SYMPOSIUM ON THE INFORMATION INFRASTRUCTURE

Building the Foundation for the 21st Century

held at Vancouver, Canada
20–21 February 1995

Symposium organized by
Asia Pacific Economic Cooperation (APEC)
Organization for Economic Cooperation and Development (OECD)
Pacific Economic Cooperation Council (PECC)

Symposium hosted by
The Asia Pacific Foundation of Canada

Asia Pacific Foundation of Canada
Fondation Asie Pacifique du Canada

Proceedings made possible by
Industry Canada

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Proceedings edited by
Amy Mahan & Catherine Murray
Centre for Policy Research on Science and Technology
Simon Fraser University
at Harbour Centre

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Table of Contents

Preface

Keith Chang

Director, International Business Development Spectrum, Information Technologies and Telecommunications Sector Department of Industry, Ottawa, Canada

The APEC-OECD-PECC Symposium on the Information Infrastructure, Building the Foundation for the 21st Century, originated as a part of the Asia Pacific Economic Cooperation Forum (APEC) Telecommunications Working Group Project on Telecommunications and Information Infrastructure. The project aimed to ensure that the APEC member economies were fully prepared to contribute to and benefit from the rapid development of the world's information highway. In early 1994, as Project Leader, I met with Mr. Richard Beaird, Shepherd of the Working Group, to discuss the plans and activities of the Project, which include the organization of a seminar. Mr. Beaird, who is also Chair of the Committee on Information, Computers and Communications Policy (ICCP) of the Organization for Economic Cooperation and Development (OECD), noted that the OECD had also in its plans to have such a seminar and suggested that it might be useful for the two organizations to collaborate to address the issues and approaches to be used to encourage the development of information infrastructure around the world.

That conversation was really the birth of the Symposium which eventually took place in Vancouver, Canada, in February 1995, whose proceedings you now have before you. In the months following, our discussions with others in the two organizations revealed a strong interest and support for such a meeting internationally. Soon, the Pacific Economic Co-operation Council (PECC) was invited to join the group of organizers, to inject the strong private-sector presence of its members, and to ensure that the meeting would not simply be an occasion for governments to talk among themselves. The collaboration of an enthusiastic and influential group of members of APEC, the OECD and PECC brought the event to life, and ensure that all the key players were present.

The aim of the Symposium was to provide an opportunity for policymakers and players from a diverse range of economies around the world to meet and exchange information on their existing and planned projects, examine the conclusions or recommendations which are taking shape in their regions, and to perhaps define the basic requirements which must be in place to allow the interconnection of networks into a truly global information highway system. Now, with the distance of a few months from the event, we feel that it was a success. In many ways, it surpassed our expectations. Indeed, the Symposium revealed a number of common concerns, and showed that participants shared a number of visions and objectives for the future of the world's information infrastructure. I am certain that APEC, the OECD and PECC will continue to work together to promote dialogue in the future, having recognized their joint role in promoting consensus and international policy development.

In the year between that early meeting and the Symposium, there was much work to be done, and this preface offers an opportunity to acknowledge those who contributed many, many hours of their (and their organizations') time to see it succeed.

At the organizational level, an ad hoc steering committee met almost weekly by teleconference to shape the program, discuss speakers, and oversee the arrangements for the Symposium. I would like to thank here the other members for their outstanding dedication and contributions to making the event a success. They were:

- John Dryden, Head of Information, Computer & Communications Policy, of the Directorate for Science, Technology and Industry, OECD, Paris;

- Bill Graham, Manager, Trade Strategy, International Business Development Division, Information Technologies and Telecommunications, Industry Canada, Ottawa;
- Janet Pearce, Deputy Director US National Committee for Pacific Economic Cooperation, and Acting Coordinator PECC Telecommunications Task Force, Washington, DC.

I would also like to thank Michael Tiger, Senior Policy Advisor, Telecommunications Policy, Industry Canada, who also participated in several of the steering committee meetings, and made a substantial contribution to the shape of the event.

When APEC accepted Canada's proposal to hold the Symposium in Vancouver, the Asia Pacific Foundation of Canada agreed to act as the official host, to manage the very complicated logistics involved in organizing an invitation- only event with representatives of 44 economies, and to be addressed by more than 50 speakers. By far the greatest part of the work was borne by the Foundation and by Industry Canada, which also acted on behalf of APEC. At the Asia Pacific Foundation of Canada, Dr. Karen Minden, Vice President, Paul Irwin (who is also Executive Officer of the Canadian National Committee for Pacific Economic Cooperation), and Anita Lum worked long and hard to bring our attention to the multitude of details needing attention to make the Symposium a success.

Also in Canada, the Asia and Pacific Regional Coordination Division of the Department of Foreign Affairs and International Trade contributed heavily to the organizational aspects of the symposium. Director Ken Lewis and his colleague Paul Sadler must be singled out for mention here.

Merry Wickes, at the APEC Secretariat in Singapore, also offered timely advice and support which was much appreciated.

From my staff in Industry Canada, Dan Byron and Margaret Whatley under the supervision of Bill Graham filled out the team in Vancouver that was able to look after the multitude of small crises and details in a way that earned the many favourable comments I received from participants and speakers.

I want also to recognize the excellent work done by Dr. Catherine Murray and Amy Mahan of the Centre for Policy Research on Science and Technology at Simon Fraser University in the preparation of this volume of proceedings, and also the World Wide Web site which presents this information and more in electronic format.

Each Symposium session was attended by a volunteer rapporteur who contributed notes on the speakers' remarks, and on the questions and comments in the discussion sessions which followed. Their reports have formed a basis for the preparation of the record of the event, and I want to acknowledge their expert contributions:

- Kenneth Hepburn, Principal, Bashuk, Hepburn and Associates, Canada;
- Catherine Murray, Director, Centre for Policy Research on Science and Technology, Simon Fraser University, Canada;
- Jane N. Hurd, President, Severance International Inc., and Vice-President for Conference Activities, Pacific Telecommunications Council, USA;
- Jerry Hanley, Centre for Telecommunications Management, University of Southern California, USA;
- Walda Roseman, President, CompassRose International, USA Mark Saunders, Marketing Manager, Hewlett-Packard, USA;
- Beverly Andrews, Director, Regulatory and Trade, COMSAT Corporation, USA;
- Heather Hudson, Director, Telecommunications Program, University of San Francisco, USA;
- Alan Horsley, Managing Director, Vistel Ltd., Australia; and
- John Gilbert, Principal, John A. Gilbert & Associates, Canada.

Finally, I want to mention the generous support of the following corporations. Without their contributions, the Symposium could not have taken place:

- AT&T;
- Bell Canada International;
- China America Telecommunications Company;
- Hewlett-Packard;
- IBM;
- Motorola;
- Nokia Group;
- Port of Seattle;
- Stentor; and
- Teleglobe Canada Inc.

In addition to those mentioned specifically above, there were a number of other individuals and organizations who contributed to the success of the symposium who I have neglected to mention above. I apologize to them for the omission, and I hope that having had the opportunity to participate in the first event of this kind has proved to be reward enough. I know I found it a rewarding opportunity to be able to participate, and contribute to this event.

Symposium Programme

MONDAY, 20 FEBRUARY 1995

WELCOME AND OPENING

Dr. William Saywell, Host Committee Chair President and CEO, Asia Pacific Foundation of Canada Chair, Canadian National Committee for PECC

Richard Beaird, Symposium Chair, Deputy US Coordinator, Bureau of International Communications and Information Policy, United States Department of State APEC Telecommunications Working Group Shepherd Chair, Committee for Computer, Information and Communications Policy (ICCP), OECD

Pierre Vinde, Deputy Secretary-General, OECD

KEYNOTE ADDRESS:
BUILDING THE FOUNDATION FOR THE 21ST CENTURY

Chair: Richard Beaird, Symposium Chair

Dr. David L. Johnston, Chair, Information Highway Advisory Council, Canada

PLENARY SESSION I:
INFORMATION INFRASTRUCTURE: THE ECONOMIC IMPACT

There is no doubt that information infrastructures will have an immense impact on the world's economies. What level of investment will be required, and by whom? What will these flows of investment mean elsewhere in the economy? Who will supply the technology, the know-how and the content? Information infrastructures are enabling technologies that will change the way we live, work and play. What will the impact be on employment? How will developed and developing economies be affected? Will information infrastructures bring greater opportunity for all economies or widen disparities?

Chair: Richard Beaird, Symposium Chair

Thomas J. Sugrue, Deputy Assistant Secretary, National Telecommunications and Information Administration, U.S. Department of Commerce

Risaburou Nezu, Deputy Director-General for Trade Negotiations, International Trade Policy Bureau, Ministry of International Trade and Industry, Japan

Suryatin Setiawan, Senior General Manager, PT TELKOM Indonesia

Brian Johns, Chairman, Australian Broadcasting Authority and Broadband Services Expert Group

Dr. Yunjong Wang, Research Fellow, Korea Institute for International Economic Policy

Rapporteur: Kenneth Hepburn, Principal, Bashuk Hepburn & Associates, Canada

ADDRESS:
LINKING THE WORLD

Sponsor's Welcome: André LeBel, President and CEO, Teleglobe Canada Inc. & President and CEO, Teleglobe Inc.

Hon. John Manley, Minister of Industry, Canada

CONCURRENT SESSIONS:

C.A.1: PERSPECTIVES ON CREATING A NATIONAL INFORMATION HIGHWAY INITIATIVE

Panelists will discuss the approach being taken in their economies to accelerate and coordinate the development of advanced communications and information infrastructures.

Chair: Peter Liebel, Executive Director, Information Highway Advisory Council, Canada

Anu Lamberg, Special Adviser, Ministry of Transport and Communications, Finland

Jocelyne Coté-O'Hara, President and CEO, Stentor Telecom Policy Inc., Canada

Liu Cai, Director-General, Policy & Regulation, Ministry of Posts and Telecommunications, China

Takashi Kugai, Director for Machinery and Information Industries Policy, Ministry of International Trade and Industry, Japan

Rapporteur: Catherine Murray, Director, Centre for Policy Research on Science and Technology, Simon Fraser University

C.A.2: ACCELERATING ECONOMIC GROWTH THROUGH IT AND INFORMATION NETWORKS

Panelists will discuss the strength of the relationship between investment in IT and information networks and the generation of jobs, growth, and improvements in productivity, drawing upon their experience in a number of settings.

Chair: Dr. Leonard Waverman, Director, Centre for International Studies,

University of Toronto, Canada

Chi-Shen Tsen, Managing Director, Data Communications Institute, Chinese Taipei

Cecil Patterson, Director, Information Systems, Port of Seattle, USA

Giuseppe Dell'Osso, Principal Administrator, European Commission

Dr. Sam-Young Suh, Vice President, National Computerization Agency, Korea

Rapporteur: Jane N. Hurd, President, Severance International, Inc. & Vice President for Conference Activities, Pacific Telecommunications Council

C.A.3: BUMPS IN THE HIGHWAY: HOW SMOOTH CAN THE GLOBAL NETWORK REALLY BE?

Views on the major challenges that will be encountered in the drive to interconnect networks and information technologies and offer services on a global scale, and how these might be addressed.

Chair: Meriel V. M. Bradford, Associate Vice President, Corporate Affairs, Teleglobe Canada Inc.

Alain Servantie, Head of Unit, International Aspects of Telecommunications and Posts, European Commission

Mr. Kaj G. Lindén, Senior Vice President, Technology, Nokia Group, Finland

Ellwood Kerkeslager, Vice President, Infrastructure and Technology, AT&T Corp.

Rapporteur: Jerry Hanley, Visiting Research Professor, Center for Telecommunications Management, University of Southern California

PLENARY SESSION II:

RESPONDING TO THE DEMANDS OF THE INFORMATION SOCIETY: REGULATORY TRENDS AND POTENTIAL SOLUTIONS

Public and private sector views on the appropriate balance between competition and regulation, and the evolving role of regulation in an increasingly competitive marketplace. Are there alternative approaches to regulation that can achieve the same goals? Will some minimum set of regulations be essential to protect the public interest? Is there a need to coordinate these internationally?

Chair: Jorge Rosenblut, Undersecretary of Telecommunications, Ministry of Transportations and Telecommunications, Chile

André LeBel, President and CEO, Teleglobe Canada Inc., and President and CEO, Teleglobe Inc.

Lars A. Stålberg, Vice President, Corporate Markets, Ericsson, Sweden

Rachelle Chong, Commissioner, Federal Communications Commission, USA

Yusai Okuyama, President, DDI Corporation, Japan

Dr. Henry Ergas, Adviser, Trade Practices Commission, Australia, & Visiting Professor, Kennedy School of Government, Harvard University

Rapporteur: Walda Roseman, President, CompassRose International, USA

TUESDAY, 21 FEBRUARY 1995

KEYNOTE ADDRESS:
TOWARD THE INFORMATION NETWORK OF THE 21ST CENTURY

Chair: Dr. Keith Chang, Director, International Business Development

Division, Telecommunications and Information Technology Sector, Industry Canada

Yoshio Utsumi, Director-General, Ministry of Posts and Telecommunications, Japan, & Chair, ITU Plenipotentiary Conference, Kyoto, 1994

CONCURRENT SESSIONS:
C.B.1: ASSESSING REGULATIONS AND GLOBAL STANDARDS ISSUES

An exchange of views on how workable standards should be set for global infrastructures. What role will open standards play? Are current standards setting processes adequate to the challenge? What is wrong with relying on the alternatives (e.g., proprietary, non-compliant or de facto solutions)?

Chair: Parke Davis, Director General, Information Highway

Advisory Council Secretariat, Canada

Lee G. Lam, Vice President, & Director, Asia Telecommunications and Media Practice, A.T. Kearny, Inc., Hong Kong

Johan Martin-Löf, Director, International Affairs, Telia AB, Sweden

Roy Mills, Director, Standards, Northern Telecom, Canada

Bill Murrey, Senior Vice President, International Television & Video Affairs, Motion Picture Association of America

Rapporteur: Marc Saunders, Marketing Manager, Microwave & Communications Group, Hewlett-Packard

C.B.2: COMMUNICATIONS CONTENT, SECURITY, PRIVACY AND OTHER LEGAL ISSUES

Views on whether there should be any controls on what information is available over networks. Are special efforts required to protect the privacy of personal information or transactional data in a digital world? How best to ensure the security and integrity of communications? How much regional diversity can be accommodated in a globally networked world?

Chair: John Dryden, Head of Science, Technology & Communications Policy Division, OECD

Dr. Gregory Tucker, Consultant, OECD, & Professor, Monash University, Australia

Stephanie Perrin, Special Policy Adviser, Industry Canada

Kevin O'Connor, Privacy Commissioner, Human Rights and Equal Opportunities Commission Australia

Dr. Kazunori Ishiguro, Professor of Law, University of Tokyo, Japan

Rapporteur: Beverly Andrews, Director, Regulatory and Trade, COMSAT Corporation, USA

C.B.3: ASSESSING TECHNICAL, FINANCIAL AND HUMAN RESOURCE CONSTRAINTS

Views from a range of economies on the technical, financial and management challenges they face in expanding their information infrastructures, and the societal implications they anticipate as a result.

Chair: Gregg Daffner, Vice President, Market Development and Regulatory Affairs, PanAmSat, USA

Somkuan Bruminhent, Assistant Vice President, Department of Human Resources, Telephone Organization of Thailand

Ian Dowdeswell, Vice President, Marketing, MPR Teltech, Canada

Pelagio Battung, Jr., Under-Secretary for Communications, Philippines Department of Transportation and Communications, Philippines

Rapporteur: Heather Hudson, Director, Telecommunications Program, University of San Francisco

PLENARY SESSION III:

MAKING A REALITY OF THE INFORMATION AGE: PILOT PROJECTS, TESTBED PROGRAMS AND INTERNATIONAL JOINT VENTURE TRIALS

Views from both suppliers and users as to the best ways of promoting demand for, and technological innovation in information infrastructure technologies, at an international, national or local level.

Chair: Janet Pearce, Deputy-Director, U.S. National Committee for Pacific Economic Cooperation

Bill Murphy, Director of Global Accounts, Hewlett-Packard, and Chairman, NIIT, USA

Yoshihiro Chiba, Director, Advanced Network Office, Ministry of Posts and Telecommunications, Japan

Brian Campbell, President, Vancouver Regional FreeNet Association, & Director, Systems and Planning, Vancouver Public Library

Robert Easson, Manager, Strategic Development, Telstra Multimedia, Telstra Australia

Rapporteur: Allan Horsley, Managing Director, Vistel Ltd., & Board Member, Australian Telecommunications Users Group

ADDRESS:

DESIGNING THE FOUNDATIONS: A PERSPECTIVE

Sponsor & presenter: William Etherington, Chair, IBM Canada Ltd. and General Manager, Industry Solutions, IBM North America

PLENARY SESSION IV:

FUTURE VISION

How will the vision of a world-wide information society, underpinned by global networks unfold? What should be the role of international bodies that group business and governments, in accelerating its realization? How can we avoid unintended negative consequences – the information highway equivalent of traffic jams, pollution, and road accidents? What should the priorities for international action be over the medium term? How should these challenges be pursued?

Chair: Nobuo Tanaka, Director for Science, Technology and Industry, OECD

Dr. Shoichiro Asano, Professor, National Centre for Science Information Systems, Japan, and Vice-Chairman, ICCP, OECD

Ambassador Vonya McCann, US Coordinator, International Communications and Information Policy, US Department of State

Dr. Pekka Tarjanne, Secretary-General, International Telecommunication Union Ambassador Pasi Rutanen, Permanent Representative of Finland to the OECD

Byung-il Choi, Team Director, International Telecommunications Policy, Korea Information Society Development Institute

Rapporteur: John Gilbert, Principal, John A. Gilbert and Associates, Canada

SUMMARY SESSION

Richard Beaird, Symposium Chair Keith Chang, Director, International Business Development Division, Industry Canada

Rapporteur: Bill Graham, Manager, Trade Strategy and Market Access, International Business Development Division, Industry Canada

Symposium Overview

Catherine Murray*

Director, Centre for Policy Research on Science and Technology, Simon Fraser University

Amy Mahan*

Research Associate, Centre for Policy Research on Science and Technology, Simon Fraser University

This Symposium marks the first time APEC, OECD, and PECC have joined forces to address the issues facing nations and regional associations in planning for the global information infrastructure (GII) – just one year after US Vice-President Al Gore proposed it at the ITU World Conference in Buenos Aires, and one week before the G-7 Ministerial Conference on the Information Society in Brussels. This Symposium brought together decision-makers from government, industry and the research community, from 28 member economies of APEC, OECD and PECC, to begin to establish clear goals and develop a common vision regarding how the GII will be developed, introduced and built so that all nations have the opportunity to realize its benefits.

As M. Pierre Vinde, Deputy Secretary General of the OECD stated, "the vision of a knowledge-based economy where integrated communication infrastructures and services would provide new opportunities to economies and society has only just begun to be generally grasped by key policymakers." The objective for this Symposium was to exchange experience at both national and regional levels: "changes in the last five years have required that international organizations (increasingly) communicate, exchange information, and cooperate horizontally across regional boundaries" (Richard Beaird).

In many respects, the Symposium surpassed the objectives of its organizers. The pages which follow chronicle a rich array of distinctively different national approaches to designing policy for the GII. There was a high degree of consensus over the basic goals of such a GII, and these broad goals or "common principles" have been embedded, with little variation, in NII statements or have found their way to the statement of the subsequent G-7 Ministerial Conference in late February 1995. As a forum for knowledge transfer, the Symposium was successful in preparing the ground for the next step – the development of detailed knowledge about how to design and implement policies for the information highway in future information societies.

The Symposium presentations and discussions demonstrated that many of the underlying assumptions about the economic social basis of the demand for new services were not yet well-tested or understood. Symposium discussions documented the absence of social evaluations of the new technologies, and of adequate empirical analysis for a social policy view of the future scope of the "information society" concept – as a counter-point to the more market-oriented conception of the "highway." Some regions, such as Europe, are committed to a moderate and incremental approach to investment in broadband fibre. In the US and Canada, partnerships are being formed with the private sector to develop and fund new high speed digital broadband infrastructure projects. Delegates acknowledged the huge investments required, and the high degree of risk in assessing end-user preferences. Many expressed uncertainty about what consumers and citizens might "really want." Also acknowledged as problematic was the tendency of early GII debates to involve new private sector players, who understandably enough pursue specific corporate objectives to launch new

* The views expressed in the Symposium Overview are those of the authors.

technologies and services. In the end, the importance of "demand" for future development was raised, as was an absence of evidence for indentifying it.

Various strategies were proposed to ameliorate the financial risk. Most proposed that the state stabilize the investment climate by setting the rules of the game, changing regulatory frameworks, and acting as "catalyst" in stimulating research and development for new applications, or guaranteeing revenue flow in the early years by developing "lead user" applications in education, health, disaster management or other public sector areas.

A second area of information need identified during the Symposium was about the growing gap in telecommunication and information infrastructure, between the industrialized countries and the developing world. While the 1994 World Telecommunication Development Report of the ITU suggests the gap is narrowing in basic telecommunications or "plain old telephone density" since the Maitland Report of 1984, progress has been slower than expected.

Dr. Pekka Tarjanne (Secretary General of the ITU), was perhaps the most forthright in expressing concern that "The GII will never be global, and it will never be a real GII unless it is really global." Tarjanne also argued that it has become fashionable in western rhetoric to favour deregulation, market liberalization and regulatory harmonization while abandoning any concept of the role of government in NII or GII development:

> [I]t is true that on a national level there is often too much old-fashioned protectionist standardization and regulation. That is a problem. ... But governments and intergovernmental organizations still have a useful role, an important role, a role that should not be forgotten, nor neglected. As a matter of fact, international organizations have new roles and without tackling these new roles the global information infrastructure will never be built.

No other issue engages international organizations as much as the need to assist developing countries in gaining access to the GII. When it came to questions of international financial and technical assistance, discussion was relatively vague. An exception was Japan's interest in extending financial assistance throughout the Asia Pacific, while acknowledging the crisis of raising enough money for the next stage of infrastructural investment at home.

Even if not fully addressed, the challenge was raised and identified as a priority. The subsequent G-7 statement of the Ministers' meeting in Brussels espoused a vision of human enrichment, favouring universal access, but ending with a call for "industrialized countries to work towards the participation of developing countries in the Global Information Society" which acknowledges few of the problems of information asymmetry between nations.

While a great deal of hope may lie with investigations underway at agencies such as the OECD which has been charged to look at the relationship between information technology, productivity and job creation in regional deployment, it is clear that economic theory and practice in policy evaluation still have a long way to go. Conceptually, the Symposium's design tried to identify specific aspects of the GII (economic impacts, resource constraints, international trials) important to the policy value chain, but the discussion tended to be more organic, convergent and unruly, as befits a first-time forum of this kind.

As Mr. Wang from Korea states below, "causality from the information infrastructure to economic development has been relatively ignored by economists and policymakers." At the macro level, there is beginning to be evidence that market integration is promoted by swift exchange of information. But work on the role of information technologies in stimulating consumption, or in better matching production to consumption is still required in order to provide a better tool to policymakers and system developers.

At the micro-economic level, there is still a lack of understanding as to where and when – much less why – information technologies can be applied by small to medium size enterprises to successfully fuel job growth and trade, and build clusters of innovation which may now be cyberspatially based.

Defining the Information Infrastructure

Information infrastructures for the 21st century have caught the imaginations of policymakers and network developers. This is borne out by the proliferation of Information Infrastructure policy statements – from the US' *The National Information Infrastructure: Agenda for Action*; Singapore's *IT 2000 – Vision of an Intelligent Island*; Canada's *The Canadian Information Highway*; Denmark's *Information Society 2000*; Korea's *The Direction of Korean Telecommunications Policy*, among others. To quote David Johnston, Chair of Canada's Information Advisory Council, "we are all immigrants of the information era ... and unless each nation sets goals for itself, others will define and shape the information highway." Mr. Johnston's message has been received, if this Symposium bears any testament. All of these statements entail a vision of how NIIs can be built and outline key areas requiring consolidation. Some of these statements are strategically oriented and detail targeted sectors and plans, and may be defined as applied, or micromanagement in focus. Others point to general areas – value statements at a more philosophical level – and leave much latitude for interpretation in application. What they share in common are convictions about economic and quality of life benefits and opportunities to be reaped from the emerging information infrastructure.

Europe's concept of the information society is broad, organic and incremental in its design for a regional information infrastructure (RII), Japan talks of an "innovation" oriented infrastructure, close to the Australian emphasis on "creative" infrastructure, although more informed by science and technology than perhaps the fusion of content and carriage concerns in the latter case. Singapore's concept of the "intelligent island" drawn from computer industrial strategies provides quite a contrast to those areas, such as the United States or Canada where the telecommunications platform is being adjusted for takeoff of the information highway.

A regional information infrastructure for the Asia-Pacific region was also discussed. Yunjong Wang (Korea Institute for International Economic Policy) noted that "the first step to take in Asia Pacific Economic Cooperation is the creation of a stable and adequate information network through close coordination among concerned nations in the region." The APII initiative is outlined by Byung-il Choi, from the Korean Information Society Development Institute. Such focus on incremental regional models serving as stepping stones to the GII cannot fail to worry some proponents in the lead up to the WTO negotiations on basic telecommunications. If some of the concerns raised are not more seriously addressed – the gap in development, the tools needed to close that gap, and theoretical work on the efficacy of the tools themselves – the views of the GII expressed here may talk past each other.

In spite of many common objectives, the juxtaposition of different National Information Infrastructure policy statements reveals the impossibility (and undesirability) of any single unified model for a global information infrastructure unless it is flexible, heterogeneous, and complex. Such an observation reinforces the need for this and further symposia, to discuss the issues and avenues for resolution of different agendas and sites of friction; and most critically, to begin to negotiate consensus on the fundamental issue of defining a vision for the GII.

Will it be Global?

There are two divergent approaches about how to ensure global reach of the GII. The first stresses the need for open, liberalized markets to harness demand and to achieve provision of a range of services at competitive prices. This view was primarily put forth by delegates from developed economies which had already successfully liberalized their telecommunications markets (such as Finland, Sweden, Canada, US or Australia) or economies which were on the verge of so doing.

Indeed, even the newly industrializing countries acknowledged the dominant view that the liberalization, and interoperability of networks was indeed a high priority in working towards the GII. These countries are faced with modernizing aging plant and equipment, and are dealing with the huge capital demands by increased involvement of the private sector in the development of standards, articulation of policy vision, and as major partners in investment.

A second perspective recognized that economies struggling to achieve such basics as reasonable levels of telcom penetration, could not realistically place the burden of building a telecommunications infrastructure on the private sector within their nations. Many countries would continue to need public investment in huge sums, would need to call upon sources like the World Bank, and were cautious to reassess policy with respect to foreign investment (e.g. China). Although some pilot joint ventures are detailed below, the jury is still out on the effectiveness of such forms of development ventures. Mr. Setiawan's views from Indonesia are representative: development of information infrastructure in his country cannot wait for the superhighway.

The theme of opportunities for training and knowledge transfer as a means of ameliorating information inequalities, especially in terms of subnational development, threaded across a number of sessions. For example, one is struck by the number of countries which have initiated trials linking schools or other community centres together with some sort of access to the Internet, which is seen by many as a first generation of the GII. Developing countries have a range of social, cultural, political and economic information. The design challenge is to manage it, evaluate its quality and develop intelligent navigators to determine if they have the 'right' kind of information. Developed nations have the luxury of being able to access a range information about developing countries – from Landsat imaging, to MNEs who control access to CIT resources. These could prove invaluable to the country of origin. Participating in the GII, in addition to facilitating access to information, also needs to involve reassessment of the need for autonomy and control over access to a country's information.

There was also significant acknowledgment that different circumstances will require solutions specific to each country. In addition to noting Japan's responsibility as an advanced economy to support developing countries, Risabrou Nezu (Ministry of International Trade and Industry) stated: "We should be careful that in giving support, that we not try to apply the logic of advanced countries, but rather consider the individual needs of each country in the promotion of information." Finding local champions as partners in foreign direct investment was discussed briefly in a number of sessions.

Nezu was not alone in stressing the need to connect developing countries to networks in developed nations. Many delegates voiced support for commitments to provide technology transfer, expertise and financial assistance. However, to a large extent, the question of how to include developing nations in the GII was subsumed under the rubric of interoperability, and ensuring access standards. There is still little evidence of the promised "leap-frogging" of technology and telecommunication infrastructure that developing nations have been encouraged to believe they will enjoy. And suggestions and strategies for this, as well as for alternative approaches to information infrastructures were vague or unaddressed, as they also were in the subsequent statement from the G-7 Conference on the Information Society.

Connecting the world through a network of networks is to a large extent accelerating on an ad hoc, uncoordinated basis. The Symposium participants herein acknowledge that is happening and want to undertake steps toward organization. But they also acknowledge that it is too early to fully plan this. Instead, what may be required is a new flexible, decentralized form of control. Pasi Rutanen put the complexity and the uncertainty of the challenge well:

> There is a Jurassic Park syndrome: something is out there, something is loose – something unknown... And something should be done – something to recreate the balance.

Several of the Symposium sessions that follow contain useful formative information on different models of management of government innovation.

Content Issues

One area of "balance" to be tabled was the balance between the medium and the message or, to put it differently, between questions of distribution and hardware, or questions of content and software. Content and cultural differences

were raised as central, not ancillary, to any discussion of the GII. Brian Johns, from the Australian Broadband Services Expert Group summarized a report from his organization which called for an 'evolutionary,' demand-driven approach to NII development. The primary rationale for this stems from, first, the high cost of providing wide access to broadband – given that it is not yet clear which new services will be in demand – when many of these new services can already be provided over narrowband, or through access points in the community such as libraries and schools. Secondly, the desire to use broadband to reinforce cultural identity, means that content, rather than technology must be the driving force for development.

Such a perspective finds sympathetic hearing among Canadian and European policymakers. Inasmuch as it also enjoins "software" innovation issues, such a view is also similar to Japan's focus on innovation infrastructure in the economy.

It is interesting that this content issue made it through to the statement of the G-7 affirming an obligation of the GII to "serve cultural enrichment for all citizens through Diversity of Content" ... "including a strong presence for indigenous cultural products and services"; this concern was absent from earlier US statements.

As previously noted, the new content providers: cultural industries, broadcast or computer software providers; were not in evidence at this Symposium, despite the convergence of issues.

Other content issues for the GII – Security, Privacy and Intellectual Property Rights -were acknowledged in Vancouver as complicated to address and difficult to resolve. Most countries are currently grappling with the inadequacies of their own legal systems in dealing with new areas of contention and potential harm. These are intensified by an order of magnitude in the global arena. As noted by Gregory Tucker (OECD and Monash University, Australia) privacy has eluded precise definition; this also holds true for intellectual property rights as intellectual property takes on new electronic forms in intangible information contexts. Security issues abound, and it is unclear as to who is responsible for protecting the accuracy and integrity of data – although it is clear that it will, by necessity, be a collaborative effort. Tucker details proposed measures to move beyond abstracted principles to workable ones. Stephanie Perrin (Industry Canada) suggests that a productive way to consider privacy issues is in terms of the democratic ideal of individual autonomy. Industry Canada is also in the process of devising a Code of fair information practices – a standards approach to the problem of privacy legislation. Kevin O'Connor (Privacy Commissioner) believes that Australia's experience in grappling with privacy issues affirms that the principles of the OECD guidelines are still valid, but that we need to rethink how they are applied and how they are worded to capture the new technologies and their applications.

Role of Government and Regulation

Aside from Dr. Tarjanne's defense for a continuing role of government at both national and international levels in the emergence of the GII, much of the discussion contained in the sessions acknowledged only a "catalyst" role for governments of industrialized countries with an extensive telecommunications base, and pointed to the need for less protectionist dirigisme on the part of newly industrializing countries. Ellwood Kerkeslager identified ten major roles which ranged from enlightened regulator to facilitator.

The first and most important role for governments is in the development of standards for the seamless, interoperability of these networks.

The second area where governments play important roles is in the creation of the investment climate. As Ms. Rachelle Chong (FCC) outlines, a primary challenge facing the FCC is to encourage capitalization, and assure investors of a stable regulatory environment.

The third area where governments or their regulators must be involved is in the review of regulatory frameworks, in determining rules for "fair competition" from dominant carriers and new players in the GII. Regulators and competition policy experts in Canada are seriously testing this concept of "fair competition," where there is a history of less than

three years of competition in long distance telecommunications. Fair competition emerged as the first of eight core principles which should guide the development of the global information society at the subsequent G-7 meeting .

Also widely recognized was the emergence of a powerful group of users and private sector interests in the standards process who are pushing other telecoms reforms. Mr. Alain Servantie (EC) acknowledged that these global companies constituted many of the drivers behind early support for the GII initiative. However, Mr. Servantie underlined the need to find a new user group, and devote policy attention and service formulation to it:

> [G]lobal companies represent less than 20 percent of the overall value added produced within the European Union, and 17 percent of the employment. Small and medium sized enterprises, which make up 70 percent of the employment and value added are at the core of our preoccupation. With 15 Member States of the European Union, we now count 17 million SMEs. It is therefore vital to offer advanced "off the shelf" services to this important segment.

