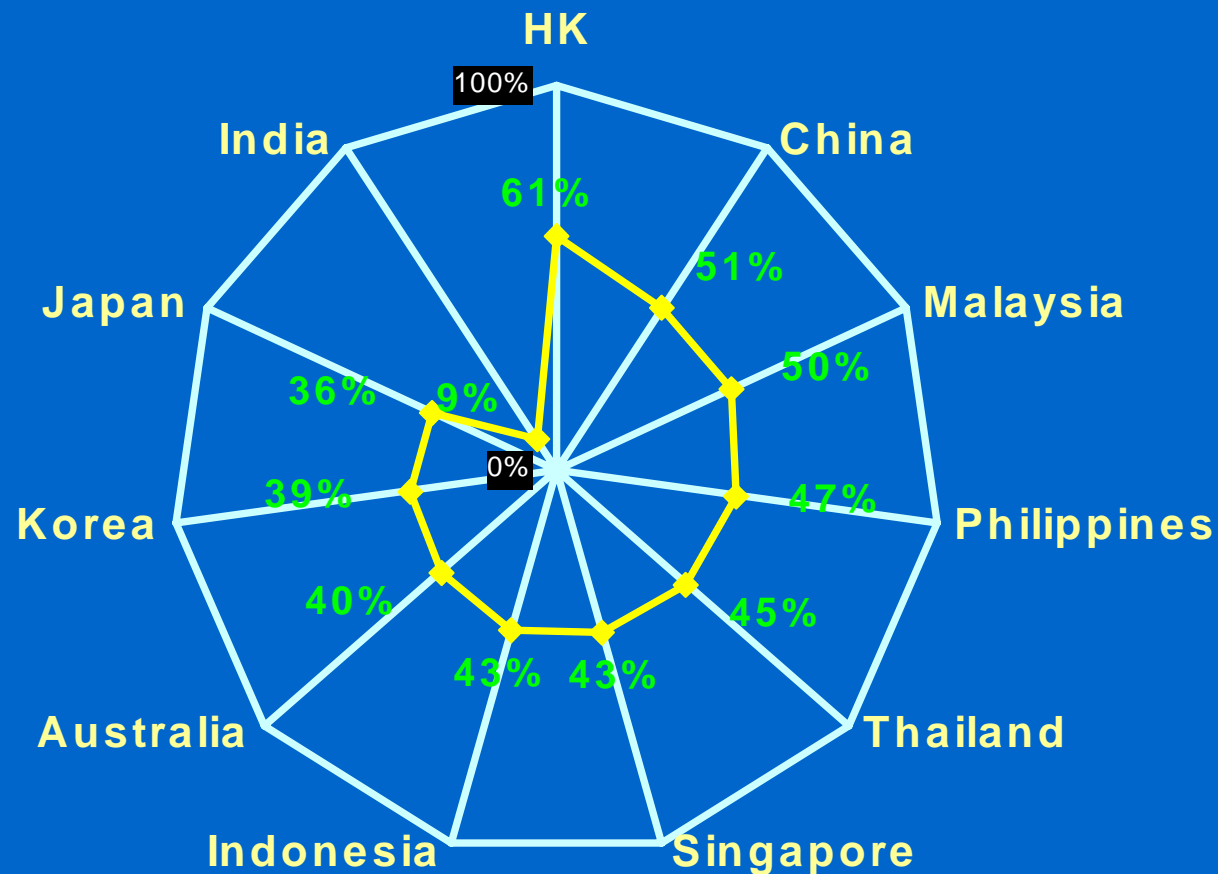


Source: Gartner Group

eMarketplaces will skyrocket - growing at a compound rate of 100% per year from 2000 to 2003.

Intra-Regional Trade Among Asian Countries

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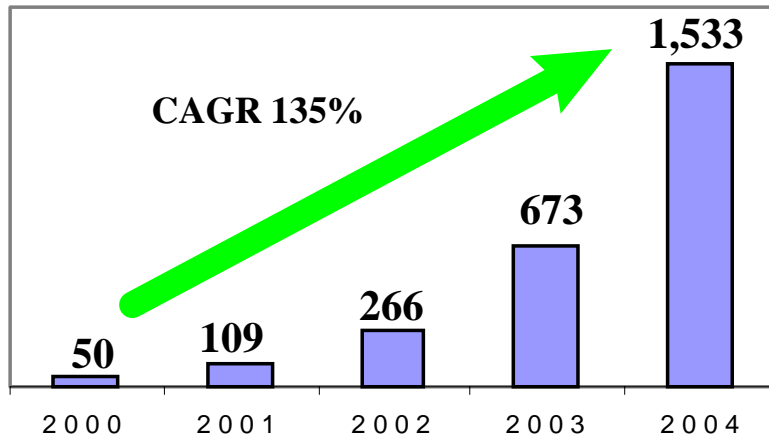


Source: 1997 Trade Statistics

The Asian Factor

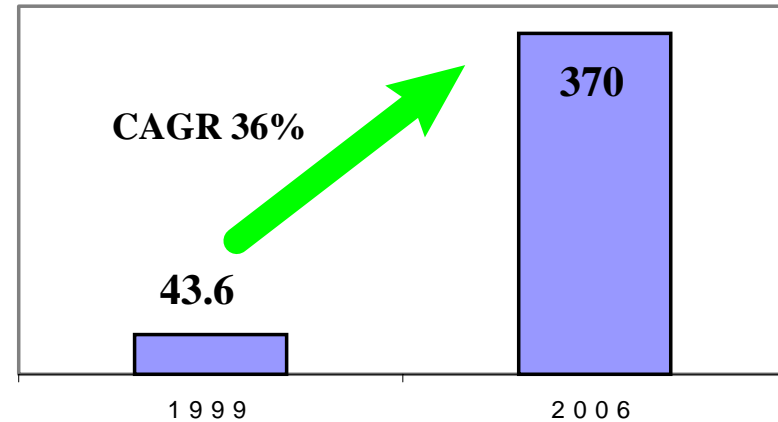
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Total B2B Market Size in Asia/Pacific in US\$B



Source: Forrester Research, Inc

Online Population in Asia/Pacific Region (in mil)



Favorable Advantages

- Quick pace adoption of US technologies and standards
- Strong intra-region trading
- Entrepreneurial spirit
- Strong telecommunication infrastructure

Consideration Elements

- Different language and culture
- Lack of common standard
-

Critical Success Factors

CABLE & WIRELESS
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Network Effect

- Asia and Business Network of the World creates spiral growth

Satisfying Needs of Constituents by Enhancing System Economics

- Offer significant value proposition to constituents to increase stickiness of customers and efficiency of cost/asset/market

Regulatory Environment

- Common standard and open market policy

Aggregation of Big Players

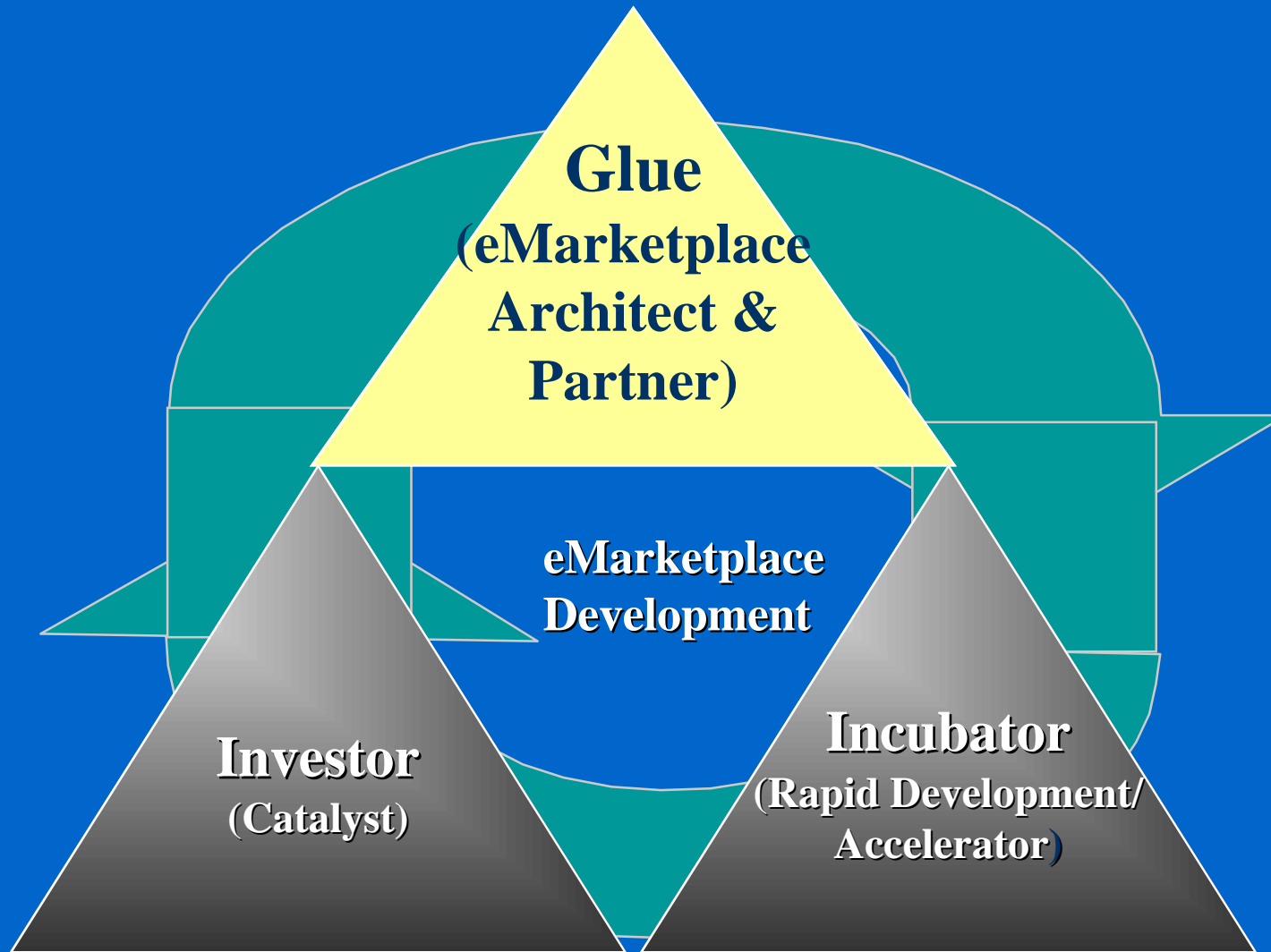
- Partner Ecosystem and Co-opetition for credibility and critical mass

Robust Technology & Infrastructure

- Power of information technology to transform old economy to new economy

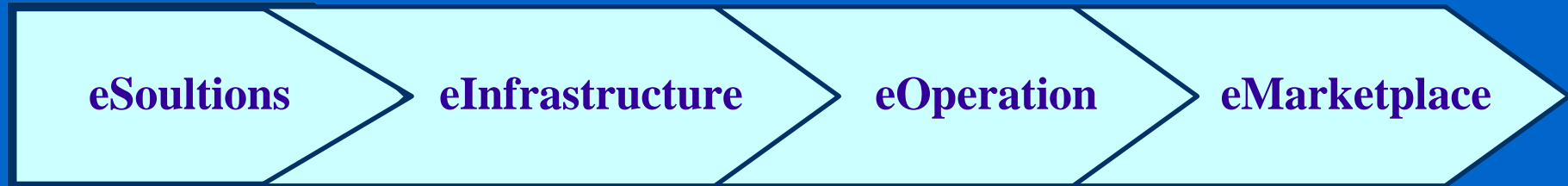
CWHKT's Contribution

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CWHKT's Approach

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Asia's Future in eMarketplace is in Our Hands

JOHN URE: Thank you very much indeed, Norman. I think you get an idea of why I said that this is a company re-inventing itself. I think telecommunications wasn't mentioned once. This is an IT company.

I think a very serious point - since I've been in Hong Kong, which is just over 11 years, I've been very conscious of how interesting Hong Kong is to study from a slightly academic point of view in terms of often what happens here today happens in other parts of Asia tomorrow. This isn't always as a result of conscious decisions by Hong Kong. Hong Kong is a small open trading economy and so very often Hong Kong is forced to react to trends which are beyond its control. But the way it reacts is what is absolutely fascinating. I'd also add that Hong Kong in many ways, I think, can show a mirror of best practice to many parts of Asia, not least through the regulatory regime, the transparency that we have here in Hong Kong.

A very large part of the credit for that goes to our next speaker, Alex Arena, when he was Director General of OFTA. Prior to that he was also involved in the Australian regulatory body and Alex's background is not just as a regulator, policy maker, but also trained as an engineer and is now steering one of Hong Kong's leading new companies, Pacific Century group. So if we can just set up your Powerpoint, I think it's on a separate machine, just under here -- obviously need a wireless LAN to operate in this room.

KEYNOTE: Mr Alex Arena, Group Managing Director, Pacific
SPEAKER Century Cyberworks - convergence in an Asian context

ALEX ARENA: Thank you, John. Good morning, ladies and gentlemen. I think one comment I'd make at the beginning is that -- actually, I'll make two comments. One is that after 7½ years of knowing John he still doesn't call me a deregulator, he calls me a regulator, which is completely contrary to my experience.

The second is that when I was asked to attend here, I was quite happy to do so. I guess I hadn't known at the time that Norman and I would be speaking on the same panel. I guess I find myself a little embarrassed since our two companies are coming together, that in no sense did we actually wish to monopolise the front desk. But I think that you can understand that probably there's some sense in actually both of us being on the same podium because I think it's a great example actually of my topic which is convergence and what is actually happening in the Asian context.

This is a wonderful word "convergence". We actually called one of our principal companies Pacific Convergence Corporation because we gave ourselves a challenge of trying to predict how convergence was going to roll out in Asia. I must admit I had been CEO of that company for well over a year and a half and we did most of our development work in California.

We went through some fairly stressful times while we had people from different disciplines. We had television people, we had computing people, we had telecommunications people - all sort of in the same room. One of the things that we learnt was the lexicon. We actually had to invent one. We had to invent one for convergence because we thought - you know, we'd have a discussion, everybody's heads were nodding and then we'd ask them to go away and do things and they'd come back and they'd all have different ideas about what they were doing.

This is not a trite comment. This is actually very difficult.

Let me tell you one of the things - let me start this conversation, this discussion - one of the things that we've learnt from our experience in the US is that most people, particularly in the US, when you're having discussions in the US, tend to benchmark everything that's going to happen in the rest of the world based on what they believe is happening in the US. There's two problems. One is what they believe is happening in the US and what's actually happening in the US may be two different things. Secondly, what's happening in the rest of the world does not have to follow what happens in the US.

If you kind of think this through a little bit first, look at some of the estimates. I mean, they're fantastic about what's going to happen in the US. 66 per cent of households in the US are going to be on broadband soon versus 1 per cent a couple of years ago. 22 per cent of the households being on interactive TV by 2002 which like - that's tomorrow, right?

These are fantastic sort of numbers. Anyone who thinks those numbers are going to project into the rest of the world in any great hurry really needs to sort of stop and think about how that could happen.

Why is broadband important? Well, it's my submission that the whole concept of convergence is critically dependant on broadband because it's only when you have broadband that you can in fact allow various forms of media, text, graphics, voice and data all to combine and converge down the one technology platform. Broadband is in fact the transforming technology. It's not just Internet but the move to broadband Internet is another quantum jump.

Asia has its problems in this respect because it is a latecomer to inter-activity. But even despite this, the number of Asian Internet users is projected to grow five-fold from about 40 million to just over 200 million in the next five years. But the real saviour I think is not in this enormous jump in narrow band. Narrow band Internet in and of itself is not really the key here. The key is to look at the underlying technology platforms that exist that could create broadband.

In this respect, I invite you to look at the cable television connected households in Asia. Now, our company knows a lot about this having been the core management team that set up Start Television about 10 years back. In 1991 there were less than 1 million households in Asia connected to cable reticulated satellite TV. That number stands at 135 million today. 135 million in context is nearly twice the size of the entire US cable market and that exists in Asia today.

This is a spectacular platform to commence the roll out of broadband in Asia. If you look at it, it's got a few features about this. First, this is new cable plan. It's not 25-year-old cable plan. It's new cable plan, and it's typically 750 megahertz bandwidth. So it's really broadband.

And likewise if you look at the telecommunications plan in Asia you tend to find that a lot of it also is new and therefore quite capable of being converted to broadband by use of the XDSL range of technologies.

So therefore Asia does have some advantages, even despite being a latecomer to the Internet as far as moving to broadband is concerned. First it can leapfrog the problem of ageing legacy systems and those of you who haven't had much to do with the United States will understand that the cable plan in the United States is not that easy to convert to broadband.

Secondly, as Norman has been saying, Asia has the opportunity to leverage other people's experience then to put in place proven e-business models, e-commerce models, and to benefit from the lower costs of spreading technologies.