A final role for governments – as lead users or drivers of innovation in the private sector – was mentioned, although the impacts of such action on subsidies of early R&D or service formulation was not explored.

Testbeds and Early Applications

Throughout the different sessions, components of the GII were broken down for analysis into the technology infrastructure, technical expertise, applications and services, governments and regulators, and end-users. This last was under-represented at the Symposium, although it could be argued that end-users are "the market" and "the citizens" for whom governments want to increase quality of life, and thus, the entire Symposium was geared toward their interests.

The session entitled "Making a Reality of the Information Age: Pilot Projects, Testbed Programs and International Joint Venture Trials" dealt with some of the issues of bringing technology to the end-user. Bill Murphy from Hewlett-Packard spoke about the US National Information Infrastructure Testbed (NIIT), which is an industry-led consortium of organizations from academia, industry and government, convened to collaboratively deploy large scale applications – to test the systems as well as their potential markets. Yoshihiro Chiba, Ministry of Posts and Telecommunications, described a Japanese private and public sector initiative to trial communications/broadcasting convergence services and B-ISDN applications. Mme. Anu Lamberg of Finland outlined several applications of transport telematics and foreign trade delivery that proved of interest to a number of Newly Industrializing Countries.

The range of applications in service development was wide, and the R&D trials myriad. Once again, aside from a description of the trials, little information was exchanged on how the trial was selected, how it will be benchmarked, and its implications for other users.

Ambassador Pasi Rutanen remarked that, "there will be totally different and totally new interest groups which will communicate globally, will network globally. (These will become)a new type of NGO and a new breed of major players in future negotiations ... they will be a powerful factor in any international negotiations." That said, Brian Campbell (Vancouver FreeNet Association and Vancouver Public Library, Canada) was the only delegate from this kind of organization. He argued "there is something missing from the discussions, namely the concept of society, community and social participation." Campbell noted that this situation was not unique to this Symposium. As a non-commercial test-bed project, Campbell noted that the FreeNets were a good example of the effectiveness of providing people with the technology – and seeing what end-users want of it, and what they want to do with it. Campbell presented the FreeNets as an organic learning society model: one based on incremental training and development, and evolutionary development of applications.

The Road from Here

The final session was entitled "Future Vision." Consensus of the Symposium's concluding plenary session was that the GII is not yet a reality, and there is still time to determine how it will be manifested. A striking analogy was raised in an earlier session by Canadian Minister of Industry, John Manley, which was that of the automobile. As a caution for the need to carefully plan information infrastructure, Manley asserted that we must begin to anticipate the information highway equivalents to hazards such as 'pollution,' and 'gridlock.'

Although it seems the advent of the GII has evolved at quantum speed, from out of nowhere, current communication and information infrastructures are, of course, the product of years of development and social integration. Their use, availability and importance already reflect things such as social values and the balance of global economic wealth. However, as Dr. Pekka Tarjanne (Secretary-General, ITU) notes, existing infrastructures and technologies such as the Internet and broadband capabilities do not constitute the GII. His vision is of a network of networks, which "in addition to being democratic, demonopolised and pluralistic, with very good markets for all kinds of smaller and bigger industries in the world ... is extremely multifaceted, extremely complex."

Likewise, Ambassador Pasi Rutanen concluded that first graders and their teachers should be provided access to the information highway, because they will be its real users – about thirty years from now. Planning for future generations suggests that there is still time for more symposia, more inter-regional dialogue, exchange of experience and above all, for concrete action. Given the emergence of new users and new voices in the GII policy debate, future symposia will have to include these groups.

"The necessity of worldwide cooperation with particular attention to less developed countries," was recognized by the G-7 to be a core principle of the global information society. The value of the APEC-PECC-OECD collaboration in Vancouver will be in carrying forward intercultural collaboration on the analysis and socio-economic impact of the GII in the realization of this principle. All members, and especially those eight countries whose membership overlaps in all three sponsoring organizations, have a great deal to share and to learn, if the experience of this seminal Symposium is any predictor.

Welcome and Opening

Richard Beaird

Coordinator, Bureau of International Communications and Information Policy, United States Department of State; APEC Telecommunications Working Group Shepherd; Chair, Committee for Computer, Information, and Communications Policy (ICCP), OECD

I have the honour of welcoming you today from two perspectives: as shepherd of the APEC Working Group on telecommunications and as Chair of the OECD's Committee for Computer, Information and Communication Policy (ICCP). During the period that I have served in these roles, there have been many changes which have together made possible, and established the basis for this remarkable symposium. There are, of course, the inevitable changes brought by technology and market creation and restructuring. We will hear a great deal about these trends over the next two days.

We will hear about the economic impact of information technology, and about the regulatory environment in which information and telecommunications services unfold, and in that context both regulatory problems and solutions. We will hear about standards, security and privacy issues, and perhaps most importantly, we will hear about human resources, their challenges and constraints. Amidst this extraordinary array of subjects and speakers, the fact that we are attending the first jointly sponsored APEC, OECD, PECC meeting should in itself not be lost.

As I step back and reflect on what this meeting means, two changes that have occurred over the last five years become apparent to me. The two changes I refer to are not so often emphasized but, I believe, they will have an impact of enduring consequences.

First, there is the emerging role of the private sector as an increasingly vital part of regional and international organizations. At the creation of the APEC Working Group on Telecommunications nearly five years ago, there was a reluctant acceptance of the private sector's place in the Working Group. Today, that place is secured by the expanded role of the private sector in the many projects of the Working Group. Delegations from member economies often include more private sector than government representatives. The OECD has long encouraged private sector participation, and in the Committee on Information, Computer and Communication Policy (ICCP) there is now an acceptance of the private sector sitting as an observer during the Committee's meetings. The fact that this symposium is also sponsored by PECC gives further evidence to this point. The many moves to restructure telecommunications markets along privatized and competitive lines will ensure that the trend towards a broader role for the private sector will continue.

The second change over the last five years, I wish to mention, involves the focus on "infrastructure" – global and regional. We still speak of "networks" but that term suggests something more narrow than "infrastructure". The Global Information Infrastructure, the Asia Pacific Information Infrastructure. the many National Information Infrastructures, all suggest a scope of services that are to be broadly understood – created by the convergence of technologies, carrying unbelievable amounts of content variety, across different yet complementary networks. The principal users of this "infrastructure" are, and will increasingly be, our private sectors. We must think regionally and, indeed, globally, because for our private sectors business is global, communications is global, and transportation is global.

The OECD, APEC, and PECC are coming together for the first time because the changes over the last five years required that international organizations communicate, exchange information, and cooperate horizontally across regional boundaries. This symposium is no doubt just the beginning. My congratulations to the organizers of this symposium for having the vision to call this meeting which has served as lasting evidence of the changing world that surrounds us.

Pierre Vinde

Deputy Secretary-General of the OECD

The issues to be discussed over the next two days at this Symposium are key issues from the point of view of the Member countries of the OECD and are likely to form an important role for the Organization itself over the coming decade, at least.

As a global, though not universal, organization, the OECD has for a long time been present in the Asia-Pacific region. Indeed, six Member countries of OECD are also Members of both APEC and PECC. These are Australia, Canada, Japan, Mexico, New Zealand and the United States. In addition, Korea, another APEC and PECC Member, is working towards OECD membership by the end of 1996. For several years, the OECD has also had a Policy Dialogue with nine Dynamic Non-Member Economies from Asia and Latin America, namely, Argentina, Brazil, Chile, Hong Kong, Korea, Malaysia, Singapore, Taiwan and Thailand. These economies account for some 35 percent of OECD trade with the non-OECD area and an even greater share of investment. Many of them are clearly well aware of the importance of information infrastructure for the continued future growth and prosperity of their societies.

In short, there is a close commonalty of purpose and similarity of working methods between APEC and PECC and the OECD. In this regard, the High Level Meeting between OECD Member countries and the Dynamic Non-Member Economies, in October 1994 in Tokyo, stressed that the OECD Secretariat should be alert to the possibility of mutually beneficial contacts, at the technical level, with APEC – of which this Symposium is a good example. We at the OECD look forward to further events of this nature.

The OECD's Committee on Information, Computer, and Communications Policy (ICCP) has, since its creation over ten years ago, been promoting a vision of the importance of communications and information technologies to the emerging socio-economic fabric of its Member countries. But the vision of a knowledge-based economy where integrated communication infrastructures and services would provide new opportunities to economies and society has only just begun to be generally grasped by key policymakers.

The emphasis by Vice-President Gore in the United States on national and global information infrastructure, and the Bangemann Report of the European Union have played a significant role in putting these issues on political agendas.

Although the OECD has been working on policy issues related to "information infrastructure" for at least two decades and has used this term in its published work for about the same length of time, the ICCP Committee renewed its emphasis on national and global information infrastructure – their development, deployment, application and impact – some two years ago. The G-7, following the Jobs Conference in Detroit last March, requested the OECD to examine the role of information infrastructures in the context of the relationship between technology, productivity and jobs. This request, endorsed by the OECD Council, will lead to a progress report at 1995 Ministerial Meeting and to a final report for the 1996 Ministerial meeting. This G-7 project is also an integral part of the OECD Jobs Study, work aiming at developing broad policy recommendations for our Member countries with a view to combating unemployment and encouraging job creation. It is indeed evident that the new information or knowledge society that is emerging will pose new challenges to our policymakers in developing employment policies for the 21st century.

There are a number of policy issues on which OECD countries need to reflect. Regulatory frameworks covering computing, communication and broadcasting and media – formerly considered as quite separate sectors – require a fundamental review in order to facilitate the rapid, efficient and integrated development of information infrastructures and associated new applications. The work of the OECD has already emphasized the need for competitive markets in order to enhance efficiency, stimulate market growth and employment creation, but for competitive markets to thrive successfully there is still a need for regulatory safeguards, for interconnection and equal access, and for efficient pricing

structures. Existing definitions of universal service may need to be re-examined. The roles of government and of the private sector in the construction of the infrastructure and the development of new applications need to be clarified.

The implementation of appropriate legal frameworks for the protection of intellectual property, for the security of information systems and the protection of personal data and privacy are key issues. Unless equitable and workable rules-of-the-game are agreed upon, there is a risk that trade frictions will arise and that applications with enormous potential for social and economic gains will never get off the ground.

The issues I have cited are important at both the national and global level. Global infrastructures provide scope for a greater integration of economies, increased economic activity and trade and sharing of information and knowledge. To maximize the economic gains we need international policy frameworks which are based on principles of transparency and non-discrimination.

The new policy awareness I have referred to is happily not limited to just the OECD countries. The fact that over the next two days we will work together with the countries from the Asia-Pacific region attests to the global interest in this issues. Indeed a key characteristic of information infrastructures is the role they play in interlocking and interconnecting all economies together. The issues we face are global ones, and have to be tackled to the extent possible, in a global context. No economies should be excluded from the coming global information society. I believe that this conference can play a role in beginning such a dialogue.

Although it can do so, the OECD does not generally function as a negotiating forum but more frequently allows the economic and policy analysis it conducts to speak for itself. The OECD and its Secretariat can, I believe, in co-operation with other appropriate bodies, provide the conceptual framework and underlying arguments which, backed by its analysis and vision, will contribute to building the knowledge-based global economy of the 21st century.

Building the Foundation for the 21st Century

Professor David Johnston

Chair, Information Highway Advisory Council to the APEC-OECD-PECC Symposium

Most of you know that Canadian theorist Marshall McLuhan coined the term "Global Village" – a phrase which has come to symbolize the meaning of the information age. You may not know, however, that it was at a conference of broadcast executives right here in Vancouver in 1958 that Professor McLuhan first uttered the famous words: "The medium is the message." It might well be that over the course of this symposium, one of you comes forth with an equally prescient thought.

The Asia Pacific Economic Cooperation Forum, the Organization for Economic Cooperation and Development, the Pacific Economic Cooperation Council and the Asia Pacific Foundation of Canada all have separate and vital interests and mandates. At this symposium, those major organizations and the wide range of individuals present recognize that despite the differences among the points at which our various countries are starting and the distinct perspectives on the future of the information highway, we also have overwhelming interests in common. The challenges and opportunities of the information age cannot be approached in a vacuum. For all of our distinct interests, the reality is that we have far more collateral, convergent and often congruent interests in the new knowledge-based global economy.

It is societal and economic forces that are leading the technological developments and the move to a global marketplace. Increasingly, firms and even consumers are able to access information dispersed around the world when making their decisions. Indeed, it is information, knowledge and ideas that are the primary resources of the new economy. Ideas and new discoveries and concepts are circulating world wide with breathtaking speed. Innovation, driven by these ideas, this knowledge, holds the promise of new undreamed of possibilities. Canada's other legendary communications theorist, Northrop Frye, aptly noted that the new frontiers are those of the mind.

Now, it is fairly heady stuff for most of us to try to apply the philosophical concepts of McLuhan and Frye to the information age – particularly when every day seems to bring a new technological change or a different software process or a breaking story about complicated maneuvering by information industry firms. We are forced to think about information in complex new ways when many people still haven't figured out how to program their VCR's. The truth is that it is hard to think about the future when change occurs so quickly.

Professor Frye, believe it or not, sometimes felt the same way. He told the story of the doctor from a big Canadian city who was traveling across the Arctic tundra with an Inuit guide. In the midst of a dreadful winter storm on a cold and lonely Arctic night, the Doctor cried out: "We are lost". The Inuit guide looked at him calmly and said: "We are not lost. We are here."

We are all immigrants to the information era and we are also all indigenous peoples in the information age. Everyone is a newcomer to the future. Everyone can be a participant in fashioning the future. Each individual, each organization, each nation brings particular strengths and special concerns to the development of an integrated global information highway. Canada is a trading nation with strong emphasis on international linkages and multilateral fora. This country has a fortunate relationship in both the Commonwealth and La Francophonie. Canada occupies a huge area, the top half of North America. Since our birth, first our transport and then our communications networks evolved to join us into one nation. Canada and the United States also have the largest bilateral; trading relationship in the world – and that unique

relationship has colored Canadian thinking in a myriad of ways since this country was founded. In the last few years, as evidenced at this symposium, Canada has moved to forge new relations with our neighbours on the Pacific Basin.

Canadians are, to some extent, a people defined by distance. Remote communities, rural ways of life, different weather and time zones have shaped our traditions. The dictates of the country's physical mass have obliged Canadians to overcome the realities of geography. Since the founding of Canada, the fact that so many of us are new Canadians, making a new start in a new land, has colored our thinking, our culture and our philosophy. This and our strong democratic traditions have created a central emphasis on equality of opportunity. Canada currently has an advanced communications infrastructure. We enjoy 98 percent telephone coverage, 90 percent cable availability and widespread use of computers in business and homes. Canadian industrial strengths are based on technological leadership in digital switching, systems integration, geographical information systems, graphics software and computer-aided engineering. All of these forces have helped to position Canada well for the world of new networks.

In such a large country, the information highway can have an enormously empowering potential. Citizens can gain previously unimagined entertainment, educational and entrepreneurial opportunities. Better medical care, better consumer choices, more access to a world of information and new modes of work can open up.

The convergence of computers, broadcasting and telecommunications holds the promise of revolutionizing how Canadians learn and how we earn, how we spend our time and how we spend our money, how we interact with each other and how we reach out to the world.

The risk for Canada, and for every other country, is falling into the belief that all these changes can come about by magic and without seizing opportunities. Unless each nation sets goals for itself, others will define and shape the information highway. Unless each nation plays a role in building the highway, other countries and other forces will determine the scope, pace and direction of the information age. Canada has a proud history of being on the leading edge of communications from Bell and Marconi to McLuhan and Frye. Past success, however, is no guarantee of future prosperity. Proper planning today is what will count in producing economic and social well-being tomorrow. With that precept in mind, the Government of Canada last April created the Information Highway Advisory Council as part of building a national agenda and consensus for the information age.

The Council was established to provide advice to the government in advancing the goal of making Canada a world leader in the provision and use of the information highway. The Council members are all from outside government.

The Council's objectives are to:

- Create jobs through innovation and investment in Canada;
- Reinforce Canadian sovereignty and cultural identity; and
- Ensure universal access at a reasonable cost.

The council has five principles which need to be met if Canada's contribution to the information highway is to become a true success. Our country's efforts must focus on providing:

- An interconnected and interoperable network of networks;
- Collaborative public and private sector development;
- Competition in facilities, products and services;
- Privacy protection and network security; and
- Lifelong learning – and the opportunities and creation of a learning culture.

The information highway can be a vital means to help Canadians find and obtain jobs. The highway can open new vistas for the disadvantaged and the disabled and it can help ensure increased employment and sustainable prosperity in Canada.

It is the Council's view that lifelong learning is the cornerstone for the nation's shift to a knowledge-based economy – a shift that is now well underway. Adults too embarrassed to go to the classroom to learn to read can have new ways to learn in private. Disabled persons can have programs from the range of new media customized to their special requirements.

The Information Highway Advisory Council represents a new wave of cooperation and coordination among industry, education and government.

The members of the Council, despite widely different backgrounds, recognize the importance of examining key issues in an open-minded manner and of reaching consensus on a uniquely Canadian approach to public policy issues.

The Council recommended, and the government adopted, new rules for Canadian use of global and regional mobile satellite systems which tie Canadian equity requirements to Canadian usage.

The Council and, indeed, the government have concluded that competition should drive the development of the information highway in Canada – but that regulators have a role as referee or arbitrator to ensure that competition is fair and sustainable. The Council has recommended the harmonization of ownership rules for broadcasting and telecommunications.

The Council urged and supports the second phase of CANARIE – this country's cooperative advanced network for research, industry and education.

Canada is moving to increase the speed of our portion of the Internet and to expand the network to the far North by the end of 1995. We are also promoting the development of content and applications for the Information Highway. Canada's SchoolNet program will ensure that all 16,500 schools in this country are linked to the information highway within five years and will provide 1,000 rural and remote communities with public access points to the highway.

The Council is developing policy recommendations in areas from copyright reform to the rights of creators on the information highway.

To ensure privacy protection, the Council has called for the banning of scanners capable of monitoring radio-based telephones.

The Council is examining, in detail, sources of financing and methods for promoting access to the information highway at reasonable prices for all Canadians regardless of where they live.

The Council is also intent on coming forth with recommendations of how governments can become model users of the information highway, and by doing so, spur industrial investment, new network training and the development of new software.

Canada has long faced an issue with which many countries in the world are now coping – the difficulty of encouraging strong domestic cultural products and services in the face of international competition. The issue of sustaining vibrant national content and culture while welcoming global competition is one which Canadians will undoubtedly pursue at this symposium and every other comparable opportunity.

Throughout the course of its work, the Advisory Council has increasingly come to grips with the significance of overall global changes upon Canada's planning for the information age.

I hope we have gained a greater appreciation of both the pace of progress in other countries and the particular perspective and nuances of other nations. Respecting those nuances and acknowledging the legitimacy of goals of others is clearly of paramount significance as the world seeks to address essential shared goals of information highway affordability, security, access, consumer awareness, fair competition and universal standards.

The United States has acted to position its industry to take advantage of the economic opportunities offered by the information age both through the *National Information Infrastructure Act of 1993* and through announced government spending commitments. The US has focused on tapping the benefits of broadband technology and new applications to improve efficiency in fields from manufacturing to retailing. Having already achieved preeminence in online private sector services, American firms are integrating online access with basic operating system software. By contrast, Canada has the world's fastest growing FreeNet system.

Japan is in the process of extending fibre to the homes, businesses and institutions of the nation – a process to be completed by the year 2005. In a Distinguished Panel Report produced for the Government of Japan last May, the critical point was made that the information highway can be pivotal for Japan in reversing the growing problems of urbanization. The panel concluded that the information age offers a real opportunity for Japan to act on a range of environmental problems. These are important objectives which we can all applaud but which may have a different priority for each nation.

Singapore is well advanced in making the information highway accessible to a large number of citizens. Interestingly, for a relatively small state, Singapore has placed emphasis on using technology for distance learning and training for its work force. It has also made the provision of an advanced information infrastructure the foundation for improving the competitiveness of Singapore's firms and as a means of encouraging foreign companies to locate value-added activities in Singapore.

Great Britain has devoted resources to upgrading its existing educational network to the advanced Super Janet.

Germany has challenged its information industry to develop and provide the means to allow the federal government to operate efficiently and effectively from two locations.

The European Community views the information highway as fundamental in furthering its goal of political and economic integration. In preparation for this month's G-7 meeting on the information highway in Brussels, the European Community has laid particular stress on the importance of avoiding a two-tiered information society.

As shown by the various initiatives of the organizers of this conference, Pacific Rim countries aim at fostering the development and trade benefits offered by the information highway. It is of extraordinary importance that global action on the new information infrastructure produce a coherent system – and that can only come about through dogged effort and international cooperation. The world will not reap the potential benefits of the information age if countries develop information infrastructures which are incompatible. To avoid that prospect, people in business, government and academia must respect the fair-minded priorities of others and must find ways to accommodate those priorities.

In his invitation to attend this symposium, Dr. Saywell indicated the need for a frank discussion of major problems. This conference and all other venues for domestic and international thinking about the information highway must take into account that many countries of the developing world still lack the most basic forms of communications technology. Of all the gaps between the developed and developing world, none is growing faster than the information gap. The world must think long and hard about how to spread the enabling power of the information highway fully interactive for citizens in every country.

The phenomenal advantage of information is that, unlike physical capital or natural resources, once diffused it still remains with the seller – it is an infinitely shareable resource. With access to the information highway and with the

requisite skills, people in countries with few natural resources can have a chance at the jobs, economic growth and the hopes proffered by the information age. The challenge is to broaden and deepen each nation's intellectual resources – its citizens.

Automobiles, planes and television changed the way of life of many people on the globe in the 20th Century. The information age can produce and, undoubtedly, will produce electronic malls, electronic libraries and electronic hiring halls. The information age also has the potential to produce opportunity for everybody in the 21st Century – including the vast array of humanity for whom progress was not realized in this century. To reach that end, countries and institutions and individuals must plan with openness, flexibility and with an appreciation that the more people who are able to gain access to the information highway, the more all of us will benefit.

Information Infrastructure: The Economic Impact

Thomas J. Sugrue
Deputy Assistant Secretary, National Telecommunications and Information Administration, US Department of Commerce

Background on the NII and GII

The United States places great importance on the role that the information infrastructure can play in local, national, regional, and global economies. We believe that our National Information Infrastructure (NII) and the emerging Global Information Infrastructure (GII) are having an overwhelmingly positive impact upon the world's economies. Not only are the NII and GII improving the development of telecommunications and information resources; they are also promoting economic, social, cultural, and political development.

Within the US Government, our recent efforts have been directed towards creating a positive and receptive international environment for the GII. Specifically we envision building the Global Information Infrastructure upon five principles. These principles, which are the same for both the NII and GII focus on:

- Encouraging private sector investment;
- Promoting competition;
- Providing open access to the network for all information providers and users;
- Creating a flexible regulatory environment that can keep pace with the rapid technological and market changes; and
- Ensuring universal service.

Through the adoption and application of these fundamental principles, we believe that it will be possible to ensure the development of a more accessible, efficient, and versatile GII.

Release of the GII Agenda for Cooperation

On February 15, 1995, Vice President Gore and Secretary Brown released the *Global Information Infrastructure (GII) Agenda for Cooperation*, a blueprint for cooperation among nations and governments in constructing international information infrastructures. Realistically, within the context of diminishing resources, investors must seek out countries with open telecommunications environments and work to reduce the technology gap between the resource-intensive and resource-poor nations. In order to share our global resources to ensure economic development is sustained, we in our respective governments must provide leadership that redirects the focus from total government funding towards greater private sector participation.

In fact, as the *Agenda for Cooperation* points out, the GII will be created as a private sector initiative. Private sector investment is recognized as the principal means of enhancing the quality of communications, the diversity of services and the extent of access. Most of all, private sector investment is the best means of responding to demand.

Governments cannot legislate technological progress, which is stimulated by growing and unfulfilled demand. Popular demand is generally focused on products and services that empower people – the very products and services, delivered by the GII. People around the world are avidly seeking access to the new telecommunications and information technologies that many of you here today are creating, selling and servicing.

As the *Agenda for Cooperation* states:

> Harnassing the global potential of information and communication technologies to support the development of the GII will require collaboration among the industries that will build, operate, provide, and use services available over the evolving national networks. It will also require cooperative efforts among countries working together bilaterally, regionally and through multilateral organizations to facilitate the interconnection of their networks and the sharing of information world-wide.

We believe that to create an environment in which national and global information infrastructures can flourish, it is essential for governments to create the conditions necessary to attract private investment in their telecommunications, information technology, and information services sectors by instituting the appropriate regulatory, legislative, and market reforms.

How to Promote Economic Growth

I am here, therefore, to repeat the gospel to which countries are converting in increasing numbers. Accelerating liberalization and opening telecommunications markets to full competition are the most effective means of promoting further economic growth. There is mounting evidence in economies all over the world that increased competition leads to lower prices and to the introduction of new services and technologies.

Likewise, it is becoming apparent that countries that do not have access to telecommunications and information networks will have trouble competing in the global economy.

Anderson Consulting estimates that the global telecommunications sector will represent a $1.1 trillion industry by the year 2000, about double its current level. Last year, the *Los Angeles Times* reported that telecommunications is now the world's largest economic sector, with a strategic importance that surpasses that of oil or steel.

In the United States, the highly competitive and largely unregulated information industry constitutes approximately ten percent of the GDP. It is anticipated that this figure will grow, to 12-17 percent over the next five to ten years. Approximately 60 percent of all US workers are employed in information-intensive industries. It is anticipated that, eight out of ten new jobs will be in the information-intensive sectors of the our economy.

Many other countries have introduced competition into their telecommunications markets in the last few years, and have realized benefits akin to those attained in the United States. In Chile, for example, the growth rate of main lines was 7.5 percent per year prior to privatization. Since privatization, its growth rate has increased to more than 25 percent per year. In Argentina, 600,000 new telephone lines have been installed and the level of investment now stands at $1.2 billion per year.

The International Telecommunications Union (ITU) reports that in the eight OECD countries that permit competition, telecommunications contributes approximately six percent more to the GDP than in those 16 countries that do not permit competition. This translates into an extra $16 billion per year of telecommunications revenue.

Asia Pacific countries account for 60 percent of the world's population (3.08 billion people) and 24 percent of the global economy. But there are fewer than four phone lines per 100 people in the region, and waiting lists are extensive. According to the ITU World Telecommunications Development Report, the wait for telephone service in Vietnam is 3.8 years; in Sri Lanka, 9.6 years; and in the Philippines, 10 years.

Experts predict that Asia Pacific countries will spend more than $231 billion by the end of the decade for 227 million additional lines, to make the region an enormous and profitable market for telecommunications products and services.

Importance of Multilateral Dialogue in the GII Process

Because of the growth potential, we therefore particularly note the importance that NII/GII development can have for the Asian Pacific region. At the November Asian Pacific Economic Cooperation (APEC) Leader's Meeting, leaders from 18 APEC Economies, including President Clinton, agreed to the future establishment a free landing zone. The leaders, through the Bogor Declaration also specifically agreed that APEC countries will take "steps to improve economic infrastructure, such as energy, transportation, information, telecommunications, and tourism."

As we review these and related information infrastructure proposals, we should not limit our analysis to the benefits that can be achieved in communications alone. Rather, we should champion the potential multiplier effects, such as improved services delivery, novel approaches to manufacturing and distribution, electronic commerce, greater job opportunities with improved job satisfaction, better health-care, and increased communications between social groups.

We are already engaged in creating a new policy dialogue through multilateral and bilateral consultations. This symposium and the APEC meeting that follows are prime examples of the expanding dialogue. Other examples are the Kyoto Ministerial last September, and the Summit of the Americas in December. During the last year, countries around the world have refocused their telecommunications agendas to elevate the concept of developing a national, and ultimately global information infrastructure. Upcoming international meetings demonstrate the worldwide attention that is currently being. focused on this issue.

- This weekend, the world's seven leading industrial nations will meet in Brussels for a G-7 conference on the development of a global information society. This Conference on the Information Society is the first G-7 Ministers' meeting to specifically focus on telecommunications and information issues.

- In April, the OECD will hold a special session in Paris on information infrastructure issues, called "Towards Realization of the Information Society." At this session high ranking government officials from the developed nations of the world will compare current information infrastructure policies and applications. In addition, the OECD. has formed a special committee program to focus on analysis of information infrastructure issues.

- In June, Secretary Brown and Ambassador Mickey Kantor will co-chair the first Hemispheric Trade and Commerce Forum following a meeting of Hemispheric trade ministers in Denver, Colorado. As part of the Miami Process following the Summit of the Americas, both the trade ministerial and the conference are important steps towards meeting the goal of negotiating a Hemispheric Free Trade Area of the Americas by 2005. Key determinants in creating this Free Trade Area in the Western Hemisphere will be the establishment of a sound, integrated commercial infrastructure, which will be to a large degree dependent upon a global information infrastructure. Telecommunications and information technology will be the focus of one of the sectoral working sessions at the Hemispheric Trade and Commerce Forum, where recommendations will be formulated and presented to the trade ministers and governments for endorsement.

Conclusion

We believe that the GII will provide a win-win situation for nations, both economically and socially. The GII can increase economic growth and improve infrastructures. Information technology and telecommunications sectors are not only dynamic growth sectors themselves, but also are engines that drive, development and economic growth in other sectors of the economy. The GII can make factories more efficient, speed the creation of new and better good and services, develop new jobs and markets, and increase trade. New telecommunications and information networks allow even the smallest companies to have an international clientele.

The new multimedia environment will comprise a global web of communications network, computers, databases, and consumer electronics. It is software and innovation content, services and applications, as well as a system of

connections at the local, national, regional, and global levels. As a "network of networks" we believe that the GII will facilitate the global sharing of information, interconnection, and communication. The GII has the potential to provide people world-wide with the means and opportunities to participate fully in the information age. Regardless of geographic location, income, or level of education, improved access to information can and will facilitate improvements in the human condition.

In closing, I would like to reemphasize that the GII is not just about new technologies and construction of mega-projects, but is an important tool to change lives, to raise the standard of living, to create high skilled jobs, to expand our knowledge of the world around us, and to bring new opportunities that go beyond anything we can imagine. The GII is about "connecting each to all" – each individual to all peoples of the world; each country to all nations of the world.

Risaborou Nezu

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INTRODUCTION

The Present Situation and Pending Issues of Our Country's Informatization Policies

As pointed out in the "Program for Advanced Information Infrastructure," which was approved last May by the Information Industry Committee of the Industrial Structure Council, an advanced information infrastructure not only raises the living standards of the nation at large, but also makes it possible to raise the standard and productivity of the various industries by creating new business opportunities and by raising the productivity of intellectual activities.

Therefore, the realization of an advanced information infrastructure is an essential issue for the future economy and society.

A comparison with Europe and the US shows, however, that in our country, the progress of informatization is extremely slow in the public sector, which should really lead the private sector in the movement toward advanced informatization. Moreover, our industries are far behind Western countries in the processing of non-standard business operations, such as intelligent manufacturing using new information systems.

The information industry is undergoing a large change in industrial structure, from a vertical to a horizontal model; and in demand structure, due to the introduction of the client-server systems, outsourcing, and solutions business.

We must urgently consider how our country's information industry is going to adapt to such radical changes and what policies are needed for adaptation. The promotion of an advanced information infrastructure will create an advanced market within the country, and is therefore extremely important for the structural change of our domestic information industry.

In view of this situation, the issues which we need to work on for the realization of an advanced information infrastructure in the public sector, are as follows:

- promotion of informatization in our industries;
- revision of systems related to informatization;
- establishment of systems which are mutually operable;
- establishment of security/privacy measures; and
- appropriate protection of intellectual property rights.

It is the opinion of the Information Industry Committee of the Industrial Structure Council that the issues listed above should be taken up by the entire government for comprehensive and systematic consideration. The committee has proposed that the government should draw up basic directives aimed at the establishment of an advanced information infrastructure. Therefore, the action taken by the government last August to establish the Advanced Information and Telecommunication Society Promotion Headquarters is to be highly applauded. We hope that the basic plans for the establishment of an advanced information society, now being drawn up by the above Headquarters, will be as specific in content as possible so as to enable the comprehensive and systematic promotion of administrative policies.

The Committee will keep the basic plans drawn up by Headquarters in mind in continuing concrete discussions on the problems related to the realization of advanced informatization. We must consider how to promote technological

developments, how to promote the database industry, software industry, and other information-related industries so that they will be adapted to the structural change in the information industry.

Background of the Interim Proposals

The Committee is now working on policies aimed at the establishment of an advanced information society and laying the foundations upon which to build an information industry. In February 1995, the G-7 Cabinet members will meet in Brussels to discuss the establishment of an advanced information society. For this meeting, the Committee drew up these interim proposals, based on discussions held so far concerning our country's role in the realization of a global-scale advanced information society, basic concepts on ways to fulfill that role, and basic concepts on the various problems involved.

It is hoped that our country's government will make use of these interim proposals in displaying its basic concepts on the realization of an advanced information society and on international cooperation to achieve that aim. We strongly hope that our government will take active measures on an international scale for the establishment of an advanced information society and, by so doing, play a leading role in the advanced of informatization in the world sphere.

BASIC CONCEPTS ON THE REALIZATION OF AN ADVANCED INFORMATION SOCIETY ON A GLOBAL SCALE

The Significance of Advanced Informatization on a Global Scale

In recent years, there have been rapid advances in information and communication technology, making it possible to realize an advanced information society on a global scale. Enterprises, households, and individuals throughout the world will be able to use a variety of information equipment connected by numerous networks to access and process all sorts of different information, such as placement or receipt of orders, payment, joint design and development, shopping, obtaining books or visual software, electronic mail services, etc. This will be possible not only within a country, but beyond borders, regardless of time or distance. It is now becoming technologically possible to establish such a seamless network, which is an important precondition for the realization of an advanced information society.

Such a network will bring about drastic changes, not only in people's lifestyles, but in every phase of society, such as industrial organizations, the relationship between enterprises and consumers, the relationship between management and labour, and so forth The network will not only encompass a single country but will be connected to networks throughout the world for the advance of informatization on a global scale. In the micro sphere, advanced informatization will raise the productivity of intellectual activities, and through the sharing of information, will help strengthen market functions. High informatization will change the industrial structure by creating new business opportunities such as home-care and welfare services, electronic publishing, personal information appliances, and so forth.

Moreover, increased investments in informatization, in each of the various fields, have a large impact on the macro economy. This will contribute greatly to solving problems in the advanced countries which arise along with the maturing of their economy, such as unemployment and low economic growth.

In the developing countries, the advance of informatization will help to raise productivity of the country's industries, and by providing access to new markets and new information, will ensure stable and continuous growth.

Such an advanced information society is made possible by fibre optics, satellites, and other communication infrastructure; with networks which make use of the infrastructure for processing of information between information equipment; with content which is integrated by these networks as if it were part of a single database; with engineers and technologists to establish and operate such networks and contents and with end users who make use of all these

for industrial operations or personal daily purposes. All of these are vitally important factors in the Global Information Infrastructure (GII). We need to keep improving all these factors and keep them well adjusted.

The adjustment and improvement of the Global Information Infrastructure must be promoted in answer to the needs of society. Basically, it is better that these operations be led by the private sector, but it is necessary for the government to make sure that the operations are performed in an environment which is in harmony with international interests.

BASIC RESPONSIBILITIES FOR GOVERNMENTS OF THE ADVANCED NATIONS

In order to realize a global-scale advanced information society that coincides with the basic concepts stated above, the advanced nations of the world, including Japan, must assume the following five basic responsibilities.

The meeting of the G-7 and EU leaders in February should attempt to clarify these responsibilities, announce to the world that each country will make a clear definition on these responsibilities, and immediately take follow-up action.

(i) Preparation of an environment for the establishment of a seamless network

For the realization of a global-scale advanced information society, it is absolutely necessary to establish a seamless network, such as the Internet, in which all users throughout the world are connected by a single large, seamless network without being hindered by differences in the communication infrastructure, equipment, or software. To prepare for the establishment of such a network, it is most important that all the hardware and software used in the world be interoperable. The governments of the advanced countries should reach consensus on the basic policies to be adopted to achieve mutual operability, discuss ways to speed up international standardization, and endeavour toward international harmonization.

(ii) Promotion of fair competition in the private sector

It is only when there is fair and free competition in the private sector that diversified services, at lower costs, and the supply of economical high-function products are realized that reflect technological advances and consumer needs. The governments of the advanced countries should lead the world toward the realization of an advanced information society by working actively on deregulation and free market access, and the promotion of fair competition among private enterprises.

(iii) Establishment of systems to ensure security, privacy, intellectual property rights, etc., in an advanced information society.

In an advanced information society, all types of information will be distributed and processed in a seamless network which extends beyond national boundaries. In such a society, the appropriate protection of security, privacy, and intellectual property rights will become an important issue.

Looking at the present situation, even in the most advanced countries, preparations for an advanced information society are inadequate. Moreover, the systems and regulations that differ from country to country will definitely be a hindrance to the establishment of a seamless network. In view of this situation, it is necessary for each country to revise its policies and work toward international harmonization.

(iv) Supporting the developing countries

By promoting advanced informatization in the developing countries as well, and connecting them by networks to the advanced countries, we can expect the disparity between the advanced countries and developing countries to be narrowed in many aspects. On the other hand, if we were to promote informatization in the advanced countries alone, the disparity between these countries and the developing countries will widen all the more. However, there is a limit to how much the developing countries can promote high informatization on their own because they lack technological

know-how, human resources, and financial resources. The governments of advanced countries should, therefore, provide the needed support for establishment of an information intensive society in the developing countries as well.

(v) Promotion of understanding of the need for an advanced information society and the sharing of information

The advance of informatization will bring about large changes in the relationship between enterprises, workers, and among organizations and enterprises, etc.; additionally, the added value of the industrial world will shift, and frictions can be expected to arise in many areas. It is important, of course, to deal with such frictions individually. However, an advanced information infrastructure will, as stated before, induce economic growth by raising productivity, and creating new businesses, and by creating new jobs. On the whole, advantages for the world are considerable, and to promote the establishment of an advanced information infrastructure, it is necessary to gain a wide understanding of its significance.

Advanced nations should take the lead in working on pilot projects to develop a variety of different applications. These pilot projects should be undertaken by nations of the world as joint projects on a global scale. These projects will be extremely effective in demonstrating advantages to be reaped from an advanced information society. Needless to say, it is important for the administrative sector to promote informatization and to introduce electronic systems into its own activities.

In working on problems or projects related to the establishment of an advanced information infrastructure, it is necessary for the various countries of the world to share information concerning their undertakings related to the advanced information society and their statistical data on software trade and other matters related to the information industry.

BASIC CONCEPTS ON EACH INDIVIDUAL PROBLEM

Concerning the individual problems which will probably be discussed at the meeting of the G-7 Cabinet members on the formation of an advanced information society, our Sub-Committee has drawn up the following basic concepts from discussions held so far.

Achievement of mutual operability – Background

Mutual operability has always been an important issue in efforts toward advanced informatization. Both government and private sectors have been working on this issue. However, in the present environment: (1) in which we are talking definite steps toward the establishment of a seamless network and the realization of an advanced information society; (2) in which the information industry is undergoing a structural change from a vertical to a horizontal model; and (3) in which the mutual compatibility and accessibility of the information industry is being promoted, we should increase our efforts for interoperability as an important step toward the establishment of an advanced information society.

Basic concepts of interoperability in an advanced information society

Interoperability, through which enterprises and individual users use networks to process all different types of information, forms the foundation upon which to build an advanced information society. Discussions on the basic concepts of interoperability should be held from the standpoint of user interests.

In considering the issue of interoperability from the standpoint of the users, the following points are required.

First, the equipment, software, networks, etc. which are supplied to the users should be mutually accessible for information processing. To avoid redundant investment by the users in the same kind of equipment, mutual compatibility in data conversion, for example, should be possible at low cost.

The difficulty here is that, for example, if to obtain interoperability standardization prior to manufacturing were to be introduced rigidly within a short period, it would hinder technological advances, and in the medium and long-term, could obstruct consumer interests. Therefore, actions toward interoperability should be well-balanced. In dealing with this extremely difficult issue, the government and private sector s should keep the following basic concepts in mind.

(i) The importance of an open interface

In securing interoperability, the various interfaces needed for common operations will be provided by public standardization organizations, by private forums within the industrial world, and by individual enterprises. To promote the development of technology and products in conformity with such interfaces, it is important that they be open.

(ii) The importance of securing interoperability in conformity with the open interface

If we are to realize interoperability, it is necessary to supply good quality products in conformity with the open interface.

Such products are born out of competition among private enterprises. To promote the manufacturing of such good quality products by the private sector, it is often necessary to demonstrate the effectiveness of the interface through trial use. Therefore, it is necessary to prepare test beds to confirm the effectiveness of the prototypes of the interface and conformity of products to the interface.

Moreover, as the information industry gradually shifts to a horizontal model, numerous different interfaces will come to be used with products and services. In order to achieve interoperability in systems for end users, those users will have to be able to judge whether or not each product is in conformity with the interface. Applicability and operability tests and certification can be conducted by each supplier, by standardization organizations, by third party institutions, and others. It will, however, be up to the industrial world and governments to make interface applicability reliable for the end users.

(iii) Protection of intellectual property rights in harmony with the openness of the interface

Even when interoperability has been achieved, the appropriate protection of intellectual property rights will be necessary to ensure the incentive of private enterprises to conduct technological developments. While making sure that the interface can be used freely by all users under appropriate conditions, intellectual property rights should also be appropriately protected.

(iv) International harmonization

In an advanced information society, interoperability should be achieved on a global scale. In working toward global scale interoperability, the means of putting standardization into effect and the choice of the standards and specifications to be used will be important. The users should be able to choose freely, from among the products and services offered throughout the world, selecting those they think are the best in quality and most reasonable in cost. To achieve this aim, all the processes from the establishment of open interface to applicability test/ interoperability and authentication should be carried out in harmony on an international scale.

The role of the government in efforts toward interoperability

In view of such basic aims and concepts, the role of the government in efforts toward interoperability are:

- to present a vision of what interoperability is like;
- to make reforms in the standardization procedure for public standards;
- to offer test beds;
- to promote the use of open interface in public systems; and
- to support applicability and interoperability tests.

Concerning interoperability, the basic concepts and policies are now being discussed in detail by the Committee on Interoperability and the Industrial Structure Council.

Appropriate Protection of Intellectual Property Rights

In an advanced information society, not only text but also audio, visual, and image information are handled as digital information. Contents in digital form will be distributed to all parts of society through an extensive network system. For such a new society to function effectively, it is necessary to establish an environment in which everyone may share the same information through the network and in which everyone will be able to use the information freely under the same conditions.

With the development of digital systems and networks, it will be easy to copy, use, or alter the contents without the consent of the person who provided the information, and thereby cause disadvantages to the provider of the information. However, if we have to ask for the consent of the rightful claimant every time we make alterations to the content or transmit the contents to others, this will greatly hinder utilization of the contents. Such problems and many others pertaining to the distribution of contents through the network will arise.

For an advanced information society to function successfully, it is important that the contents be supplied sufficiently and be easily accessible through the networks. There must be a good balance between protection of the right-holder and securing unhindered use of the contents. Therefore, in dealing with this problem, it is important that the legal aspects, the institutional aspects, and technological aspects of the problem be dealt with comprehensively. Specifically, the following measures are required.

(i) Legal aspects

When the existing intellectual property rights laws were enacted, there was no consideration for the advance of digital systems and networks. It is, therefore, necessary to reconsider laws to make them better adapted to the new environment. Specifically, it is necessary to reconsider the concept and meaning of right of reproduction, right of wire transmission and right of transmission, the meaning of the limitations on copyright such as reproduction for private use; and the moral rights.

(ii) Institutional aspects

Whenever the contents are altered, copied, or transmitted through a network, it may become necessary to ask for the copyright owner's consent individually. This may hinder the smooth use of digital information and the appropriate protection of rights. To avoid this, it will be necessary to consider an intensive supervision of copyrights.

(iii) Technological aspects

The problems of unauthorized reproduction and unauthorized use of digital information obtained through networks cannot be solved unless copying and employment of digital information can actually be controlled and supervised. It is extremely important, therefore, to use software technology and hardware technology to develop technological measures for controlling the use of information distributed through the network. Together with the development and diffusion of systems to supervise the use of information, it also will be necessary to consider legal regulations to prohibit actions which will partly or completely damage the functions of the supervisory systems.

Through the network, the contents will be distributed to all parts of the world instantly. Therefore, it will be important to work on the protection of intellectual property rights on an international scale in harmony with the other countries of the world. It is desirable that the World Intellectual Property Organization (WIPO) begin a concrete and full-scale discussion immediately on whether the existing treaties such as the Berne Convention are adaptable to the new

environment created by advances in digital and network technologies, and if not, to consider which points need revision.

Moreover, for the realization of international harmonization, it is necessary to discuss the institutional and technological aspects of the problem. It would be advisable to work on such themes as the intensive supervision of copyright on an international scale, and the development of and experimentation with digital information control systems as international projects.

Security/Privacy

In an advanced information society, it is extremely important to set up measures to guarantee the security of information systems and to protect personal information obtained through information systems. For example, if an information system were to break down or be attacked, the harm would not be restricted to economic activities but could spread to every phase of people's daily lives.

Also, along with the diffusion of information systems, all sorts of information concerning an individual may be collected and stored while the person is completely unaware of the fact. Such personal data can be abused or used for many different unexpected purposes. As for security measures, we have computer systems security standards, computer virus prevention standards, the certification system of recognizing business establishment of information processing service as acting on the safety measures for computer systems, and a computer virus damage reporting system. As for privacy measures, there is a personal information protection law for the public sector, and for the private sector, guidelines for the handling of personal information.

However, along with rapid developments in information-communication technologies as seen in the down-sizing of computers, and open networks, information systems are changing from the formal central processing with the mainframe computer at the center, to distributed processing types such as the client-server system. Moreover, open computer networks like the Internet are developing at a rapid pace.

In such a situation, the revision of existing measures and the establishment of new measures issues require urgent attention. To explain in detail, we need to work on the following measures.

(i) Measures against hackers and computer viruses

Along with developments in distributed processing and open networks, we can expect damage by hackers and computer viruses to become even more serious than before. Existing measures are not effective in dealing with such new problems. We need to revise the computer virus prevention standards and the computer virus damage reporting system. R&D on computer virus prevention should be promoted and legal measures also should be considered. It also is advisable to cooperate internationally by establishing a system whereby countries can share information on hackers and computer viruses with other nations of the world.

(ii) Measures for encryption and authentication

Encryption and authentication technologies, which make it possible to develop secrecy functions to prevent data leakage, and to assure completeness of data and the authenticity of digital signatures, are extremely important to ensure the security of information systems. In our country, there is a lack of awareness of the need to use encryption. And, because the infrastructure is not sufficiently prepared, encryption and authentication technologies are not used effectively. In other countries, there are discussions about the use of encryption and authentication technologies, for safety guarantees, criminal investigations and protection of individuals' privacy. In view of such facts, we should endeavour to prepare an infrastructure through which to develop encryption and authentication technologies, and to promote the dissemination and use of encryption and authentication systems. Moreover, to enable information

processing beyond national boundaries on an international scale, it is important that nations set up integrated systems related to the use of encryption and authentication technologies.

(iii) Measures to protect privacy

For an advanced information society to function smoothly, it is important that personal information be justly protected. In order that public organizations, private businesses, etc., handle personal information correctly, and in order for personal information to be controlled justly, it is necessary to consider the contents and application of existing guidelines. It is also necessary to consider how we can establish internationally acceptable protection levels and protection methods for personal information.

(iv) Revision of the electronic computer system safety standards

In view of recent advances in information technology, such as the development of open systems and the down-sizing of computers, it is necessary to revise the existing security standards so that end users can set up security measures effectively. Moreover, in order to set up security measures which are in harmony with international interests, it is necessary that our standards be coherent with the enacted OECD security guidelines and security evaluation criteria now being discussed at ISO/IEC.

(v) Security evaluation criteria

It is important that our country participate actively in the current ISO/IEC efforts to establish international standardization of security evaluation criteria. Considering the fact that the US and countries of Europe already have security evaluation criteria which they apply to information systems-related equipment to evaluate their security level and to grant authorization, we must establish similar security evaluation and authorization systems in our country, too, at as early a date as possible. In order to achieve international harmonization in the application of evaluation and authorization systems, it is necessary to discuss measures whereby the countries of the world can mutually approve each other's evaluation and authorization results.

Supporting the Developing Countries

There are two kinds of support which we can give to the developing countries in their efforts to establish advanced information societies. One is to help them build up the necessary human resources, technology, and communication infrastructure. This can be done by giving financial assistance through yen loans, offering technological assistance, and by supporting their R&D activities.

Another way to give support is to establish a network connecting the developing countries with the advanced countries. Such a network will help to diminish the disparity in informatization standards between the developing countries and the advanced countries. The network will give the developing countries greater access to new markets and new information, and will thereby speed up economic growth.

At the APEC meeting of ministers on small and medium businesses held in 1994, the problem of access to information was addressed. The Asian area seems to have strong interest in advanced informatization, and our country's responsibility is extremely large. We should be careful that in giving support, that we not try to apply the logic of advanced countries, but rather consider the individual needs of each country in the promotion of informatization.

Strengthening of International Cooperative Ties through Joint Projects

The Internet, which has now grown into a large network with over 30 million users, was originally a research network. This fact shows that the impact of public projects on the advance of informatization is extremely large. It is through such public projects that the general public will come to have a deeper understanding of an advanced information

society. At the same time, issues related to the realization of an advanced information society such as standardization, intellectual property rights, security and privacy, etc., will take large strides toward resolution in the development process from pilot projects to applications for actual use. For this reason, it is of great importance for the advanced countries to conduct pilot projects. These pilot projects should be conducted as joint projects on an international scale. Each country should regard these projects as important undertakings toward the realization of an advanced information society and participate in these projects actively.

It is necessary for our country to make further efforts to promote application development projects, such as the model remote medical care project to join specialized physicians in hospitals in large cities with clinics in remote rural areas of the country, and a research and development project on a model electronic library which would offer the technological data needed in an advanced information society.

It is also necessary for our country to undertake new projects such as an electronic network between the government and small and medium enterprises for electronic commerce. Additional research is needed for the realization of an advanced information society in areas such as electronic signatures, electronic notarization, and electronic account settlement. In working on such projects and research, it is necessary to strengthen international cooperative ties and to promote undertakings such as joint projects. In so doing, it is desirable that our country take a leading role and make large contributions to the promotion of the establishment of the world information infrastructure.

Suryatin Setiawan
Senior General Manager, PT TELEKOM Indonesia

Information Infrastructure: Its Impact on the Nation and the Economic Development Program

For Indonesia, the world's most expansive archipelago consisting of 17,508 islands and the fourth most populous country in the world, the development of an Information Infrastructure can not wait until the National Information Superhighway is available. However, effective utilization of the available information infrastructure will support the national development program. In line with the growth of the economy and the improvement of the quality of life, the information infrastructure will also be developed to form an appropriate and effective electronic superhighway for day-to-day operation of the economy.

Indonesia, with its endless diversity in almost every aspect of life, is moving towards a future globalized and liberalized economy bringing along all of its uniqueness which includes: a large archipelago country; cultural, religious, language, and social diversity; a large population and a low-ranked Human Development index. The Information Infrastructure has been identified as being used for the National and Economic Development Program effectively on a nationwide scale, especially for the development of remote areas, where the economy and infrastructure are not yet completely developed. This utilization pattern will continue working both for the "far reaching scheme" in the area of the Human Resource Development program and for the "immediate scheme" to support the present economic development program.

Indonesia's Information Infrastructure was already effective in the early 1970s when satellite-based nationwide radio and television broadcasts were used to transmit programs directed towards a large number of community areas all over the country. The broadcast programs carry information such as better farming techniques for better productivity, family planning and health-care, basic education, and "law awareness" improvement programs. On the basis of the transmitted information, the groups organize discussions among themselves to exchange views, in order to understand the substance.

The Information Infrastructure also plays a very strategic role in distributing information to every citizen in an effort to narrow the gap between the information rich and poor. Satellite-based communication facilities are also utilized to support the "open university" program. Recently, a Research Information Infrastructure, linking major research centers in two major cities, was inaugurated to improve their Information Infrastructure to operate EDI in some sea ports, a world class stock exchange in Jakarta, and a nationwide virtual banking system. Those developments in Indonesia's NII are taking place to welcome the APEC liberalized economy in the year 2020.

Before the mid-1980s, Indonesia relied totally on oil, timber, and agriculture for export income. At the height of the oil boom in 1982, over 80 percent of export revenue was derived from oil exports and 70 percent of government revenue was from oil and gas. A dramatic fall in export income happened in 1985 after the world oil prices plunged. Because of this, the country's major income resource is changing from agricultural and natural resource products (including natural resource-based industry) to manufacturing or non-oil and gas products. As industrialization continues – it will need another couple of years until it becomes the core of the national economy – the tourism industry will play a dominant role in collecting foreign exchange, while domestic income is escalated through an effective "information-technology-supported" tax system. In conjunction with that pattern, the National Information Infrastructure of Indonesia will be developed to support the tourism industry, tax management network and improving the country's attractiveness for foreign direct investment. The development of the information industry should also encourage private sector/industry participation in order to promote local industries, such as the manufacture of telephone exchanges, terminals, cables and transmission systems.

Brian Johns

Chairman, Australian Broadcasting Authority and Broadband Services Expert Group

Today I want to give you an Australian perspective on developments, and in particular tell you about the report of a group I have been chairing – the Broadband Services Expert Group (BSEG).

Like many countries, Australia regards the development of new communications networks as vital. In the words of the Australia Prime Minister Paul Keating, "How well we play the information game will determine how well we prosper as a nation." However, sifting through the enormous amount of information, speculation and hype to decide what we should do to implement a national information infrastructure is not easy.

I have some sympathy for representative Edward Markey, Chair of the United States House of Representatives Sub-committee on Telecommunications and Finance, who was quoted as saying: "The good news from Washington is that every single person in Congress supports the concept of an information superhighway. The bad news is that no one has any idea what that means."

In Australia, the BSEG has been grappling with these issues, and although we do not pretend to have all the answers we do think that we are close to reaching agreement on some principles and processes for handling the difficulties as they arise.

Set up in December 1993, under my chairship, the BSEG was asked to report on the preconditions for the delivery of broadband services to homes, businesses, and schools. The group was designed to be a representative body, drawing from broadcasting, telecommunications carriers and users, industry, unions, researchers, and government. From the first, we consulted widely with the community about what was wanted from the new communications technologies.

An Interim Report was produced in July 1994, and the BSEG Final Report, Networking Australia's Future, has just been released. In the Interim Report, we laid down some basic principles for the introduction of broadband services. Many of these principles are similar to those put forward in other national information infrastructure initiatives. For example, networks should be open, private investment encouraged, and inequalities avoided. However, there were some distinctly Australian perspectives, notably the view that broadband services should reinforce our cultural identity.

This conclusion is perhaps inevitable given sensitivities in Australia to our exposure to the full force of international entertainment industries since the early days of cinema. This sensitivity is sometimes viewed as mere protectionist resistance to imported cultural products. But I believe this is a fundamental misunderstanding of the real concerns of Australians, and indeed of many other peoples in both the Asia-Pacific and Europe.

The concerns are not about the availability of foreign programs, for we are enthusiastic consumers of American, British and other foreign film and television products. There is, however, a legitimate concern in Australia that there be a diversity of programming available, a diversity which also allows cultures to be reflected and supported. Time and again this has also proven to be good box office – local consumers want to see their own society and concerns reflected in what they watch.

This is not just an Australian concern, however. The preservation of cultural identity is becoming an issue for more and more countries in the developing world, as the globalization of broadcasting and entertainment industries gathers speed. These concerns are just as legitimate in the multimedia, broadband world as they are in film and television. Concern about reinforcing our cultural identity led us at an early stage to the conclusion that content, rather than technology, should be the focus of our attention. At the time of our Interim Report, this conclusion was rather a

pioneering approach, although I am glad to see that it has become widely accepted, almost commonplace part of the debate now.

The emphasis on content rather than technology has also been useful in turning debate around to what sort of content we want to see on new communications networks. We hear more about what people may actually want and find useful, and more about people creating their own content for distribution across networks. It makes a welcome change from talk of 500 channels of cable television!

This emphasis on content in our interim report quickly struck a resonance with the Australian government. In October the Prime Minister announced a number of measures to stimulate the growth of the multimedia industry, citing the work of the BSEG in so doing The measures include substantial seed-funding for multimedia projects and a commitment to training and development facilities.

In our Final Report we sought to develop a framework for an information infrastructure policy. In doing so, we decided against endorsing any particular technology to deliver services. We did not seek any commitment to cabling every home in Australia with optical fibre by a set date. Instead we have taken the view that an evolutionary strategy is more likely and most appropriate for Australia.

Evolutionary Approach

It was clear to us that no one really knows what the exact shape of the technologies will be in the future – for example, how much it will cost to deliver broadband services into the home via optical fibre as opposed to hybrid cable or other means. We can be sure that technologies will continue to advance, but we can't be sure of the precise directions.

More importantly, the world still only has a hazy idea of what services people are going to want – and be prepared to pay for. It is exciting to speculate and dream, to be entranced by the possibilities. But it is very difficult to build a convincing business case at the moment about particular services.

This is not unusual – no one really predicted the demand for such inventions as the telephone and computer either. But the uncertainties about technology and demand for services do pose problems for planners and policymakers. The cost of connecting everyone in Australia to interactive broadband networks has been estimated at something like $30 billion US ($40 billion Australian). This is a very large sum for a small country like Australia, given the uncertainties.

Another reason for an evolutionary approach is that many new communications services can in fact be delivered over narrowband networks. We only have to look to the staggering growth of Internet to see this in action. Australia already has a sophisticated communications infrastructure on which to build new services. Within five years all telephone exchanges in Australia will support ISDN. While ISDN has failed to capture the market share envisaged at the time of its introduction we believe that the time is now right for it to make its mark, as new services become available. We have a competitive telecommunications environment which will become more so in the near future. And, we have telecommunications carriers committed to building broadband networks – but in a way dictated by market demands rather than imposed from above. By taking advantage of the opportunities offered by this existing narrowband infrastructure, an evolutionary strategy gives us the opportunity to build our expertise, and to develop new applications now, without having to wait for a fully-evolved broadband network.

This ties in with our emphasis on content, by recognizing that content providers can get a head start on developing applications now for narrowband (and CD-ROM) which could later migrate to broadband networks. Again we think this is pioneering work, perhaps the first explicit spelling out of a transitional strategy to make the most of current developments and infrastructure as a preparatory stage to broadband networks.

We have also looked at how to avoid creating inequalities between information rich and poor – not an easy task given difference in income, location, interest and, familiarity which will affect the take up of new technologies. In the near

future any notion of a universal service obligation – such as we have in Australia with telephone service – is impractical. The cost of providing connections to everyone in Australia would be huge. Instead we have proposed a concept of universal reach. Not everyone can (or will want to) have network connections to their home. But everyone should be able to have access to network through community access points such as schools libraries and community centers. We have recommended that government commit to providing network links, at first narrow-band and then broadband as it becomes available, to schools and libraries throughout Australia. This is fundamental for ensuring community access to the new services.

Access in itself, however, is not enough. We have also recommended education and training strategies in order to prepare the community to make effective use of new networked services.

We believe our evolutionary strategy must be backed up by ongoing advisory and policy development mechanisms. Recognizing that we cannot expect to answer all questions now, we have proposed that the Prime Minister chair a council to provide leadership for an Australian strategy on information services.

Other key elements of the Final Report include:

- a scheme to protect the privacy of users of advanced networks;
- an emphasis on government use of networks, both to improve the efficiency and effectiveness of its own operations and also as a spur to the use of new services elsewhere in the community; and
- a re-enforcement of our belief in open access to the networks service providers, regardless of their size.

Conclusion

This has been only a very quick summary of the BSEG Report. However, many countries around the world face similar issues as they upgrade their communication services. We believe that solutions to the problems of convergence and globalization must be worked out by countries on the basis of what is most suited to their own circumstances. But we can still learn from each other. It is essential that we continue to exchange information and ideas about these developments through meetings such as this.

Finally, we believe that the evolutionary, demand-driven approach we are developing in Australia will leverage our existing advantages, and avoid locking ourselves into positions which may prove untenable. We are convinced that providing content for the new networks will be an opportunity for those countries, who act quickly, to encourage the development of appropriate skills and facilities. With the correct policy settings in place, I believe that we can demonstrate that new communication services need not be seen as a threat, but as a means of reinforcing and invigorating cultural identity as well as our economies and societies.

Yunjong Wang
Research Fellow, Korea Institute for International Economic Policy

The information industry, particularly the telecommunications industry, has been growing rapidly as demand for information services has increased dramatically and become widely diversified. Such demand is expected to expand further. Hence the role of information infrastructure in social and economic development will be crucial to satisfy growing demand for information services. In this regard, information infrastructure is "new infrastructure" for both global and regional economic development, because adequate channels for information flow will be the most essential part of the newly emerging information society.

Conventional wisdom states that advances in information systems are by-products of economic development. Hence, the more developed a country, the better its information system. The often used ratio of GDP level to telecommunications penetration is a typical example of this notion. According to World Bank data, main lines per thousand persons in OECD countries is 475 on average, while it is only three in low-income countries, 73 in middle-income economies, and 122 in high-growth economies. Recent studies have also found strong evidence to support the role of information infrastructure in economic development, although the causality from information infrastructure to economic development has been relatively ignored by most economists and policymakers. Noting that information and communication technologies have become key factors behind firms' competitiveness at the micro level and behind economic growth at the macro level, it is now widely recognized that information infrastructure plays a key role in supporting all information-related services, such as production, processing, and distribution of information. To consider the impact of information infrastructure on economic development, I will address three types of positive benefits.

First, at the macroeconomic level, economic integration is promoted by swift exchange of information. When economic activities expand their spatial scope beyond national borders, the role of information infrastructure becomes all the more important, since it is the best means of overcoming the distance between economic actors. With world-wide information networks, isolated areas in the world will diminish. Thus, more resources will be made available and will be more efficiently utilized through trade and investment. The global trend of international integration certainly depends very much upon the construction of information infrastructure.

Second, at the consumption level, ordinary people in the world, previously constrained by limited information, can enjoy a wider variety of goods and services through increased awareness of other consumption possibilities. With more information and better knowledge of goods and services, consumers will benefit from better consumption choices.

Third, at the production level, firms will experience a greater market expansion through gaining access to more information about market size, demand fluctuations, consumers' tastes and other competitors' strategies. For instance, multinational corporations can hardly coordinate, unify, and speed up world-wide operations – from procurement of inputs to production to final sales – without proper vehicles of information exchange. More importantly, firms will face a higher degree of competition, because it will be harder to maintain monopolies in the global market even if they have strong competitive advantages in local markets. Furthermore, the degree to which a firm has access to information will in part determine its competitiveness. Thus, firms will make big investments to build their own information networks and systems. In this regard, information infrastructure as a public provision will be important in enhancing the overall efficiency of firms' production and marketing.

In light of the fact that there are many positive benefits which cannot be addressed in the time allowed, I would like to emphasize one particular aspect of information infrastructure in terms of global economic development. While the technical jargon "information infrastructure" delivers its own meaning clearly, information infrastructure also has the characteristic of being a public good. When we talk about the information industry, for example, the telecommunications industry, the information industry has a commercial purpose, no matter what type of ownership

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structure that industry has, public or private. However, information infrastructure is more likely to be a public good which is shared by all economic agents wanting to gain access to information services. Consequently, the first step to take in Asia-Pacific economic cooperation is the creation of a stable and adequate information network through close coordination among concerned nations in the region.

While advanced countries have enjoyed widespread use of information technology and infrastructure, information technology has also started to reach the lesser developed countries, due largely to declining costs of hardware and software, the advent of microcomputers, and advances in telecommunications. Furthermore, many multinational corporations and government organizations are investing in global information systems and global information networks in the interest of international business and general social welfare. Due to the application of information technology at the global level, the barriers from national boundaries are beginning to disappear. In addition, many other countries (e.g. Korea, Singapore, India, China, and Russia) are also making determined efforts to assimilate information technology as an important ingredient in their developmental infrastructure.

Nevertheless, there is widespread concern that developments in information technology are and continue to be concentrated in just a few countries. Even if the demand for information services to modernize production and enhance international competitiveness far outweighs existing capacity in most developing countries, these developing countries often feel left behind in recent developments in information technology. One of the key issues that has enlivened the telecommunications policy debate in recent years is "infrastructure competition:" who should be permitted to construct network infrastructures and under what circumstances? Many countries have attempted to draw regulatory lines to define what can and cannot be done, according to:

- the clients served (the public, a closed user group, a single user or self-provision);
- the services offered (a full range of services or specialized services for data, mobile communications, satellite communications, or leased lines); and
- the network provider (the holder of a concession or license, a company with less than a certain maximum percentage of shares owned by a foreign company or government).

Such regulatory distinctions are usually designed to protect "universal service" or "national security" although these objectives are rarely specifically spelled out, making it difficult to monitor policy success.

Most developing countries are very much concerned about how they will compete with advanced countries that possess state-of-the-art information technology. Once the door to competition is opened, it is difficult to leave it only partially open. This is because regulatory line-drawing is inevitably an arbitrary exercise. For instance, enterprises which are constructing mobile communications networks need leased lines or microwave links between switches/cells. If they cannot rent these at a favorable rate, or if they are charged too much for interconnection with the PSTN, it will be impossible for them to compete on price. A similar difficulty arises when an enterprise is allowed to construct infrastructure to carry data but not voice, even though there is no technical distinction between the two. Regulators would be better advised to make the process of awarding licenses as technologically-neutral as possible. Furthermore, a globally efficient and equitable information infrastructure should be linked to technology transfer and the active participation of developing countries.