An additional comment is that it's not necessarily the case that there'll be a big premium between narrow band Internet and broadband internet in Asia. In fact Hong Kong's Telecom own tariffing of broadband Internet is about US\$27 a month which is very low by world standards for broadband. So my point here is - yes, you can expect some broadband to be introduced into Asia and it can be introduced quickly, and it could be quite cheap.

I think another area that one needs to look at is the whole question of mobile services. Yes, tele-density and fixed services in Asia is low. Everybody knows the figures - for instance, that there are more telephones in Tokyo than there are in many countries in Asia. For that matter there are more telephones in Hong Kong than in many cities in Asia.

But if you look at the growth of mobile customers, we now have gone through a very interesting "inflection point". There are now more people in Asia taking telephony on a mobile service, a wireless service, than there are taking telephony on a fixed service. The rate of growth of mobile is spectacular.

Despite this expensive narrow band access, low PC penetration and low tele-density, the rapid growth of Internet continues in Asia. This base of cable subscribers and modern cable plan and modern telco plan can actually combine to make broadband attractive. If we look at a few markets in particular, China and India contains substantial long-term opportunities. The network infrastructure is expanding at a tremendous rate.

A lot of the business systems right now in these countries are not very well developed, not even traditional modes of delivery. I mean, paperbacked sort of stock trading is not very well developed. So there's an opportunity to go straight to online business use. Consumers are requiring a lot more information particularly to trade globally. Local content is growing. What it needs is conduit and opportunities to come out. And invariably countries around the region have their national and local government supporting Internet development.

Now, I think in terms of looking at the killer applications in Asia, again this is a different situation we found to North America. Killer applications from our market research tend to be - yes, I mean, people are interested in some basic entertainment, but that's not what they really want. What they really want are education services. Parents are particularly keen to see social advancement of their children and education services on broadband is extremely important to them.

Information services, particularly financial and trading information is important. And things that we often take for granted - things like weather information, forthcoming disaster information, and finally local information. You'll be surprised at the number of people that tell us they want something as mundane as the bus timetables because in many of the countries in Asia it's almost impossible to get that sort of information.

Now, just a short commercial. Our company is actually launching a service under the brand name NOW - Network of the World - and our aim is to become the world's first and largest producer of converged broadband content and to deliver throughout Asia broadband services to consumers at speeds of better than 1 megabyte per second and to provide a whole range of distance learning and information services across a variety of platforms.

Commencing about a week from today in English and then followed later this year by Chinese and Japanese, we will be distributing a free to air television channel, satellite delivered across Asia with a synchronised web service across the whole of the internet across four portals, or vertical portals as we call them. Initially we'll be producing four hours a day of original content rich material moving to 24 hours a day, 7 days a week early next year. To do this we have a whole range of global content partners in place.

I'm not going to dwell too much on our service but we think that to make services like ours viable in Asia we have to use the existing cable infrastructures I've just mentioned while we have to develop other platforms, a telecommunication plan and the mobile plan. So we are adopting a technology agnostic approach to our content delivery.

We have a model in which we aim to convert the cable operators as our sort of first target market into broadband ISPs and to create a revenue model for them and for ourselves which monetarises every link in the convergence chain. So we have advertising subscriptions, connectivity fees and ultimately e-commerce.

Obviously, our company, we're putting our money where our mouth is. We will probably invest upwards of US\$2 billion in this venture over the next few years. If we didn't believe in that, if we didn't believe in the broadband opportunity, we wouldn't spend that sort of money.

But it would be foolhardy to suggest that everything is a downhill run. There are serious issues in Asia if convergence is to become a reality. Let me just deal with a few of these.

The first of these is people. People are an extremely scarce resource in this industry. I was in the United States last week and I remember last year there were an estimated 350,000 job vacancies in information technology. Well, guess what, folks, the figure this year is close to a million - a million vacancies. I mean, that is an enormous ramp up in skill shortage, and that's in the United States.

We've just seen in recent months Germany now offering 10,000 green cards to people to go to Germany to try and jump start its IT workers. People are really a difficult issue. We spend a lot of our time on recruitment at all management levels in our company. As a matter of fact it is so critical to us that we actually internalise the headhunting job. We formed a company called People Now and that has the aim of scouring the world to get talented people. Any government, any policy maker, any company that really wants to

play an active role in a convergence situation in Asia really somehow has to address this people issue.

The second is actually creating the right environment. We addressed on a personal level, at a corporate level, about two years ago. We had to decide if we were going to run a Pan-Asian service which city in Asia is the logical place for us to have our headquarters and I can tell you the choice was very difficult. Every city had its advantages, every city had its disadvantages. We had a natural tendency to try and put it in Hong Kong but we found the culture wasn't here in Hong Kong. The environment wasn't here. People would rather vote their job in financial services and property. To actually get people to become IT interested it took a change and the change agent that we employed was the Cyberport project.

Now, while many of you have heard about the Cyberport project, you probably haven't heard the full story about the Cyberport project and I haven't got enough time to go through that. But the biggest single event in reshaping the mentality in Hong Kong was that project. When it was announced in March 1999, from that point on Hong Kong suddenly got it when it came to internet and information technology. So the lesson to us in that is - yes, you can proactively shape the environment.

Related to that is the whole question about the conditions under which online commerce will flourish. These conditions are not self evident. Venture financing is not a concept that Asia has had a lot of experience with. I mean, there are a lot of people now making money available for venture financing but there hasn't been a long history of it and a lot of the lessons haven't been learned.

Similarly, the e-commerce logistics - basic things like credit cards or credit systems and fulfilment chains simple don't exist. And as Norman was saying it takes quite a lot of effort to get those going.

The last of the topics I'll raise is creativity. Asia must become more creative. I mean, the whole education system needs to change to move away from sort of rote learning to actually to encourage people to be creative and to risk making mistakes. Having done that, having actually created something - because there are not too many patents actually created in Asia - but having created something then how do you actually protect it? Because if we're moving onto an online world where is the value store? To a large part the value store has to be in protecting that intellectual property. As we know in a lot of countries in Asia we don't have very good legal systems and their particularly poor when it comes to protection of intellectual property.

So judged against those criteria where does Asia stand today? Well, I think several countries in the region will score well in one or more of these areas. It's my submission that very few meet all or most of the pre-conditions for making convergence work and I think that, in conclusion, is the challenge that we all have in trying to unlock the undeniable potential in Asia for doing business in the internet world. Thank you.

JOHN URE: Thank you, Alex, and thank you for the challenge of that last question and I think that that's a very appropriate point at which to open it up for questions, comment, discussion. Who would like to come in first?

QUESTION AND ANSWER AND DISCUSSION SESSION

Participant: Alex, I just wanted to follow up, on a couple of the numbers that you were using just then. You had the number of the underlying cable infrastructure up from 1 million a decade ago to 135 million now. What percentage of that 135 million is China?

ALEX ARENA: Just off the top of my head, I think China represents something around about 70 million so it's about 55/60 per cent.

Participant: The question that intrigued me was that that number would have been about -- my understanding that number of cable subscribers would have been about 50 million odd by about a decade ago so I presume what you're pointing to is the integrated nature of the service now.

ALEX ARENA: Yes.

Participant: Then the interesting part is that the integrated facilities were promoted by the government as a way of building domestic industry and domestic content, in my understanding specifically to keep foreign content providers out, which makes your job even more difficult.

ALEX ARENA: No, I believe not. I mean, I think the real stimulus is actually the ability for foreign content to create a revenue source for expanding those networks into the future. I think if you look at a lot of them it is a regulated charge, it's a very low regulated charge. Typically it's a dollar to US\$2 a month per customer. Obviously it's a very valuable infrastructure. If you look at cable plans overseas, look at what AT&T paid for TCI, for instance, it's a very valuable infrastructure going forward. People want to unlock the value of that infrastructure and to do that they're going to require a judicious mix of local and foreign content.

Participant: I have a question to Alex. I fully agree with you broadband service potential in millennium is great in Asia and you mentioned your broadband content delivery platform of cable television and the mobile but I understand that you have some satellite platform schemes that you didn't mention at all. Can you elaborate your satellite project?

ALEX ARENA: Yes. As I said, we're technology agnostic. I mean, we will use any technology for delivery, so in quite well developed cities in Asia we will get our content to those cities where we can by fibre. If those cities are vertical cities, such as Hong

Kong, where there's good telecommunications plan we could well use ADSL to get to the customer. Where the cities or inside the cities, the areas tend to be flatter and less well developed, then we will use things like broadband wireless or we'll use cable plant where that plant exists. The issue is how to get to it and for the trunk piece of that we could well use satellite. In fact, that is the way that we will be broadcasting or datacasting to start with using satellites. So satellites to head ends, to local distribution.

Participant: With convergence today has come the focus on content distribution over that of infrastructure. Now, is the infrastructure the necessary evil to deliver the content from which your revenues are going to come, or is the content the necessary evil to get the revenues from the infrastructure?

ALEX ARENA: I guess my analogy is you can't run high-speed trains if you want to sell tickets to the train. You can't sell those tickets and you can't run the trains unless you've got the track. So you basically have to put the track so it's a pre-condition. Now, your question can be taken in a slightly different way. Having put all the necessary pre-conditions in place, the track, the train, the ability to sell tickets, then what's the relative economics? How do you share the economics? That's a commercial discussion.

Participant: I wonder if you could talk, Alex, a little bit about the strategy for your content development, whether it's going to take the form of international partners, your own content, how you plan to brand it, whether it will be your brand or somebody else's brand? And secondly, could you perhaps identify some of the partners that you are working with or plan to work with?

ALEX ARENA: Sure. We've made a series of announcements and we'll continue to make announcements about our content partners. The first significant content partner that we announced was Mark McCormack's IMG-TWI group, who are the largest independent sports content producers in the world. We've actually built the first of our production facilities which will go live to air next week. In West Chiswick, which is right next to TWI's location, we've built converged content studios which are quite different studios to traditional media studios in partnership with TWI.

We've announced that we'll be working with Era in Taiwan to produce Taiwanese Chinese/Putonghua material in Taiwan. We're working with partners in Japan. We're working with partners in India and in other places. With Telstra we've committed to pooling a facility in Australia for English and some Asian languages. So I mean our whole process is to joint venture on the content side to produce converged content and it's a very scaleable model because we can put it in different locations in different languages and we can localise it.

JOHN URE: Following on that, I've got a question for both Alex and Norman. Norman, you mentioned the issue of cultural diversity and you also mentioned that you're working with a lot of local content providers. So I'd like to ask both of you: firstly, how do you overcome the issue of cultural diversity in terms of content? I mean, the

localisation of content, does that require local content providers or can you localise global content? Second question will be: from your two perspectives what is the current vitality of local content and applications development in Hong Kong?

NORMAN YUEN: Let me take the issue part first and leave the difficult part to Alex. For Hong Kong Telecom it's easier because we'll be developing applications more than content/content. So the cultural part will be the business practices, business culture which I've talked about for which is easier to develop a common structure. Of course, what we have to deal with is the interface bit. You know, the graphic user interface or develop that system so that we have the proper language, the marketing customer education material. The localisation of that is our day in/day out operation so I think we have more confidence of achieving that over a very short time frame than the softer side of content which I'll leave to Alex.

ALEX ARENA: Actually, I'm remiss. I should have mentioned in my answer to the last question that one of our content partners is actually Hong Kong Telecom Interactive Multi Media because they must be one of the world's top Chinese sites on current internet. It gets more than six million page views a day I think so it's a very popular site and a lot of those page views come from offshore.

I think one needs to draw a distinction between content, raw content generation, and content reconfiguration - you know, reformatting, recombining, aggregating. There's a whole set of things you can do with content. Our facilities are based on the notion that yes, we have to produce some raw content ourselves, but a large part of the content is aggregated from other people, whether it started off live as a piece of speech, or whether it was a piece of film, or graphic or piece of text, we treat everything as a digital object. The whole secret is to do it all digitally, combine it and recombine it.

Now, coming to John's point about cultural diversity, a certain amount of content will cross cultural boundaries. I think a good example of that is sport. I mean, you can turn down the voice, the commentators' track, and you can watch sports and most people will understand what's going on. And of course a lot of sport is internationalised. But some content is very particular, very local. A lot of the chat, for instance, that goes on. A lot of the sort of communities of interest that go on are very local.

So what we try and do in our service is create a leader for people to get into that interest area and then allow it to split off into its natural groups, whether that's a language group, whether that's a city-based group, whether it's some sort of ethnic group. The whole nature of the internet is that it allows people to find their own place. And that's the way we approach our internet content.

Participant: I just wanted to follow up a bit further. Alex, the comment you made about Asia being a bit different in terms of killer apps and education potentially being the killer app I thought was fascinating. I'd like to hear a bit more about the market research which leads you to that conclusion given that it sounds scarily like what was being said

back in 94 to 96 with the broadband trials in the States where we had the great Microsoft out there getting involved and saying it was going to be education infotainment services based on their market research. Then of course everyone ticked the box that said they wanted education for their kids but as soon as it came time to pay up they wanted the Hollywood blockbusters which brought me back to Sam Chisholm's statement of "Give me four channels and I'll make you money on content anywhere in the world" - news, movies, sports and porn and you keep raising sports as a potential killer app.

I'd like to, if I could, get Norman to come in on it as well given that Hong Kong's T has run out one of the best earliest commercial broadband services in the world. And I wonder how well their entertainment services are doing off of the IMS VOD service.

JOHN URE: In light of time what I'm going to suggest is that there are two other questions forthcoming so if we can take the other two questions and then perhaps you can take them all together.

Participant: Yes, A question on the same theme of content. From a regulatory standpoint how much of a hurdle do you see in dealing with government regulators in your different markets who may be concerned about the content of what you're transmitting. I have in mind in this context the reports that ran yesterday about the Beijing authorities calling in all the ISPs telling them to be careful about what kind of news they were posting. I guess my question is from a long-term strategic standpoint do you see that as a hurdle, especially in your activities in China and India?

Participant: It's interesting obviously the same ideas were occurring to the three of us so if I give a further twist on the same two themes mentioned. With international sport we're seeing comes international betting and in Singapore there was a very successful shift to sports betting in a regulated environment. So my question is do you think it's time to deregulate in Hong Kong the added value on the sporting content for, say, soccer betting?

ALEX ARENA: I think what all the questions have in common is that policy makers everywhere I speak to around the world are grappling with the same sorts of issues about the internet. It's a transforming technology. It does change the way in which content is delivered. It changes the way that business is done. It changes the way that things like gambling are dealt with. I don't think any government is yet comfortable with where they're at. I mean, the US Congress debates these things from time to time about putting restrictions on here and restrictions on there.

We've had to find a way in our architecture that we can accommodate whatever it is that any national regulator wants to put in place, subject to their own jurisdiction and laws passed, etc. So I wouldn't single out China or India or anyone else. I mean, I think this is a developed world as well as a developing world issue. Our solution to it is because it's fully two-way broadband interactive, every single box, whether it's a set-top box or whether it's a PC, is uniquely identifiable. It has to be because otherwise how can you

conduct secure commerce on it? And everyone of our head-end operators is uniquely identifiable. So it is possible for us to code the data that is sent - not sent - when we send the data we code the data and then any receiver will be allowed to accept that material subject to local regulations. It's not us that sets the local regulations. It's in fact the government that sets the local regulations.

NORMAN YUEN: I think I will respond very quickly on the question about broadband access. Indeed, I don't know how many of you are aware in Hong Kong we have about 1.8 million households. Right now we are providing around 200,000 households with broadband services through ITV or broadband internet access or both. We have learned many, many lessons. Actually, one of those is that once people get broadband internet access I don't think you can get them off it and go back to 56k. No way are they going to do that.

Secondly, is that really to run the 7x24 high quality broadband access services there are lots of opportunities for us to differentiate in terms of customer support in various content and various service packages. So indeed we are on the route to revamping our service to give various services according to customers' demands.

On the technology bit we developed the real video-on-demand platform. We are now servicing 90,000 customers in Hong Kong. We purposely don't want to grow that one because I don't think it's going to be a mass demand product. It will be supporting a niche in customer services. It's indeed a very complex system. Just imagine we have a huge super computer to hold all the media content. We are pumping out at 6 to 10 megabits per second according to customer demand on a point-to-point basis through our ATM network, all the switches, fibre to the building and then optical termination units, set-up box and then wire just to your TV and at DVD quality too.

So basically right now we have engineered that platform to 99.95 per cent reliability. We started off operating at around 80 per cent which is not acceptable but right now it's 99.95, more or less the same as our PSTN network. So with that there are lots of opportunities to use that as a platform to deliver really effective services.

We have a question about education. Again we have an arrangement of City University of Hong Kong to provide what we call the IMBA services to students. We have been running it now for two semesters and course is oversubscribed. That has been operating pretty well.

JOHN URE: And finally, Rex, would you like to just say something about Hong Kong Government attitude to internet content?