Finally, it is also important to consider cross-country differences in network systems when constructing a global information infrastructure. The harmonization issue is not a purely operational one. Different systems and facilities hinder the efficient flow of information across borders and will incur extra costs for conversion and harmonization (mix and match). An international standard in information services will contribute to the development of global information networks despite there being different carriers in different countries and companies. However, the establishment of an international standard should proceed with caution, and should not be determined in a hegemonic way by a few agents monopolizing information technology.

Linking the World

Honourable John Manley
Minister of Industry, Canada

We have come here from more than 40 nations – under the auspices of three major international bodies – to take stock of developments in global communications, and to foster co-operation between our governments and our economies.

We come to the table as policymakers, business executives and educators, to exchange ideas and information, to gauge our progress, and to look at how we can work together to achieve a dream we all share – a global information highway.

Vancouver is an appropriate site for our deliberations. As a great port on the western edge of North America, it is a place where economies and cultures connect. It is fitting that we come here to work towards the interconnection of our economies and cultures through the electronic networks of the future.

I am particularly pleased that we are holding this meeting right across the street from InterComm '95, the pre-eminent Canadian trade show, showcasing technologies, products and services for the information highway. I urge you not to miss the chance to see some of the exciting work being done by Canada's information technology and telecommunications companies by adding InterComm to your list of groups not to miss in Vancouver.

Some of you may have attended the last InterComm trade show, in 1993. If so, you may recall that Canada, like many countries, was thinking about the information highway for the first time. And although much work remains to be done, all of us have made significant progress in just two years. Significantly, the discussion has moved into the international arena, to meetings such as this one and the G-7 Conference on the Information Society, which begins this Friday in Brussels, Belgium.

These meetings are important tools in the growth and development of a global information highway. As leaders within the communications sectors of our respective economies, we have a responsibility to ensure that our people are able to benefit as much as possible from the new emerging and converging information technologies. How can we do this?

The International Challenge

Rather than trying to take you forward in time, by talking about the future, I'm going to begin by asking you to travel in the opposite direction – towards the past.

In the early days of this century, like today, the world stood on the threshold of a technological change which would transform the way people live, learn, work and play. That change was the development of the first affordable automobile in 1908.

Henry Ford and other automotive pioneers left a legacy of transforming significance: a North American society in which almost 90 percent of households now have access to at least one motor vehicle, with 88 percent of all employees using it to get to work every single day. But imagine if the visionaries of the early twentieth century had been able to foresee some of the unintended effects of Henry Ford's invention. Pollution. Gridlock.

Perhaps the early automotive engineers would have decided to build in more safety features in the early days. Seat-belts, air bags and shatterproof glass, for example.

Perhaps the design could have been more friendly to the environment. If they had known what was coming, maybe even municipal planners would have been able to produce transportation plans that would take the enormous number of automobiles into account and would therefore be less disruptive to our cities and communities.

The impact of the information society will be no less profound. If we are to make this powerful force a positive one for everyone, the challenge facing us all involves learning from the past, maximizing the benefits and minimizing the problems associated with the widespread implementation of information technologies. This is both a tremendous challenge and a great opportunity. And it is a road which will be smoother if we travel together.

Emerging Issues

Some key issues are already coming into focus – issues which cross international borders and compel us to collaborate. For example, who will have access to the information highway? How can we promote diversity of content on the networks? What are the implications for global trade? And, of course, how do we ensure that the information highway fulfills its promise of enhanced productivity and jobs? Let me touch briefly on each of these.

The issue of access is important to Canadians. To echo a theme of David Johnston's remarks to you this morning, we are a people whose achievements in communications have often been born of necessity – due to our climate, geography, and diversity – our distances and our differences. These factors have made universal access to our communications networks a long-standing priority. It shouldn't surprise you that one of our key objectives today is to ensure that all Canadians have access to the information highway, at a reasonable cost.

But in an era when governments face tight budgetary constraints, Canada, like other nations, needs to come up with new financing and costing frameworks to help us achieve this goal. And all nations will benefit from sharing and exploring innovative solutions to this common challenge.

Another important dimension of access relates to where people can go to find information. In the age of printed information, we have the public library. But what will happen to these libraries in the information age? How can we ensure our citizens have easy access to their intellectual and cultural heritage – their information capital? Such considerations need urgent attention, for even today, we see a rapid transformation of information from a public good to a market commodity.

A key concern which Canada shares with other countries relates to content. There are two fundamental objectives at play here: the goal of promoting diversity and the open flow of information, and that of preserving and enhancing the cultural uniqueness of each nation. Neither objective is more or less legitimate than the other. The key is to find an appropriate balance.

Turning to the issue of trade, the very fact that we are here today is a reminder of the interdependence of our economies. Trade between nations is freer and more intense than ever, and strong international relationships have come to depend on a shared view of the importance of orderly trade and economic growth.

The information highway will bring great change to global trade patterns. Global markets, once the domain of multinational corporations, should be more accessible than ever to small companies, and even to individuals. This is a very positive development, but governments have a key role to play in making it happen. we must work together to provide a positive environment to electronic commerce – by agreeing on standards, ensuring network interconnection, privacy and security of information, and establishing rules to protect intellectual property.

More than anything else, the issue on the minds of citizens of all countries is jobs. All over the world, governments have seized on the information highway as a bright new catalyst for opportunity, productivity and employment. We do so with good reason, but the road from here to there will not be free of obstacles.

For all of us, success in the global marketplace will depend on advanced technology, on a highly-skilled work force, and on finding new ways to add greater value to our products and services. As the OECD indicated in its 1994 Jobs Study, "the main way to job creation in OECD countries must be through improved productivity in firms that have a solid capacity to innovate and use technology effectively."

The information highway presents other challenging issues for employment, as well – issues such as the quality and quantity of work available. As technology becomes "smarter," some skills will become redundant, while a new demand is created for others. In order to manage this change smoothly, we must help our citizens adapt to the need to actively pursue learning throughout their lives. We must collaborate in looking at the concepts of training and retraining, so that each economy can equip itself to deal with the challenges and changes imposed by technology.

Canada's Strategy

The notion of adapting our economies to face the future gives me a good opportunity to tell you a little about our strategy here in Canada. Last November, we outlined our approach in a major policy paper entitled *Building a More Innovative Economy*. The paper's thrust is to let market forces, rather than regulation, drive the development of the information highway and the content and services it will carry. The government's role is to be both a leader and a partner in shaping the development of the new infrastructure.

The Government as Leader

Building the highway is a massive undertaking which no government could tackle on its own. The rewards of building it rest with the private sector – and, of course, so do the risks. Our task as a government is to mobilize Canadians in a national effort to focus their creativity, resources and expertise on this common goal.

This view led me, just under a year ago, to appoint our Information Highway Advisory Council. Since David Johnston, the Chair, has already addressed you today, I will consider you to be informed on the Council's deliberations. I wish to point out, however, that I consider the work of the Council to be essential in delivering Canada's strategy.

Its members are leaders in their own fields, and their recommendations will have great influence on the government's approach to universal access, privacy, consumer choice, and a range of other complex issues, with the goal of ensuring the orderly development of the information highway in Canada.

The most important type of leadership the government can provide is to put in place a policy and regulatory framework which will allow the highway to flourish. I am very pleased with the progress we have made on this front. Canada now has one of the most progressive policy and regulatory regimes in this area.

Canada has introduced competition in the sale of terminal equipment, in the resale and private-line markets, in cellular and radio communications, and in long-distance telephone services. The results have been lower prices and greater choice for businesses and consumers,along with new investment and innovation.

In the last five years, we have completely revised our legislation. And we have overhauled our regulatory framework, opening almost all aspects of the telecommunications business to competition. Cable-TV operators and others can now provide local telephone service, and telephone companies can provide video dialtone and content services.

This year, we are going even further. The government has asked our regulatory agency, the Canadian Radio-television and Telecommunications Commission, to establish the rules for the convergence of services from cable-TV companies, telecommunications carriers and information providers. And we have set up a panel of experts to advise us on the question of competition between direct-to-home satellite service providers and cable-TV companies.

As you can appreciate, 1995 will be a year of huge significance for Canadian communications industries. The decisions we make and the quality of leadership we provide today may define the landscape of Canada's information society well into the next century.

The Government as Partner

I also see a key role for the government as a partner to the Canadian businesses, research and educational institutes, arts and cultural organizations and other levels of government.

In 1993, the government created the Canadian Network for the Advancement of Research, Industry and Education (CANARIE). CANARIE's goal is to accelerate the introduction of high-speed networks in Canada, and to position Canadian firms to capitalize on market opportunities. Phase One of the project was a success, and in *Building a More Innovative Economy,* the government announced funding for Phase Two – an investment of $80 million over four years, to be matched by $396 million from the private sector. In this phase, over 300 firms will take part in the CANARIE network.

CANARIE is just one example of the many ways we are using partnership to achieve our goals. The response of Canadian industry has also been impressive.

Last April, nine of Canada's largest telephone companies announced the Beacon initiative. The project calls for an investment of $8.5 billion over ten years to bring high-capacity fibre-optic telephone lines within reach of almost 90 percent of all Canadian homes and offices within a decade. It is expected to create 12,000 jobs.

In Québec, Le Groupe Vidéotron has teamed up with five Canadian partners and a US media conglomerate to form a $750 million consortium, known as Universal Bi-directional Interactive, or UBI. It will deliver interactive services to the home starting this spring, with a goal of serving 80 percent of Québec homes by 2002.

We welcome such initiatives. Canada's business environment will become increasingly competitive, and this will stimulate investment in the development and use of advanced technologies. And as Canadian companies are already demonstrating, being competitors doesn't mean you can't be collaborators.

Working with other Nations

The same principle holds true at the international level. There are many nations with the capability to build their own information highways. But if their goal is to make this process as positive as possible for all people, creativity and co-operation must cross borders, oceans and time zones.

Canada has always been a strong promoter of multilateralism – especially international organizations that promote the development of global communications networks and international trade agreements.

This year, we celebrate the 50th anniversary of the United Nations – but I would like to pay tribute to a UN specialized agency which is actually much older – the International Telecommunications Union (ITU), which has promoted the world-wide development of telecommunications for 130 years.

We want to work with our ITU partners in pursuing the interconnection of the world's communications networks.

In international trade, the North American Free Trade Agreement has created one of the world's largest integrated markets for advanced technology goods and many services. This presents remarkable opportunities for the people of Mexico, Canada, the US, and soon, Chile.

Canada and most of the countries represented here today were also signatories to the GATT Uruguay Round, which resulted in the creation of the new World Trade Organization (WTO). As a result, the world is evolving towards a much

more open trading structure for all goods and services, which is conducive to the development of a global information infrastructure.

The WTO will help to break the ground for the global network. As we eliminate barriers to trade between nations, we will encourage the flow of information, and commerce creating an even greater need for communications networks which will link the world. It is the global equivalent of what we are doing at the national level when we deregulate markets and create convergence towards large, open systems.

The most-favoured-nation and national treatment principles were the foundation stones of each and every round of the GATT in the post-war era. The world's economic growth has been due, in no small measure, to their success in liberalizing trade.

Similarly, as we enter the era of trade in telecommunications and information-based services, Canada believes that the most-favoured-nation principle should be the cornerstone of international arrangements for the telecommunications sector. This will encourage a trade liberalization approach to the construction of the world's communications infrastructure and to all the exchanges that flow across its arteries.

To this end, Canada favours the broadest possible participation of countries in the GATS negotiations on basic telecommunications in Geneva. Broad participation, and application of the most-favoured-nation principle, would benefit all parties; it also means that the participating parties will be the ones that set the trade rules for the global information society.

I would like to make one final suggestion relating to a key way for nations to work together to promote the development of a global information society that is equitable to all people. And that is by helping to overcome the information inequalities of the past. Of all the gaps between the developed and the developing world, none is growing faster. And none is more compromising to economic and social development in the majority of developing nations. Developing countries, which are often part of the fastest growing regions in the world, need the global information highway and the business opportunities it presents to sustain their momentum.

Digital wireless technologies offer developing countries a wonderful opportunity to catch up to their competitors. Canada has valuable experience in providing universal access across forbidding terrain by deploying technologies such as satellites and wireless telecommunications. We want to share this experience. We have been working closely with the ITU to implement the Buenos Aries action plan, and to assist in the development of the telecommunications infrastructure in the least developed economies.

Ending information inequalities between economies must be one of our key objectives in the development of the global information infrastructure. Nothing will do more to ease the integration of all nations into the global economy.

Let us all share this responsibility. And let us also share a determination to make the growth of the information society as positive as possible for all people. We may have different views on how we approach this overriding goal. But no one government, and no one person, has all the answers. I believe that as we contemplate this incredible challenge, we are both competitors and collaborators. We must use both co-operation and competition to bring about economic prosperity. We must build our information highways effectively and quickly. And we must promote the right to access and right to communicate for everyone.

A century from now, people may look back on this generation as the pioneers of the information society. What would you like them to say about us? I think we would like them to believe that we did our work well. That we showed foresight – and perhaps even insight. That we were quick to realize our interdependence. And that while we knew we could not predict the future, we were wise enough to plan for it. Being here with you today, I am more optimistic than ever about our chances.

Perspectives on Creating a National Information Highway Initiative

Anu Lamberg
Special Adviser, Ministry of Transport and Communications, Finland

INFORMATION HIGHWAYS IN FINLAND

Competitive Telecommunications Market

Finland has a forefront country implemented a truly competitive telecommunications market. The achieved experiences have been extremely positive in terms of network tariffs and quality of services. Accordingly, the government is pursuing its active licensing policy further. It also promotes network service provision by other measures, in order to forestall unhealthy competition, and to promote interoperability of networks and services both nationally and internationally. It is the national interest of Finland to speed up the liberalization of the telecommunications market in Europe.

The level of technology and operability of information networks is based on the functions of telecommunications operators and their business partners. The competitive telecommunications business environment in Finland is defined by the legal framework set by the government. The present state of liberalized competition has been created through several phases. In 1987, the first steps were taken in this direction when a new *Telecommunications Services Act* was put into force, eliminating all monopoly rights which had until then been established in law. All telecommunications activities were made subject to licenses describing the rights and duties of the licensee. About 30 new licenses have been granted since the Act came into force. A set of new Acts and steps has been taken since, with the result that all domestic long-distance and local telephone services are freely competitive as of January 1, 1994 and international telecommunications from July 1994.

Telecompanies and service providers as private enterprises are responsible for the quality and competitiveness of the services they provide. Public measures in communications aim not only at securing the legal framework for telecommunications but also at encouraging and promoting development work in order to see that the quality and accessibility of services can be maintained. In addition, authorities in Finland are advanced and professional users of network services. A recent example of this role is construction of the intra-governmental radio network.

In 1993, the telecommunications operators had about 2.7 million telephone subscribers. At the same time, the density of the telephone subscriber lines in Finland was as high as 54.4 percent. It is estimated that about 43,000 PABXs and key telephone systems were in use in Finland. A total of 3,001 million local telephone calls and 585 million trunk calls were made. Of the existing 2.7 million subscriber lines, 62.1 percent were digital.

National Guidelines for Information Networks in Finland

The national guidelines for the development of information networks are a part of the decision in principle taken by the Council of State on measures to develop the Finnish information society. The main areas of development are:

- The Finnish information highway program;
- Basic and supportive services of information networks; and
- Transport telematics.

The Finnish information highway program include the following subprograms:

- Organizing of and support for a broadband experimenting and piloting network environment
- Definition and description of the Finnish Information Highway concept and architecture;
- Evaluation of the status of ISDN.

This program is speeding up the implementation and dissemination of national broadband communications. A national broadband network environment will be constructed mainly on existing commercial networks. By nationwide cooperation, advanced know-how on e.g. ATM technology, wireless data communications and multimedia, the Finnish telecommunications and information technology cluster will be strengthened further.

The telecommunications cluster consists both telecommunications services and the telecommunications industry. The total turnover of the Finnish telecommunications cluster in 1992 was about FIM 13 billion, which is about two percent relative to GDP. The export products of the telecommunications cluster are primarily telecommunications industry products. Industrial exports in 1992 were about FIM three billion. By international standards Finland is one of the leading exporters of the telecommunications equipment. Telecommunications equipment accounts for 3.45 percent of Finnish exports, which was the third highest share of any country in OECD. Exports rose by almost 80 percent in 1993, i.e. by well over FIM 5 billion.

A national consortium, in early 1995, started a common program to test and promote the use of broadband communications in multimedia applications in Finland. The consortium is headed by Nokia and it consists of local telephone companies, Telecom Finland, Technology Development Center and some of the biggest media companies in Finland. An open multimedia pilot platform will be established using existing ATM networks and other broadband networks, and special measures will be taken to stimulate SMEs to develop multimedia technology and new services around the network. During the next three years the volume of this program is expected to rise to 20-30 MECU.

The open architecture of the Finnish Information Highway will be defined in cooperation with affected parties. This description will define how the Information Highway will be formed as a combination of various broadband and other technologies and services. The specification will include a suggestion on how to incorporate Internet in the architecture.

Telecom Finland was the first public network operator to offer long-distance commercial ATM service in Europe. In 1994 Telecom launched Datanet ATM and other ATM-based LAN interconnect services. Telecom Finland's Datanet back-bone links Finland's 10 largest cities at the present but it plans to extend its backbone with ATM links to Stockholm and St. Petersburg, Russia, in the near future.

Telecom Finland's approach is different from that taken by most telecom service providers in that it supplies whatever termination equipment the customer wants, such as ATM LAN switches or Ethernet hubs. Also local telephone companies, headed by Helsinki Telephone Company, offer ATM services.

In the European Information Society Programme, ISDN is considered as the predecessor of the European Information Highway. ISDN provides digital switched connections at medium speeds. The Finnish subprogram is analyzing the reasons for the modest success of ISDN in Finland and is evaluating the possibilities of ISDN to meet in the short-term the high-speed data communications requirements by households and private companies, i.e. whether ISDN could provide one access to forthcoming broadband solutions.

The telecommunication networks in Finland are highly digitalized. By 1993, all the trunk exchanges and 51 percent of the local exchanges were digitalized. The telephone network is already used for local calls, trunk calls, radio paging services, telecopy, public data transmission and surveillance and control (S&C) services.

The development program on basic and supportive services of information networks includes the following subprograms:

- Development of basic information network services;
- Evaluation and development of supportive services in information networks;
- Data protection and security and other related legal frameworks;
- Development of interactive information network services and their interoperability.; and
- Promotion of EDIFACT- messaging in information networks.

The objective of the programme is to achieve considerable improvements in information services provided through networks. The basic services will cover such generic services as email, file transfer, video services, interactive multimedia and network directory services. Supportive services will cover data protection and security, user identification and invoicing, statistics and advanced terminal access based on smart-cards technology. High quality basic and supportive services will provide preconditions for quick and extensive network service applications. The programme also includes further development of the Finnish open interactive service architecture, TELMO and its connections to Internet.

In Finland there are five information network service users per population of 100, a figure exceeded only by France with its broad Teletel/Minitel usage. It is expected that by the end of the decade almost every organization and 50 percent of households will be service users in some form and volume.

The application areas that are most used include banking systems, electronic mail and messaging systems and directory services. Information services, business-to-business type applications as order entry and entertainment are also widely used.

According to a survey carried out in Finland in autumn 1994, it was found that 99 percent of the civil servants in the state administration work in offices with access to electronic mail.

In Finland, there are more Internet nodes per population than in any other country.

Transport telematics is central application are in the field of information networks in both Finland and the EU. The objectives come from the transport policy such as improving the traffic safety, the efficiency and economy of transportation and even reducing the needs of mobility. One main objective is to connect the various transport modes together into an efficient totality with the help of transport telematics. Telematics also provides an opportunity of optimizing the operability of each transport mode. Telematics supports the reduction of logistics costs of the Finnish companies and improving the competitiveness of transport industry.

In the field of transport telematics, Finland is an active participant in international cooperation within research, development and standardization in order to ensure the international interoperability as well as to improve know-how and competitive domestic products. Emphasis points of transport telematics in Finland are based on the specific features of our transport conditions. These emphasis points are:

- Public transport fare collections systems;
- Public transport management;
- Logistic applications;
- Wintertime transport; and
- Information services based on radio and cellular networks.

The road weather conditions are monitored by 200 automatic road weather stations and road condition monitoring cameras located on the road network. The traffic flow is monitored using an automatic system consisting of 180 detector stations.

Smart cards of various types of technology are used in local bus travel throughout the country as well as in transport and parking services of several towns in Finland.

The most important project in logistics applications is Telematics in Foreign Trade Delivery Management in the Baltic Sea Area (TEDIM). The objective of this project is to improve the competitiveness of the various logistics counterparts and to support transport between Russia, Finland, and the European Union by creating solutions based upon new information technology and telecommunications.

The State of the Art in Mobile Telecommunications

Mobile communications have experienced the fastest growth in telecommunications during the last decade. Now it is possible to make a phone call from almost anywhere with a mobile phone.

There were about 500,000 subscribers to the mobile telephone networks in Finland at the beginning of 1994. When calculated per inhabitant, Finland has more mobile phones than any other country in the world, 97 subscribers per 1000 inhabitants.

The national mobile telephone networks consists of three generations of mobile networks: operator-assisted ARP, the automated NMT (Nordic Mobile Telephone) and the digitalized GSM networks. The creation of the Scandinavian NMT-network early in the 1980s brought advanced knowledge of mobile networks and telephones. Other Nordic countries, Switzerland and Holland belong to the same NMT system.

There are two nationwide GSM networks operating in Finland.

Mobile communication will be one of the focus areas of R&D in Advanced Communication Technologies and Services (ACTS), the next European research program on telecommunication. Within the framework of ACTS, test facilities (called National Hosts) will be set up around Europe to support the trials conducted by the ACTS projects. A consortium of Finnish organizations, actively involved in telecommunications research and business, proposes to establish a Mobile National Host (MNH) to support the development of the European third generation mobile system, UMTS.

The goal of MNH is to set up a test environment where the UMTS system concept, based on integration into B-ISDN and the extensive use of Intelligent Network (IN) technologies, can be verified. To this end, the MNH will offer a selection of technologies and services that will help UMTS research to proceed at the same speed foreseen for UMTS standardization. Two main aspects of UMTS development will be supported.

As third generation mobile network must derive their justification from the services and applications offered, there must be a central theme of the MNH. The second aspect will be the development of a UMTS platform based on the integration of B-ISDN and IN and a suitable radio interface.

As no UMTS test system will exist at the start of ACTS, application development and service trials involving actual users must initially be carried out using existing wireless technologies. To support these activities, the MNH will offer the possibility to develop, test and deploy advanced multimedia applications using second generation mobile systems.

Eventually, the applications and services developed should also be tested using the actual UMTS test bed. To enable this, applications must be easily portable from the second generation environment to the actual UMTS environment. This will be facilitated by offering application development tools that support the portability.

Jocelyne Cote-O'Hara
President and CEO, Stentor Telecom Policy Inc., Canada

There is an old saying that you can always tell when you are on the right road because it is uphill. And really, building an information highway or information infrastructure whether it is in Canada or any other country is going to be an uphill battle. It is an uphill struggle because there will be a lot of transformation, a lot of changes, both to our existing operations and essentially to our economies. But I am very pleased to be here along with my colleagues from China, Japan and Finland to discuss their visions, our visions, and the international visions, for information highways.

As we have heard at this conference, Finland is at the forefront of some of the challenges that are before other governments regarding the new information highway. Finland has, perhaps, an advantage in terms of geography. We in Canada feel we have quite a geography challenge because of the size of the country: in this respect we are more similar to China than Finland. I think both David Johnson and Minister Manley have provided you with an outline of the major elements of developing a Canadian information highway and the things that are being done in Canada.

I am here to talk to you about the private sector and what the private sector is considering as the advantages, the opportunities, the challenges, and the concerns for an information highway or an infrastructure. The companies I represent are Canada's large telephone companies and in almost all cases they are privately owned, and subject to the restrictions and opportunities associated with publicly traded companies.

I would like to discuss first, the most compelling trends and developments affecting national information highway initiatives, and second the opportunities arising from these trends and the obstacles preventing industry and government from capitalizing upon them. I think it is important to emphasize from the outset that the drive to build national information highways arises from the need to nurture the international competitiveness of domestic information and communication industries.

I am a board member of International Research and Development Centre (IDRC) and while environmental issues have been our primary concern for the last two years, what is surfacing on the project lists from all countries recently are questions about how to leverage any country's domestic information and communication industries to greater wealth. As digital technology continues to push the convergence of telephony, cable, computers and broadcasting, nurturing this competitive spirit will become more and more essential.

Equally important however, is the need to promote cooperation where possible between different industries. No one industry has all the answers, and partnerships can be very productive. In the United Kingdom, for example, cable companies are successfully packaging and selling both telephone and cable services.

Canadian and US telephone and cable companies are daring and doing else where what they can't do in their own countries at this present time. And there are some very interesting cooperations. The Canadian company BCE is involved with Videotron and the same with funding with other companies, shareholder companies, AGT. Trends in the United States show that there are powerful cross-industry alliances being created daily, and these are also the companies that are looking at new hybrid services. The dichotomy of competition and cooperation will continue to fuel the world's progress towards convergence.

We should also remember the tremendous impact that the globalization of business has and will continue to have on communication industries. For example, international voice and data traffic was 23 billion minutes in 1988. By 1993 this traffic doubled to 47 billion minutes and by the end of this century it will double again to 100 billion minutes. This underscores the fact that any discussion about the information highway cannot be confined to the boundaries of a single national economy.

The convergence of technologies and the competition and cooperation engendered by this convergence are global trends and clearly global businesses are ready to embrace the advantages inherent in these trends. It would appear that things are on the right track, that we are moving ahead to a new and exciting world of abundant opportunities and the recasting of all our economies. But in many ways this new world remains in its infancy and the major obstacle to its realization in most nations, lies in the fact that regulation and public policy generally lag behind technology and growing customer expectations.

To illustrate this point consider Canada's record. Canada has the most advanced communication networks in place in the world and has relatively strong communication industries. Over 98 percent of Canadians have both a telephone and a television and more than 80 percent have access to cable television service. According to a recent figure released by Statistics Canada, 40 percent of Canadians have personal computer.

The private sector telephone and cable companies have responded to the need to improve Canada's infrastructure. For example, Stentor companies have already announced that they will be spending more than 8eight billion dollars to upgrade Canada's current telecommunications network to broadband capability with the Beacon Initiative. We also plan to cooperate with other companies; already the Stentor companies are seeking partnerships with other industry sectors to explore and develop the new interactive multimedia services that this broadband network will carry and export.

We believe in the fundamental principle that Canadians should have choices: choices in services and choices in who provides those services through a network of networks: a true information highway. However, the current communication environment in Canada remains one of mainly closed and proprietary systems rather than open systems. It is my view that an open architecture with open standards will give customers choice, promote competition and cooperation, lead to quicker innovation and bring more business opportunities to every nation.

In Canada the federal regulator is examining the issues surrounding convergence and Canada's information highway and this regulatory proceeding comes not a moment too soon.

Earlier this year, the local telephone market in Canada was opened to cable companies and others, creating one of the most open, most competitive telecommunication environments in the world. It is important that equity be brought to the regulatory treatment of all these potential service providers and that all customers receive the benefits of choice. This includes, of course, cable customers who currently deal with a monopolized industry.

Specifically, we believe that telephone companies and others should immediately be allowed access into the cable market to stimulate competition and innovation and bring choice to consumers. The new market place is a market place of packaging: we believe that you do not extract or separate video from voice and telephony services, voice or data or imaging,, All aspects of these communication and telecommunication services must be available to all players.

We welcome the challenge of helping build Canada's information highway. We the industry believe that it's our responsibility to make the investment to see that it happens. We also believe that governments responsibility lies in creating good policy and regulation that will smooth the rocky uphill road towards the information highway. By working together, government and industry can ensure that all communication players and their customers are headed in the right direction.

We must not forget that the real battle is global and the winners of this battle, the countries on the right track, will be those countries who have eliminated the gap between regulation and technology, who control their economic and cultural destinies and who are masters in their own home.

Liu Cai

Director-General, Policy & Regulation Ministry of Post and Telecommunications, China

INFORMATION INFRASTRUCTURE IN CHINA

China is a developing country which has a very weak foundation for telecommunications and information industry. We are still in the early stage of building up basic telecommunications networks and spreading basic telecommunications services. Telephone penetration is very low, online computers are not in wide application and public databanks providing information services are yet to be established. However, with the progress and convergence of telecommunications and computer technologies and the policy of opening up to the outside world, the social demand for electronic information services (value-added services), especially in the economically advanced areas, has become increasingly apparent. In order to promote economic and social progress, China is building and planning today's and tomorrow's national information infrastructure according to its own situation. Consideration will be given to China's NII in conjunction with the on-going basic telecommunications network construction. We are facing at the same time urgent tasks from two sides: to provide the households and offices throughout the country with plain-old-telephone connections; and to meet the needs from business and social-economic sectors for advanced business information and communications. Therefore, the construction of China's telecommunications network should take into account both demand for telephone service, which will hold the lion's share of the information flow for a considerable length of time in the future, and the demand for data image communications of different types and speeds. It is well known that in today's world of digitalized telecommunications this dual consideration can be easily materialized and should be materialized both technologically and economically.

China is building its nationwide digital trunk transmission network with fibre optic cable as basic means and digital microwave and satellites as the supplementary means. Based on this transmission network, China is speeding up its efforts to build service networks such as the automatic telephone network (PSTN) for its urban and vast rural areas, packet switched data network (CHINAPAC), digital data transmission network (DDN) and mobile radio communications network. In 1994, China laid down seven inter-provincial fibre optic cables and 14 satellite earth stations, which resulted in a 63.6 percent increase in long distance circuits. Also in this year China installed 18.9 million lines of new telephone switches and 10.8 million subscribers were connected, both growing by 63.5 percent.

China's present telecommunications policy encourages all parties concerned within the country to actively participate in building information systems and proving value-added services. The state-owned public telecommunications network should also provide equal dedicated info-communication services on the basis of equal competition. Competition has facilitated development and many business information-communications systems, built on the basis of public network s or separately, are now rapidly established and have a bright future.

The public digital information service sector in China needs time to be developed. At present, suitable policies, regulations, and technical standards should be formulated to encourage provision of information services. More public databanks should be established and the digital information service market should be fostered.

As for the construction of China's national information infrastructure (or information highway), I believe that it is most important is to make solid efforts in areas of information networks, information equipment, information resources, information applications, and training of information personnel, so as to achieve continuous and substantial progress.

Reaching all the major cities in the country, CHINAPACK has 60 thousand terminals and has been interconnected with the major international information networks and public telephone network within the country. Put into service in October 1994, the DDN connects all major cities of China, provides semi-permanent inter-connection for various

sectors to establish dedicated information systems. Most of the cities above the county level have cellular mobile telephone service, which had 930 thousand new users in 1994, 145.3 percent higher over the previous year. Also in 1994 about five million more people became radio paging users, a n increase of 90 percent.

The previously mentioned national telecommunication network constitutes the main network of China's information infrastructure at the present stage. This provides an available network platform for many sectors to transport different types of information,. The Chinese government has recently announced the program to promote the informatization of the economy. Attention should be first given the application and popularization of info-communication in the major economic sectors and the establishment of various kinds of dedicated info-communication systems. Some inter-provincial information engineering is now being implemented in applications for banks, customs, stock-markets and agencies of science and information, etc. These kind of information systems will spread universally to all sectors of the economy.

Despite accelerated development during the past decade, China's telecommunications service remains insufficient, especially in terms of per capita usage. We are now formulating a new plan for telecommunications development to be completed by the year 2000. The development will include: a nationwide fibre optic cable trunk network, installation of 1.4 million long-distance circuits and 70 million main lines of exchanges to the present facilities, an increase of nationwide telephone penetration rate to 9 percent. The plan also calls for continuous efforts be made to improve and populize the packet switched data network and DDN network as well as mobile and satellite communications. At the same time, research and development and pilot projects are also planned in the fields of broadband networks and multi-media services in order to prepare the present networks to move into the next-generation network for the 21st century.

Accelerating Economic Growth Through IT and Information Networks

Cecil Patterson
Director, Information Systems, Port of Seattle, USA

The Port of Seattle is chartered to contribute to the economic well being of the Port district. There are two primary lines of business, the operation of Seattle Tacoma International Airport and the seaport operations. The seaport or marine operation is by far the more competitive of the two. Seattle is one of the United States' largest container ports and must compete with other west coast container ports for cargo that moves between Asia and the United States.

Over the last 25 years, IT has played a major role in the Port of Seattle's ability to maintain market share, create jobs and infuse millions of dollars into the local economy. The ability to be able to process information quickly has led to the expeditious movement of cargo across Port of Seattle docks through Port owned and operated warehouses and on, to truck and rail carriers for inland distribution.

As a result, the Port of Seattle has developed many EDI systems with its warehouse customers, US Customs, truck and rail carriers, etc. The following is a listing of some of those systems.

Electronic Data Interchange (EDI)

The following EDI systems have been developed since 1983.

- **Inland Tracing**

  This system traces container status and location of rail shipments. The Port of Seattle has a direct computer link with several railroads and uses the CLI (Container Location Inquiry) format, established by AAR (American Association of Railroads). Information is then stored in a database for inquiry and performance tracking.

- **Rail Services**

  The Port uses EDI to book containers with the Burlington Northern and Union Pacific Railroads using ANSIX12 transaction set 404 (Rail Bill of Lading).

- **Warehouse Shipping**

  The Port electronically receives shipping orders from Port warehouse customers. It also electronically sends shipping information to warehouse customers using standard EDI formats, WINS 940 and 945 transaction sets.

- **Electronic Freight Bills**

  Truck carrier freight bills are received and processed using ANSIX12 transaction set 210. We currently communicate with all the STCP (Seattle Truck Contract Program) motor carriers using a third party VAN (value added network). The Port also sends Electronic Freight Bills, ANSIX12 transaction set 210, to large volume users of the STUCCO program.

- **Truck Tracing**

  This system traces the location and status of STCP truck shipments using ANSIX12 transaction set 214 and a third party VAN. We currently communicate with all the STCP motor carriers. This information is then stored in a database for inquiry and expediting. Inquiry access is also made available to customhouse brokers and steamship lines.

- **SCAMPI**

  SCAMPI is an ocean manifest system that communicates with the US Customs national system, Automates Commercial System (ACS). It contains bill of lading information for all of the cargo being imported through the Port of Seattle. For each bill of lading, the system maintains the current Customs status.

  Manifest and Customs cargo status messages are transmitted electronically from ACS to SCAMPI. This information is then made available to customhouse brokers through PC inquiry and is transmitted to ocean terminal operators for their use in managing cargo moving through their facilities. The information is also integrated into the Port's own Container Freight Station (CFS) operation and the Dispatching functions for the CFS and the Port-operated Warehouse.

LINX – At the heart of the Port of Seattle EDI development is the LINX system. LINX is a service developed and sponsored by the Ports of Seattle and Tacoma to provide a full range of electronic data interchange products and services for the international trade and transportation community. The LINX EDI service facilitates rapid and accurate exchange of business information among trade and transport companies to optimize cargo handling and movement throughout the world.

The LINX system is a network which utilizes electronic mailboxes. An electronic mailbox is a repository where data is stored on a third party's computer. In the case of LINX, the computer belongs to Sterling Software. The information stored in the mailbox can be retrieved by the company renting the mailbox, at their convenience. The minimum hardware requirements are a PC, printer, and a modem.

As a mailbox network, LINX provides security and confidentiality only for qualified users. Each user decides which of its trading partners can access the information. Companies without LINX have to communicate with each of their trading partners separately. They re-enter data for each communication and document. As a result, they handle more paper, spend more time on the phone, and make more errors.

Computers hooked up to LINX can communicate with and understand each other, without human intervention, by way of standard EDI language. The system translates information to and from the company's application system into the EDI standard. LINX supports EDIFACT.

Anyone in the global trading community can benefit from LINX. With it, major shipping companies, freight forwarders, customs brokers, port authorities, and others exchange data about cargo contents before the vessel even arrives in port. All parties always know the whereabouts and destinations of containers for just-in-time (JIT) delivery, quick response (QR), and inventory control.

LINX trading partners use standard EDI formats to exchange information related to the purchase and movement of goods and services. This electronic exchange of information expedites the movement of cargo by reducing delays and errors. It has been in production since July of 1991. Participant companies include ocean carriers, customhouse brokers, truck lines, importers, exporters, freight forwarders, ports, etc.

The Benefits of LINX

1. Reduction of paperwork and associated savings
   - Higher throughput and productivity without increased staff
   - One-time data entry
   - Reduced errors, improved error detection
   - Faster management reporting
   - Automatic reconciliation
   - Increased clerical efficiency

2. More timely communication
   - Rapid exchange of business information
   - Reduction of mail charges, courier, services, and fees
   - Reduced levels of inventory
   - Improved production cycles

3. Uniform communications with all trading partners
   - Customers
   - Suppliers
   - Carriers
   - Banks and financial institutions

4. Better market position relative to non-EDI competitors
   - Ability to partner toward long-term relationships

Chi-Shen Tsen
Managing Director, Data Communications Institute, Chinese Taipei

CHINESE TAIPEI NII – DEVELOPMENT STATUS

Origination

Proposed in February 1994 by the NII Task Force under the Chairship of Minister Hsi and approved for implementation by Premier Lien in June, 1994. The following ten initiatives were established:

1. Install an NII Steering Committee
2. Liberalize the telecommunications industry
3. Support R&D
4. Improve the Radio Frequency Spectrum Management
5. Announce government equipment procurement in advance
6. Articulate the vision and dialogue with the public and private sectors
7. Revise and enact the related laws and regulations
8. Experiment the concept through pilot projects implementation
9. Develop network-to-network interconnectivity
10. Adopt/establish national and international standards

NII Organization

NII Steering Committee formed in August 1994

- Convenor: Minister Dr. M.H. Hsi
- Membership from the Vice Ministers of all related Ministries
- Supported by a Civil Advisory Committee
- Intended to fully reflect the comprehensive needs at the national level
- Ensure the resources availability for NII Deployment
- The Five Sub-committees are:
  - Resource Planning
  - Network Construction
  - Application Technology & Promotion
  - Human Resource and Core Set Applications Development
  - General Affairs

NII Steering Committee Mission & Responsibilities

1. Resource Planning

- Information & Communications Industry Planning, including:
- Analyze the resources spent on the NII Development by the other nations and its effectiveness to the National Competitiveness and Productivity Improvement;
- Research and recommend the needed tasks and other incentive measures;
- Formulate information and communications industry development plans;
- Analyze and recommend CATV and networking integration strategies.
- Telecommunications Liberalization Strategy Planning
- Research and study the related laws and regulations, recommend the needed revisions.

2. Network Construction

- Telecommunications networks planning, development, operation, support and maintenance
- Including the Advanced Broadband Experimental Network Construction
- Radio Frequency Spectrum Management and Distribution
- Existing and future network-to-network interconnections
- Announce procurement lists and schedules in advance
- Telecommunications networking technology research, development and technology transfer

3. Applications Technology & Promotion

- Promote efficient information communications applications to all industries
- Expand value-added services & applications and government information automation
- Accelerate technology R&D and its applications
- Implement pilot industrial experimental programs
- Enhance technology transfer and international cooperation.

4. Human Resource and Core Set Applications Development

- Expedite professional development to keep pace with technology advances
- Expand information technology accessibility to the middle and elementary schools
- Implement pilot core set experimental application programs
- Promote distance learning and health-care information applications

5. General Affairs

- Formulate National Information Infrastructure Strategy and deployment plans
- Articulate and promote the NII Vision
- Provide cross-sectional sub-committee coordination and integration
- Responsible for conference coordination, record keeping, information dissemination and administrative support.

NII Steering Committee – Civil Advisory Council

Formed in August 1994, nominated by the Premier with Members from the leading Industrialists, Experts and the Information and Communications related Professional Associations, aimed at:

- Formulating a deployment model for private sector leadership with the support/assistance from Government;
- Establishing a broad representation;
- Opening the dialogue and inviting input from the Industries; and
- Serving as the bridge to reach the general public and industrialists for participation from all people.

NII – The Strategic Thrusts

Chinese Taipei as one of the most advanced informationalized countries:

In our vision, as a result of our concerted effort, Chinese Taipei will be among the most advanced countries by the 21st Century with a nation-wide information infrastructure. It will interconnect computers/information devices in virtually every home, business, office, school and factory.

Realization of Asia-Pacific Operating Center Goal:

NII deployment will enable our air and sea ports to provide the most efficient services to facilitate cargo and passenger movement; spontaneous and timely market information access by the financial industry and business, and productivity gain to the manufacturing industry, so as to strengthen Chinese Taipei's position to be one of the Asia-Pacific Operating Centres.

Sustained Economy Growth and Industrial Development:

The advancement of multimedia and communications technology has led to the birth of a new generation of information products. Through the policy of NII experimental pilot programs implementation, it will further energize information and communications industries growth as benefited from new technology and products development, and to reinforce the competitiveness of our industries through effective utilization of the information technologies.

Better Human Welfare and Quality of Life:

NII deployment will enable people to enjoy the benefits of the technology advancement and to achieve better quality of life. Distance shopping, convenient information systems, electronic banking, distance learning, telecommuting,

electronic health-care, along with the availability of other leisure and recreation services will contribute to the enrichment of human welfare and life quality.

Social Evolution and Better Humanities:

NII deployment enables expedient and wide spread information and knowledge flow. It can be used as a tool to translate technological innovation into social evolution, and hence people's ability to engage in creative endeavors for better humanities.

ACTIONS AND PLANS

- NII is a Long-term Endeavour
- Brief – The Progress since August to December 1994

Network Construction

- Announce Government Equipment Procurement in Advance
- An advance announcement of the next budget year equipment procurement plan was made on 17 September 1994.

- **Establish a Planned Target to Increase Digital Communications Ratio**
  - A target is set to increase the ratio of digital communications services from the current 2.6 percent to 7 percent within five years
- **Radio Frequency Spectrum Planning and Management**
  - Assigned the frequency spectrum between the ranges of 1885-1930 MHz and 1965-1990 MHz for PCS usage.
- **Integrate and Interconnect CATV and Telecommunications Networks**
  - A joint study meeting with the industry's representation held on November 30, 1994
  - Will consult with the industry for input to the formulation of a support plan on an ongoing basis.
- **Formulate the National Communications Development Plan**
  - Second revision in progress basis on the NII requirements
- **Establish Pilot High Speed Broadband Experimental Construction Projects**
  - Hsin-chu Area: Targeted for June 1995 completion
  - Taipei Area: Targeted for September 1995 completion

Resource Planning

- **Import Maritime Electronic Customs Clearance System**
  - Testing completed November 1994
  - Targeted May 1995 to open for use
- **Electronic Document Regulations Study and Revision**
  - A study team formed
  - Targeted May 1995 to submit a revision proposal for adoption

Application Technology and Promotion

- **Hsin-chu Science Park – Pilot Experimental Programs**
  - Distant Shopping: under planning
  - Video-on-demand: under planning
  - Customs Clearance Automation: Targeted July 1995 for trial use
  - Telecommuting: under planning
  - Teleconferencing: Targeted July 1995 for trial use
- **Install a Multimedia Experimental and Application Promotion Centre**
  - Under MOEA planning
- **Telecommunications Standards**
  - Item included in the Central Bureau Standards/MOEA budget submission
  - Standards adoption will factor NII requirements into consideration
- **Technology Research and Development**
  - R&D Plan is being formulated by MOEA
- **Articulate and Promote the Vision**
  - 27 public meetings – large scale seminars conducted thus far
  - Other 27 meetings/seminars to articulate the NII vision in 1995 is expected

Human resources and Core Set Applications Development

- **Distant Learning**
  - A planning committee was formed on 11 November 1994; a pilot experimental system will be jointly developed by Taiwan University, Chiao Tung University, Ching Hwa University, Normal University, National Open University, Chung Chen University and III
- **Telemedicine**
  - As decided on 24 November 1994, the Veterans General Hospital is responsible for the pilot experimental project implementation with Taiwan University Hospital and Cheng Kong University Hospital to assist in planning
- **E-mail to Schools**
  - Through the regional network centres, 30 percent subscription rate within two years is expected
- **NII Human Resource Development**
  - Human Resource Development is under the coordination of the Ministry of Education with National Science Council and MOEA's participation. Has targeted to submit a development proposal in 1995.
- **General Affairs**
  - Through NII, the plan is to upgrade the Government Computerization from internal data processing
- **Inter-agency Database Integration**
  - To integrate the Governmental databases and information systems as a logical whole through NII networking
  - To facilitate public access to the government information – laws and Regulations, Patent, Trademark information for public access

- To provide government services electronically – through NII networking, it enables the public to handle tax claims, residence changes, licenses applications electronically; so as to make these processes more convenient, to save time and to increase productivity.

Conclusion

The advancement of information and telecommunications technology has ignited another sweep of industry reorientation and social evolution. The breadth and depth of its far reaching effects will surpass the Industrial Revolution. Information will be the new engine for growth for the next generation economy and the foundations for social civilization and cultural heritage.

It is our vision that in the 21st Century, NII will have direct bearing on the development of national competitiveness and civilization. The success of NII deployment will require:

- Effective linking of the complementary participation by the private and public sectors with vigorous support from the Government;
- Accelerated information and telecommunications technology R&D and its applications deployment, for creating a modern and advanced development and operational environment for the industries; and
- Creation of a healthy environment for national construction, with the laws and regulations, policy measures and assistance programs, training and education will all tightly fit with the goals, priorities and needs.

Dr. Sam-Young Suh
Vice President, National Computerization Agency, Korea

INTRODUCTION

Today's IT and Information Infrastructure

There is no doubt that we are in the middle of an Information Revolution. According to Alvin Toffler's terminology, we are experiencing the "Third Wave." Ideas about "information superhighways" and the "information society" rightly attract a good deal of interest. Every society in the world is confronted with opportunities and challenges arising from the convergence of communications, information technology, media technologies and services, and the development of multimedia. Korea is no exception. We, think that the telecommunications, information services, and information technology sectors are not only dynamic growth sectors, but also engines of development and economic growth throughout the economy.

Korean Government's Initiatives

With this perspective in mind, the Korean government has been trying to secure opportunities of this Information Revolution. Since 1987, the Government had promoted and successfully completed the first phase of the National Basic Information System (NBIS) Projects and now the second phase on the way. Objectives include improving the quality of public services and to foster IT industry through computerizing several key administrative tasks and domestically producing computers.

KOREAN INFORMATION INFRASTRUCTURE (KII)

The objectives of the KII are to strengthen the national competitiveness and enhance the quality of life for Koreans and to facilitate National Basic Information Projects.

Goals

Through the KII initiative, the goal is to interconnect every home, school library, hospital, and government agency by the year 2015, to facilitate information sharing amongst people both from within and outside of Korea.

The private sector will play a major role in implementing the KII. Additionally, carefully crafted, and positive government action will catalyze the efforts of the private sector and assure the growth of an information infrastructure that is available to all Koreans. Encouraging private sector investment and promoting applications and technology development are needed and are very important strategic factors to be pursued.

GOVERNMENT'S ROLE AS A CATALYST

For successful pursuit of the KII, following actions or programs are useful and necessary roles for Korean government. First, implementation of the government Information Infrastructure is necessary to meet early demands for high-speed, high-capacity networks in the public sector. The government Information Infrastructure will be under construction until 2010 and will rely on the bulk purchase or long-term lease of advanced telecommunications services from the private sector.

Secondly, because the value of the KII will be determined by how people benefit from it, government has to develop the applications which will deliver the benefits of the KII. The Korean government currently has a program to provide support for applications development for the government Information Infrastructure.

Third, is to establish testbeds for R&D. This role is very important to provide key enabling technologies for the KII and demonstrate NII applications. A testbed will be established between Seoul and Daejeon with 2.5 Gb. speed.

Fourth, in terms of demonstration projects by the government, successful applications will set in motion a continuous cycle of demand that will encourage future development of the KII. Demonstrating the possibilities of the KII will stimulate consumer demand for a variety of products and services at affordable prices. This demand will provide the necessary incentives for private sector investment. In Korea, demonstration projects in such fields as education, health-care, and agriculture, etc., are beginning operations and additional projects are under consideration.

Finally, there is the issue of telecommunication and information policies. Forward-looking telecommunications policies focus on (1) ensuring that all Koreans have access to the benefit of the KII, (2) encouraging private sector investment in building the KII, and (3) creating a competitive market for telecommunications and information services.

As a conclusion, let me talk about the macro impact of the KII on economic growth. Last year, a group of young economists, including myself attempted to establish links between KII and the national economy. Korea is planning to invest about $56.6 billion through to the year 2015. Most of this investment will be made by the private sector. What is anticipated as a result of this investment? Through the KII initiative, we expect to create 560,000 new jobs, and by 2015 more than $125 billion will have been added to the GDP.

Giuseppe Dell'Osso
Principal Administrator, European Commission

In my paper I shall present an outline of the European Union approach to the information society, explaining briefly the steps followed to establish a European policy and describing then the major alliance of the action plan for the information society.

Since the end of 1993, there has been rapid progress in the European Union to bring forward the concept of the information society and to set the ground for policy definition. First, there was a document called the White Paper on Growth, Competitiveness and Employment which set the contours for the information society. The White Paper is a document addressing the problem of unemployment in Europe. It conveys two main political conclusions. First, that the policy for economic growth and employment cannot ignore the revolution in the information and communication technologies. Secondly, that the policy for developing the information society is essential for promoting a balanced economic growth and favouring the creation of new jobs. The economic and social objectives of the White Paper have led us to identify the information society as a priority for community policy.

Following this orientation, a group of industrialists was set up and charged with producing suggestions for a complete plan of action. This was the second step. The conclusion of the group, summarized in a document called the Bangemann Report, was in fact both an endorsement by the industrialists of the vision of the White Paper and a definition of clear priorities and complete actions.

This brings us to the third step, the recommendations of the Bangemann Report have been taken up and are described in the communication titled Europe's Way to the Information Society: An Action Plan. This communication illustrates the complex engineering required to set the most favourable environment for private action. It details the measures to be implemented and defines a calendar from there. It is a working instrument organized along four axes around which to articulate all future actions.

The four axes are the regulatory framework, the applications network and services, the social dimension, and the promotion of the information society. I think it is important to note that these four axes are considered of equivalent importance.

The first axis is that of the regulatory and legal framework. A condition of both the private sector to invest and for the citizens to accept the information society. The key element is the liberalization of telecommunication infrastructures.

The most important progress up to now has been made in this area. A political agreement was reached in November 1994 on the principle of a complete and simultaneous opening to competition of both services and infrastructures by the 1st of January 1998. This decision goes together with accessory accompanying measures regarding the provision of universal service, establishment of interconnection rules, procedures for licenses, and guarantees for fair competition.

Other important issues in the regulatory framework include interoperability of services, of standardization, intellectual property rights, and protection of privacy.

Along with the telecommunication liberalization, we have also seen some progress, within the regulatory framework, in the standardization policy. Debate was initiated on this subject in a November 1994 seminar on new orientations for the definition of standards.

In order to allow effective interconnection interoperability, the standardization process should be market-led, based on the identification of critical interfaces and the definition of a minimum set of requirements. Although debate about

these issues has just begun, conditions for a broad consensus appear to exist. The second axis is network services and applications.

The Commission has adopted applications that are pragmatic in approach, and intends to act as a catalyst for the private sector. The priority is to contribute to the development of new applications where many uncertainties exist. The market will be defined by an interactive search and process between the suppliers on one end and the users' requirements and willingness to pay, on the other. Public authorities must create the best condition for experiments that often necessitate partnerships between complementary actors and between users and suppliers.

The Commission is preparing a methodological document explaining how to promote partnerships and also how to use existing community instruments to stimulate new applications. In particular it is foreseen that to articulate the use of R&D for supporting specific phases of development of applications.

On their side private players have set up forearms which serve as platforms for the exchange of ideas as a tool for dialogue with public bodies and as a mechanism for promoting experiments. And of course the Commission is supporting the creation of this forum.

The third axis is the social dimension. The implementation of the information society will entail extensive consultation with all parts of society, as well as expert advice on related matters. The work carried out by OECD on the claims of technology for productivity and job creation is considered particularly important in this context.

Regarding this area of action, the Commission is preparing the creation of two advisory and consultation boards. The first would be set up to represent all the sectors involved: manufacturers, operators, users, content providers, social groups, with the function of advising on implementation of the measures and to monitor progress. This forum will be called the information society forum. The second, called the social expert group, is comprised of experts in economic and social sciences, would be set up to provide analysis of the social and societal impact of the information society. Some priority things have been already defined for the work of this group.

The fourth axis of the action plan is the promotion of the information society. Experience shows that the new and complex ideas surrounding an "information society" require a considerable effort of explanation. The Commission supports information initiatives and intends to participate in actions to promote public awareness.

To conclude, I would just like to recall the specificity of the European approach to the information society. This specificity is expressed in the term itself used in the European Union documents: "information society" is the term which is always used rather than "information infrastructure" or "information highway". The concept of an "information society" is not new, but reflects the European social model based on a constant search for a balance between economic and social objectives.

Bumps in the Highway: How Smooth can the Global Network Really Be?

Alain Servantie

Head of Unit, International Aspects of Telecommunications and Posts, European Commission

BUILDING THE FOUNDATION FOR THE 21ST CENTURY
The Political Agenda for the Global Information Society – Are we on the right track?
The European Perspective

Introduction

The global information revolution is on its way and has the potential to advance human progress world-wide. Information and the communications systems which make it available to every citizen are being transformed into the life blood of our societies. Already, the information society tops the political agenda, and in five days' time in Brussels, the world's attention will be focused on its potential and challenges, with the convening of the group of most industrialized nations of nations conference. The Member States of the European Union recognized the far-reaching opportunities offered by the information age for a more balanced economic and social development at their summit in Corfu when they indicated that when they indicated that "the current unprecedented technological revolution in the area of the Information Society opens up vast possibilities for economic progress, employment and the quality of life."

This revolution promises much, but also poses certain risks which must be accommodated in our political and regulatory decisions. The major challenges would appear to be:

- to provide a smooth transition toward the information age and the development of an adequate information infrastructure, which can allow both the market players and the work-force to adapt to a radically new environment;
- to ensure that every citizen can enjoy the benefits of the Information Society in order to avoid the creation of information "haves and have nots";
- to prepare society more widely (ordinary citizens and workers alike, to accept and use new technologies, which will require priority to be given to education, training, and promotion activities.

These challenges are certainly not confined to Europe, but are truly global in nature. Europe's Information Society finds its parallel in the Information Superhighway in the United States and in similar initiatives in Japan and Canada. Our major trading partners share our concerns over how to approach universal service, employment, liberalization, as well as global trade considerations in the context of the Information Society. These issues will be central to forthcoming G-7 discussions in Brussels on the Information Society.

The Driving Forces Behind the Information Society

The opportunities now opening up result primarily from a technological revolution, which is speeding up innovation, enhancing performance and brining down costs. This results from:

- the increasingly widespread deployment of broadband technologies;

- convergence between IT and telecommunications, supported by the tremendous growth of computing, information services and multimedia applications both in the workplace and in the home, thus generating a profound transformation in the way human people live and work;
- the unprecedented take off of affordable digital mobile systems, led by GSM and ISDN; and
- network intelligence as the cement which holds together national and global networks and services.

In the wake of such technological change, we are witnessing a major reshaping of telecoms markets with the formation of both global and regional alliances within the telecoms sector, and the combination outside the sector of telecoms operators, computer manufacturers, software and publishing houses as well as the broadcasting and cinema world at large.

Global companies need global systems, implying that obstacles to market access need to be removed. New large satellite-based communication projects tend to take a global dimension, like Iridium, Global star, Odyssey, recently approved by the FCC, the Africa link, just to name a few. Grand alliances emerge such as Unisource with AT&T, BT/MCI, Sprint/France, Telecom/Bundes Post Telekom, in which all main European actors have found their place.

However, global companies represent less than 20 percent of the overall added value produced within the European Union, and 17 percent of the employment. Small and medium-sized enterprises, which make up for 70 percent of employment and added value are at the core of our preoccupation. With the 15 Member States of the European Union, we now count 17 million SMEs. It is therefore vital to offer advanced "of-the-shelf" services to this important user segment.

What Has Been the Response at the European Union Level?

The initiatives taken to promote the Information Society cannot be separated from the overall reform of Europe's regulatory environment for telecommunications. Union action dates back to 1987, and has led to:

- the removal of monopolies in the equipment and services markets with the exception of voice telephony until 1998;
- the creation of a common Europe-wide regulatory framework promoting pan-European services and networks;
- the development of detailed policy proposals in the areas of satellite and mobile communications as well as telecommunications infrastructure in general under the heading of Trans-European Networks as embedded in the provisions of the Maastricht Treaty on the European Union; and
- agreement on a clear timetable for the liberalization of all telecoms services (including voice telephony) and infrastructure by 1 January 1998, subject to the necessary regulatory framework being put in place before that date. Liberalization is currently envisaged by 1996 for existing alternative infrastructure (including cable TV).

Fresh impetus has been given to the process by the new Commission powers under the Maastricht Treaty on Trans-European Networks and the publication last year of the Bangemann Group Report on Europe and the Global Information Society.

In the Trans-European Network domain, GSM and a harmonized Euro-ISDN are operational in most Member States. An ISDN dedicated Community action plan should be adopted this year.

In parallel, we are in the process of preparing an overall Community strategic vision for the development of these Trans-European Telecommunication Networks. In addition to Euro-ISDN, it will include Community action plans in the areas of broadband networks (TEN-IBC), and application services of general public interest, like education and training health care, teleworking, telematics for transport, telematic services for SMEs. Through the RACE Programmes and its successor, the Advanced Communications Technologies and Services R&D Programme, the European Union has

favored the cooperation between technologists from several hundred organizations throughout the Union and beyond to agree on common functional specification and common practice recommendations particularly in the field of ATM.

Bringing together all these different elements, the Commission adopted its Action Plan for the Information Society last Summer.

Europe's approach is one of balancing faster liberalization with the creation of a regulatory approach which can safeguard the fundamental interests of every citizen and every enterprise. It is essential that we are able to control this Information Revolution rather than the other way round. This requires:

- Adequate mechanisms to ensure that all citizens and enterprises can access the Information Society.
- This challenges raises the issue of the universal service, its financing and its evolution in the context of the emergence of broader communication facilities and services.
- A managed transition to allow both market players and the work-force to adapt to the new environment, and to stimulate the creation of employment opportunities. This must involve full consultation of all social partners involved. Special attention should be given to what we believe will be the potential major source of employment: small and medium-sized enterprises.

This engages a clear timetable for change so that investment strategies can be planned, but also a transition period which is accompanied by action to retrain and re-skill the work-force, as employment shifts from the traditional telecoms operators to new entrants providing a range of innovative communications services.

Efforts to Address the Wider Societal Impact

The widespread use of new technologies and services in specific sectors of the economy (such as education, health-care, and transport) and amongst the general population must be encouraged.

Developments in a Global Context

These developments see their parallel in other parts of the world. Indeed, the policy agenda of the Community is very similar to the policy agenda for other industrialized countries.

Bilateral dialogues on the global issues of telecommunications and the information society have been established between the European Union and the USA, Canada, and Japan. All of these countries have been conducting bilateral dialogues.

I hope this is going to be confirmed by the G-7 Conference on the Information Society taking place in Brussels and hosted by the European Commission. Without anticipating what Ministers are going to discuss, we could give a hint as to the issues identified for the development of an open, competitive, and integrated world-wide information infrastructure.

Collaboration to Agree on Common Principles

The emerging global information economy requires seamless international communications for all involved.

The overall objective of citizen's access may be served by the implementation, at world level, of several core principles:

- promote fair competition;
- encourage private investment;
- define a stable but flexible regulatory framework;
- provide open access to the network for all service providers;

- ensure universal service; and
- guarantee equal opportunity for citizens all around the world to avoid a two-tier information society.

Measures should be taken to ensure universal availability of services, to promote equality of opportunity to the citizen and to stimulate diversity of content, including cultural and linguistic diversity.

Therefore, the regulatory framework should ensure freedom and variety of choice, quality and affordable prices. It should promote competition, be flexible enough to meet a variety of complementary social objectives in order to encourage the development and use of a wide range of compatible technologies and advanced services. The operating environment should enable the emergence of global players, while allowing the growth of small and medium enterprises. National authorities as well as international organization should therefore take the appropriate steps towards the following:

- opening up access to markets effectively and equitably through liberalization of supply and operation services and infrastructure. Particularly the provision of open access to networks is essential for service and information suppliers. Lifting ownership restrictions for foreign capital for license applicants will also be an important issue;
- ensuring universal service based on national requirements;
- air licensing and frequency allocation;
- promotion of a consensual standardization process which is open, voluntary, and market-led to allow interconnection and interoperability particularly through open standards for interfaces which avoid proprietary standards belonging to a dominant company.

Competition rules which are interpreted and applied in the light of the new realities allowing productive forms of co-operation while shielding against the risk of anti-competitive behavior and promoting economic efficiency and consumer welfare. The information society brings into question existing rules and practices concerning privacy and personal data, security and confidentiality, intellectual and industrial property safeguarding the plurality of opinion which is a basic principle of our democracies.

In order to demonstrate the opportunities offered by the information society, and to stimulate its growth, especially in relation to the promotion of employment and the creation of jobs it may be useful to share experiences on emerging applications, encourage co-operation in R&D efforts and to launch selected joint projects as stimulants and catalysts, especially as regards interoperability. The fourth European framework programme for Research and Development (1994-1998) provides a substantial budget for both research and development of advanced information and communication technologies and applications (about 4.5 billion $US).

Beyond the core principles, one has to ensure that no country is left aside. The European Union particularly favors multilateral negotiations in this context rather than bilateral agreements which would hamper the development of a global market place for telecommunications.

The International Agenda for a Global Regulatory Framework

The Marrakech Treaty creating the WTO has confirmed the opening of the markets for telecommunications. As a follow-up, the GATS negotiations on the opening of the basic telecommunication services markets have started and aim at the removal of obstacles on so-called "basic" telecom services (in particular on voice telephony infrastructure-based, resale-based, notion of universal service) around the world within a multilateral framework. These should be concluded by April 1996. In parallel with its internal liberalization process, the European Union is actively taking part in these negotiations alongside the main industrialized counties. Our concern is that more major developing countries like Singapore, Malaysia, and Brazil, join in order to make sure that a real world consensus emerges on the core principles

which we have discussed earlier. These negotiations will play a major role in implementing the core principles mentioned earlier, i.e., new global rules for trade in telecommunications services.

The ITU is playing a major role in standardization, through addressing the general regulatory framework and in promoting telecommunications in developing countries. The WRC Conference taking place in October will give an opportunity to discuss the use of frequencies in particular with regard to satellite communications. The Policy Forum created at the Kyoto Conference last October will give an opportunity to discuss regulatory matters at world level.

Providing high levels of internationally recognized legal and technical protection of creative works or intellectual property will be one of the essential conditions to ensure the necessary climate for the investments needed for the development of the Information Society. The World Intellectual Property Organization (WIPO) is actively working on this issue.

A collaborative evaluation of the impacts of information technologies, services, and applications on our societies has been launched by the OECD to identify creative technological and policy solutions to problems in each of these areas that might otherwise limit the growth and use of the Global Information Society. This APEC-OECD-PECC symposium represents a major event in this context.

UNESCO may also play an active role in promoting the networking of libraries and museums, so as to make more readily available the existing knowledge, and to promote the use of new advanced communication technologies for training.

Our Role in Avoiding the Gap Between those Having Access to Information and the Have-nots

Satellite and mobile communications, together with decreasing prices, will contribute to an easier integration of all countries into the global economy. These technologies provide an opportunity for countries alike in transition and developing countries to leapfrog stages of technology and help to stimulate social and economic development. This trend is visible in Latin America and South East Asia where wireless telephony is rapidly expanding.

Improved access to human knowledge and the constant exchange of information may also favour the progress of democracy world-wide. New opportunities for educating and training people in developing countries will further promote both socio-economic development and democracy.

There is a necessity for world-wide co-operation with particular attention to less developed countries in order to avoid increasing the gap and to make sure that they also profit from these developments. Industrialized powers may apply similar principles on cumulating the various international development funds for the best use of communication technologies to improve development and to help solving problems. In the ITU context, the Telecommunications Development Bureau is going to work on this issue with an Action Plan during the next four years following the Buenos-Aires and Kyoto conferences.

As far as the European Union is concerned, regional responsibilities arise from regional proximity. The European Union is promoting the notion of the information society in Eastern Europe and former communist countries. We welcome their reflection in preparing access to the information society. We actively support investment in advanced communication infrastructures and services through the PHARE and TACIS technical assistance programmes, and the European Investment Bank (70 MECU of grants and about 1000 MECU on investments), providing assistance for progressive regulatory changes towards liberalization and opening of the market, with the aim in some instances of progressively harmonizing their legislation with Community legislation in the perspective of future accession to the Union. These counties are progressively integrated in to the regional European organizations dealing with communications (Conference Européenne des Postes et Telecommunications, European Telecommunication Standard Institute, EUTELSAT, European Broadcasting Union). Their research laboratories and industries can

participate in the community-funded R&D communication programmes. Their adoption of European standards like GSM will allow interoperability with the rest of Europe and of the world.