REX CHANG: Thank you, Dr Ure. I can't speak about the mainland of China and India but in Hong Kong I think we don't need to worry about that. We respect very much the freedom of expression and speech and we uphold firmly this fundamental. So we do not

have any intention to regulate. Even for pornographic materials we also intend this to be regulated by the industry itself and by the ISPs themselves.

Another point about soccer betting, it's under my purview but the government is reviewing this and an announcement will be made I think in due course. Thank you.

JOHN URE: I'm sorry, I can't take any more questions. We do have to have the coffee break and after the coffee break Stephen Lau who is the Privacy Commissioner will be taking the chair for the second session. There is some information in front of you regarding issues of data privacy which is an important issue. So it remains for me to thank our speakers, Rex Chang and Alex Arena and Norman Yuen for contributing to this session this morning. Thank you very much.

Asia Panel Discussion Two: Internet and convergence in Asia: implications for cross-border investments and regulation

CHAIR: Mr Stephen Lau, Privacy Commissioner for Personal Data, Hong Kong, SAR

STEPHEN LAU: ...be seated, thank you. To reiterate the message to you that you are all welcome and invited to the PTC lunch which will happen after this session in this hotel. So you're all welcome to lunch.

Good morning, ladies and gentlemen. Once again, on behalf of Hong Kong to our overseas visitors welcome to Hong Kong. I wish you have a nice stay. My name is Stephen Lau, Privacy Commissioner for Personal Data for Hong Kong.

Being a panel chairman has it's prerogative in the sense that the panel chairman isn't really required like the speakers to spend a lot of time in preparing for presentations, but at the same time basks as part of the panel in the glory of the pearls of wisdom to be disseminated by our illustrious speakers. On top of that the panel chairman has some air time.

So I just want to spend just a few seconds talking about our office which is the Office of the Privacy Commissioner for Personal Data, because it does relate a lot to technology and technology applications and electronic commerce and all that. Our office actually promotes, monitors and enforces a law which is called the Personal Data Privacy Ordinance which seeks to protect the use and disclosure and collection of personal data in both the private and the public sectors.

As we all know, with the advent of the internet in electronic commerce trust and confidence of consumers is an issue as indicated by a lot of surveys locally as well as overseas. Trust and confidence in a sense of the two issues relating to personal data are two issues having to do with the interception of data across cyberspace - let's say your credit card, because of history the internet is not a very secure media. Secondly, when organisations collect your data people are very concerned about how the organisation would use it for purposes not intended in the collection process.

So therefore we do have a law that covers this and though we are a regulator we like to present ourselves and act as and work as a facilitator because in promoting and advising our constituents including the private sector on how to ensure respect and protection of their customers' or employees' data they could actually instil trust and confidence in the consumers and their customers and thereby overcome the impediment upon which they might feel reluctant to do business with the organisation and thereby indirectly enhance the progress and the potential of electronic commerce in Hong Kong. End of commercial. Thank you.

Now, okay, back to the panel. We have heard this morning about a convergence of information technology, communications as well as media in terms of newly integrated businesses and phenomenon. But obviously alongside this convergence come challenges as well as opportunities. Opportunities obviously from the business point of view from that new businesses, new business models, B-2-B, B-2-C and new from infomediary business. From the infrastructural point of view we've got opportunities from satellite transponders, carriers providing broadband services down to the ISPs, the ASPs and the solution providers and right down to the hand of the consumer in terms of mobile phones, 3-G, to provide access from internet to internet.

For countries the opportunities as were mentioned this morning included being able to leap frog ageing or aged infrastructure.

But what are the challenges? The challenges for businesses, particularly for traditional businesses, how do you transform your business to face this paradigm shift in business requirements as well as to fight off competition from the invasion of what is known as cyberspace.

For countries, from the government's point of view, it's actually how to strategise a vision in taking advantage of these new technologies and once you are coming up with a strategy on the vision it's how to provide guidance, how to facilitate, how to regulate and if necessary how to deregulate in terms of implementing such a vision. When you talk about cross countries then we're talking about the co-operative actions or initiatives that will allow for consistencies in terms of policies, consistencies in terms of maybe legislation and codes to allow for synergy between the countries, to allow for progress in this area.

Therefore for this panel I think following on the convergence aspects we've been talking about, this particular session on implication of convergence in Asia, particularly for cross-border investment and regulation, is a very logical sequel to what we have discussed so far. I'm very glad to say that we do have two very good speakers on these kind of implications and I would like first of all to invite Mr Charles Kenny to speak.

Charles Kenny is an Information Infrastructure Economist in the Communication and Information Technology Group at the World Bank. He has written books and papers on this subject and he is an expert on what is referred to as IST - information and communication technology. So without further ado I would like to invite Charles Kenny to speak and his topic is "communication and development - cause or effect?" Mr Kenny.

Communications and Development: Cause or Effect?

Charles Kenny

CITPO, World Bank

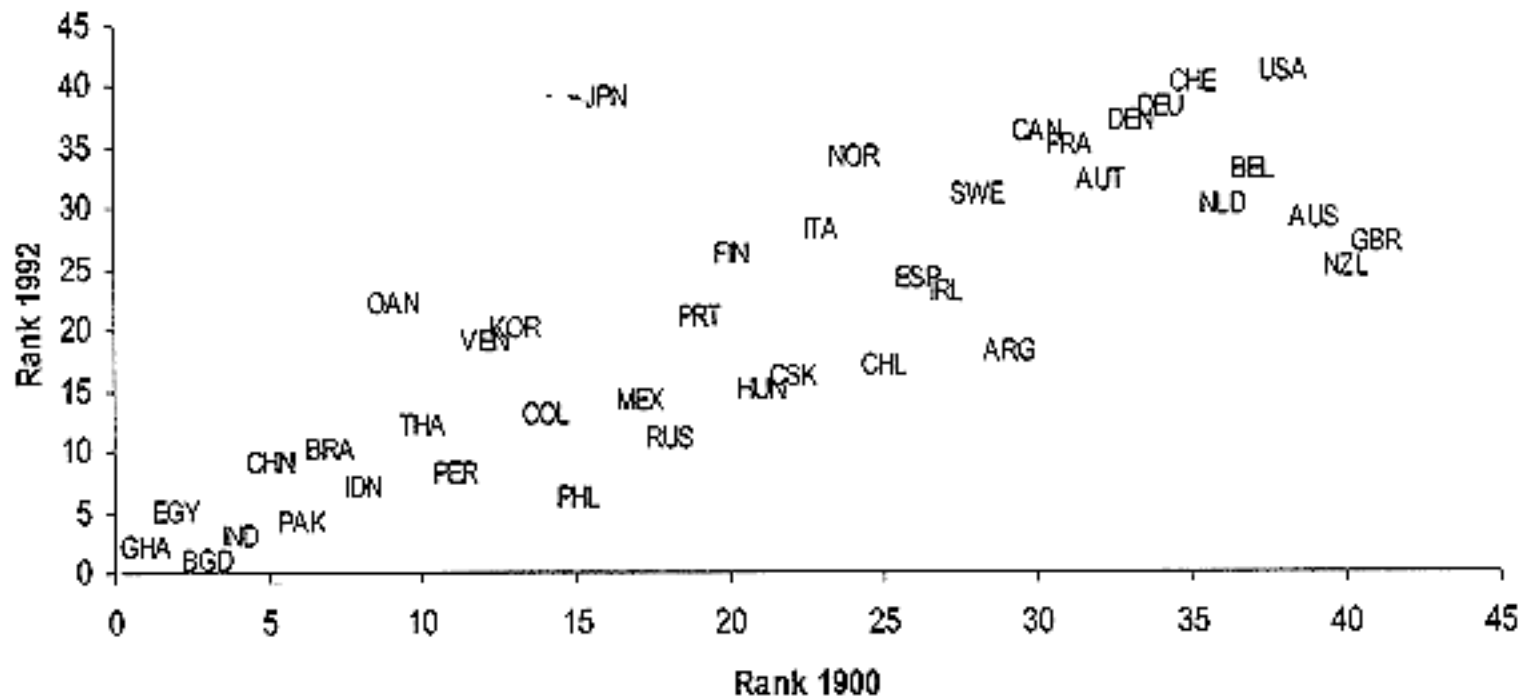
ckenny@worldbank.org

Outline

- Telecoms and Growth
- Internet and Growth
- ICTs and Broad-Based Development
- The Digital Divide
- Policy Conclusions

Leapfrogging is Very Rare

Income Rankings 1900 and 1992

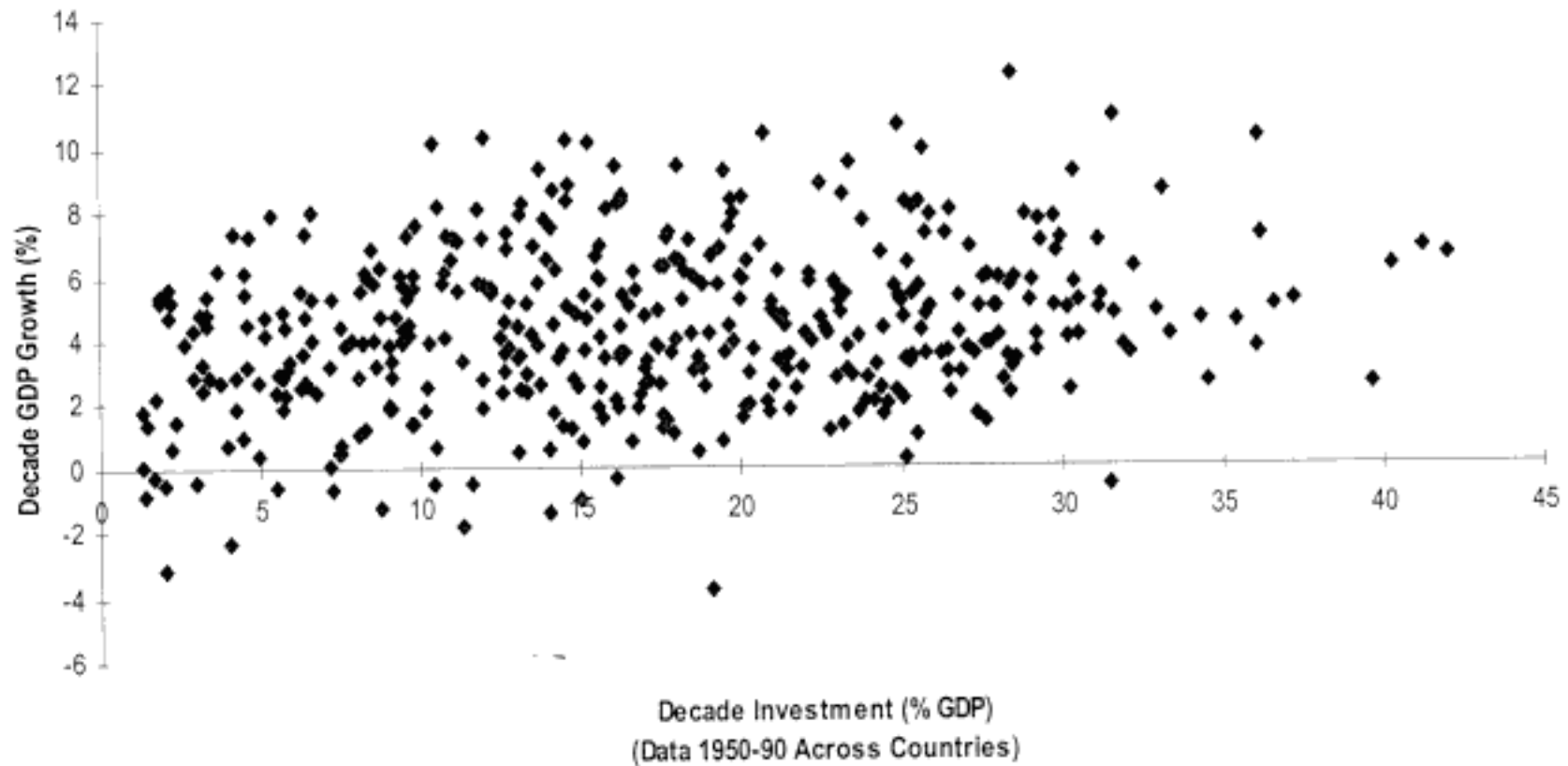


Source: Maddison, 1994

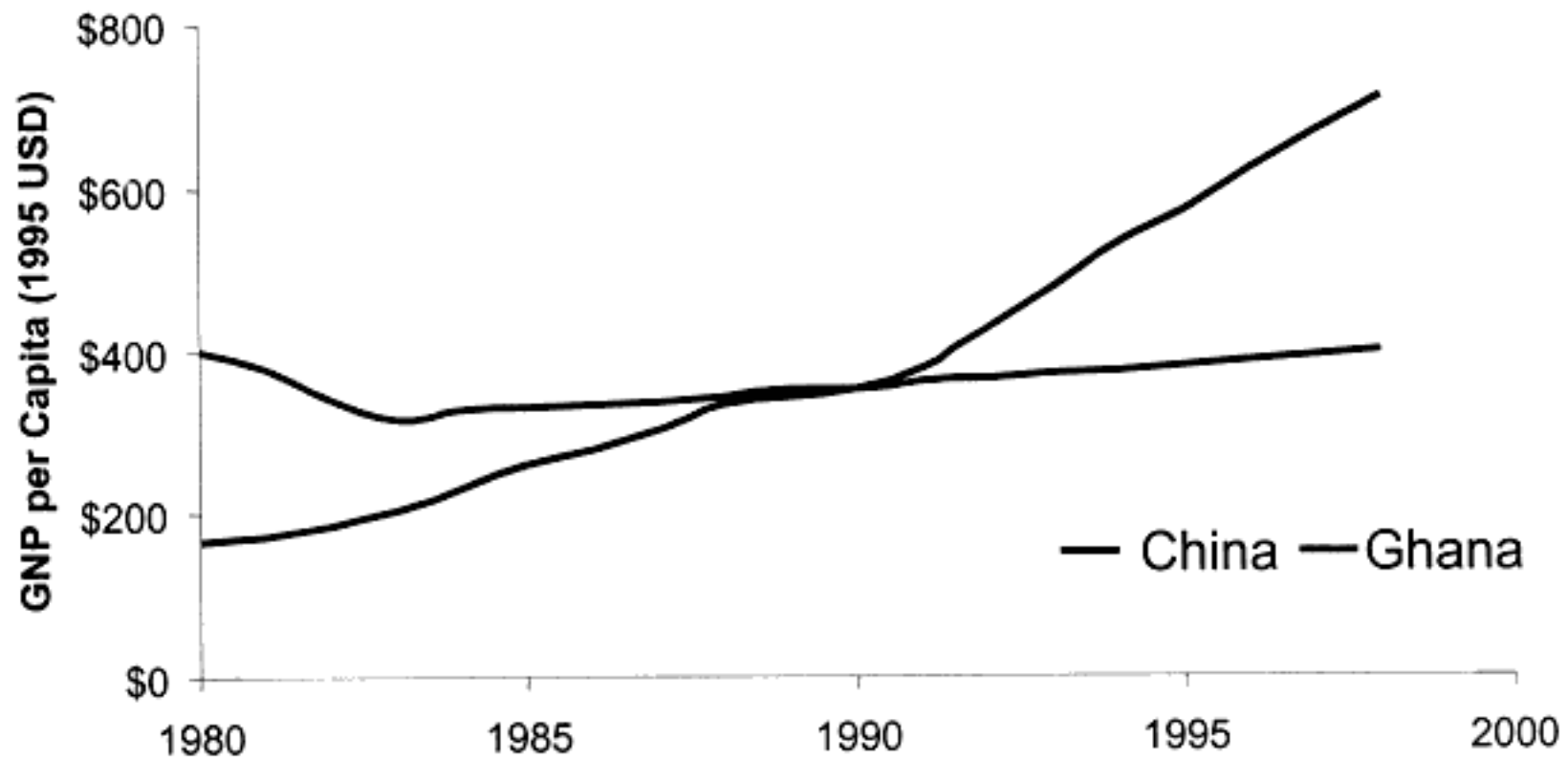
What Causes Economic Growth?

- The Right Culture (1900)?
- Investment in Capital (1950s)?
- Investment in People (1970s)?
- The Right Policies (1980s)?
- The Right Institutions (1990s)?
- The Right Culture (2000s)?