I am convinced that actions should also be launched to increased the cooperation between Europe and the Southern and Eastern Mediterranean Countries in order to build the bridges necessary for their participation in the evolution happening in Europe. Some 113 million ECU have already been directed by the IB towards the modernization of telecommunications in Malta, Jordan, and Morocco. The European Council, in Essen, has supported the Commission's proposals to increase the funds directed towards this sensitive areas of the world. The North-African and Middle-East Summit organized in Casablanca in October 1994 indicated the importance of acting together in this area to facilitate the success of the Peace process through increased communication. Furthermore, the exchange of information and specific actions will be carried out with Latin America and specially within the context of the EU's relation with Mercosur. The Union is also developing an active cooperation to promote the use of advanced communications with countries like China and India. I would finally like to point to the willingness of the European Union in establishing a dialogue with the industrialized countries regarding co-operation with the developing countries in this area, charting a path towards an international harmonized framework in which solidarity can be promoted through specific and effective actions. We are just at the beginning of this long and winding road. More efforts are needed to stay together on the right track.

Conclusion

In recent months, consensus has built up amongst governments that incentives to stimulate the development of the information infrastructures constitute the most important political drive aimed at finding solutions to current social and economic problems.

The communications industry is essential to the efficient functioning of the economy and to improving social relations. However, market forces alone cannot rule this highly strategic sector. Public authorities have a duty to create a flexible regulatory environment in the framework of which market forces will produce more wealth for all in accordance with the principle of universal service.

A close concertation amongst all interested parties is required at an international level in order to harness support all around the world for this ambitious global project and to ensure that will reach all citizen its benefits.

Ellwood Kerkeslager
Vice President, Infrastructure and Technology, AT&T Corporation

National Information Infrastructures(NII) and Global Information Infrastructure (GII)

Broad Vision of NII and GII Leads to Best Public Policy

Public Processes should Establish NII/GII Value and Benefits

Public Processes should Identify NII/GII Impediments

Roles of Government and Industry

Action Plans to Remove Impediments

What is the NII?

Built and operated by Industry

Three Industry Areas:

- Information Appliances
- Communications Networks
- Information Resources

Countless Applications for Business, Consumers, Governments, and Other Institutions

It Exists Today and Continues to Evolve

- Technology and competition are the enablers
- Critical to a nation's economy, society and quality of life

What is the GII?

The Interconnection of the NIIs of the World

It Exists Today and Continues to Evolve

Critical to Global Economy, World Trade and the Full Potential of Individual NIIs

Impediments to Enhancing the Current NII

Lack of Exchange Communications options

- Affordable digital enhancements to copper
- Exchange communication competition

Professional Reluctance

Lack of Focused Investment and R&D Incentives

Protection of Intellectual Property Rights

Protection of Privacy

Security of Information

Difficulty of Use

Training/Ongoing Support

Management of Government Administered

Technology-Enabling Resources
- Spectrum, numbers, right-of-way

System and Network Incompatibilities

Lack of Government Focus on Open Public Industry Standards
- Government procurement
- Electronic access to government information
- Support of international industry standards
- Encouragement of rapid agreement on new technology standards

Impediments to Expanding the GII

Lack of Comparable Market Access

Monopoly/State-owned/Subsidized Competitors

Unbalanced Carrier to Carrier Interconnect Compensation

Domestic Content and Ownership Rules

Technology Import/Export Restrictions

Regional Focus Conflicting With Global Focus
- Regional Standards/Specifications
- National Conformance Testing
- Mandatory Standards
- Mandatory Licensing

Outdated Intellectual Property Rights Protection and Enforcements

Potential Intrusion of Individual Privacy

Potential Diminished Security of Information

Roles of Government in the NII/GII

The Government can stimulate the NII/GII by being a:

Leader: create the vision and define the national challenge;

Supporter: support global comparable market access for NII/GII industry;

Administrator: effectively administer government controlled resources to enable competitive markets;

Enlightened Regulator: focus regulatory efforts on opening markets to competition and eliminate regulatory efforts which fine-tune working competitive markets;

Motivator: provide industry investment incentives;

Facilitator: support and adopt industry-developed international interoperability standards;

Protector: protect privacy, security, intellectual property, freedom of speech;

Participant: support inclusion of appropriate government information in databases and digital libraries;

Innovator: invest in pre competitive technology research at industry, government and university laboratories;

Wise Funder: direct any appropriate subsidies to end-users who can freely select from the competitive market.

global-mobility technologies that can be proven to be more efficient in providing end-users with access to the global network.

Where Canada is concerned there are a number of things we can do to maximize the returns on our innovation investments:

- avoid duplicating same-technology infrastructure;
- channel our available facilities dollars into under-served regions and into alternative infrastructures required to support new technologies such as wireless and global mobility systems; and
- invest in developing the value-added services that will enhance Canada's overall competitiveness in the information age.

Now, I'd like to broaden my focus to the global scene. Sophisticated new value-added and multi-media services delivered via intelligent networks and ATM are, for the most part, being introduced first to the European and North American markets. But there is no question that demand for such services exists right now in a number of the more advanced economies and centres of commerce around the Pacific Rim – Singapore, Korea, Japan, Hong Kong, and Australia, to name just a few.

Given the dynamic growth of the Asian market, widespread demand for the sort of new-world infrastructure capable of supporting of such applications will emerge very quickly.

In terms of infrastructure, the constrictions which apply to the Canadian domestic market are not applicable to the fast-growing international marketplace. With the world's population soon to reach 6 billion – 1.2 billion in China alone – and demand for information services exploding, a single global telecommunications infrastructure couldn't possibly suffice. A certain amount of duplication of continental and intercontinental networks is not only desirable but necessary, if we are to maintain a healthy level of competition in both the price and quality of global telecommunication services.

In this regard, a strategy which optimizes utilization of the extensive Canadian-owned infrastructure will prove beneficial not only to Canada but also to our friends and trading partners in Europe and Asia, whose long-term interests will be well-served by the availability of viable, alternative information links to other areas of the globe.

In the information society of the future – as with today's telephone traffic – when someone in Asia wishes to communicate with someone in Europe, or vice versa, they will have to go in one of two directions. Considering the relative merits of the respective infrastructures, I would suggest that the preferred route will continue to be across North America – where Teleglobe's presence ensures foreign carriers a choice of routings.

So, by maintaining a strong Canadian-owned infrastructure and thereby facilitating meaningful competition in intercontinental telecom services, we'll help ensure that small and medium-sized powers everywhere are able to share fully in the benefits of globalization and deregulation.

In summation, satisfying the demands of the information society will pose considerable challenges to all of us associated with the field – regulators, infrastructure operators and service providers.

New value-added applications are the real detonators of the information explosion. And those of us in the infrastructure end of the business will find our ingenuity taxed in terms of making certain that whatever facilities are needed to carry these applications are available, at a competitive price, as end-users require them.

Rachelle Chong

Commissioner, Federal Communications Commission, USA

It is a great honour to take part in such a distinguished panel of telecommunications leaders. As a Commissioner of the United States FCC, I bring the perspective of a government regulator to this discussion.

We have come here today to talk about our shared vision of the GII – a global "network of networks." As we enter the Information Age, technological advances in the information and telecommunications sectors will continue to bring us exciting new services and products. These advances are transforming societies and markets around the globe by increasing the speed and efficiency – while decreasing the costs – of creating, processing, and distributing information.

As a result of the profound effect technology is having on our economies, many of us realize that the information and communication sectors are vital engines of development and growth in other sectors of our economies. The challenge that policymakers like myself face is how to adapt our traditional regulatory structures to this changing technology in order to achieve the vision of a GII. Our challenge is two-fold. First, we seek to ensure that innovative services are brought to as many people as possible, as quickly as possible, and at reasonable rates. Second, we seek to implement policies that will encourage investment in advanced infrastructure.

However, one cannot generalize about the specific steps each member economy must take to meet these challenges. Member economies differ in how their telecom systems evolved, and in their regulatory regimes and ownership structures. Despite the differences, however, a consensus is building that private investment and competition are the most effective means of bringing innovative communications and information services to market. Thus, the key principle for the US that we hope all global markets will agree to honour is that national markets should be internally competitive and open to foreign competition. My country promotes this principle based on our actual experience. The telecommunications and computer revolution of the past 25 years is traceable to the adoption of policies that promoted competition and private investment.

Because building the GII will require significant capital, the United States sees the private sector and its resources as the driving force behind the Information Revolution. But in order to encourage capitalization, government officials of a member economy must assure investors of a stable regulatory environment in which to make prudent investments. It is a policymaker's challenge to ensure that our new regulatory schemes are flexible enough to keep up with the pace of technology, to ensure open access and interoperability of systems, to encourage competition without stifling private investment, and to promote broad availability of basic services to all, without sacrificing service quality.

Right now, the US government is actively working to accelerate the development of the Information Superhighway. Our administration has put a top priority on the development of an advanced infrastructure. The FCC has been urged to continue to put in place forward-looking telecommunications policies. One problem the FCC faces, however, is outdated communications law. American telecommunications law was established in the 1930s – an era when television, cellular phones, and satellites were a futuristic fantasy. Our traditional regulatory scheme assured clear, unchanging boundaries between industries and markets. This assumption sometimes led regulators to view and regulate firms in various industries differently, even when they offered similar services. Moreover, regulators of the past often addressed the threat of anticompetitive conduct by barring some firms from certain markets and industries.

US lawmakers recognize that our current laws are outdated, and that increased competition will accelerate the development of an advanced infrastructure. As I speak, our legislators are drafting comprehensive telecommunications reform packages that will encourage private enterprise to develop and fund the NII and GII. One legislative proposal would remove the existing barriers to full competition in the US telecommunications market over the course of three

years. Subject to certain safeguards, it would allow different types of companies – such as telephone companies, cable companies, broadcasters, and equipment manufacturers – to compete in markets that are currently closed.

While Congress does its work to reform our laws, the FCC – whose duty is to implement the law – is increasing competition to the fullest extent possible under current law. However, our outdated law has at times constrained the Commission from going as far as we might like. As examples of procompetitive policies, the FCC has begun to license telephone companies to compete with cable companies in offering video services. The FCC is also introducing greater competition in the mobile telephone market with the recent licensing of our Personal Communications Services and global satellite systems. In addition, our regulatory regime for low-earth orbit satellite systems is structured to permit a number of competitors. On the international front, we have recently approved private line resale in the US – United Kingdom and US – Canada long-distance markets. These decisions will increase competition in these international markets and result in lower rates.

These examples give you a flavor of what the FCC is now doing under existing law. Of course, should a new telecommunications law go into effect, the FCC could take even more procompetitive steps. Here in Vancouver, we hope to engage in dialogue with our foreign partners about how best to provide a favorable regulatory and investment environment to develop the GII.

But even as we talk with our foreign partners, the United States continues to set an example by working hard to achieve greater competition in our own domestic market. For example, Congress and the FCC are actively discussing relaxing foreign ownership restrictions on communications companies currently contained in our law. As these ownership restrictions date back to the World War I era, the issue has been raised as to whether they should stay on our law books. We hope to set an example to show that countries have nothing to fear – and much to gain – from greater international investment.

The United States also believes that information content will power the Global Information Infrastructure. To be successful, the GII must offer content which is useful and desirable, and the transmission of which is profitable for information providers. Network users must feel that their privacy is protected and their information secure. The US believes that it is essential to ensure protection of intellectual property rights, and guarantee rights holders control over the use of their creations.

Cooperation and collaboration among nations is critical to reach a goal as ambitious as the GII. We hope that this excellent symposium, the upcoming G-7 GII conference, and other international meetings will all be successful to this end.

Just last Thursday, Vice President Gore and Secretary of Commerce Brown released a *GII: Agenda for Cooperation* in which the US pledged the following:

- First, to support pilot projects that demonstrate the benefits of the GII;
- Second, to exchange electronic information to support global trade and commerce;
- Third, to share public domain information with other countries on GII projects;
- Fourth, to encourage new applications of information technology that will encourage use of the GII;
- Fifth, to encourage private sector efforts to develop standards to ensure interoperability of applications; and
- Finally, to eliminate any barriers to GII development.

This agenda provides evidence of US commitment to work cooperatively with our foreign partners to build this global network.

global-mobility technologies that can be proven to be more efficient in providing end-users with access to the global network.

Where Canada is concerned there are a number of things we can do to maximize the returns on our innovation investments:

- avoid duplicating same-technology infrastructure;
- channel our available facilities dollars into under-served regions and into alternative infrastructures required to support new technologies such as wireless and global mobility systems; and
- invest in developing the value-added services that will enhance Canada's overall competitiveness in the information age.

Now, I'd like to broaden my focus to the global scene. Sophisticated new value-added and multi-media services delivered via intelligent networks and ATM are, for the most part, being introduced first to the European and North American markets. But there is no question that demand for such services exists right now in a number of the more advanced economies and centres of commerce around the Pacific Rim – Singapore, Korea, Japan, Hong Kong, and Australia, to name just a few.

Given the dynamic growth of the Asian market, widespread demand for the sort of new-world infrastructure capable of supporting of such applications will emerge very quickly.

In terms of infrastructure, the constrictions which apply to the Canadian domestic market are not applicable to the fast-growing international marketplace. With the world's population soon to reach 6 billion – 1.2 billion in China alone – and demand for information services exploding, a single global telecommunications infrastructure couldn't possibly suffice. A certain amount of duplication of continental and intercontinental networks is not only desirable but necessary, if we are to maintain a healthy level of competition in both the price and quality of global telecommunication services.

In this regard, a strategy which optimizes utilization of the extensive Canadian-owned infrastructure will prove beneficial not only to Canada but also to our friends and trading partners in Europe and Asia, whose long-term interests will be well-served by the availability of viable, alternative information links to other areas of the globe.

In the information society of the future – as with today's telephone traffic – when someone in Asia wishes to communicate with someone in Europe, or vice versa, they will have to go in one of two directions. Considering the relative merits of the respective infrastructures, I would suggest that the preferred route will continue to be across North America – where Teleglobe's presence ensures foreign carriers a choice of routings.

So, by maintaining a strong Canadian-owned infrastructure and thereby facilitating meaningful competition in intercontinental telecom services, we'll help ensure that small and medium-sized powers everywhere are able to share fully in the benefits of globalization and deregulation.

In summation, satisfying the demands of the information society will pose considerable challenges to all of us associated with the field – regulators, infrastructure operators and service providers.

New value-added applications are the real detonators of the information explosion. And those of us in the infrastructure end of the business will find our ingenuity taxed in terms of making certain that whatever facilities are needed to carry these applications are available, at a competitive price, as end-users require them.

This symposium and the enthusiasm here is a testament of the importance of GII issues. Policymakers around the world now view communications and information issues in a global context. As technologies and markets advance, I hope that we keep the vision of a global "network of networks" in mind.

In closing, I would like to paraphrase Vice President Gore who urged us to build a global community in which the people of neighboring countries view each other not as potential enemies but as potential partners, as members of the same family in the vast, increasingly interconnected human family. As one who is ready to take up a hammer and build the GII, I look forward to working with you.

Lars A. Stålberg
Vice President, Corporate Markets, Ericsson, Sweden

Existing Trends

- Almost Free Competition
- Unbiased Regulatory Structure
- Separation Between Operator and Regulator
- Era of National Champion Supplier is Coming to an End
- State Control of Vital Parts of the Networks
- Huge Fragmentation of Terms of Actors and Segments

In 1998 we will have a situation in Europe that almost could be described as free competition. In the US, Japan, Australia and New Zealand we will face a similar situation. Many countries have already introduced regulations with no exceptions for the national PTO. Most countries have already separated the regulatory authority from the PTO. State control of networks seems to be something we have to live with for many years. In terms of number of actors and segments, there has been a tremendous increase in those countries that have introduced competition.

Market Forces Surrounding the PTO Include:

Suppliers – Northern Telecom, Ericsson, Siemens, Alentel, AT&T, Nokia, Motorola, NEC;

Politics – Authorities, Regulators, Policymakers, Unions;

Colonizing Industries – Post, CATV, Power and Electricity, Railway, Newspaper, Entertainment, Banks, Computer Industry;

Consumers – Rural, Small businesses, Multi-location businesses, International corporations;

Competitors – RBOC, AT&T, C&W, NTT, BT, Telefonica.

There will be a race for influence on every liberalized market among all actors, consumers and authorities. This race will reshape the existence of every PTO. The foundation for their business will change rapidly. The PTO will probably do less on the market, while improving their profits but losing relative market share.

The Dismantling of the Monopoly

Regulatory Driving Forces

Pre-1995

- APTT with Full Control
- The PTT is Broken Up
- Competition in Selected Areas

1995 – 2000 range

- General Public Perception Changes
- Competition Introduced in the Access Network
- Removal of the USO

Post-2000

- Full Competition in the Access Loop
- PTT Equal Player in the Market
- Final sell-off of PTT

It is an irreversible situation which can not be stopped, but merely delayed. The different steps in this process are not similar for every market – there will be many different scenarios – however, the final result will be the same: free competition.

Legal Framework and Government Policies – International and Bilateral Agreements

The two great tasks facing every telecom regulator are on one hand, finding a sound mechanism between the different actors (interconnect agreement) and on the other hand, finding an efficient and fair way to distribute the national resources (number series, frequencies) amongst the different actors.

The great task is to find a "natural" and consistent balance between securing national resources, commercial interest and consumer and social needs.

Telecommunications should be viewed as any other input and production such as energy transport, labour, etc. Telecommunications are becoming increasingly important for economic growth. Some indicators predict that it could be the most important factor in fewer than ten years.

Toward the Information Network of the 21st Century

Yoshio Utsumi

Director-General, Ministry of Posts and Telecommunications (MPT), Japan &
Chair, ITU Plenipotentiary Conference, Kyoto, 1994

The Earthquake in Kobe

The recent earthquake in Kobe was a tragic disaster. Being the most serious earthquake in recent Japanese history, it claimed more than 5,000 lives and left hundreds of thousands of people homeless. The causes for such a catastrophe are now being investigated, and we must wait for the results.

But certainly one reason for the magnitude of the disaster seems to be the failure of the authorities to make decisions quickly and to respond adequately during the very important hours immediately following the earthquake. It took the Governor of Hyogo Prefecture four hours to make the necessary request for aid to the Self-Defense Forces. During this time, the ordinary telephone network was almost paralyzed because it has to handle more than 50 times the number of calls of a normal day. Additionally, the emergency communication facilities of local governments were shut down by power failure after only half an hour. Officials could not reach their posts because of the damage to transport. Thus, it was impossible for the authorities to communicate well with each other. And it appears that the Governor did not receive adequate information.

The tasks of modern bureaucracy are complex, and the scope of authority given to each bureaucrat is narrow. Consequently, without mutual exchange of information and coordination, officials cannot perform their duties. And this, indeed proved to be extremely difficult in the first hours after the earthquake. Ensuring reliable communication during emergencies and disasters is essential. Experts have long been pointing this out.

At one time, I was responsible for computer communications in the Ministry of Posts and Telecommunications. I spent a few years requesting funds for research from the financial authority to prevent computer networks from breaking down in the event of a major disaster, or to enable them to be quickly restored. The effort got me almost nowhere. It was impossible to make the financial authorities understand this area of priority.

There currently is fierce criticism in Japan that adequate measures had not been taken to prevent the dreadful results of the earthquake in Kobe. Now that it has claimed more than 5,000 lives, perhaps Japanese people are finally starting to become aware of the importance of communications.

There was one bright spot, however, in the field of communications following the earthquake. After the Kanto earthquake in 1923, lots of false rumors spread among the survivors. As a result, many foreigners were murdered by people misled by the rumours. In 1923, there was no radio to inform people about the true situation after the Kanto earthquake. But today, in Kobe, television and radio broadcasters are making every possible effort to inform people about the situation of water and gas supplies or local relief activities and so forth. The broadcasters are doing this even though they themselves are victims of the earthquake.

Understanding the Importance of Communications

Everybody attending this conference, and all experts in communications and information, are very aware of the importance of telecommunications. Everyone here understands that telecommunications is essential, and not only during emergencies. It is also the foundation and engine of future socio-economic growth. But to what extent do policymakers in areas other than telecommunications understand its role?

In Japan, the government has allocated tens of trillions of yen to build such infrastructure as roads and bridges, but has spent only billions of yen on telecommunications. Considering the effects of the telecommunications infrastructure on the whole economy, this amount is extremely small.

Telecommunications is also given a low priority among requests for ODA made by developing nations to the Japanese government. Even though those of us working in the field are ready to cooperate, communications still ranks well down on the list of priorities in developing nations. We must raise public awareness around the world of the importance of telecommunications.

In this regard, the enthusiasm of the Clinton administration should be applauded. After first promoting an information superhighway within the United States, it proposed the creation of the GII, and a meeting of G 7 ministers this week in Brussels to discuss its development. Japan is very grateful to the United States for promoting telecommunications so earnestly.

In Japan, the feet are sometimes considered to be an impure part of the body. We have a saying that you should never sleep with your feet pointed toward someone who has done you a favor. That would be thankless and impolite. Fortunately, as my country is on the other side of the earth to the United States, we won't be able to sleep with our feet pointed this way. Although during the day, when we are on the move...

Infrastructure Development Depends on National Conditions

There are several factors we must consider in relation to our target of building a communications infrastructure. One of these is what measures to implement in each phase of economic development. The greatest policy issue in these developing nations is how to obtain funds to build telephone networks. At present, developing countries outnumber industrialized nations by four to one. In developing countries, many villages do not even have one telephone. The goal of the ITU is to install telephones within walking distance of everyone on earth by the year 2000.

Domestic private enterprise cannot be expected to build telephone networks. Developing countries depend heavily on their governments for such funds. The main policy goal in those countries is to provide a basic telephone service to their people. It is, therefore, vital for governments to take responsibility for achieving that goal. Naturally, as a result, the telecommunications market becomes monopolistic.

Asian countries which are undergoing remarkable economic growth have already emerged from this stage and are now in the second stage of building communications infrastructure. In these countries, the spread of telephones to all homes, the spread of different kinds of information terminals, including computers, and the construction of an advanced network to link them together are the challenges faced now.

In these countries, because private and foreign capital is available in addition to government funding, the major policy goals should be privatization, competition, and introduction of BTO among others.

In industrialized countries, such as G-7 countries, the basic infrastructure for conventional communications has already been completed. The issue now is building the next generation of networks. The foremost concern is to create an environment where private enterprises can act freely to invest and develop new business in this field. Therefore, pursuing free competition to the utmost is imperative.

However, doing so will, at the same time, engender gaps between profitable and unprofitable areas since a universal service is not something that private enterprise will necessarily aim to provide. The issue of universal service will thus have to be addressed by policymakers of those countries.

Considering the existence of such differences between developing and industrialized countries, I believe that identifying the issues arising at each level of national development, and establishing policies to solve those issues, are

essential for building communications infrastructure in each country. In other words, taking account of each countries' needs according to its economic development is vital.

What is GII?

The main theme of this meeting is GII. But what is GII? I believe GII should enable people to communicate with others anywhere in the world and to have access to information from any source in the world.

Building GII is not an issue that merely concerns industrialized nations. Rather, it should be a common goal for everyone. Building a system that can be used worldwide – including in developing nations – is not simply a business opportunity or a trade issue: it is a goal for all humanity. The impact of a GII will be limited if only rich nations proceed with its construction. Developing nations must take part too. For this purpose, industrial nations must understand the issues facing developing countries and provide them with technical and economic assistance.

About fifty telecommunication Ministers from around the world discussed these points at the Plenipotentiary Conference of the International Telecommunications Union in Kyoto last September, and adopted the Kyoto Declaration. In this declaration, the following points were recognized.

- Firstly, telecommunications infrastructure is being enhanced by means of rapidly developing technology, and such advancement should be made available to all citizens of the world.
- Secondly, even a basic telecommunication service is still not available in many countries. Everyone throughout the world should be guaranteed access to the potential of telecommunications.
- Lastly, quoting the original text, "as we approach the threshold of the new era, a vital goal emerges before us, that of moving toward globally balanced economic development. We are convinced that telecommunications is the driving force for helping to achieve this goal through spurring development of our society toward higher economic efficiency, while at the same time taking care of the environment. With this in mind, we will commit ourselves to work toward advancing the world's telecommunications infrastructure, enabling all our citizens to share its benefits as we progress toward the 21st century."

Coordinating Policy

Asia has a great diversity of nations: from Buddhist to Muslim, from capitalist to socialist, from island nations with less than a million people to a country with a population of 1.2 billion, and from some of the poorest countries on earth to some of the most economically advanced. When it comes to building a global network the differences in the political and economic policies between each country could be major obstacles. To imagine the problem, we only have to think about what happens when commercial enterprises and go-getting businesspersons have to work together with state-owned monopolies run by government officials tied up in red tape.

Compared to developing nations, industrialized nations have more systems in common, and this enables them to adopt common policies. They also have the means to implement these policies. Moreover, they are all planning to deregulate telecommunications. However, this is not the case in developing countries. Each country must create a framework that is best for building infrastructure according to its level of development.

Consequently, it is not appropriate to force a policy that has worked for an industrialized country onto these countries. Developing nations will not join GII if rich countries stick to the principle of free competition. And gaining the participation of developing nations is the key to success. Coordination of policies between developed and developing nations is, therefore, of utmost importance.

The Construction of GII

Many issues must be coordinated and resolved for building a GII. These include acquiring funds, coordinating radio frequencies, protecting copyright, promoting interoperability, setting up a new telecommunications service framework and so on. And of course, we have all become very keen on creating competitive environments.

I believe, however, what is most important is to establish a common vision of the future global network. We must have a common target. Without this, how can we talk about GII and cooperate with each other in building it?

How and where can these issues be solved? It will not be an easy task. We need time and practice. We have to make use of every possible means to tackle the problems we face.

In this connection I have to mention that under the GATT arrangement, many important issues have been, and are being discussed in the telecommunication fields.

The free trade system is the basis of our global economy and is essential for economic growth. However, what is utopia for the trading system is not necessarily ideal for building communications infrastructure. We must understand that the first priority is the immediate construction of infrastructure in each nation, not free trade in telecommunications services. Having a well established information network will then contribute to free trade among nations.

It is, therefore, clear that the international organizations set up to facilitate free trade will not be an appropriate forum for establishing GII. I am very happy to report that a new forum is to be established which can fulfill that role. The Plenipotentiary Conference of the International Telecommunications Union in Kyoto, decided to set up a Policy Forum. It is expected to serve as an ideal place for coordinating major policy issues relating to telecommunications. We expect that in the capable hands of the Secretary-General of the ITU, Dr. Tarjanne, the forum will serve us well.

Social Reform is Required

There is another matter that cannot be forgotten for building a GII. As noted by the Telecommunications Council of Japan as well as others, an information communications network consists of four layers:

- physical networks;
- information processing devices;
- applications; and
- and legal and social framework.

The legal and social framework is certainly the most important for the development of GII. Let me provide an example of how the laws and expectations of a society might need to be changed. Communication networks are now able to transmit medical data so precisely that remote treatment of patients should be possible. However, as long as laws restrict doctors to only treating patients through direct contact, it will be almost impossible to use the communication network to provide remote medical services. There are numerous other instances of how we need to adapt our ideas. Changing social systems embedded in the history and traditions of each nation is far from easy. But unless the citizens of all countries do so, the potential of modern technology will remain unrealized.

Japan has experienced major upheavals this century. The disaster of the earthquake in Kobe was only the latest. But usually we have been able to adapt ourselves to change in the past. We intend to use such experience to approach positively the social demands which information superhighways will bring about. As we enter the 21st century, our most important battle will be against our old conventions. It is a battle that is well worth fighting.

Assessing Regulations and Global Standards Issues

Parke Davis

Director General, Information Highway Advisory Council Secretariat, Canada

This session will deal with issues of regulations and global standards. In school we all learned that telecommunications networks had attributes that made them natural monopolies. We further learned that government policies and regulations were the necessary glue that held the monopoly telecommunications networks together throughout the world. There were rules that applied to each of the monopoly players and they ranged from who could offer services and where those services would be provided to the tariffs which specified how much could be charged and under what conditions service could be offered.

With few exceptions this was the case for both telephone companies as well as for cable broadcasting concerns. Overall monopoly service providers offered varying levels of universal service to meet a basic set of needs in various parts of the world.

Over the last 10 or 15 years the glue that has traditionally held monopoly providers rigidly in their roles has dissolved like snow in summer. As technologies advanced, governments in societies have embraced consumer choice and market forces in place of regulatory decisions. Having adopted competition in place of monopoly, the regulatory role for governments now is first to set the rules of the competitive game and then secondly to act as a referee, if necessary, to enforce those rules.

In order for market forces to be fully developed, a new approach to global standards issues is also necessary. Standards development must enable and stimulate, not hamper, competitive forces. Standards must also make the shift beyond their traditional roots in hardware and communications protocols to services, quality management, and even content. Standards need to be widely applicable – regional, if not global – open and non-proprietary. Anything less will result in a future information highway that would be limited in its range and its extent and, ultimately, in its use to all peoples.

Lee Lam

Vice President, & Director, Asia Telecommunications and Media Practice, A.T. Kearny, Inc., Hong Kong

The topic of assessing regulations and global standards issues is huge and can be approached from many angles. I will discuss the complexity and diversity of key players in this area. I'd briefly like to list a couple of key driving forces if you will for the changes that are taking place now.

Many customer needs today have to do with advanced, not just basic, services. This means that customers or users are a driving force behind any developments in standards these days, especially global or regional standards. As well, a lot of organizations such as the ITU have their own mandate, agenda and budget to pursue work in this area. We also have user groups which include telecom user groups and telecom associations across countries. The latter are well established in Europe and America, and are becoming more and more common in Asia. All these groups facilitate improvements in the area of open systems and interoperability.

Bankers and investors also encourage the adoption of standards that can help them recover investments quickly and surely. And we also have economic institutions engaged in long-term planning – although some policy makers argue those plans are less than practical. Technology is changing so quickly and standards – by nature of technical subject – are becoming increasingly technical. This presents problems for policymakers, many of them feel that they know a lot about standards but in fact there is a huge gap between what standards are supposed to be, standards as they exist now, and what policymakers really understand at heart.

The next group of remarks introduces the major issues in the standards and regulations area: how they interact. Many questions have emerged over the years which still do not have good answers or complete answers or consensus answers. One such issue is privacy: privacy is key in terms of how we talk about software standards and architecture, and systems architecture. As well, privacy issues surround public access to information, spectrum management, and card-based services (calling cards and so forth). There are also questions about international value-added network services, roaming for mobile services, and numbering for both fixed and portable services, to say nothing of EDI, international satellite and wireless services and of course the catchy topics of convergence and multimedia. Finally, there is the need for international consultation and coordination. Regulators have to move beyond their own county's, boundaries to work with their counterparts in other countries.

I would like to conclude with some remarks about the way forward – what we can do to make some improvement in the area of regulations and global standards. This is easier said than done, of course, but we can point to such things as increased regulators' knowledge and know-how of technological advancements and standards issues in particular. It is important to examine the policy impact of standards. Many standards have profound policy impact by the bureaucracy and the political system in certain countries.

A second potential area to improve is to encourage regional initiatives. Consensus building and dialogue at the regional level can facilitate wider global discussion and agreement. As well, public sector and private sector dialogue and cooperation, should be encouraged.

Often when people talk about standards, it is presented as a regulator's issue, or as a national agencies' issue, or as a multinational suppliers' issue, but in fact it is more than that. Users and government ministries, and so on, need to come into the picture. This diverse population requires more information on standards. There are comprehensive sources of information on standards and their development across countries. We need easy-to-understand, easy-to-get, easy to refer to, and updateable and updated information, perhaps in the form of databases.

Finally, we must think about consultation and coordination across countries and between the private and public sectors Conferences such as this one and organizations such as APEC encourage precisely this sort of dialogue.

Martin Johann Löf
Director, International Affairs, Telia AB, Sweden

I should, perhaps, preface my remarks by saying that my perspective is from the vantage point of the National Operator in Sweden which used to be Swedish Telecom up until mid-1993 when it was corporatized into Telia, a state-owned company which has taken over from the old agency.

A background point which has been mentioned at this Symposium, is that Sweden is an interesting country with respect to regulations. The Swedish system that had been introduced is very minimal, and deliberately very minimal, so that the Swedish marketplace can be regarded as a very free market in comparison with many other heavily regulated markets. That is perhaps why we have been asked to convey to you some experiences from that marketplace.

We are here, to share experience on Telecom changes and the way forward into the global information infrastructure. It follows from what we have heard thus far, that telecom is a very key element in the development of the information infrastructure. It is a central element and we are expanding our discussion out from that central area into many other areas which hang together.

There are no general blueprints in this area but there are a number of trends and issues that are related and that touch almost any economy in addressing the transition from the old inherited monopoly traditional situation into tomorrow's much more diversified competitive atmosphere. The first element I want to address is the setting of telecom policy objectives. Things have perhaps not been so clear in the past, but in order to trace a way forward, setting clear telecom policy objectives is very essential.

Efficiency should be the major element in setting telecom policy objectives. I mean two things when I say efficiency. I mean both an efficient provision of telecom services the internal efficiency of the telecom system – not only the national operator, but the whole national system of many operators. Secondly, I also refer to the efficiency in the use and employment of the telecom services in society at large.

We have come to understand that telecommunications is a very important ingredient in the provision of almost any goods and services in a national economy. It follows also that other legitimate objectives will have to be balanced against this objective of efficiency. A very common objective is the provision of universal service. This may or may not be running, to some extent, in parallel with the objective of efficiency. My opinion is that universal service should be limited to basic telephone service and certain should be made in extending universal service obligations over a wide range of services. However, basic telephone service these days is, of course,much more than voice.

Boosting national champions in industrial matters is another objective that has to be looked at very carefully. But my main conclusion is that efficiency should be the main objective and that objective will have to be carefully balanced against other telecom objectives.

The second item I would like to touch upon is the liberalization of the market place. The promotion of competition has proven to be the major tool to improve efficiency. You can improve efficiency by regulatory means but it is my experience that there is nothing that improves efficiency so much as real competition. Not only real competition but managed competition. The terminal market has already been improved or liberalized and we have seen a rapid improvement in performance and reduced prices. Things have happened of course, for example we can no longer make telephone instruments in Sweden at prices that are competitive with those provided by the south-east Asia market.

If we turn to liberalization of advanced services, these too have also developed very rapidly. A particular example in the Nordic area, that you may know, is the development of mobile communications. In Sweden the mobile telecom

penetration is one quarter of the fixed penetration network, a surprise even for the enthusiast. This was achieved because there was no tug-of-war of who could do what to whom and why and where. We just went away and did it and got off the hooks much earlier than anybody else, and this proved to be a profitable avenue. Another issue here is the basic services such as telephone lines. This is now at the heart of the debate. In some countries it has already been liberalized.

The European Union has decided to liberalize telephony and also basic infrastructure by 1998, so we are seeing a strong changes here. This opens a number of critical issues. One is, of course, tariff rebalancing which is highly needed in order to provide for a fair competition and is bound to meet some type of public opposition. This must be managed with care on the political scene. But remember the comment from Japan yesterday which stated that they "don't feel too much upset about risking the basis service in the competitive situation". Competition and basic service may very well be concurrent. Corporatization, as we have been through in Sweden has been a widely-used tool to improve efficiency. Corporatization can improve inflexibility and human resource development with the operator. Further, it that it places the operations at arms-length distance from the political system,which tends to remove politicians from the day-to-day decision-making in the operator. This is a healthy thing. Another product of corporatization, is that it facilitates international alliances and makes it possible for the operator to better improve its competitivity in alliance with foreign partners.

The next step could then be privatization. And privatization, as we know, can improve the supply of capital and confidence. Investments will probably not be any problem in a telecom sector which is highly expanding, provided that the conditions are made right. For example, if you have a very bureaucratic marketplace you tend to also scare off potential investors.

Finally, I would like to say a few words about human resources. Human resources is, of course, a very key asset with any operator. Thus, human resource development is crucial. Regrettably, one has to note that employment levels are going down with the national operator, but that is partly compensated by the fact that new activities come about, and new operators come about. However, we should not be led into the conclusion that we should retain an inefficient operator just to maintain employment levels. An efficient operator is the only long term guarantee to retain employment with the operator.

A further element is what needs to be done on a national level in terms of adapting the legal framework. I have already addressed the setting of basic political objectives. We have heard very much about separation of regulation and operational activities, but I think that regulation should be primarily focused on ensuring fair and open competition and it should be kept minimal so as not to hamper development. A very heavy regulatory system has a lot of friction forces, tends to slow down and focuses innovation on the legal field rather than on the technical and the market field. In the long run that can slow down the progress. I am an advocate of general competitive rules in order to ensure a fair and open competition.

We have noted during the symposium that some sector-specific regulations are still needed to ensure equitable access to limited resources such as frequencies, numbering space and rights-of-way. Mind you, the rights-of-way is not only a telecom problem. It is a problem for other utilities as well, such as electricity, water, sewage and the like,. So maybe rights-of-way is not a telecom policy problem as such, it is more of a planning problem but nonetheless it has its impact on telecom.

To conclude, I would advocate minimum sector-specific regulation – some is needed. I would advocate fair competition rules and the essential point I should finish on is "believe in the market forces". Limit regulations and let the competitive forces loose: they are less dangerous than you may think.

Roy Mills

Director, Standards, Northern Telecom, Canada

The focus of my paper is on standards with respect to the global information infrastructure. Some of the underlying principles which I believe have the greatest intersection with standards, have an impact upon the global information infrastructure, and in the opposite direction, where the information infrastructure intersects with standards are as follows:

Information Infrastructure – Underlying Principles:

- An interconnected network of networks;
- Competition in facilities, products and services; and
- Universal access.

There really doesn't seem to be a great deal of debate that the GII will be realized as an interconnected network of networks. But if the GII is going to flourish and meet user needs and be a positive drawing card for investment, it must be positioned in a competitive environment and it must provide cost-effective universal access. In other words, the global information infrastructure is targeted to provide open communications from anyone to anyone, to give anyone access all offered services and to provide these capabilities from anywhere in the world.

To satisfy these principles, achieving interoperability of the many networks and services and of the associated hardware and software systems is crucial. If there is no confidence that the diverse components of the GII will effectively work together, investment will be impeded and users will find that in the best of circumstances the GII just doesn't quite meet their expectations, and in the worst case they will lose interest and seek other options to satisfy their information needs.

I firmly believe that a high degree of interoperability is best achieved through the adoption of open interfaces based upon, to the greatest extent possible, international standards. Many standards which are essential to an interoperable GII already exist and there are many more being developed quite rapidly which focus on state of the art information and telecommunications technology and services. Our evolving and increasingly competitive industry is using the standards community – which includes both the formal standards development organizations such as ISO and the ITU and the much newer industry consortia – to achieve consensus on how new technologies such as wireless in asynchronous transfer mode and new multimedia services should be deployed. Clearly the standards infrastructure, the standards community, is a vehicle for the industry at large, including users, to come together to determine how these technologies can best be used.

However, that does not mean that we have all the answers. There is clearly a need for a disciplined process to identify both gaps in existing standards and new requirements so that they can be addressed in a timely fashion. It is essential to produce standards which are of high quality and are available at the right time considering demand and technology and cost-effective application.

Consistent with the competitive environment in which we believe that the GII should be implemented and operated, it is important that the compliance with standards be market-driven, except in a minimum number of areas such as safety and network harm where compliance may be made mandatory. In the interest of fostering global markets to keep the cost for testing down, and to ensure a timely introduction of products to new markets, it is highly desirable that mutual recognition agreements be established. These will allow one stop testing to demonstrate compliance with mandatory standards.

In addition, supplier declaration is the preferred means of demonstrating that systems conform to standards and that they do, in fact, interoperate with similar and competitive products. We are confident that in a healthy competitive market there is no need for rigorous, costly, and time consuming certification of compliance. And for all of this, the private sector led, voluntary consensus standards development process should be called upon to deliver the necessary standards. This includes not only the traditional and well-established formal, national and international standards bodies such as ANSI in the United States and ISO and ITU on the international scene, but also the newer industry forums and consortiums such as the ATM forum, the Frame Relay forum, the Network Management forum which have been initiated to promote rapid development of specifications and applications in focused areas of new technology and services. It is critical that the standards community continues on its current course to develop the processes to facilitate the effective partnering of these different bodies. We clearly cannot afford to have these bodies compete with one another or go off in different directions.

While we want to rely on the private sector led voluntary consensus standards development process to satisfy the standards requirements of the GII, there are important roles for governments to play as well. It is important that governments promote the use of standards as the way to achieve an open, interoperable network of networks; in other words, governments should be advocates for standards-based implementation. Governments can also have significant influence on the timely development of high quality standards by participating in the development process as users and clearly, governments are very large users of information technology and telecommunications.

Closely related to this front-end influence of contributing to the formulation of standards is government ability to lead and influence through adoption of procurement policies based upon standards compliance. In addition, governments can also make a significant contribution by serving as a catalyst in the realization of test beds which will facilitate demonstration of product and service interoperability. A key to achieving a competitive and open standards base global information infrastructure is effective government/private sector cooperation.

Communications Content, Security, Privacy and other Legal Issues

Gregory Tucker
Consultant, OECD, and Professor, Monash University, Australia

In my brief today, I'd like to speak about a recent ad hoc OECD meeting of experts which discussed the three issues we'll be looking at today and where they direct. We should begin with some background. We've heard a lot about privacy and security but haven't really heard what it is or what they are. Indeed, they have been bracketed together so one may be forgiven for thinking that they are the same, indeed they are not.

"Privacy" has eluded precise definition, probably because it is more of a cultural, social concept rather than a legal one. Many people have tried to define privacy – but it has not really been done adequately. Privacy is really a set of fair information practices, which starts with a collection of information: how you collect information in a proper, legal manner; how you use that information; how you store that information; how you give access to that information to the person that it relates to.

Privacy is a collection of rights or fair practices. And that is what is meant by this term in the sense of data privacy.

Security, on the other hand, is a protection of interests in the information systems. In particular, when considering security, we look at the areas of integrity: that data is not being tampered with, is correct and accurate, and confidential. Severe security itself, does not relate only to protection of personal data, it relates to a much broader sense of information. Thus, the concepts of privacy and security are quite distinct. Security is understood by some as the nuts and bolts part of privacy protection in terms of, for example, encryption techniques which can provide some protection for privacy. There definitely is a linkage between the two, but they are separate in themselves.

The OECD has produced privacy guidelines (1980) and security guidelines (1992). However the OECD does not have an executive role, and cannot provide legislation in any sense. It provides guidelines, and tries to provide a clearing ground for the relevant issues. In addition to these documents the OECD has provided a meeting forum on a yearly basis in the past few years at least, to discuss relevant issues For example, it has addressed the area of medical data; using technology to protect privacy; and so forth.

The nature of the recent ad hoc meeting was of great interest because it would have been very easy to run the meeting by drawing in people that all have interests in protecting privacy. The more challenging approach is to bring in people who are unlikely to agree, people from all different paths and disciplines; and that is what was done at this meeting. We brought together people from government, from business, from academia, consumers. From these different people, we hoped to see what their view of the information society was and what their input was to that society. There were about a hundred people present, a collection of interested parties to consider issues of privacy, security information systems and intellectual property rights.

Now you may be thinking: well, I can understand the connection between privacy and security but why was intellectual property rights (IPRs) in there? The main delegates at the meeting held in December were wondering the same thing. But as the meeting opened up, it became very obvious that there were connecting points, for example, between privacy and intellectual property rights. For example, if you are a provider of software to which you have copyright, and it go as into a production which has many facets, you do not just have one contributor. In order to get the return for your monopoly right, your copyright, you may want to trace the use of it so that you automatically know or can get details of the users. So you obtain information about when your software is used, what parts are used, and how often, so that you

can recover your money. Thus the privacy dimension in that the users of it are providing, whether they know it or not, the details of their use of the software or the copyrighted material.

The first objective of the meeting was to demystify what the GII is and will be. To that end, we had people from the various computer and software houses providing us with their vision of the future and detailing the elements that make up this superhighway. And, these issues are all being discussed s in the context of the superhighway – not in a vacuum but squarely in this context.

Key Points

The first general point was that there are many economic and social benefits that will be derived from what is around the corner. However, it would be a little silly to overlook some of the challenges. At the very least, we need to talk about them in detail and see what needs to be done, if anything.

We looked at the legal structures for each of these areas to see whether there were fundamental changes that needed to take place before we could go forward. The consensus seemed to be that, with security for example – which has only had OECD guidelines since 1992 – that the legal structure was just fine and that the private sector would carry along in consultation with government. In terms of IPRs, there was some disagreement about various regimes that were available, but the legal structure seemed to be resolving those issues as they arise. It was the privacy issue that gave people the most trouble. There were definite opinions both ways, as to whether the current status quo was sufficient.

When talking about the current status quo, I refer to existing national regulations. For example, there was a Convention in 1981 of the Council of Europe which 15 countries have ratified; there are the OECD privacy guidelines from 1980; and there is a draft European Union directive to be passed this year. There are international rules of the game, national regulation, a provincial regulations and there are codes of conduct, and codes of practice. There is also the use of technology to provide some protection of privacy and of course there is basic education. A number of different tools which are not mutually exclusive, exist to protect privacy. So the real question was to ask of the people in the society we are moving towards: is this aggregation of tools sufficient to cope with what we're facing? And there was basic disagreement about that.

This is the real challenge that lies ahead. We are heading towards a Global Information Infrastructure. The rules underpinning the GII must be global as well. Otherwise, difficulties or barriers will arise, which will in turn impede the realization of the full benefits of the GII. The OECD has been asked by the G-7 to look at this area, including the potential barriers to full realization of the benefits of the GII.

Surveillance was raised in the meeting as an interesting example of what lies ahead. Surveillance is a neutral term: it is how it is used that makes it good or bad. In this instance we are talking about technological surveillance. Surveillance happens, there's almost a predisposition in my view to surveillance these days. We have satellite coverage of shipping movements and aircraft; we have surveillance of goods; we have just-in-time management systems etc. Supermarkets are a good example of this predisposed surveillance; for example, cash transactions are becoming less common, and consumers are leaving data shadows through shopping transactions. We are also hearing about intelligent vehicle highway systems, and automatic road toll payment. Surveillance is already here, and is becoming a way of life. The current question is whether the technology that is arriving will necessitate changing the status quo, the legal status quo that we have now.

So we return to the issue of a global technological system, the GII, without a global set of rules. The argument is that current rules are not sufficiently detailed to deal with the GII: they are abstracted principles where what is needed are some workable principles.

A different perspective voiced on these issues was that the status quo is fine, and that we should move ahead – if there are any holes in the road, we'll fix them as we see them.

A real balancing of interests went on in this meeting and there were clear tensions between law enforcement and national security perspectives as opposed to the privacy representatives. Another matter that arose out of each of the sessions was the lack of awareness that delegates thought their constituents had.

Concrete Measures Proposed

The first suggestion, was the preparation of guidelines for international encryption policy. I think that would be interesting to do, but I am sure that there are a lot of people with different views.

The second recommendation was for the development of a model framework for legislation for security, for security information systems.

The third point considered the economic benefits and economic impacts of privacy protection; and security and the fourth looked at the benefits of intellectual property rights.

It was also said that the OECD should continue to provide a forum for guiding and stimulating international debate and developments in this area although we have yet to resolve exactly where that debate is going.

It was proposed that we examine particular applications, in the information infrastructure, in depth and use them as examples of the impacts of particular technologies within the new information society.

Finally it was said that once the policy positions were taken up as a result of the G-7 meetings, we should follow through with anything that comes out of those.

In summary it is perhaps a disappointment that I have not provided you with any answers. Indeed over the last day we've had more questions than answers. But we are attempting to set in place a detailed path, a path which will lead us to an action plan. Underpinning all the perceived economic and social benefits is the hope that the information society that we are heading going towards will be better than the one we are leaving.

Stephanie Perrin
Special Policy Adviser, Industry Canada

Those of us who have worked in the area of the so-called information highway tend to get rather tired of information highway metaphors: potholes, road kill, on-ramps, off-ramps, speed bumps, and so forth. It seems, on occasion, that we speak more in metaphors than we talk about the nitty-gritty of what actually needs to be done.

However, that said, I'll begin with one that David Johnson provided in his opening remarks. I had not really thought of us as cruising towards a surveillance society as the Titanic steamed towards the iceberg. I was blissfully unaware of the role of the cable operators in that whole tragedy. However, as a privacy advocate who has preached about doing something in this area and tried to get things going for a number of years, I can relate to the poor telex operators who tried desperately to tell the captains of the ship that there were icebergs ahead and that they had better pay attention.

We know that privacy is being addressed, at least at one level in much of the rhetoric that surrounds the GII. What is disturbing is that in terms in rolling up our sleeves and getting the job done, we are not moving as fast in the area of privacy protection as we are in interoperability, allocation of frequencies, and other technical arenas.

In other words, we are creating a capacity for a surveillance society at an exponential rate and the privacy balances that we are putting in place are happening at an incremental rate. Like the iceberg, the dangers in failing to address privacy issues lie below the surface. The tip of the iceberg is not the part that sinks the ship. In the case of privacy, there will certainly be services that people will not go for because of the possibility of surveillance. And, there may be economic dislocations such as experienced with the caller-ID in North America, where a service has to be retro-fit.

I think that from the point of view of government and of those whose business it is to care about privacy protection, the real dangers lie underneath the service – that is, what living in such as surveillance state means for democracy and for our notion of individual autonomy.

At a recent Industry Canada symposium to explore technological solutions for privacy and security, we invited the well-known cryptographer/developer, Whitfield Diffey, to give the keynote address. He introduced himself as someone who is not really a privacy advocate, but rather an advocate of individual autonomy. This is perhaps a more useful way of looking at the problem. He was concerned not just about privacy protection but also about the ability to get information, and to control information, to participate autonomously in this information age.

This is a useful perspective, in that speaking only about privacy leads to protecting deviant behaviour. For example, why would you not want the bank to have a software program that trips when an unusual deposit or withdrawal is made? Or, why would you not want the highway system to track every mile covered, i.e., what have you got to hide?

However, if we understand autonomy as central to what we believe in as a democracy then it becomes quite clear that if we're going to reap the benefits of the GII – the education, the enrichment for human beings – it will not be through creating a society of drones who are afraid to move because of surveillance.

Industry Canada has addressed some of these issues in a discussion paper, "Privacy and the Canadian Information Highway", in which we explore different approaches to the protection of personal information:

- The legislative approach which is as difficult in Canada as it is in Australia.
- The need for voluntary codes, because even if you have a data protection, as they do in Europe, companies have to interpret how they meet a piece of legislation and that means policies, procedures, voluntary codes. Of course they are involuntary in the case where there is a legal framework, but we need to explore technological solutions.

- Many of the pressing problems in such a surveillance panopticon can be solved simply by not gathering the information. By coming up with road tools systems for instance, that don't track you, that don't have a running stream on your credit card as you drive by, and therefore does not create the surveillance.
- And finally, consumer education, which is a problem for cash-strapped governments, and for companies trying to build infrastructure, who necessarily do not want to alienate customers. This is a key problem when launching a cellular phone, for example, you do not want to tell potential customers that everybody in the world will be able to hear what they are saying. However, once launched, there comes a time when transparency is a virtue.

Another key issue that Industry Canada has been working on, is the Canadian Standards Model Code. Back in 1990 when the European directive came out there was some furor over its possible extra-territorial implications to other countries. It seemed to us that harmonizing legislation was going to be tough slogging. We decided that perhaps a standards approach might be more fruitful.

And, over the four years that the European directive has been chugging through the Commission, in their attempts at harmonization, we have been hammering out a Code. I would not suggest to you for a moment that this Code is a miracle, but it is a basic set of fair information practices. An interesting aspect of its development is that rather than being hatched in the back room by privacy experts, it has been hammered out at the table, line by line, with the industries who will be expected to implement it. Thus there is a degree of consensus on the draft which is currently is out for comment. Colin Bennett, author of *Regulating Privacy*, has been contracted to explore how we might implement this Code.

Privacy experts generally have dismissed voluntary codes as not enforceable, and as providing inadequate redress mechanisms. Industry Canada is studying various ways to approach this. The beauty of operating in the standards framework is the basic, common understanding of what a set of fair information practices involves.

There is also an interest in the Quality Management Institute associated with the Canadian Standards Association to integrate this into the ISO 9000 series of standards and therefore incorporate it, into other quality management issues. In addition to being a human rights issue, in terms of delivering services in an information society, privacy can also be considered as a quality management issue. Once this perspective achieves some weight, we have the possibility of a very simple and cheap way for governments to come up with legislation frameworks that would allow us to legislate the areas where there are a problems and to leave the other areas without legislation.

This provides a useful tool, which is easier to work with than a more all-encompassing piece of privacy legislation such as the in European experience.

Kevin O'Connor

Privacy Commissioner, Human Rights and Equal Opportunities Commission, Australia

PRIVACY STANDARDS AND THE INFORMATION INFRASTRUCTURE

This Symposium has underlined the need for national standards which are internationally-based to ensure full interconnectivity and interoperability. Technical standards, while an important component of international standards are only one part of the picture. I would like to talk briefly today about behavioural standards which should govern information infrastructures, and, in particular, privacy standards. I will touch on three ideas:

- the role of privacy standards in the information infrastructure;
- whether existing privacy standards need to be replaced by new privacy; and
- applying privacy standards to the new information infrastructure.

The Role of Privacy Standards in the Information Infrastructure

It is encouraging to see in Australia, as well as internationally, the increasing attention being given to the social policy dimensions of the new information infrastructure. By using the words "new information infrastructure" I am referring to the web of modern communications systems capable of transmitting vast amounts of information, many of which have been made possible because of the convergence of telecommunications and computing technology. I believe we are starting to recognize that we have a choice in how, or whether, we are going to embrace new technologies. We do not, after all, have to be technology-driven, but we have the capability to shape our acceptance of the new technologies by those values which are important to us. While technology is always opening up new ways of communicating, the behavioural and ethical standards to which we adhere should, in my view, govern the technical standards, and not the other way around.

I regard privacy as one of the most important consumer protections in new information infrastructures. As more of our communications between each other, and with government and businesses, take place by electronic means, the more we need to ensure the privacy of information transfers are protected so as not to undermine the integrity of our communications.

Security is one element of this, but not the only one. Privacy is as much about protecting the quality and integrity of personal information, and encouraging fair information handling, as it is about preventing unauthorized access to the information. In an automated environment, information handling techniques are less visible, and less capable of public scrutiny. It often is the case that information handling techniques are dictated by the capability of the technology. Privacy is about exposing these processes to standards which seek to protect individuals' interests. In my view, we should not be deterred from this task simply because of changes in communications technology.

We need to be aware of the consequences of new modes of communications, so as to ensure adequate privacy safeguards accompany their application. A major problem here is the lack of understanding among the community at large of the way different types of technology operate. Individuals who use particular products and services may be quite unaware of the consequences in terms of personal information flows. Technical experts or those who make available new products and services should be obliged to explain fully the personal information management implications of new technologies. This should include detailed assessments of how particular applications generate, use and transmit personal information about individuals.

Importantly, measures should be taken to allow individuals to know the consequences of using particular products or services. They should be informed what data about them is generated, how it is used, and where and to whom personal information about them is being made available. Security procedures should be tailored to the level of sensitivity of the information and its purpose of use. These and other issues are critical to protecting individuals' privacy rights in the new communications environment.

My experience is that it is not sufficient to leave these matters to the hands of those whose interests might conflict with the privacy interests of individuals. Hence, there is a need to examine how the new technologies operate against internationally-accepted privacy standards to ensure individuals' privacy interests will not be compromised.

To sum up, I see the role of privacy in information infrastructures as an individual protection role. The benefits lie in a better informed community, more accountability in personal information management, and, ultimately, better information systems.

Are New Privacy Standards Needed?

From time to time it is suggested that information privacy laws of the type found in many economies around the world are outmoded because of the new communications technologies. Some go so far as to question whether the information privacy principles on which they are based are relevant or capable of being applied to new technologies.

I have reservations about such arguments. We should avoid the error of concluding that we need to re-evaluate what standards of behaviour are acceptable simply because it is now easier to breach those standards.

The OECD Guidelines for the Protection of Privacy and Transborder Flows of Personal Data, adopted by member economies in 1980, have had a widespread impact on the development of privacy legislation around the world, including in Australia. They establish fundamental minimum standards of individual privacy protection which have been accepted at many levels within the public and private sectors of member economies.

In my view, the principles enunciated in the Guidelines remain valid. We ought not need to reinvent privacy standards. However, we do need to re-think the way those principles are applied to ensure that they are capable of being accommodated by new information handling technologies. The wording and terminology used to express privacy standards in the 1970s and 1980s may not necessarily be appropriate to the environment of today. The wording reflects certain assumptions about the way data is held, used and moved, for example:

- that it should be possible to identify a single record keeper who is responsible for controlling the data in accordance with the principles;
- that comprehensive blocs of data are organized within separate self-contained systems controlled by separate organizations;
- that most, if not all, of the data concerning the performance of an organization's key functions are held by the organization itself; and
- that an organization has the capacity to amend and rectify the data upon which it relies in dealing with individuals.

In the new communications and data-processing environment some of these assumptions do not easily apply. I suggest we need to find alternate ways of expressing privacy values in a way which better fits the new communications environment of today.

As many of you would be aware, the European Commission is developing a directive on privacy and digital telecommunications services. The draft proposal deals with such matters as the security of personal data, itemized billing, traffic data, calling number display, the use of call return and call forwarding, surveillance of communications,

computerized telephone directories, and unsolicited marketing/research calls. This is one example of the way the broad principles in the OECD Guidelines are capable of being applied to a specific sector.

There are other sectors where immediate risks to individual privacy are posed as a result of new technologies. A more detailed approach should be taken in these sectors to specify how the OECD principles should apply. The health sector is one such example, and a number of countries, including Australia have already done some work in this area. I refer to this later.

The point I would like to make is that the principles outlined in the OECD Guidelines are still valid and that individuals should enjoy the same rights regardless of the medium of communication. The challenge for regulators and for those who promote privacy principles is to find appropriate ways of translating already accepted privacy principles into language which is meaningful in the context of new technologies and their particular application.

For example, the translation of privacy principles needs to take account of technical features which make possible the generation of new and potentially commercially valuable personal information. They need to address the potential for personal information which is not encrypted or otherwise protected to be intercepted and diverted to any number of destinations and capable of being used for any number of purposes. Also, specific privacy procedures should be directed towards the seemingly limitless potential for correlating, manipulating and disseminating data on a scale we have not witnessed before.

Applying Privacy Standards to the New Information Infrastructure

As Australia's Privacy Commissioner, I have been seeking to have a legislative framework established which, firstly, extends the fundamental privacy principles which are established in the OECD guidelines to the whole community, since at present they only apply in the main to federal government agencies. Secondly, I believe the legislative framework should make it possible to develop specific sectoral privacy codes on a case by case basis. These more specific standards should have the backing of legislation but would have the benefit of being developed and monitored by stakeholders themselves.

I see a role for sectoral codes being developed in areas such as:

- direct marketing;
- financial sector networks;
- health-care; and
- electronic retailing.

I will outline briefly a specific example involving the health sector in Australia which illustrates some of the points I have been making. In Australia, an "Ethical and Policy Framework" has been established to govern the operation of a telecommunications network for the transmission of sensitive personal medical information. The Health Communications Network (HCN) as it is called, is a project which will allow various parties in the health-care system – medical practitioners, specialists, hospitals, administrators, researchers and so on – to communicate with each other more easily and efficiently than is currently possible. The Ethical and Policy Framework addresses some privacy measures, although I have expressed some concerns with the extent to which the company operating the network will be capable of setting standards and monitoring compliance with them. Since there is no federal privacy legislation in Australia which would govern the HCN, privacy controls affecting the HCN will be limited by those which are capable of being stipulated in a contract.

Therefore, there is a need for privacy standards applied in specific sectors to be backed up by appropriate enforcement mechanisms. These need not conflict with the interest in allowing government, business and other sectors of the

community to embrace new technologies. Rather, they should be an integral element of infrastructure policy and regulation, a reminder that the travelers on the "information superhighway" are, after all, individuals.

To conclude, the changes that are occurring in our national and international communications should not cause us to lose sight of the continuing relevance of individuals' information privacy rights. The OECD Guidelines are a valuable point of reference for determining appropriate privacy policies which should be applied to new technologies. We already have the conceptual framework for privacy, now the task is to develop technologically-specific privacy protection programs within the building blocks of the new information infrastructures.

Kazunori Ishiguro
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FREE FLOW OF INFORMATION AND PROTECTION OF INTELLECTUAL PROPERTY RIGHTS UNDER THE NEW INFORMATION INFRASTRUCTURE

Theoretical Backgrounds for the Monopoly of IPRs and the UR Negotiations

Although the protection of legitimate interests of IPR holders is essential to support widespread use of the GII, (International Information Industry Congress [IIIC], Common Views Paper on GII [September 1994], p. 7) the one-sided intensification of its protection cannot be viewed as suitable in the GII contexts. If we are to discuss IPRs problems under the new information infrastructure, we must thoroughly analyze the very theoretical background of the monopoly of IPRs. Can economic analyses explain why IPRs should be protected by a monopoly? The answer is probably no. That a monopoly is necessary should be viewed as an historical outcome. Therefore, Japanese specialists in economics have discussed how to minimize the social costs of the theoretically unfounded monopoly of IPRs, insisting, *inter alia*, on the flexible use of compulsory licenses. This should be viewed as the starting point of the Report on the Basic Issues Concerning Economic Effects of Intellectual Property (May, 1994 Institute of Intellectual Property, Japan).

However, this aspect of the problem was actually cut off throughout the Uruguay Round negotiations concerning the TRIPs, as evidenced by the single fact that the TRIPs say almost nothing about the parallel import problems, although they are critical if one thinks about the negative impacts on competition policy of international market divisions using IPRs. (In Japan there have been academic discussions, according to which parallel imports should be widely admitted also in cases of patents and copyrights in order that the territorial monopoly of IPRs may not be used as a tool for international market divisions.)

As seen in the Report on the Fifth Global Contribution Seminar (Tokyo in June 1994, organized by the Japan External Trade Organization [JETRO]) these problems were heavily discussed in the said seminar and finally viewed there as some of the most important issues in the next Round if competition policies are discussed there. In the said seminar, the discussions went beyond monopoly to the question of giving equitable remuneration, which means a fundamental change in the nature of IPRs.

Free Flow of Information vs. Protection of Intellectual Property Rights? The Need for a Well-Balanced Approach

I would like to turn to the Initial Theme Paper of European Commission (September 22, 1994) for the G-7 Ministerial Conference on the Information Society planned to be held in February 1995. The following points in the Paper should be mentioned here for the purpose of our discussions. First, preventing abuse of dominant positions in all aspects of the information society, including those of computer and electronics manufacturers, is viewed as particularly important. Second, danger of creating islands of networks which cannot communicate with each other because of technical incompatibilities is well recognized. Third, and most important, there is a serious need for a thorough analysis of existing intellectual property rights regimes. In other words, the balance between the private interest of the IPR holders and the public interest of a properly functioning information society is viewed as the most important aspect of the problems. This represents great progress in thinking, if compared with the almost one-sided intensification of protection of monopolies in the TRIPs negotiations.

In the US opinions are split. Some argue that US industry depends on IPRs, especially copyrights, and that IPR issues are, unfortunately, too often treated in the NII/GII context as an accompanying issue. This sort of argument appears to

be the most popular in the US. In areas such as contributory infringement, interoperability, and fair use, the Preliminary Draft of the Report of the Working Group on Intellectual Property Rights by Information Infrastructure Task Force (July 1994), consistently takes the view that copyright law's task is to increase the ability of copyright owners to sue users and distributors of works or to increase the ability of owners to control the use of their works.

However, others in the US argue differently. To take the example of the Comments of Computer & Communications Industry Association (CCIA) on the said Preliminary Draft (September 1994), which shows us some of the key problems very clearly, there are the following arguments: excessively broad or overzealous application of contributory infringement principles to service providers on the NII will prevent the NII from ever becoming an interactive, multimedia information superhighway (id. 5); the chilling effect on hardware manufacturers and service providers should not be underestimated (id. 17); the said Draft ignores the lessons of current compulsory licensing, and does not consider a variety of statutory techniques utilized to balance the rights of copyright owners, distribution interests and users (id.19).

There are two deficiencies in the said draft's discussion: first, it gives the impression that fair use is limited to educational purposes, and second, it fails to fully explore the current state of fair use law and the importance of fair use in a digital era (id. 21); CCIA believes that one of the most important barriers to the development of the NII would be the existence of proprietary interfaces at certain critical points in the NII (id. 30).

The same problems, fear of which was expressed in the CCIA's Comments, will occur in international contexts. For example, the US District Court Central District of California rendered a judgment of permanent injunction on June 8, 1994 (*Stac vs. Microsoft*). Defendants were enjoined and restrained from making, using, or selling the Enjoined Products which infringe Stac's US patent world-wide(!). Considering the territorial principle of IPRs, the US patent does not have extraterritorial effects. The judgment is very questionable. However, if such a judgment is rendered in the NII/GII contexts, its chilling effects could be more serious than we currently imagine.

On the other hand, there is a tendency to use unfair competition laws as a supplement of territorially limited IPRs. Then the said chilling effects might become more and more serious.

The Challenges to the Monopoly of IPRs under the Multimedia Circumstances

Even if we do not touch on the adequacy of the traditional monopoly of IPRs, the protection of copyrights and other intellectual property rights must address the challenge posed by digitalization, as mentioned in the said Initial Theme Paper of European Commission for the G-7 Conference. The legitimate rights of IPR holders must be protected against the easy opportunity which the new information society offers to reproduce, broadcast, modify and use works without proper authorization. Monopoly without sufficient controls over infringements will be one of the features of the problem under the new information infrastructure. As mentioned in the OTA, Information Security and Privacy in Network Environment (1994, p.105), once a user has paid for one legitimate copy of something, little can be done to prevent him or her from making other copies, and there is a potential for any reader to become a "publisher" of unauthorized copies. The access control or other technological proposals will work only within a closed system. Once a user moves an authorized copy out of the system, there seems to be no way to prevent further copying (ibid.).