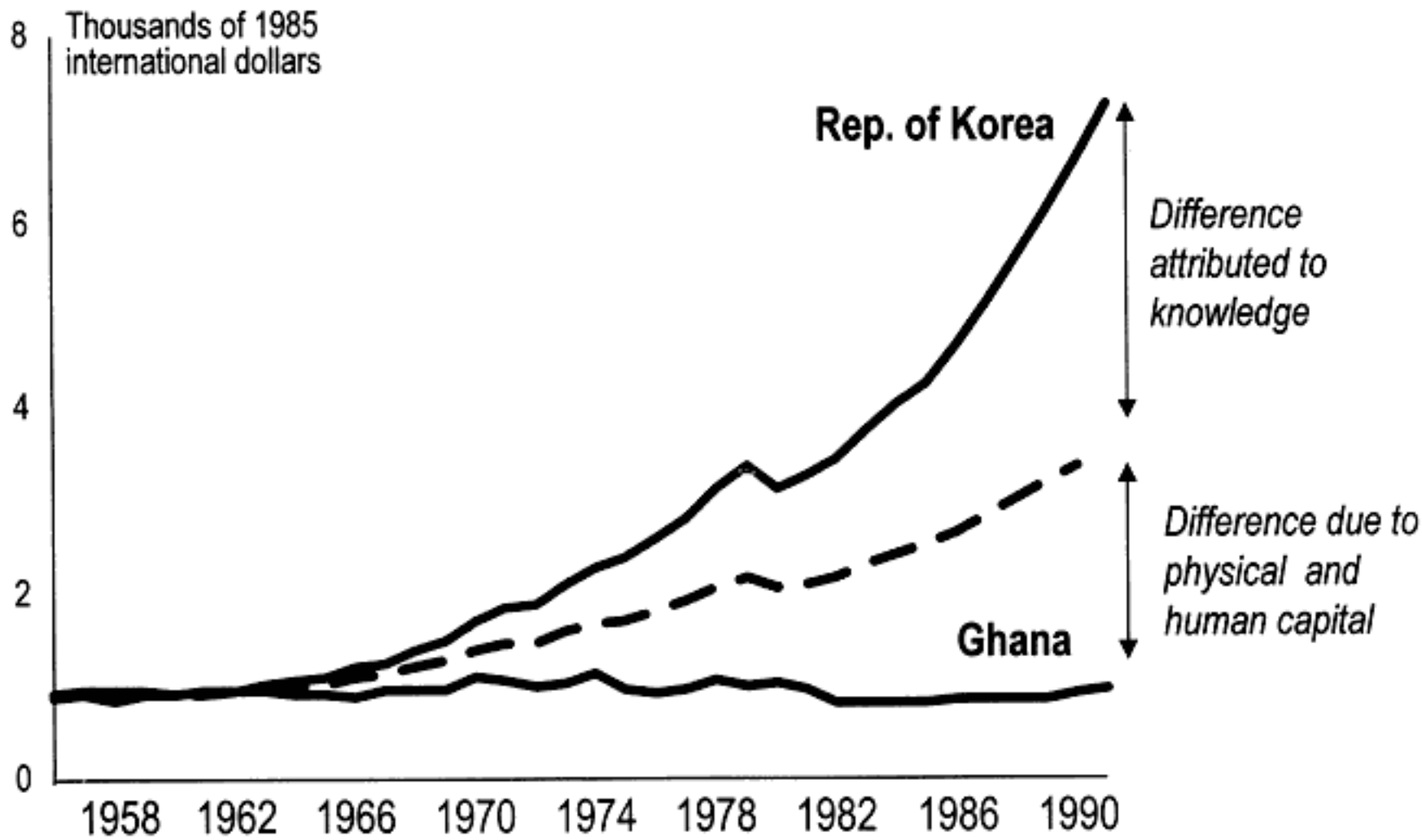
Whatever It Is, It Isn't Just Investment



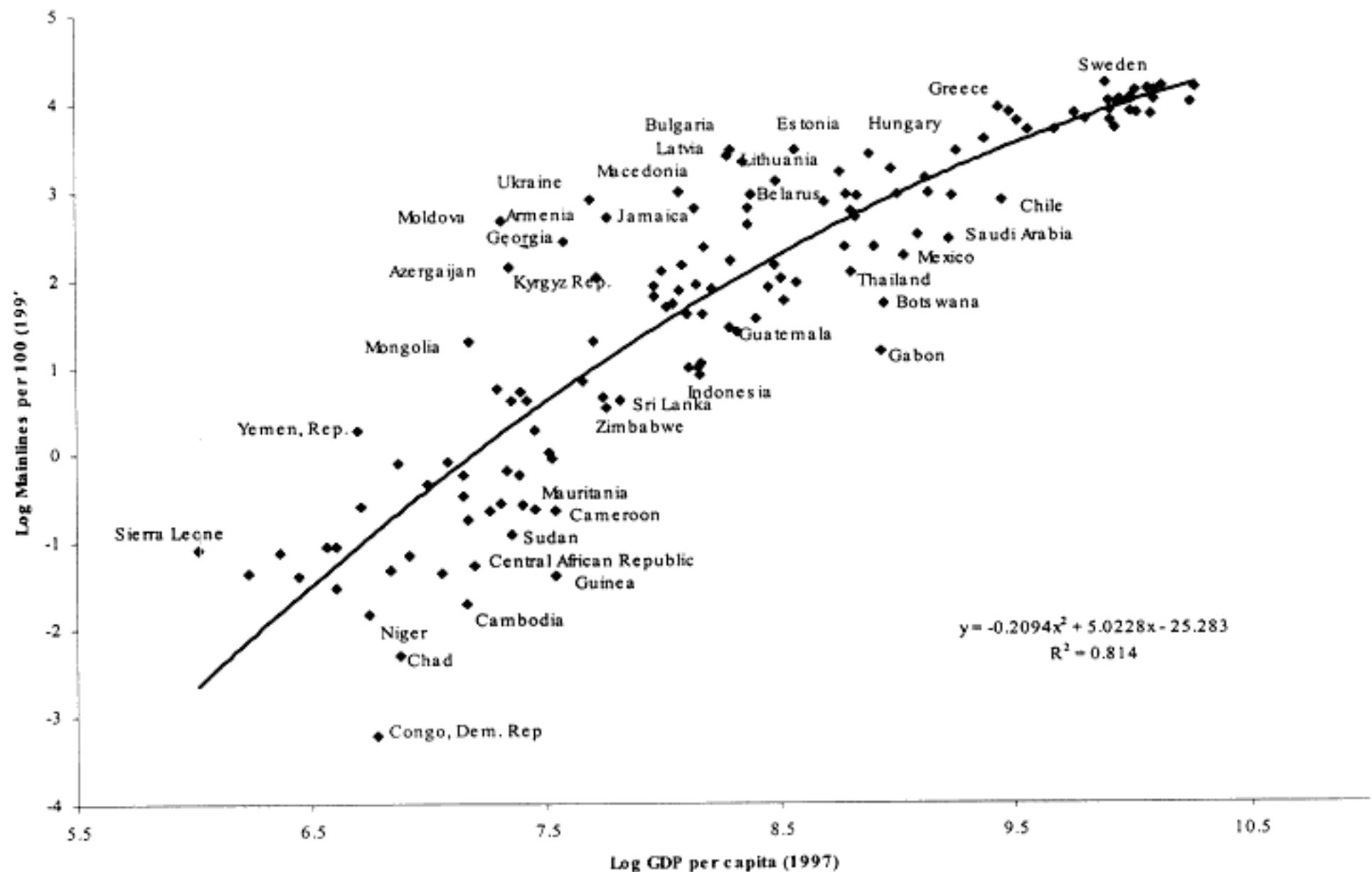
And It Isn't Just Policies and Institutions



But Knowledge and Communications Have a Role



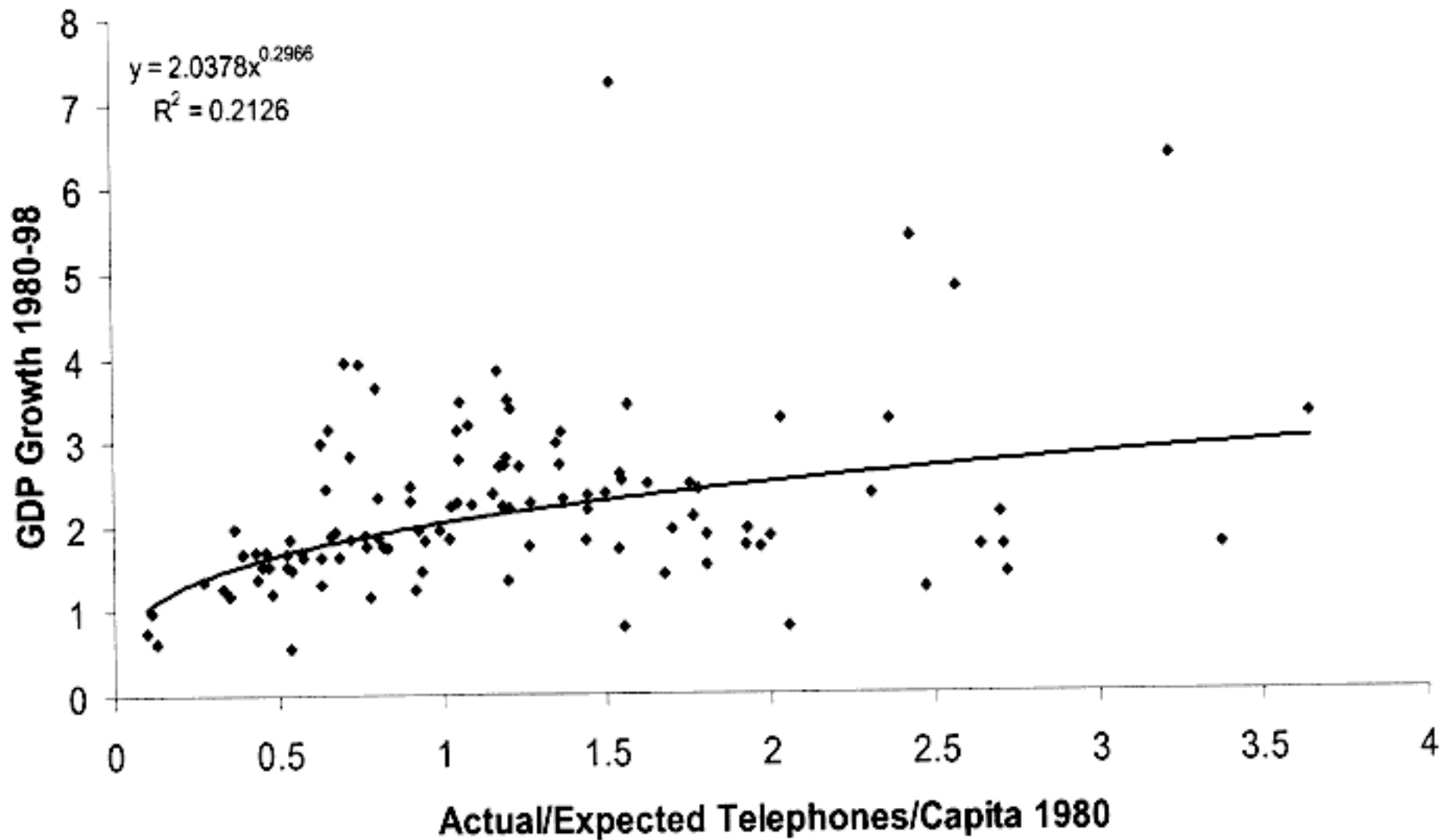
Teledensity and Income



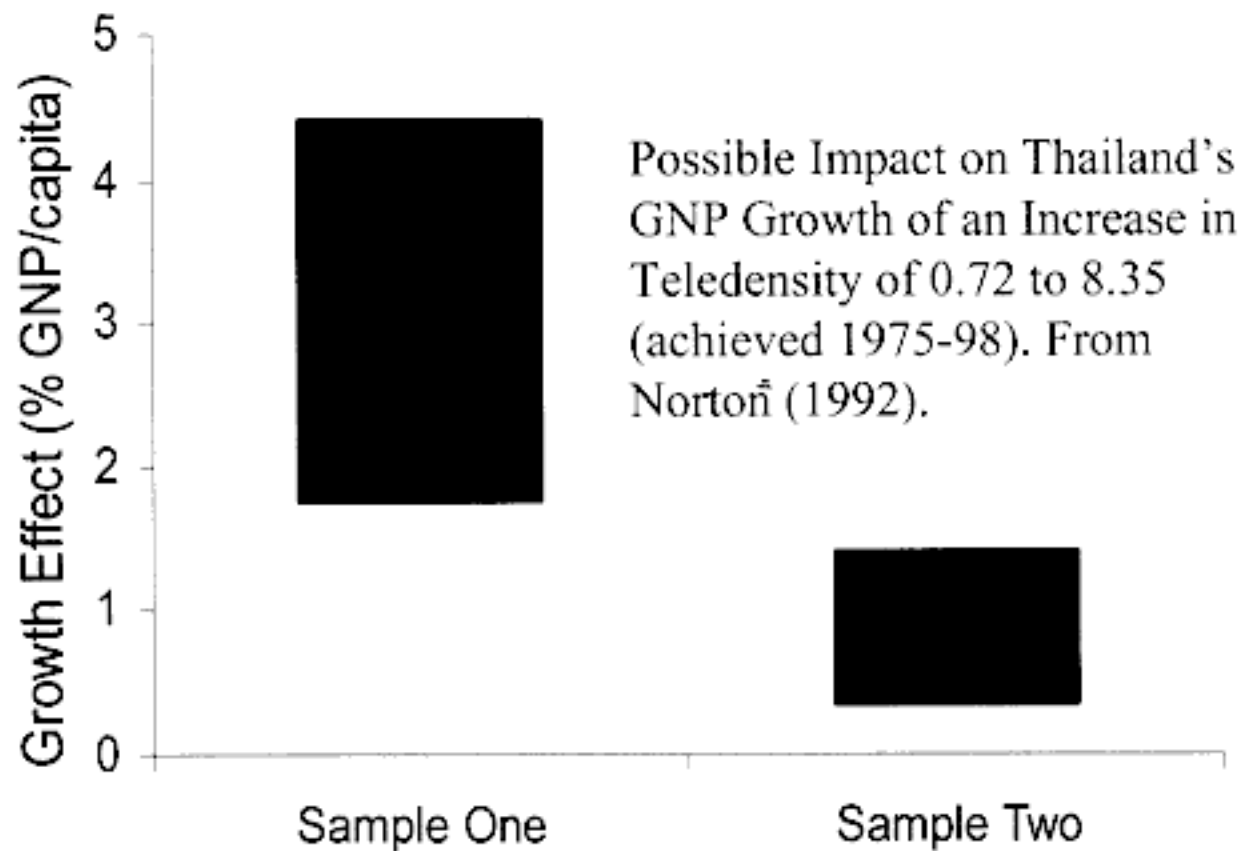
New Markets and Networked Economies --The Birth of the Telephone



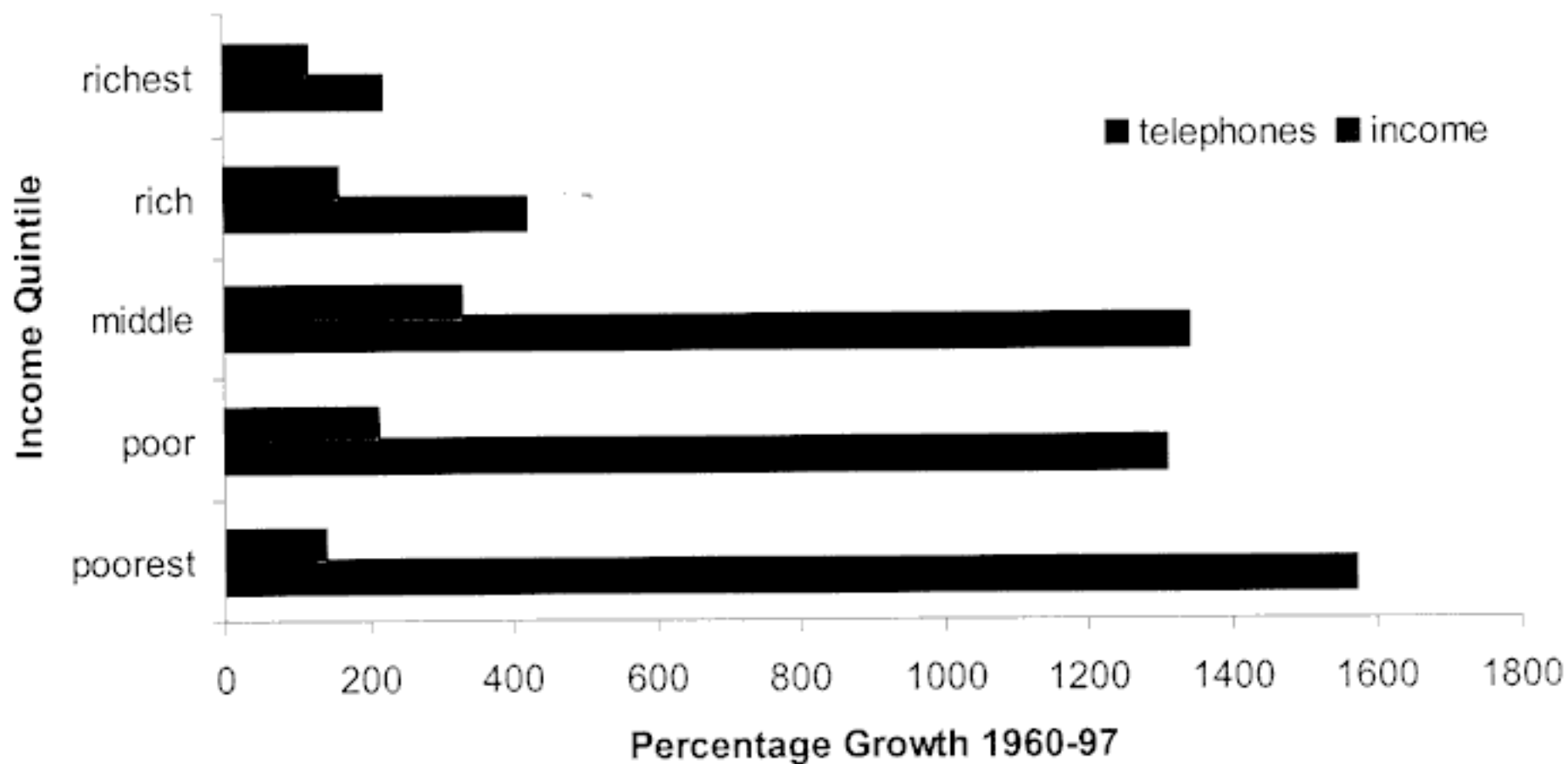
Teledensity and Growth?



Estimates of the Impact



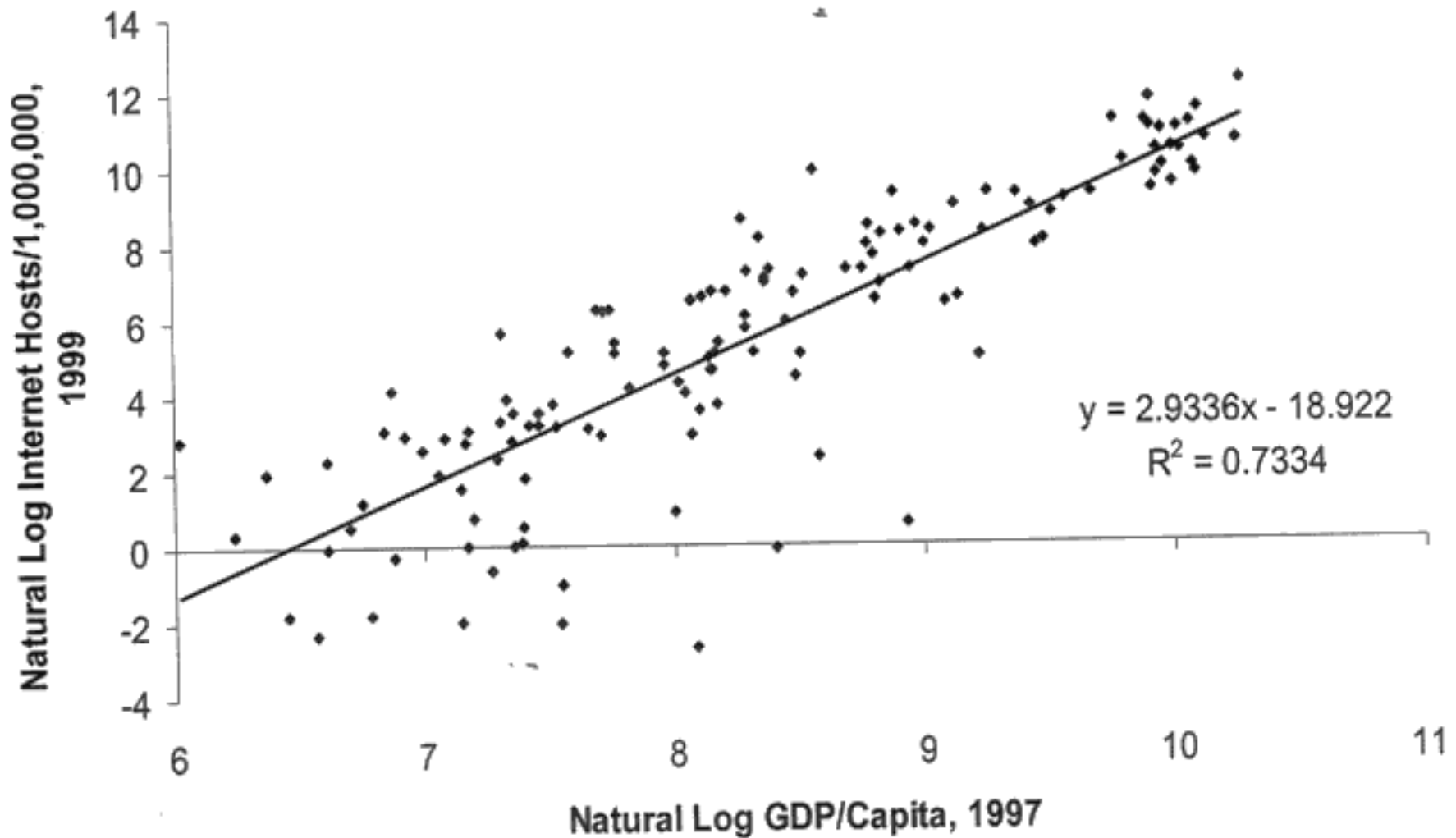
Impact, Perhaps-- Enough, No



Internet and Economic Growth?

?

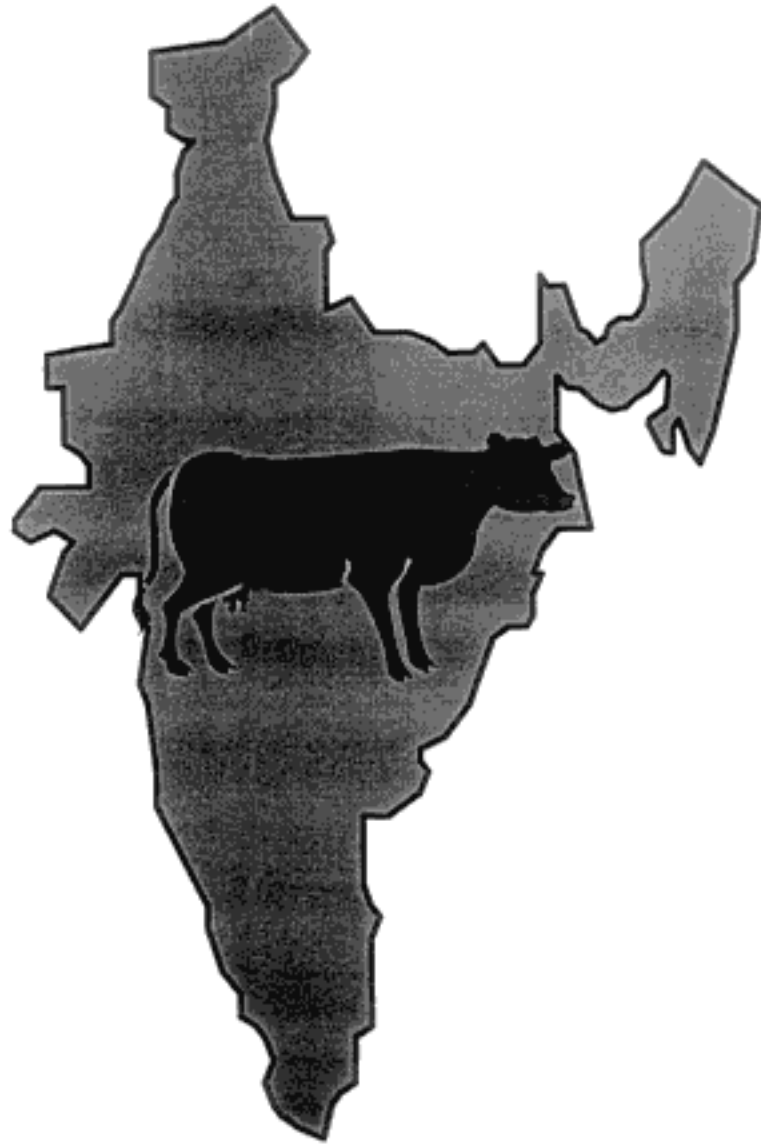
Internet Hosts and Income



New Markets And Networked Economies (2) --Goat Net



Broader Development



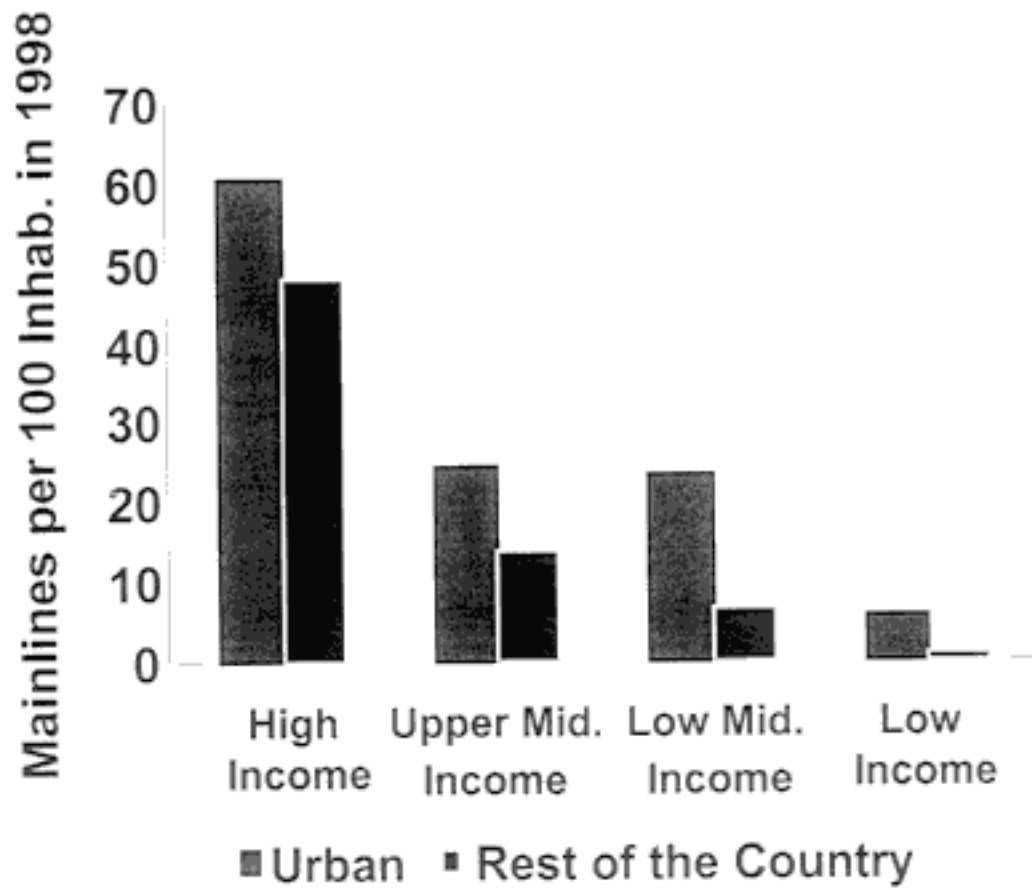
But Access is Concentrated in a Few Countries

Divide Between

Mainlines (inc. cellular) -

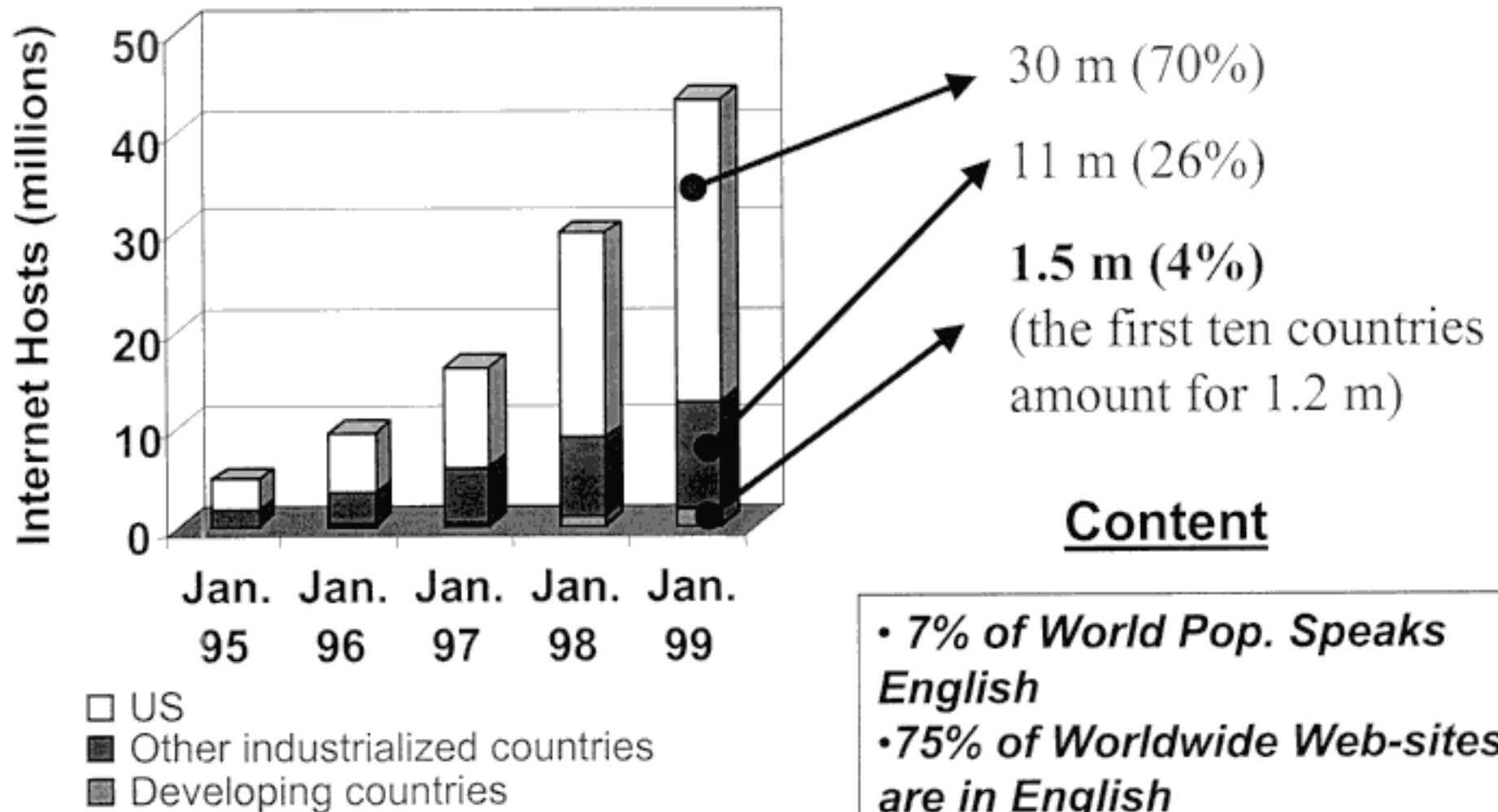


Divide Within



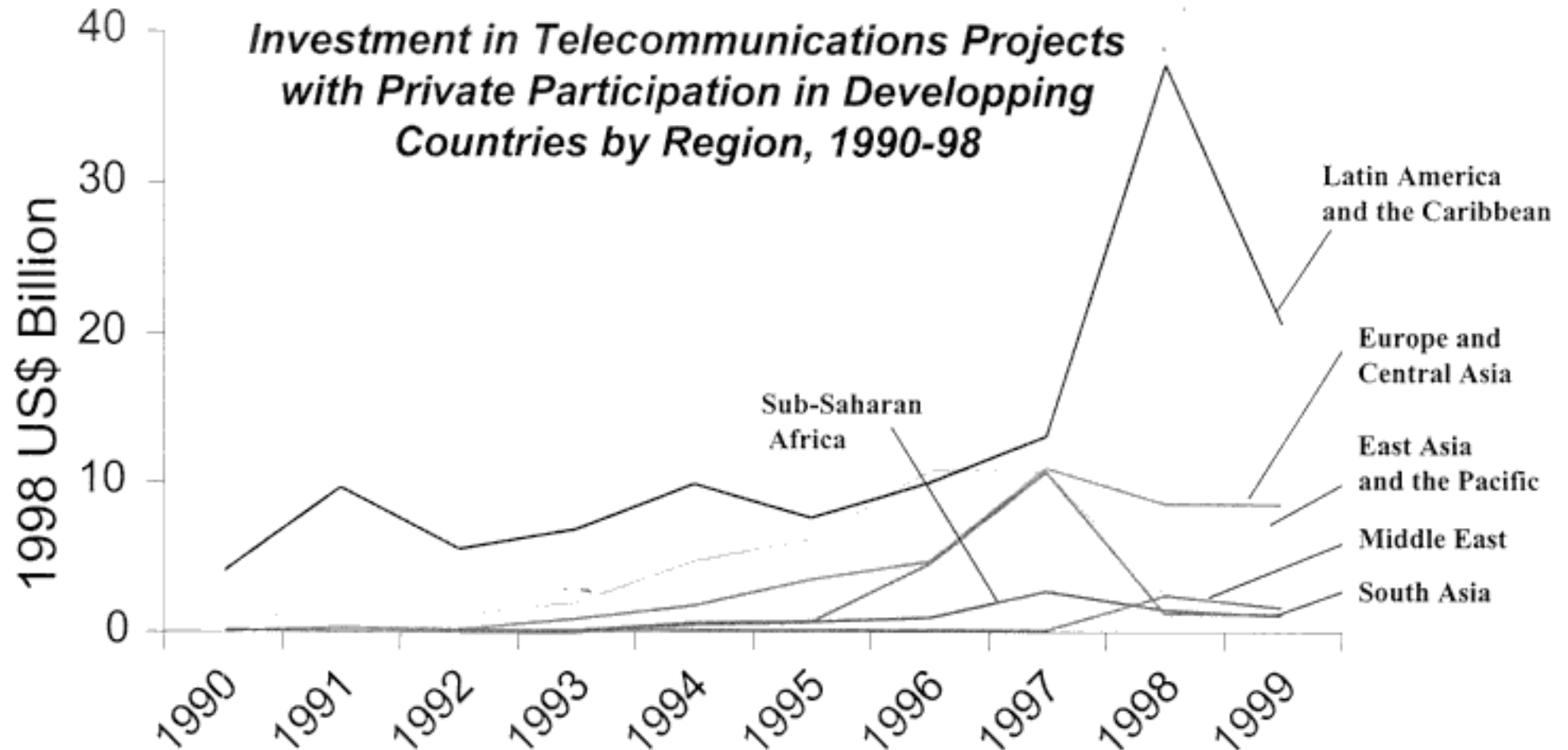
As is the Internet

Connectivity



Source: Network Wizards, World Bank, 1999

..Because Investment is Concentrated



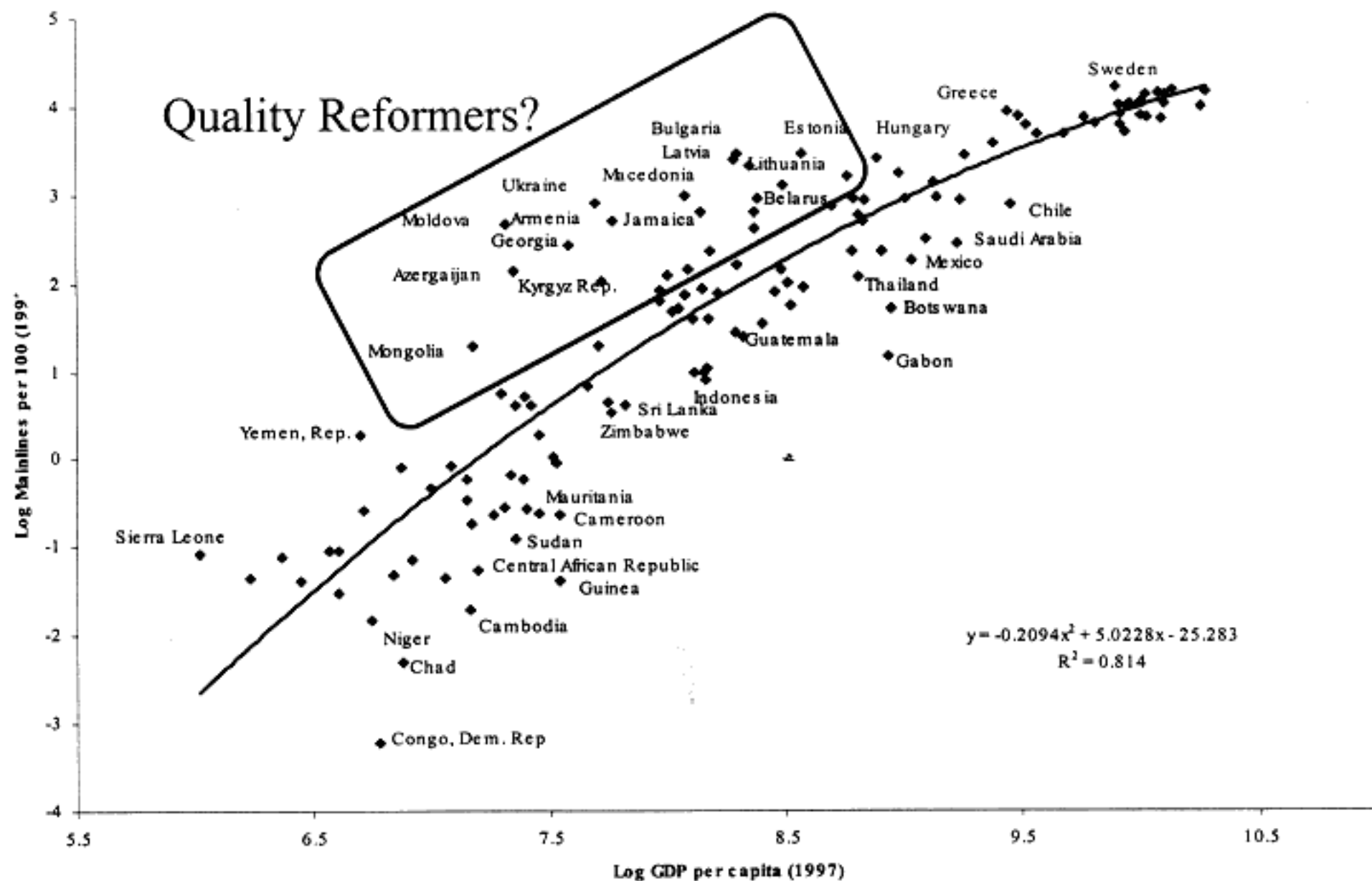
Source: PPI Database, World Bank

- Total Investment: OECD - \$129 per capita; SSA - \$9 per capita.

How to Get More ICTs

- Policy

Teledensity and Reform?



Why Don't Countries Get Enough Access?

- Market Failures
 - Information (who, what, where, how much)
 - Network and Scale Economies (it's better to do lots)
 - Finance (credit and liquidity constraints)
- Government Failures
 - Broader Institutions (banking, macro policy etc)
 - Under-use in Government Services (what for, for whom)
- Equity
 - ICTs are a tool for improving the lives of the poorest

How to Get More ICTs

- Policy
- Poverty
- Geography

How to Get Countries More Access

- Ensure the Best Possible Environment --
in the Sector
- Ensure the Best Possible Environment --
in the Macro Economy
- Support Private Investments
- Support for Government Provision of
Pro-Poor Services using ICTs
- Provide Information
- Rollout Subsidy Auctions

Beyond Access

- Content
- Skills and Education
- Credit

Conclusion

- Don't Believe Economists
- But There Probably is a Link
- And It's Probably Getting Stronger
- ..Which is a Worry for Developing Countries
- Suggesting the Need for Active Rollout Policies...
- And a Large Role for the World Bank Group!

KEYNOTE: Mr Charles Kenny, The World Bank - Telecommunications and development cause or effect?
 SPEAKER

CHARLES KENNY: Good morning. I was speaking to Peter Lovelock during the break just now and he was saying that last time he was at a conference where somebody actually had the nerve to use transparencies a hush fell over the room - what is this backwards technology? He told me that I'd better come up with a pretty darn good reason why I was using transparencies rather than a computer. I'm afraid the best I can do at this short notice is say that a dog ate my laptop.

I want to open with two stories that I think sum up different approaches to the relationship between telecommunications and economic growth. The first is that in 1876 when Alexander Graham Bell was touting his new invention, the telephone, around the country looking for backers, that President Rutherford Hayes turned to him and said, "That's an amazing invention but who would want to use it?"

The second story involves Edgar Dega, the impressionist painter. He was friends with one of the first people in Paris to own a telephone. He was invited over to view the machine. As a typical reactionary he was very much unimpressed. Then they sat down for dinner. During dinner the phone rang and his host leapt up. "Ah," said Dega, "the telephone. Now I understand. It rings, you jump."

These two opinions I think suggest two different views on the impact of telecommunications on economies and societies. Hayes saw there being no real relationship. The telephone was just an expensive toy, a consumer durable like the television or stereo perhaps. Dega could suggest an alternative view, although a rather negative one, that the telephone might have a significant impact on societies and economies. Whilst Dega saw us becoming a slave to the machine - I think people in this room could hardly deny that that's happened to some extent - others at this time saw the telephone as a liberating and invigorating force. Indeed, many people were wandering around saying this is a harbinger of world peace. Who could go to war with each other once they've talked to each other over the telephone?

Under the second view we might think that an information network would speed development. It's merely a product of that development under President Rutherford Hayes' view.

Broadly these two views of relationship between telecommunications and growth irrelevance or catalyst remain. The argument has clearly spilled over into broadband technologies and the Internet.

I want to spend a little time today talking about what economists can add to this debate, if anything at all, and after that I'll run briefly to some policy conclusions and roles for international donors including my international donor, The World Bank.

Why the interest in information and communications technologies as a tool for development? I guess it's much for the same reason that economists and policy makers have looked at a range of potential sources of economic growth. This is an oversimplified slide but basically what it shows is that it's not easy becoming rich. It's easy to forget that in this neighbourhood but if you look at the world as a whole what the slide shows is income ranking of countries in 1900 on the X and income rankings in 1992 on the Y. It shows a very strong relationship. Ghana was one of the poorest countries in 1900. It remains so today. The United States was one of the richest countries in 1900 - it remains so today. The outlier on the top left there is Japan. On the right at this side over here, sadly are Australia, New Zealand and Great Britain - make what you will of that. So countries are very concerned to discover the causes of growth and to discover methods to leapfrog, to become much richer much faster.

Economists, policy makers and others have looked at a range of different possible mechanisms. We started with a sort of Protestant work ethic of ^ in the 1900s. We then looked at investment in capital in roads, in factories, in the 50s. Education and health in the 1970s. Macro stability in the 1980s. Better institutions of governance in the 1990s. And perhaps with Francis Fukiyama writing about trust we're now back to where we were in 1900 looking at issues of culture.

If I was to put 2001 on here or indeed 2000, ICTs, the new communications technologies would be the latest in this list of miracle cures for economic growth. Perhaps one way of judging how likely it is that this is true, that this is a miracle cure is to look at the past record of other miracle cures. And frankly it's not very impressive.

Whatever causes growth it's not just investment. This is a slide of levels of investment as a percentage of GDP against GDP growth over decades over the long term. There's somewhat of a relationship. It looks like countries are investing sort of 35/40 per cent of GDP in investment see slightly higher growth rates than those that are investing 5 per cent. But it's really not much of a relationship, not nearly as close as economic models would suggest.

What about policies and institutions? Well, this is a great place I think to show this slide. If you were to ask the average World Bank economist - take me - which country out of China and Ghana was following the better policies and had better institutions from the standpoint of the institution of the World Bank, we'd have to say Ghana. We've been pushing structure adjustment policies there for 20 years and they've been listening to us and they've been forming institutions and they've been putting in place the policies that we approve of. The growth results - well, yeah.

China on the other hand has been doing many things that the World Bank sort of officially would disapprove of in terms of policy and institutions. As we all know it's been growing like billy-o. So at least there's no simple story about policies and institutions and growth.

The past suggest then that we should be very careful about miracle cures. It's not just investment, it's not just education, it's not just health, it's not just policy. Having said that it would be hard to deny that technology in the broad had some role in development. If we look at this slide it suggests that, (as at least one economist argues) the amount that knowledge technology accounts for the difference between the growth rate of Ghana and the growth rate of the Republic of Korea over the last 40 years.

As you can see this economist thinks that most of it is knowledge, some of it is physical and human capital. I like this economist, he used to be my boss. Other economists out there think very differently. Paul Krugman of MIT says that if you look at the experience of what's been going on in East Asia it's all physical or human capital investment and there's a very small role for technology. Others would argue differently.

So there's some role. Where does the Internet fit in here? Nicholas Negraponte of MIT Media Labs argues that the Internet really is different. It's not like these old technologies that didn't need to leapfrog into stunning growth rates. It's a new technology with a much greater possibility for leapfrogging.

So who's right here? Well, we know that there's a very strong link between telephones per capital and GDP per capita. That's GDP capita on the X, telephones on the Y. As you can see, basically poor countries have few phones. Rich countries have more phones per capita. That's something that's been known, since at least the Maitland Report and indeed long before that.

Of course, this doesn't necessarily prove anything. It could well be that the relationship runs from growth to increased telecommunications rather than the other way round. It could be that there's a sort of bi-causal relationship - more telephones cause growth, more growth causes more telephones. It could be that telephones, or at least not enough telephones, act as a bottleneck to growth. It could be that more telephones act as a catalyst. There are many possible relationships here.

Which one is it? I think it's probable that the relationship is causal and one reason for believing that there's a relationship between more telephones and economic growth is the network externality feature of any network. The telephone and Internet are classic examples.

The value of the telephone line goes up exponentially the more you add users so a system with one phone is useless, a system with two phones allows for one connection, a system with three phones allows for three connections, a system with four phones allows for six, etc.

This explains explosive growth in network technologies because once you reach a certain threshold everybody wants one. This graph just shows the number of telephones there were world wide in the months after Bell invented the telephone. As you can see it runs

pretty flat for a long time. The telephone was pretty much a useless toy as President Hayes said it was. But after a while the number of telephones connected reached a threshold point and they became a very useful technology and everybody wanted one so that by the turn of the century there were already 2 million telephones world wide.

Network economies suggest an ever larger return to the same amount of investment. This is the kind of thing that might have a very large effect on economic advance.

So is there a relationship? Well, this is a graph with the expected number of telephones in a country. The actual number of telephones divided by the expected number of telephones given its income level against growth rates over the last 20 years. It's not terribly impressive but trust me, there is a relationship up there. Indeed, if you asked a statistician he would claim that it explains 20 per cent of the variation in growth rates across countries. I would say that's one reason never to listen to a statistician. But that's just me.

How big do these studies suggest the impact is? Well, that's very hard to know. Seth Norton of Washington University has done a lot of work on this kind of stuff. In just one study he came up with a huge range of estimates for how large the impact of telecommunications role was on growth. I won't go into details on this but basically if you take Thailand's tele-density in 1975 and it's tele-density in 1998, and you look at what Seth Norton said the result of that higher level of telecommunications role over time should have done to Thailand's growth, he's predicting that it might have been as high as increasing yearly growth rates by nearly 5 per cent which is, frankly, unbelievable.

We know that the relationship is positive. We know there is a link. We also know econometricians and statisticians don't have a clue how strong that link is, I think.

The third thing I would say about what we know is the telecommunications role alone certainly isn't enough to help countries catch up. This graph takes countries, divides them into five groups by their income in 1960 from richest at the top to poorest at the bottom, then looks at how fast their income group - that's the red bars - and how fast the number of telephones per capital group shows. What it shows is that the poorest countries in the world have done phenomenally well in rolling out service, from a very low level, but nonetheless over 60 to 97 period you've seen a 1,500 percentage increase in the number of phones per capita in the poorest countries in the world - a great performance and far faster than any other group, especially the richest countries.

On the other hand, when you look at income growth rates, the poorest countries have been the slowest growers over that period. So rolling out telephones certainly doesn't do it all by itself. It suggests a complex relationship between the two. You get results from rolling out telephone services if other things are right. For instance, a recent country study of Singapore suggested that the country's export dependence acted a driver for rolling out telecommunications services in the first place. So it was purely a sort of growth to telecommunications relationship.

But then when this telecommunications system was in place, Singapore used that - was enabled to rapidly roll out services provision much more broadly in the economy so that in that case the relationship went from a good telephone network to more growth.

Well, all of that was 13 slides. Sabrina ^Covern yesterday got to the same place in approximately three slides. I think that's why I'm the international bureaucrat.

But what about the internet? Frankly, it's just too early to say. I learnt yesterday that more people today watch Baywatch than have access to the internet. Baywatch has been around longer than the internet and I still haven't done the study of a relationship between Baywatch and economic growth. After I've done that maybe I'll move onto the internet. Nobody else has done that either, really.

What evidence do we have? A recent survey of surveys looking at IT in the United States found that studies in the early 90s and 80s found a disturbingly negative relationship between investments in IT and productivity growth. More recent studies have begun to reverse that. We're seeing in some places excess returns for investment in computers, especially in the presence of skilled labour. Even a number of leading sceptics now argue that we are seeing IT leading to increases in productivity outside the sector as much as 0.4 per cent per year.

Having said that and before we take Nicholas Negraponte and sort of crown him the Adam Smith of our age, two problems do remain. One is that finance and insurance which are two industries that are very IT intensive are seeing absolutely no increases in productivity. Something is stopping IT having an impact in at least those sectors which does suggest again the story's more complex - it depends a lot more than just having the infrastructure there.

Secondly, 0.4 per cent per year is big but it's not really stuff of industrial revolutions. Over the long term it probably suggests an impact about the same size as was caused by the railways in the United States on income per capita in the United States which is about a 10 per cent increase over the sort of 25 years. Not bad, but over the next 25 years we would expect the United States economy to grow by about 80 per cent anyway.

The Internet is making a difference, not necessarily a huge one. I guess the bottom line at the moment is that on the subject of Internet and economic growth economists have a lot less to say than futurologists. On the plus side for economists the only people who make economy forecasts look good are futurologists. So, you know, we might be right to be cautious.

Indeed much like telephones the internet is shaping up to be a classic consumption good in that you can explain how much internet people have by how rich they are. This is the same graph as I showed you earlier with telephones except replacing with Internet hosts.

Clearly the number of Internet hosts per capita depends very, very much on the GDP per capita.

On the other hand, there is definitely some evidence that the Internet is having some impact as we've seen and there's a fair amount of evidence - and it might well have a big impact in developing countries. This is just one example of what's going on even in a poorer developing country. In Senegal a farmer set up a site that allowed people to buy goats over the Internet. There's a huge Senegalese Diaspora in New York and they've been logging on and buying goats online to be provided on birthdays and holidays to their family in Senegal and the Senegalese farmer that set up this system is now incredibly rich.

This is a very small example. Clearly there are bigger ones. Everybody knows the story of the Indian IT industry which is growing hugely and keeps on growing hugely partially because of the impact of the Internet.

On the flip side there's definitely a growing fear that developing countries that don't have access to this technology are going to be left a long way behind, chronically behind, and they're going to lose what access they have to global markets. If everybody is trying to purchase online and you're not online to sell you've lost your opportunity to sell. One recent study found some evidence of that in the slightly older technology which was the fax. They were able to explain a large amount of the difference in performance between Africa and East Asia on manufactured exports by the fact that African companies, for various reasons including a very poor telephone network, were way slower at rolling out a fax machine and the fax became very important in importing and exporting and African manufacturers didn't have one. This was accounting for something like one-third of the difference in manufactured exports between Africa and East Asia.

Given that we should certainly be worried by a growing digital divide, and as we saw yesterday high income countries undoubtedly have a lot more access to both telephones and the internet, as the slides I showed earlier as well. There are two risks not only that divide between countries where high income have the majority of the mainlines in the world despite having only about 16 per cent of the population. Also within countries.

This graph shows the number of mainlines per capita in urban areas in groups of countries and in rural areas. The gap in high income countries is there but not very big. In low and low/middle income countries, while there is some service in cities, outside cities hardly anybody has access to a telephone.

The same is also true of the Internet. Indeed the figures are even more stark with the internet. This is from January 1999. It's a bit out of date now but about 96 per cent of internet hosts are in developed countries, 4 per cent are in developing countries and the first 10 developing countries account for the great majority of that 4 per cent. 75 per cent of world-wide websites are in English compared to 7 per cent of the world population who speaks English.

A couple of years ago the whole of Bangladesh had about one-third the number of internet users than there were in the World Bank. Looking at that another way: I think if you took everybody in this room and their five closest friends that would be more people than the number of people who had internet access in the entire of Bangladesh a couple of years ago. It has improved since then but not very much.

Right, well, investment is clearly one reason. Investment is very concentrated both within and between countries. Total investment in the OECD was about \$129 per capita in communications. In sub-Saharan Africa it's about \$9 per capita. That buys you a lot less telephones.

The other thing is that private investment is very highly concentrated. Latin America and the Caribbean gets a lot of it. East Asia and the Pacific does surprisingly badly in this, partially because of the number of unreformed markets. But who does really badly? The old favourites of sub-Saharan Africa and South Asia who hardly get any.

Why is this? Well, reform should definitely help. We've seen dramatic returns to reform around the world, especially in mobile markets. Even in countries where there's pretty lousy regulation like in many Eastern European states, we're seeing growth rates in mobile phones of over a 100 per cent a year for the last few years. This is thanks in no small part to that being the competitive sector and a fair amount of overseas investment.

However, I think it would be a mistake to suggest that reform will do it alone. Here's the same graph I showed you earlier with GDP per capita and mainlines per capita. The ones in the blue box are the ones who have more telephones than you would expect for their income level. They're not the classic reformers. Moldova, Azerbaijan, Armenia, Georgia, Kurdish Republics, Bulgaria, Lithuania, Belarus, Jamaica. In leasing their fixed line service most of these are either unreformed or very recently reformed markets.

What am I saying here, that we ought to go back to state provision of telephones? No, I'm certainly not. I'm saying that we need to go a long way beyond the market if we are actually to overcome barriers to ICT provision. We've got to overcome the barrier of poverty. What do I mean by that? I don't mean that we should expect poor people to spend 90 per cent of their income on getting their own phone. I mean, we've got to overcome the barriers that stop poor people aggregating their demand so that 10 of them together can get access to a phone - a public phone. There are a number of policies that actually stop that happening in developing countries.

The other thing we've got to overcome is geography. It's still more expensive to provide a telephone in rural areas which are thinly populated. We need to go beyond the market. Network economies suggest that the market level of provision will be too low for economic efficiency -- sorry, market failures, poor provision of services in the government sector using telecoms and just the straightforward problem of inequitable access. All of these suggest that the market acting alone won't provide service to enough

people. We want universal access. We're not going to get it with just the market. The market will move us towards that but it won't get it all the way.

So what do we do? Well, first of all we ensure the best possible environment and the big thing there is undoubtedly privatisation, competition, and a good regulatory environment. We have to go beyond that. For a start we have to look at the macro economy. One reason that private investment from abroad is so highly concentrated is that people are -- sorry, governments are -- putting barriers in the way of foreign investment. Given that one of the main reasons for privatising telecommunications services is to maximise private investment, it seems very foolish then to deter that investment by mucking up the broader macro environment.

We need to support private investments further. For a start we need to advertise the fact that there are investment opportunities there and provide a one-stop shop for private investors to come into the sector. Support for government provision of services is very important. Governments still account for 30/40 per cent of most countries' GDP. They're providing education services. We need to make sure that we're using ICTs there. They provide health services - the same. It's very important that government sector gets this right.

But we need to go even further and I would argue we need to provide rollout subsidies. I mentioned yesterday the Chilean case where what they're doing is auctioning subsidies to the lowest bidder to provide service to under served areas. In a reform market this is an incredibly efficient way of getting access even to the very poorest.

We need to go outside the sector as well. I think this meeting has suggested the importance of content and we were just hearing about the importance of local content. I couldn't agree more. We need local content in local languages, otherwise it's going to be an expensive toy where, you know, maybe kids will go and have a look at the Disney site but that's about it. This has got to be central and while the market will go a long way in providing this, I also think there's a small role for government to support the rollout of content for education, local education, disaster awareness campaigns, this kind of thing.

There's a huge role for schools in education. We're hearing about the shortages of technically able people in the United States. It's a hell of a lot worse everywhere else in the world. Government has got to get its act together and be pushing the education agenda very hard.

There's also the problem of credit, especially in rural areas. People don't have access to the credit that means they can buy the services that you can get over the Internet, or indeed buy access to the Internet.

Also this is kind of where I think The World Bank Group comes in. Traditionally we've done technical assistance for policy reform and policy reform in a broader macro environment. I think that remains very important. The private sector arm of The World

Bank Group, the IFC, International Finance Corporation, supports private investment. Recently for instance we invested in Rwandan cellular company and we've also moved into the internet and have a deal with SOF Bank which I'll be happy to talk about more later.

But we do need to go further. We need definitely to be supporting suitable and local content rollout. We need to be supporting education.

Where have we gone and where have we got to? At 6.25 on August 22nd, when Alexander Graham Bell died, all the US phone companies shut off the entire network for a minute. Now, if they did that today it would cost them approximately half million in lost revenues. If all the phone companies shut off networks for a minute, it would cost about \$1.5 million. And that doesn't include all those companies that rely on the telephone for survival - banks, telesales, pizza delivery.

Telecommunications and Internet are becoming ever more central to economies. They clearly are very important. However, don't believe the economists when they say they can tell you how important. Don't believe anybody who says they can tell you how important. It depends very much on circumstances. Having said all that, there's almost certainly a link. I would go further, there's probably a link, and it's almost certainly getting stronger. This is a huge worry for developing countries because especially with the Internet they're falling behind. They're falling ever further behind from a very low start base.

This suggests the need for active rollout policies and I mean rollout in a broad sense, not just the infrastructure but also the content. These policies need the support of governments - the active support of governments and of course that means there's a huge role for The World Bank Group so I hope my job is secure. Thanks very much.

STEPHEN LAU: Thank you. Thank you, Mr Kenny, and I can't help noticing that when the last slide when Mr Kenny said don't believe in economists but there probably is a link, I was wondering whether he was implying economists is the missing link.

Well, I'll hold off questions until the next speaker finishes his presentation. Our next speaker, which should have been Mr Rob Willis, of Northern Telecom. Unfortunately Mr Willis, due to unexpected circumstances, could not come but obviously his colleague is here to give the presentation. He is Mr John McCready, who is the Vice President of Marketing, for Nortel Networks Internet Solutions for Asia-Pacific. John's presentation "a broadband alliance in Asia". John?

KEYNOTE: Mr John McCready, Nortel Networks Internet Solutions
SPEAKER for Asia-Pacific - A broadband alliance for applications in Asia.

JOHN McCREADY: Maybe I'll just open with a bit about myself. My name's John McCready. I've been with Nortel in Asia for about 4 years. Prior to that I was in North America. I split my time between Singapore and Hong Kong so I'm well aware of that rivalry and how people feel about it. I of course have my own opinion.

What I'd like to talk about today is an initiative that has been put into motion in the last two months called the "***Broadband Content Delivery Forum***". It's an industry alliance and what I'd like to talk about is the objectives of that, some of the things that we believe can come out of that, how we think that's going to improve both the internet economy and the internet experience, and of course how all that can impact Asia and how people in this room and in Asia can get involved.

So the Broadband Content Delivery Forum was actually founded in April of this year with the founding members you see listed. It's a mixture of content providers, infrastructure providers, operators, software companies, etc. and the initial meeting was held in May which was really just a kick-off, get a board of directors, and so on. Now there are a number of activities going forward and I'll have information at the end in terms of how people can think about getting involved.

The mission of this Forum is to create standards that will enable the distribution of broadband content to the edge of network, bypassing internet bottlenecks and thus enabling the broadband business case and allowing service providers and content providers to effectively ally and partner to deliver personalised services. Now, of course, coming from an infrastructure provider we tend to think of these things in terms of the technical challenges that that provides but as is so often the case with these kinds of things, the technical challenges are not by any means necessarily the most challenging.

Developing standards, developing alliances, getting around different parties' desires, wishes to control things, or to come out on top of course is also a very important part of this and that's why a broad-based forum is one of the best ways to ultimately resolve all those kinds of issues.

So at Nortel we've had a slogan called, "What do you want the Internet to be?" This is something we've been using in advertising but it's a very serious question actually. The Internet really started to grow in 1994/95 and people have taken what's there and there's been of course thousands of businesses launched to try to take advantage of the Internet and the opportunity of the Internet.

But what is going to be the thing that really takes the internet, to allow that growth to continue, to allow it to accelerate and to allow people to make a lot of money. The answer that's come back overwhelmingly - and it's not just an advertising campaign,

we've done research behind this - is what people are looking for is their own world. They're looking for personalised services, personalised content, things that interest them in a timely way, in an edited way, in a manner that gives them the most value. Of course we believe that the world of content when we get to a broadband basis is going to be very different from what the internet experience is today on a narrow band basis.

It's not just a question obviously of PCs. For internet content to be effective and broadband content to be accepted then people need to receive that data anywhere they are, any time, any way, basically, and it needs to maintain that personalised angle. So the problem is of course that we're not there today. The Internet as we see today is not even close to fulfilling my world. The idea of My Yahoo! or individual pages is probably the initial start of that but we believe, and I think a lot of the other members of BCDF believe that there can be a lot more done and will be a lot more done in terms of bringing personalised content and creating broadband technologies that allow that content to be delivered in a cost-effective and profitable manner.

So what's of course a bit difficult that a lot of people are learning today is that access is quickly becoming a commodity. In many markets you can now get internet access for free. There are a few examples in Asia. Probably the largest one I'm aware of is Free.net in Australia and Starhub in Singapore both of which have launched completely free narrow band ISPs. And so as a result the business model of trying to make money off access, I think everybody would agree, is going to become increasingly difficult.

So that means that for infrastructure providers in particular, or for operators in particular, they need to find ways, alliances, partnerships, etc. to make their network more valuable to the customers and allow them to receive some sort of payment for the huge investment they've made.

So today you could characterize the internet in some ways as being what some people call a value-free network. That's because the fundamental problem is that the internet today is really dumb. In terms of the internet the users are virtually invisible and what you have is a network with bits flowing around, very little intelligence as to whether it's voice or video, internet content, and there is nothing done in terms of trying to make that content more relevant and more valuable to an individual. Connectivity is there but nothing in the way of personalization.

So we believe that real value is going to come from personalized content, connecting customers to specific things that they want and specific information that they want in a timely way and the way they want it, etc.

So that means for that to work you need to have a coming together, alliance and partnerships of service providers, content providers, and in many cases, customers, to develop that broadband experience in a way that people will pay for. This is really where we think broadband internet and internet IP is going to move.

I think everybody sees the link up of AOL and Time-Warner as being a seminal event in the development of the internet. Here you had a company whose essential business model was connectivity in America OnLine. They developed some specific content and so on but their business model was 21.95 a month gets you unlimited access to a 1-800 number that allows you to dial onto the internet. And on the other hand you had Time-Warner whose essential business is content and in fact they're probably, at the time of the merger, one of the richest sources of content. So these two companies coming together I think is strong evidence of the business driver for alliances and partnerships that bring internet access and content players together.

Now, technically one of the challenges we have of course is that the internet today is sized for a dial-up world so the typical access to the internet, whether you be in Bangladesh or Hong Kong or United States, is to dial-up through a dial-up modem, you get 56k and you go back and you get content from a central position. One of the problems of course we face in Asia is that most of the content in the internet is based in California and the bandwidth restriction across the Pacific Ocean means that if you get a high local access rate in Asia you very often do not get an enhanced experience in terms of delivery of content.

So the broadband internet is definitely under construction in that you have a lot of companies investing in high-speed infrastructure in the core, particularly in the United States but also now starting to be in Asia. It's interesting to note that China, for example, is one of the most highly fiberized countries in the world. You have fiber to virtually every major building in every major city in China.

So this is happening on an island's basis around the world primarily as I said in the core so the interaction of fiber optics, STM64 and DWDM technologies bring extremely bandwidth to the core of the network.

We also are starting to see local access providers who are putting in caches or some form of local content hosting but this is really done so far on a not particularly intelligent basis and only with the effort to try to remove bottlenecks for the very highest sites.

A lot of people think of course of the bottleneck being in the local access and that is certainly true, although, as I said, I think in Asia we have a particular issue in terms of local of content as well. So you're already seeing in Asia development of networks based on copper, cable, technologies for high speed. Here in Hong Kong it's a very simple process to get a high speed DSL connection from Hong Kong Tel. Those kind of networks are being built throughout the region and with the advent of 3-G we're going to see high-speed wireless access as well and finally optical access.

Again, it's interesting to note that Asia is one of the pioneers in terms of optical access in that, again in China, you have a number of PTAs who are building optical ethernet, 1 gig ethernets or even 10 gig ethernet networks that are going to be among the first in the world to launch and offer services. Also in Japan we're seeing many of the operators

start to put in plans in a public way plans to go all the way to fiber to the home. So optical access, I think in some parts of Asia, may in fact leapfrog copper in a cable.

Now, for that to be successful though and for that massive investment that's required, these operators who are going down that path are going to have to form alliances with content providers, find a way to deliver content that is local and relevant in order to make the business case work. That's going to involve obviously a heavy element of local content hosting, not just caching in a way to bring content from California to a local position, but to actually develop, generate local content and to sort through content to bring it into a personalized manner.

So we see the development of what we call the subscriber edge, basically a position where subscribers are logged into the network, their information is registered in the network so now anybody providing service to that customer through the network is able to get access to information about the customer that allows them to customize that experience.

This is accomplished through the concept of a personal content tunnel which I'm going to talk about more in a few minutes. But basically the idea of allowing quality of service, all the features that are required by that customer to be delivered by all the content providers to that customer. Now, as the operator, the infrastructure provider, they can then earn a part of the value chain of that transaction by providing that information and by enabling the transaction.

So there's a number of things that the owner of the subscriber will be able to do, passing on things like security information, quality of service information, be able to enable paper use capabilities, etc. that allows them to be part of the value experience.

So that means that you're going to have a number of people together in the value chain. So we see a development where you're going to have several basic kinds of operators. Some operators will be in the wholesale access business simply investing in access in order to provide other companies who are providing content who want to resell access to that infrastructure. And you can see that model again in some places in Asia. For example, Virgin has brought their mobile phone business to Australia. They've not bought any mobile phone base stations, they've not bought any MSCs but they're offering a service and wholesaling infrastructure from other places.

You also see that business model starting to develop in the dial-up access space where, rather than every one of the two hundred ISPs in Hong Kong having their own dial-up access platform, increasingly the big players get bigger and bigger and the small players outsource that access.

But these two things are really just the beginning of the wholesale model. The long term, we think, is the idea of the large investors building the network and then earning value

from that a number of ways by allying with content providers as well as smaller players who are actually their competition.

So I'd like to move forward now and just talk a bit about reference architectures in some of the specific issues from a technical point of view that are being put before the Broadband Content Delivery Forum. So the Internet today, as we said, is narrow band and is straining in terms of trying to deliver content. And I think, as I already said, that's a particular problem for us in Asia.

So some of the ways to alleviate the bottlenecks are content caching. That's something that's being already done today. It allows big cost savings for the ISP because an ISP pays for the Internet, so to speak, through their pairing relationships. So you effectively have a hierarchical setup. Higher order people in the Internet chain charge lower order people for bandwidth and that's how the Internet is constructed from a value point of view. So that means if you're a local ISP in Hong Kong and you have to pull CNN.com every 20 seconds you're paying every time and caching it locally obviously can save you money as well as it will allow you to provide better service.

Another point that can be done to alleviate bottlenecks and improve the experience is to actually move the content so this gets to content providers in context with service providers providing content in a position much closer to the subscriber. The challenges of course is that narrow band content delivery, which those two are typically based on, can alleviate narrow band bottlenecks but broadband content is going to cause much more damage to the network. So today someone browsing at ISDN rates, 144 kilobits, if they truly get that end to end, is going to have a very good experience.

Moving forward to music which is developing as definitely one of the more popular applications on the internet already, only a small increase in bandwidth is required to 160 kilobits. Once you get into video services then you really start to see a huge demand on the network in terms of bandwidth and I think for many infrastructure providers and content providers looking at the internet today, the Holy Grail is really going to be the ability to deliver full motion video and true video on demand.

So simple video clips such as you download today are typically small window on your screen, not the full screen, and short. You download them for a few minutes and then play them for a few seconds. To do that in a streaming manner would require 300 kilobits of bandwidth.

To move forward to full screen video, so basically low quality TV, would require up to 1.5 megabits. If we move forward to HDTV you'd need to be able to get end to end bandwidth of 6 to 8 megabits. So the requirement for throughput in the network for broadband and the requirement for local content delivery increases dramatically as you get to these sort of high bandwidth services.

So you see the example here, in the future, people are likely to pay nominal or no charge for access but be charged for every one of the events they go to as personalised or premium services.

Blockbuster Video is a 10 billion a year industry delivering true video on demand over the industry. You could effectively move that entire \$10 billion of revenue away from video rental stores and to the internet value chain combination of content providers and infrastructure providers along with other services such a telephony, etc.

So I'm just now going to go through some examples of issues that are being studied or to be studied by BCDF. What I said at the beginning is that the BCDF is really thinking about how to get standards around this delivery that allow an efficient way for companies to ally and interwork together to deliver this content a variety of different ways.

So, starting out, standard No. 1 that they're looking at is the idea of how do we standardize subscriber logins? So you need to get agreement on what is the information that should be gathered, how will that information be passed through the network. I think Mr Lau would probably have comments about how that information should be passed through the network. But you need to find a way that that could be done in context with the authorities in a way that still allows the subscribers to feel like their privacy is protected and at the same time allows the delivery of its personalized content through the network. So that's actually item No. 1.

No. 2 is a standard around how subscribers should receive branded content - so advertising and so on. We need to find a way to define in the network for individual things to be placed. So for example, this is the whole idea, the network knows that I'm John McCready, it knows I'm 36 years old and live in Hong Kong with two children and so that allows the network to decide what's the most efficient advertisement to place in front of my eyes at this moment which raises the value of that advertisement.

No. 3 we also need a way to standardize service selection in terms of the browser. So this is basically a subscriber saying through their service provider, 'I would like to receive this quality of service, I would like to receive this bandwidth. I would like to receive a different quality of service, I'd like to receive video, etc - those sorts of information.

A fourth area is what we talked about with personal content tunnels. So a personal content tunnel is the idea of being able to deliver this mechanism through the network. It is built of course on the existing tunnelling protocols in the Internet which are well set up in terms of security. But there are a number of things that need to be done to make that work ^ and allow the content to be delivered correctly and securely.

No. 5 another standard to be worked on is the development of premium content so allowing, like I was saying a few minutes ago, quality of service requests to be made on a subscriber by subscriber and action by action basis so that the network is always optimized. I think most people would agree that they would want a different level and

may end up having to pay for a different level of bandwidth when they're demanding a text web page than when they're demanding a full motion video.

Finally, No. 6 probably most important, what the BCDF is looking at, is finding a way to bill for premium content, ensure that the information is passed through the chain and that again alliances are enabled. If you look at the telecom industry, the sort of standard voice world, one of the items that an awful lot of effort is expended on is defining internet connect agreements between telephone companies within the same country or between telephone companies in different companies. That becomes a major effort but a very important effort in service being delivered.

When interconnect models are set up poorly or unfairly, what you find is that the service is never delivered and there are examples of that in different parts in Asia, particularly South Asia. India as an example, tried very hard to get a big alternate operator business off the ground in 95/96 but defined the interconnect arrangements in such a way that there was virtually no foreign investment and only one or two of the companies got off the ground, although 20 received licences and had initially promised to pay billions of dollars for those licences.

So while it seems like a simple thing, how do we bill? Defining this, defining how the information is going to be passed around is critical. In the simple voice telephone network it's amazing when you dig into it how much effort goes into recording information, who called who, from where, where was that call handed off and so that the different operators can settle with each other. For alliances, for partnerships, all these things to happen in the internet space, the same sort of agreements have to be made and a standardized way to record that information needs to exist.

So just looking at some of the proposed work items then under the Broadband Content Delivery Forum, obviously the reference architecture is one of the items on the agenda. The chief benefit of that is to keep away from proprietary mechanisms. Proprietary mechanisms work out well for one or two companies but they slow down the overall development of the industry.

We talking about standardizing network logins to allow identification of subscribers in a secure manner and in a way that gets that information to all the potential content deliverers. We talked about an advertisement protocol so the network can tell a subscriber what services are available to that subscriber in a way that's tailored to them and their particular interests and needs.

We talked about tunnelling protocols to allow access to any network; quality of service in the last mile, so that customers can get a guaranteed service level agreement. This is probably more important today in the business environment than residential but in the long term potentially important in the residential world as well as we get into true video on demand on that side. And of course payment mechanisms - who does the billing, who gets what, how are things settled?

So the Broadband Content Delivery Forum is looking to deliver this open architecture. It allows alliances and partnerships to develop for broadband content broadband applications and broadband services. Everyone is invited to join. The BCDF is not an exclusive club. You'll see here I've given the URL for the forum. The first global meeting was held on May 11th and essentially what was achieved at that meeting was to elect a board of directors for the forum and to begin to define things that we were going to be worked on, as we discussed today.

The next meeting is in about three weeks time in Boston in the US, July 9th to 11th, and I think it's clear for this to succeed as we wanted to and the other members of the forum wanted to, it really needs to have participation from all areas of the world, from all parts of the industry in a way that we set things up in a way that things can work smoothly and easily. And that's it, thank you very much.

STEPHEN LAU: Thank you, Mr McCready. Now the floor is open for questions and if you have any questions please state your name and organization and follow with the question. The floor is open.

Participant: Charles, I deeply resent your attitude to economists. I can assure you economists always hold enough views that one of them is correct.

Just a couple of comments, I'm particularly interested, as you know in the issues that you've been raising because some of the even more recent work which I think you know about, although you haven't gone into it here because it's a bit obscure, econometric, but does superficially at least throw considerable question marks over the received wisdom of the ITU during the last 20 or so years, about the relationship between telecommunications, investment and economic growth and development, although as you say it's extremely difficult to be conclusive about anything. But it does call into question perhaps some of the perceived wisdom.

I'm just thinking of obvious examples, approaching it from the bottom up rather than from the top down, of communities such - and I'm thinking of Indonesia where, to a large extent, probably having a telephone in a rural area may be useful for disaster purposes but in terms of economic - the role of the telephone network for many of the peasant farmers, actually it would have very, very slender benefits at all. I give that example because it was an example I used some years ago where you could clearly identify the industries which were highly dependant on telecommunications. For example, the tourism industry in Indonesia, that clearly did require good communications. But there was serious doubt over how much economic return, let alone commercial return, there would be on a telecom's investment.

Now, I don't want to be seen to be arguing against investment in telecommunications but it does seem to me that we need to start this century with far more realistic views about what works and what doesn't work and how it could be made to work. It's a big subject

that I do think that a good splash of cold water on some of the thinking of the last 25 years would be required.

I also noticed you almost talk yourself out of a job and I wasn't quite sure how the conclusion arrived. I was aware some years ago that The World Bank side was concerned that with all the privatisation taking place the IFC would get a shoe in but the World Bank would have difficulty in actually investing so there was a self interest in having some state ownership so that you could invest through the state in the telecommunications network.

And just one final comment which, it seems to me, is intriguing about the productivity figures. Recently I think Bob Gordon has come out with a strong argument that, sure, there was a lot of productivity but it all disappeared into the profits of the software manufacturers and actually that's where it disappeared. It didn't actually flow into the wider economy. And that raises very interesting questions, I think, that maybe spill over into some of the points that John was raising or implying at the end there about the need to move to open systems which more rapidly defused the benefits of developments. And that of course is something which has strong social benefits, economic benefits, but may cut across some of the self interests of some of the big content providers.

CHARLES KENNY: Just on the World Bank being worried that it would be out of a job in telecommunications, bureaucrats always find a way to find something to do, we've re-invented ourselves as being - I think there's still a long way to go in the basic reform agenda. But after we've finished with that rest assured there'll be other things for us to do - one of which is the universal access agenda. As I was mentioning in the presentation I really don't think yet the technology is there that means that if there is a competitive private sector, even in the presence of a competitive private sector, you're going to see access being rolled out in the poorest countries to rural areas - in some cases, yes, in a lot of cases, no. There's still a role for governments in supporting that, using private sector mechanisms but supporting that rollout.

Now, this links back to your earlier question of why - I think you were referring to a study that showed the strong threshold effects with telecommunications rollout. This study suggested that yes, there was a link between telecommunications rollout and economic growth, but it only actually kicked in when you already had quite a lot of telephones out there. It was basically in effect limited to richer countries in the OECD. I found that study very unconvincing partially because I find all econometric analyses somewhat unconvincing when I haven't done it.

But perhaps more to the point we do know there's a huge economic impact from micro studies of telephone rollout in poorer countries and it's interesting that you mentioned the case of farmers. That's where we've seen some of the most dramatic returns and here's why: farmers that don't have access to the telephone can't get real-time information on crop prices so when a middle man walks into their village and says, 'The price of rice in

the city is 2 cents a bushel so I can only give you a cent a bushel', the farmer has no way of knowing whether that is true or not and has to accept the price offered.

If the farmer has access to the telephone, or in Chile now they're doing this over the internet, they can find out what the price is in the city. It puts them in a far stronger position vis-à-vis the middleman, the salesman. And when we look at countries where there are areas where there is telephone access in rural communities, and areas where there isn't access, we see huge differences in the percentage of the final value of the crop that goes to the farmer.

In communities where there isn't telephone access, farmers get about 40 to 50 per cent of the value of a crop that's sold in the city. Where there is telephone access they're getting 80 to 90 per cent of the final price of the crop. That's a huge difference in incomes for the poorest people in the world. We've seen many examples of that world wide. We've also seen examples of the impact of rural telephony on non-farm income. Where there is a rural phone you see many more entrepreneurial activities in non-farm areas.

So micro studies suggest that getting the first phone into a village has a huge impact, a huge economic impact. And that's the real reason that I don't believe the ^Roller and ^Waverman study you're referring to. And that's the real reason why I think universal access is very important.

But it does even go beyond that, which is that if you look at the usage of rural phones, they are actually used more for business than the average phone. The average phone, at least in Botswana and Zimbabwe where I've seen these studies, the average phone is used about 30 per cent of the time for business, 70 per cent of the time for personal. If you look at a rural phone it's used about 50/50.

But that other 50 per cent, the social uses of a telephone, is very important especially in Africa and in poorer parts of Asia. There are a large number of migrant workers who get back home maybe once a year. Now, giving those migrant workers the ability to phone their family may not have a dramatic impact on the economy, but it has a real impact on the quality of people's lives. I think we really can't forget that when we think about universal access.

Participant: I have a comment and a question on the billing issues that John raised, payment for premium service, for example. I was interested to hear you mention the infrastructure for the voice services. My company (E-Charge), my company, is developing payment mechanisms that take advantage of existing infrastructure such as the infrastructure that the Telcos have in place. So my question for John and perhaps for any other representatives of telecommunications companies in the room is to what extent do you see that as a way to move forward, to develop the kind of billing and payment infrastructure that's required for the internet and what other kinds of partnerships with financial institutions, for example, will be necessary to support that?

JOHN McCREADY: Okay. A couple of comments. There's no question that the amount that existing Telcos have invested in just being able to bill is a significant sum and that when you look at what it takes to get a new - like an alternative operator or a ^, or whatever term you prefer, up and running, a billing system, a mechanism of billing ends up being a substantial part of the investment as well. So it would make sense from that point of view that leveraging that investment would be obviously attractive and advantageous.

However, just a personal comment, I've never yet met an operator who was happy with their billing system. It's particularly true in the mobile business. You talk to anybody who is involved in selling mobile services, they'll invest 20 or 30 million dollars on their billing system and three months later they can't do what they want. So I think it's an area that probably hasn't been solved yet.

The focus of what's been put before the BCDF is to define how information will be passed in the network so that everybody knows what happened and the information exists to settle between parties. So that's more the focus than actually cutting a bill for the end user but obviously that's still important.

You made a comment just at the end here and it's disappeared from my mind. There was something else.

Participant: Partnerships with financial institutions.

JOHN McCREADY: Yes. So I think, again from my own perspective, one of the most important things that financial institutions can provide to the internet is ready credit. The comment of the farmer in the village, not only can he find out the price of rice and not be taken, he can find out the price of a tool and not be taken when he's making buying transactions. And you can already see examples in South Asia where just small community owned almost credit unions have provided capital to a lot of development. I think that from a social perspective I think financial institutions can certainly provide a lot of value add to the internet by figuring out how to get credit services.

STEPHEN LAU: Thank you, one last question, Mr ^Nealy.

Participant: Robert Nealy, Commerce Net, a couple of comments leading to a question. The Broadband Content Delivery Forum seems to me to have set itself some daunting challenges and I wish you well. It reminded me of 15 years ago, the European Computer Manufacturers Association tried to define functional standards or profiles which would run all the way from the top of OSI right down to the bottom picking options that suited some particular aspect which could have been broadband content delivery. The sheer political problems of discussing with everybody who was involved from top content to bottom ATM, led to the demise of the initiative, I think we'll say.

A model that we looked at in Commerce Net three years ago was to take the requirement and the money from interested parties, we needed to rationalize 60 different micro payment schemes and then we handed the technical evaluation to the World Wide Web Consortium. But even that ended up with nothing because of the politics involved.

So the question is how do you hope to fight your way through the network externalities of far too many consortia but all necessary at different parts?

JOHN McCREADY: Okay, an excellent question and one that obviously doesn't have an easy answer. I mean, the only way this can work is if all the parties realise that it is in their own interests to make the thing function at the end of the day. A parallel that I would say has been successful would be the evolution of 3-G standards in the wireless side where - I mean, admittedly it was bogged down for more than 2 or 3 years, but at the end of the day the parties, really forced by the operators, came to the table and sorted out what was a lot of people believed really a conflict between just two companies at the core - Ericsson and Qualcomm and the intellectual property they held.

But what I think drove that is everybody realized we have to make this happen. Our industry doesn't work or can only be one tenth as successful as it could otherwise be if we don't make this work. So certainly, I mean, from our perspective as a founding member the development of the broadband internet has a huge selfish interest for Nortel Networks and without these standards coming into place that development is going to be many years delayed and potentially end up driving value for just a few individual companies or concerns, etc.

Your question is totally valid and there's no easy answer. The only way is if the parties truly work together.

STEPHEN LAU: Thank you. In view of time let me conclude by asking you to thank our two distinguished speakers in the usual way. And once again I remind all participants you're all invited to lunch. Thank you.