Under such technological circumstances, it will become more and more difficult for each IPR, especially copyright holder, to find out about infringement activities. There may be some powerful means of preventing any infringement, but their possible chilling effects on the new information society should be taken into consideration, too.

On the other hand, there might be a tendency of broadening the coverage of copyright protection by newly introducing the digitizing right or by protecting the "sweat on brow" itself. The history of copyright law is that of the broadening of its coverage of the protection. However, the "sweat on brow" theory was clearly rejected by the US Supreme Court in *Feist Publications vs. Rural Telephone Service, S. Ct. 1282* (1991). To give sufficient incentives and remuneration for

creativity and invention is the main reason for the protection of IPRs. The one-sided strengthening of barriers is questionable. We should find a more balanced way.

The Role of Copyright Collectives Now and in the Future

As for copyright protection, which is a central issue in the new information society, there are several collective bodies in each country (for example, JASRAC in Japan; in the case of the US see, OTA, supra, 108ff). They collect royalties on behalf of copyright holders. Each copyright holder may reserve the right to sue for infringement activities, but actually it is very difficult, time-consuming and expensive. This should be viewed as the main reason for the existence of such collective bodies.

In the new information society with advanced and interactive information networks, it will become almost impossible for copyright holders to have a contract every time their work is used. Therefore, the role of such bodies will inevitably become more and more important. It might be viewed, in future, as an actual substitute for, not a supplement of, the conventional copyright regime.

However, the fragmentation of collective bodies has been increasing, and such a trend is now being much more intensified for the future multimedia society in Japan. This trend is quite questionable. Even if such fragmentation is unavoidable, or efficient, considering the peculiarities of the different kinds of copyrighted works, a common interface should be built in for the smooth utilization of multimedia products ("one stop licensing"). The policy for collecting and distributing royalties should be coordinated among the various collective bodies for the benefit of the development of the new information society. Under the GII contexts, such policy coordinations should be carried out internationally and multilaterally in order to achieve a balance between the needs of the multimedia society and the protection of IPRs.

If the global networks of such collective bodies are effectively built up, there will be the great incentives for IPR (especially copyright) holders to entrust their rights to such bodies and the better functioning of such systems will minimize the unnecessary litigations.

The Advanced Feature of Universal Services and the Protection of IPRs

The redefining of universal services is now under way in the US, EU and also in Japan. As Vice President A. Gore insists in his proposal for GII, and as is endorsed in the Resolution COM4/1 of the Plenipotentiary Conference of the International Telecommunication Union (Kyoto, 1994), GII should be a tool for everyone in the world, rural or urban, to travel world-wide, using the most advanced telecommunication and information technology, which should be inherently interactive.[1] The barriers for such international free flow of information must be minimized.

In Iowa, there is the statewide, interactive fibre optics network of 45 Mbps. named ICN (Iowa Communications Network). It is a network only for very broadly defined educational purpose and for administrative services for all of Iowa, including some advanced medical care and the education for the disastrous accidents. It should be viewed as the paradigm of the new information infrastructure which offers the advanced universal services to everyone.

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[1]We should not forget the fact that the model for our future concept of advanced universal services can be found now in the State of Iowa, as shown in my paper submitted to the International Conference on "Centralization and Decentralization in Japan and the US: Reinventing Intergovernmental Relations in an Era of Increased Internationalization", held in Washington D.C. (August 14-17, 1994) and organized by NIRA(Japan)/NAPA(US): Ishiguro, The Role of National and International Telecommunication Infrastructure for the Internationalization and the Economic and Social Development of "Rural Areas" – Iowa's Confidence in ICN, the GII and the Japanese Response.

In OTA, (supra, 96ff) there are discussions concerning digital libraries, the establishment of which is one of the purpose of Iowa's ICN, too. Copyright problems are the concern of the said OTA Report, the main issues of which have been mentioned already in this paper. However, if one think of the "social policy" aspect of the information superhighway, some special treatment of copyright problems might be needed in the context of fair use. Exceptions to the monopoly rights of IPR holders differ from country to country, although fundamental aspects of IPRs have been regulated by international conventions. The time might have come to reconsider the fair use problems in the global, GII contexts.

We should not forget in this context what is written in the Preamble of the INTELSAT Agreement which refers to the Decision No.1721 of General Assembly (XVI) of the United Nations, deeply inspired by the ideal of J.F. Kennedy, and Article 5(d) of the Agreement. INTELSAT was established for the provision of technologically best telecommunication services world-wide, namely for the provision of world-wide universal services. The existence of INTELSAT (and INMALSAT) should not be forgotten when we think of the future and advanced feature of universal services in the GII context.

Standardization vs. IPRs

It is very interesting that the negative impacts of proprietary standards are now realized in the NII context in the US, as mentioned earlier taking the example of CCIA's Comments. Although the efforts of ETSI for the establishment of IPR Policy and Undertaking have substantially failed recently, the so-called patent policy of each standardization body, whether national or international, has functioned as a useful leverage for the balance between IPRs and standardization. Non-discrimination and reasonable terms and conditions are the essential prerequisites for IPR-attached inventions to be included in a technical standard.

In this sense, the fact that the crisis of ANSI's Patent Policy is over should be viewed as very fortunate. Some members of ANSI argued that IPR holders were free in choosing the licensees and that some discriminatory treatments should be allowed under the ANSI's Patent Policy. But after lengthy discussions within ANSI, such arguments were rejected. (See ANSI, Guidelines for the Implementation of the ANSI Patent Policy [Final January 1991]).

The coordination of patent policies of standardization bodies at the international level has been promoted as seen in the First Global Standards Collaboration (GSC) Meeting (Melbourne, March 1-3, 1994). At the next stage, the coordination activities among ITU, ISO/IEC and WIPO are deeply needed. As for ITU-T (the former CCITT), its Patent Policy is not a formally adopted one, and there are many points to be revised. From the Japanese side, a proposal for the amendment was actually made twice following the 1991 Report of Telecommunication Technology Council, Japan (pp. 33-36), but ignored by the CCITT (ITU-T) side.

In any case, from the US side also, as seen in the NII Agenda for Action and the GII proposal, the importance of standardization activities is now widely recognized for the information superhighway. On this point, the arguments in OTA, European Market for US Telecommunications Services (1993), Chapter 2 (Technological Trends) are also interesting. US trade policy concerning technological standards is criticized there, because of the emerging importance of international standards for US industries in their international activities.

In WATTC-88, the US formally declared that the Recommendations of CCITT were produced (only) for voluntary consideration by international telecommunication service providers and manufacturers of telecommunication equipment. Behind this view, there were the IPRs' problems in interconnecting networks, as seen in the 1988 trade conflict between the US and Japan concerning the protocols for the international VAN services between the two countries. This sort of negative view on the importance of international standards might have to be reconsidered in the GII context. In the new information society the standardization policy, as well as the competition and telecommunication policy, should have some adjustment powers concerning the protection of IPRs.

OTHER LEGAL ISSUES

Anti-Trust Issues

Preventing abuse of dominant positions in all aspects of the information society should be viewed as particularly important. However, if the anti-trust authority of one country views the network of the dominant carrier of the other country as a bottleneck and wants to regulate it directly by its own national law, as if it were the local bottleneck in its own country, it might be viewed as an "excessive" extraterritorial application, as criticized in the 1994 Report on Unfair Trade Policies issued by Industrial Structure Council, Japan. (Its 1995 version will be published in this April.)

Extraterritorial application of national laws itself, including that of anti-trust laws, is permitted under the public international law, if it is based on the so-called effect doctrine or the center of gravity test (the connecting points theory). However, the abuse of the word "effect" is now prevailing in some part of the world and some people even want to regulate the almost purely domestic matters of another country. It should be viewed as "excessive" extraterritorial application, and be rejected as violation of public international law in cases where there is no consent of the relevant country.

Global policy coordinations should be needed also here. The one-sided and unilateral intensification of such regulatory barriers should be rejected for the future of our global information infrastructure. And, at the same time, it should be borne in mind that there might be something beyond competition policy and/or now prevailing fair trade arguments, if we really seek the universal and world-wide, namely not confined to industrialized countries, use of the GII.

Proposal of the International Key Escrow Encryption by Prof. Dorothy E. Denning and the Doctrine of State Jurisdiction

In a seminar held in Washington D.C. in September 1994, Prof. Denning (Georgetown University), a world-wide famous specialist in encryption technology, proposed the international key escrow encryption system. I comment here briefly only on the state jurisdiction aspects of her proposal. According to her proposal, the best way is, under the international agreement among the countries, to keep the relevant encryption key only in one country. The other countries ask the key holding country to help them for the purpose of law enforcement, including the crime investigation or for other security purposes.

However, I fear, as a specialist in trade conflicts, state jurisdiction and other international legal problems, that there will occur from such an international system not a few serious problems of constitutional and public international law levels. In the near future it might become necessary for authentication and other (mainly private law) purposes to internationally standardize the new encryption technology which is most suitable under the GII context. However, the point is how and to what extent such (mainly private law) needs should be combined with (public) law enforcement needs. Heavy debates which are essentially open and transparent to all (including potential) users of GII should be needed.

"Network Disasters" and the Legal Risk Management Systems under the GII

Context

Even in the UN-based activities in harmonizing the legal rules on EFT, the problems of the so-called systemic risks were beyond their reach. In financial sectors, one of the most famous cases of network disasters is that of Bank of New York (BONY), a core financial institution of the US Treasury Bonds clearing system: On November 21, 1985, BONY's computer software went wrong. And, in a single day, BONY went into a catastrophic situation which needed the liquidity support of 23,600,000,000 dollars from FRB New York.

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In an age of global B-ISDN, such accidents can occur in every part of the networks, and easily spread across the border. Not only the technological means, but also the legal, institutional means should be built in order to prevent them and to cope with their almost inevitable disastrous outcomes. In financial sectors, many countries have deposit-insurance systems which may be ultimately supplemented by the lender of the last resort (LLR). However, the victims of network disasters will not be limited to those in the financial sector.

Before the enactment of Telecommunication Business Law of 1985, there was a semi-official discussion in Japan which concentrated on the legal and institutional aspects of the network disaster problems. The gist of the discussion was that the network disasters in an age of advanced telecommunications might be comparable to those of atomic accidents which were far beyond the normal insurance services. Japan has a special legal system targeted the atomic accidents and there are international agreements which have the similar purposes. And such a comparison is no exaggeration when one think of the impact of the said BONY case, which was very fortunately and successfully settled by a well-trained specialists' team of the US.

The existence of such serious issues should not be forgotten in our discussion on GII.

Assessing Technical, Financial and Human Resource Constraints

Pelagio Battung, Jr.

Under-Secretary for Communications, Philippines Department of Transportation and Communications, Philippines

Technical Constraints

Technically the Philippines is not considerably behind in terms of technical know-how on new technologies because of the in-flow of new products from the first world countries, i.e. USA, Canada, Europe and Japan. Technical constraints arise from the influx of several technical standards that are being adapted and used in the Philippines. Two decades ago we used strictly American standards for electrical and telephone applications. But this does not currently hold true.

What happened in terms of standards was born out of our country's financial difficulty wherein we availed ourselves of financing packages which included the supply of equipment manufactured by the country offering financial assistance to our government.

Most students have traditionally been trained on American standards, subsequently, some of them have encountered slight difficulty in familiarizing themselves on other standards. So our government established the National Manpower and Youth Council (NMYC) where students could be trained on the use of equipment and tools of different sets of standards.

In the Department of Transportation and Communication (DOTC) we have a Technical Training Institute (TTI) for Telecom operators, engineers and technicians. The institute was responsible for the training of over 5,000 students from the Philippines and other ASEAN countries such as Thailand, Malaysia, Indonesia, Burma and recently the Republic of Vietnam. Also TTI is equipped both with the old equipment and the most modern switching and digital transmission equipment supplied by the different manufacturers from the USA, Europe and Japan who have had telecom projects with the government.

Financial Constraints

Constraints relative to financing differ from one country to the next. Again, let me cite our experience in the Philippines where the number of telecom projects have out numbered the availability of funds to back-up implementation. Scarcity of funds was further aggravated by our ongoing telecom modernization program which will extend service to the far flung rural areas of the Philippine archipelago.

In the field of energy, we are slowly being successful in supplying electricity to rural areas through Build Operate Transfer scheme (BOT). This was adapted about ten years ago, and is a system wherein foreign suppliers are permitted to finance and build power plants and are subsequently allowed to operate them until their investment is returned.

The same scheme is now being considered for our Telecom modernization and expansion program as a response to financial constraints.

Human Resource Constraints

Although the Philippines has a ninety percent literacy rate, and although college graduates each year more than triple the available vacancies for employment, we are still not spared the problem of labour and human resources.

Every year Philippine labour and human resources suffer depletion due to the migration of our professionals to other countries for greener pastures and better employment opportunities. The sad part here is that it is most often the highly trained and resourceful employees who are being pirated. The Philippines is now acknowledged as "the human resource training institute of the Far East."

Our Department of Science and Technology (DoST) has been conducting small industry technology training for the transfer and financing of small industries in rural areas. The skills training programs were specifically undertaken by a separate agency known as the Technology and Livelihood Resource Center (TLRC). Although we have addressed the issue of improving our human resources through constant training, we have not equally succeeded in improving their quality of life due to very low salaries, lack of incentives and recognition and other socio-political problems. Hence human resources constraints still prevail.

Making a Reality of the Information Age: Pilot Projects, Testbed Programs and International Joint Venture Trials

Bill Murphy
Director of Global Accounts, Hewlett-Packard, and Chairman, NIIT, USA

The organization I represent is the National Information Infrastructure Testbed (NIIT). It is a US industry-led consortium with more than 65 current organizations that are committed to accelerating the evolution of a national information infrastructure. It involves government, private enterprise and academia and the focus has been initially to help develop a NII. The long-term goal is to move towards a GII. And we are looking to work with other organizations around the world.

In order to make the vision of an information infrastructure into reality, first we need to focus on some of the key challenges – many of those challenges have been referenced here at this conference.

The first step is to identify and understand potential markets. Our belief is that information infrastructure is really going to be market-driven. Technology may be great, but who is going to want these goods and services? Who is going to pay for them? Identifying potential markets, given our emphasis on applications and running test-applications can be the test track to test drive some of these new applications: Do they make sense? Will people use them? Will people pay for them?

Another key challenge involves integrating heterogeneous technologies in order to provide end-to-end solutions. We know that users want to be able to utilize what they have today as well as move to newer technologies. Today users have multiple choices of technologies, which often-times are confusing and not easily integrated. What we need is to develop a seamless integration of diverse technologies.

A third key challenge that we are learning, is how to work together to make this a win-win situation. All organizations, be they private enterprise, government, or academic institutions, can work together, and make the market bigger for everyone. Collaborating between public and private sectors also ensures the widest reach and the use of information infrastructures. In terms of our own experience, on the board at the National Information Infrastructure Testbed, we have companies that are direct competitors. Hewlet Packard, Digital and IBM for example are on the board. AT&T and Sprint are on the board. But in this environment we have to learn to collaborate. Outside that environment, clearly we compete.

We also like to look at the information infrastructure from a utility perspective, defining utility essentially as a capability that is transparent to the end-user. It is also pervasive, so the user can focus on specific tasks rather than on the technologies that allow them to complete the task. That is, focus more on getting things done than on the tools at hand. This utility can involve government, education, home, business of all sizes, health care, and scientific research.

The utility will be made up of a multiple of multiples, if you will. It will be made up of existing and emerging infrastructures that will include satellite, fibre, cable, cellular, and a variety of technologies. It must connect the various networks that exist today, including the Internet, with newer technologies – with ATM, with frame relay, with different types of computing platforms including personal computers, cellular devices, and future hand-held personal appliances.

Most importantly, the utility must connect people with information that they want whether they are consumers, knowledge workers, physicians, scientists, students, when they want it, where they want it.

Now with that vision, the NIIT was created to help accelerate the development of the information infrastructure. Much as transportation infrastructures drove industry in the creation of millions of jobs in the past century, so too will the information infrastructure have the same kind of effect in the future. The prosperity of all of our countries really depends on the ability to transform and transmit information as well as process it. And to conduct electronic commerce.

The basic foundation of the National Information Infrastructure Testbed is that of a collaborative testbed environment, which allows organizations to bring their technologies, resources, and applications to test with other technologies, with other organizations, with other information providers, and with other users of those technologies.

The goals of the organization are relatively straightforward – we are very much application oriented, we deploy application projects. And, we really think it is critical to foster public and private collaboration. To learn by doing, as we deploy application projects. To assess the various technologies, the various operational procedures and policy issues that are involved. And finally and maybe most important, to document and share the lessons learned.

Application Areas

Application areas that we are focusing on include environmental and earth sciences, health care, electronic commerce, education, astro-physics, entertainment, manufacturing, and energy. We are focusing on these applications because we feel they can help us test the market. We can get applications, we can run them and we can learn the applicability of these things and whether people would really want to use them, and whether they will pay for them. They will provide us also the greatest return to our member organizations, to be able to find out, again, the marketability of these technologies.

Earth Data Systems

Our first project was a large scale distributed computing solution using a high-speed ATM network, augmented by a frame relay capability. It enabled earth scientists to undertake and solve complex and interdisciplinary environmental problems. In the case of this particular project, the NIIT brought together scientists expert in deforestation and scientists expert in oceanography. These scientists were able to collaborate in real-time, on their work stations. They shared data and earth images as if they were sitting side by side.

The underlying technologies also enable the scientist to access earth data information stored in archives all over the country. This data was previously very hard to locate and once found could not be shared across dissimilar computing platforms.

The collaborative effort also brought together earth scientists with industry partners and national research and development laboratories. It also leveraged programs sponsored by NASA, to map deforestation using satellite images taken over a very long period of time up to 20 years.

The project also integrated emerging and existing technologies. It allowed the NIIT to study frame relay in comparison with ATM, and studied the impact and response times using distributed computer services over a very high-speed ATM network.

We learned a lot technically and we also saw what scientists could actually do in this kind of an environment.

Health Care

The NIIT built an ATM network in conjunction with satellite capabilities to extend health-care to a trauma patient in a rural hospital environment. We built a scenario where an individual was injured in a rural environment, and were able to provide access to patient records much more quickly to diagnose and treat that particular patient.

Also, in assessing the procedures that were used, we were able to eliminate costly and surgically invasive procedures because the physicians were able to collaborate with the data they had on the patient record. They were able to collaborate across the country, through having access to the information.

This collaboration brought physicians with industry partners and national laboratories together to learn how to use these technologies.

National laboratories have also been working on sophisticated three dimensional reconstruction of medical images which can then eliminate the need for invasive diagnostic procedures and ultimately to use for tele-surgery procedures.

Industry partners also brought expertise in networking and software components to enable access to dissimilar hospital information systems.

This project also allowed us to integrate existing technologies: high-speed nation-wide ATM, also allowed us to move large 70 megabytes CT scan files, and to use satellite imagery to enable video conferencing, and the Internet to access patient information.

There were many lessons learned. Extending the ATM from a campus environment over a wide-area network caused all kinds of issues that need to be addressed, including congestion and flow control problems. The lack of ATM standards between interexchange and local exchange carriers presented problems which we have to resolve.

Even though the technology presented a number of interesting problems there are also a number of regulatory issues that surfaced: licensing and credentializing the physicians, privacy and confidentiality. If a patient in the emergency room wants treatment, you like to have access to your complete patient medical records. In another environment if you are applying for a job you probably do not want that information to be so readily available.

Health-care standards, liability, insurance reimbursement, technical standards, all of which requires the work of the public and private sector to address these particular issues.

Conclusion

What we are facing is a set of technical issues which we can work on but also a very formidable list of public policy issues. Looking ahead from an NIIT perspective, we will be developing a number of applications along the lines of which I mentioned earlier. I will leave you with three fundamental thoughts about the evolution and development of an information infrastructure.

First of all, we strongly believe that the development of these infrastructures is going to be driven by the private sector which will ensure technical innovation and the best value for the users of that infrastructure. The global information infrastructure will clearly be market driven.

But the private sector needs to work in close collaboration with the public sector to ensure buying of the vision, to enact legislation and remove the barriers, to encourage competition and to participate as information providers and the users of that technology.

The third key point I would like to leave you with is that we need to integrate what we have, to use what we have, to integrate existing and emerging technologies as the information infrastructure evolves.

The National Information Infrastructure Testbed is committed to accelerating the development of the information infrastructure.

Yoshihiro Chiba

Director, Advanced Network Office, Ministry of Posts and Telecommunications, Japan

New Generation Communications Project in Kansai

1. Introduction

The establishment of an info-communication infrastructure for the 21st Century is an important national challenge which the public and private sectors should collaborate on. Recognizing that, we have carried out the trial of communications/broadcasting convergence services and B-ISDN applications for realization of multimedia info-communication at Kansai Science City since July 8, 1994.

2. Operation Area

Kansai Science City (extending over the three prefectures of Kyoto, Osaka and Nara including five cities and three towns).

3. Trial of communications/broadcasting convergence services

Objectives

This trial provides subscribers with new multimedia info-communication services, namely communications and broadcasting convergence services by way of optical fibre communication networks. It subsequently discerns the problems from the experiments and assesses the possible tasks to solve them. As well, the project opens up the prospects of the use of the optical fibre multimedia info-communication services in the 21st Century.

Trial schedule

This trial commenced from July, 1994 for three years. Trial applications involved: High Quality Video on Demand, Video Game Delivery, High Quality Cable TV, Video Telephone, etc.

Trial facilities included:

- Centre facilities (switching facilities, video-on-demand facilities, cable-TV facilities, HDTV experimental facilities, satellite communication experimental facilities, digital server, etc.)
- Terminal equipment for 300 subscribers (video on demand and cable-TV control units, HDTV monitors)
- Participation in the trial included more than 120 institutions, including carriers, broadcasters, cable-TV companies, communication equipment manufacturers, user companies, etc.

4. B-ISDN application field research project

Objectives

Applying B-ISDN technology, stated to become a major infrastructure in the next century, as well as the latest technological advancements, to realize and advanced information society in the 21st Century and the decentralization of social and economic functions in Japan.

Experiments schedule

Experiments on various applications have been carried out since July, 1994. The term of the experiments is scheduled to be ten years. The schedule consists of three terms. The first term, which is the promotional stage, is scheduled to be two years. Several experiments were demonstrated at the ITU Plenipotentiary Conference in Kyoto, September – October 1994.

First term of the experiments: 1994-1995 (Promotional Stage); Second term of the experiments: 1996-1997 (Field Test); Third term of the experiments: 1998-2004 (full-scale introduction) experiment applications.

Seventeen kinds of experiments are performed and considered at present (*refers to the supplement)

a. Real time image transfer type applications High-Definition Large-Screen Multi-Point Relay System for Symposium and Events, Background Video Image.

b. Database type applications.

   Multimedia Information Service System,* Electronic Library System,* Multimedia Online Catalog,* Public Art Gallery, Electronic Illustrated Reference System for Marine Animals,* Multimedia Entertainment Service (Integrated Digital Karaoke system).

c. Bi-directional information exchange type applications Multimedia TV Conference

   Remote Interactive Three -dimensional Computer Graphic System for House Design,* Remote Education System,* Multimedia Symposiums and Lectures Using Large-screen HDTV, Remote Diagnosis Support System for Medical Care, Satellite Electronic Editing and Printing System.

d. LAN

   High-speed LAN, High-speed Inter-LAN Communication, Remote Super-high Speed Inter-researcher Cooperative System.

Research facilities

a. Centre facilities: ATM node, High-speed LAN, HDTV systems, Workstation, etc.

b. Transmission link: Optical fibre

c. Terminal: Multimedia terminal

Participants in the research

More than 190 institutions, including carriers, communication equipment manufacturers, user companies, etc.

Brian Campbell

President, Vancouver Regional FreeNet Association, & Director, Systems and Planning, Vancouver Public Library

While there has been a signal that regulatory issues are perhaps more complex than technological issues, this needs to be substantially broadened as a concept because regulatory issues are only one dimension of the social issues that need to be dealt with when talking about the information highway. The organizations that I represent, the FreeNets (primarily a North American phenomenon but also occurring throughout Europe and Japan), and the public libraries have a different perspective on the problems addressed at this symposium.

Before going into an analysis of the issues at hand, let me provide some background. FreeNets are local, community based online computer facilities that attempt to bring the benefits of information technology to individuals and organizations that do not have access to it either at work, through their academic institutions or who cannot afford to pay for it. One of the things that makes FreeNets an historical anomaly in the 1990s and the late 1980s, is the concept of "free".

Access to the FreeNets is without charge. The costs of providing FreeNet access is supported through memberships, government grants, corporate donations, and a range of other activities. The key concept is to make information technology available to the broadest percentage of the population, so that they will not become isolated from the general trends of using information technology.

There are currently about 30 active FreeNets in the United States and about 50-70 organizing committees. In Canada, there are about 10 active FreeNets and about 35 organizing committees, 17 of those organizing committees are in British Columbia. This represents, I would argue, a reasonably broad-based, but very embryonic social movement that is expressing concern that the development of information technology is not quite right.

Part of what is being expressed is that there is something missing from the discussions, namely the concept of society, community and social participation. And that loss is being responded to by these community organizations. Although somewhat against my character to be involved in them, these are the social welfare organizations of the information age, attempting to overcome the inadequacies of the marketplace.

The problem here is that increasingly people involved in FreeNets, and people involved in other organizations, are beginning to realize that they can have free access, and they can train people at the grassroots level. However, the regulatory, policy and market-place changes are happening at such a fast pace, that they are overwhelmed. Any attempt to provide ancillary services is being overwhelmed by the magnitude of investments and policy directions.

There is beginning to be an urgency felt in involving the public in information policy development which has heretofore not been the case.

I think most people in this room are representing governments or corporate organizations, I may literally be the only person in this room who is a representative of neither of those areas. The Canadian experience has been one of cutting the public out of the hearing process. We have an Information Highway Advisory Committee Council in Canada which was initially going to be a council of 29 people, almost entirely corporate representatives, almost entirely interested in the market place. They were going to meet in secret and it was unclear whether they would issue other than an advisory report to the Minister responsible. This strategy collapsed after sustained lobbying to open up the process and we have now a somewhat open process but still no public hearings on the information highway in Canada.

The CRTC in Canada has been holding hearings, the first stage of which was what we called "the deregulation hearings" which opened up competition in the telephone industry. The second round concerned the structural

hearings, and the third which is to begin next month involves the convergence hearings – the impact of various technological convergence on regulatory policy. It is interesting to note that there is no ability for the public to participate in the third round of hearings. They are being held in Canada under the *Telecommunications Act*, rather than the *Broadcasting Act*, so there is no way for the public to participate and for their cost to be awarded to organizations that represent the public.

Thus, we have a situation which began as an attempt to provide some services to compensate, and now a felt need to be involved in the policy process.

One of the organizations I represent is the public library system. I have endured many long conversations with cable companies and telephone companies all of whom have assured me that public libraries will cease to exist by the end of this decade. Libraries will become a historical anomaly, taken over by many of the features discussed this morning. I want to assure you that the many thousands of access points that libraries provide to community information are absolutely essential to any progress on your part in terms of providing an information highway.

What is not being heard yet again, is that with all of these resources out there in the community, how are people going to access them if they are not one of the 30 or 35 percent who own micro-computers in Canada? The truth is that many of those people will have their first contact with online access in the same way that they had their first contact with asynchronous terminals and that is through public libraries or through FreeNets in the latter case.

We have been talking about technological testbeds. This is a pyramid form in which the technology is developed at the top and then everybody madly scrambles to find a market for the technology that has been created. And we have heard again and again "we've got to try to create the market, we've got to find the market, we've got to find what's successful." This is a very interesting concept in terms of development, but not unusual.

I would like to suggest another concept of development, one represented by FreeNets, one represented by the Internet – to invert the pyramid so that basic technology is made available to a very broad range of people, and see what they do with it. One of the things that the Internet did was simply to put some tools in people's hands and people started using those tools and they started embellishing on those tools and they started sharing those tools. This is also one of the things that FreeNet does, it makes a certain level of tools, very primitive tools, text based tools, available to the general public. From these opportunities, we can see what people do, and how they use these tools. Subsequently, you have the emergence of FreeNet developers – a mini-industry looking at what the short-comings of FreeNets are, short-comings of what libraries provide, what the public have indicated they wanted. From this we start developing tools, not in response to the technological imperatives, not in response to what is possible in the technology but rather in response to what the market is demanding, when they have broad access to the tools.

I think it is important to look at some studies that have been done in terms of the Internet. Only 5 percent of Internet users, according to a *Time* magazine study last September, are female. Fewer than 5 percent are over the age of 50. My experience on the Internet (and other networks), indicates a population of single males, aged 15-25, whose hormones have kicked-off in the wrong direction at some point so that their lives have become silicone motivated, rather than hormonally directed (personally I do not see that as a historical advance). Thus this huge impulse that we have is directed towards a very small percentage of the population, a transitional one as well, because at some point they are going to discover partners and life and things outside of their terminals, at least I certainly hope so.

The argument I make now then is for serious consideration of social testbeds on a far broader scale and not as a minuscule percentage of total testbed funding but as an equivalent to technological funding as a way of determining how the technology will work socially; what social changes are required on a broad scale; and assuring that the introduction of information technology does not exacerbate the current inequalities in society, but provides some tools for in fact incorporating the whole of society in the use of information technology.

Future Vision

Dr. Pekka Tarjanne
Secretary-General, International Telecommunication Union.

It's always nice to be introduced with your national background and I'm very proud of my Finnish passport but I guess I should emphasize the fact that in 1989 I took an oath meaning that from then on I am an international civil servant and not supposed to take any instructions from any particular government, not even from representatives of "good" governments.

Mr. Chair, good friends, since there were no questions from the floor I thought I would try to be as provocative as I can, so don't get insulted if I exaggerate some things.

First, I feel that I've been invited here today with you because all the rest of the organizations here present are represented in some four letter words: APEC, OECD, PECC and so on. ITU is the only non four letter word. More seriously speaking, if you count the member countries of the three other groups you don't come near to half of the number of ITU members, which means that the ITU is really the only global organization. And as we talk the global information infrastructure, it is a good idea to have a global organization present.

My first conclusion is that the GII will never be global, and it will never be a real GII unless it really is global. We have heard a lot of talk about how important this information infrastructure is for the whole world and we have said that of course it has to start first and then it has to be made global but if we continue at the pace we have seen up until now, I tell you that will never happen. We have to find to find new ways of improving the progress towards the real globality of the GII.

I say this having recently studied, in detail, the ITU statistics about what is really happening in the world. If you take the good old telephone density that all of us are used to looking at, as the real figure measuring telecommunications development, it is true that during the last 10-15 years there has been on the average only slight, slight improvement because several developing countries have made good progress but others again have certainly failed to do so. However, in general and on the average something positive has happened in the development of plain old telephone density.

Nonetheless, the sad story is that if you look at anything else in terms of telecommunications, any other services that are being built upon the basic old telephone network, then the gap is continually widening, and there seems to be no end to this widening.

I am an optimist. I believe in the good of mankind and I believe that these problems can be solved but I am becoming a little bit impatient with the proliferation of speech and lack of concrete action. As representatives of different organizations and countries let's at least decide and agree that we take this challenge seriously and do our utmost to improve synergetic cooperation that. We need more than just a new forum for discussions. When I look around, I realize that I have been discussing these same matters with you for some years now, in different parts of the world. We have to get better grip of the real work so that we see in the statistics real improvement.

Maybe this was not provocative enough – I'll try better. There are some other slogans that I have heard, in particular during the past few months, perhaps in particular in preparation for the famous G-7 meeting later on this week in Brussels. Big industry leaders and even politicians seem to have understood that there is something in the market

economy or in the political ideologies which require that everybody who wants the audience to laugh, or who wants to say something even slightly populistic has to come with statements like:

"Governments...we don't need them. Get out".

"Standardization: that's barrier to free trade and free flow of information and free economy."

"Regulation, that's from 18th century we shouldn't have any of that anymore."

It is clever, intelligent and powerful people who I hear saying things like this. And, I find this to be a lot of nonsense because we all know that we should not have standardization and regulation which acts as a barrier to trade or economic development. We certainly know that governments should stick to their role, however these kinds of exaggerations that have become so popular, it is in my mind, dangerous to the discussion as a whole.

I would like to go a little bit in the other direction, in order to provoke discussion. With the globalization of our communication technologies, and with the globalization of our economy as a whole, it just so happens that global, international and global standardization and regulation is getting, relatively speaking, more important than before.

It is true that on a national level there is often too much old-fashioned protectionist standardization and regulation. That is a problem. However, at the global information infrastructure will never be built in any reasonable way unless there is some consensus, some minimalist standardization and regulation that sets rules so that we can build something which in good old telecommunication terminology is called interconnectivity and interoperability. I certainly don't mean to suggest that governments should construct these superhighways, that would be the end of the GII. But governments and intergovernmental organizations still have a useful role, an important role, a role that should neither be forgotten, nor neglected. As a matter of fact international organizations have new roles and with out tackling these new roles the global information infrastructure will never be built.

A final statement that again might create some opposition, concerns having heard several times that the Internet is the information superhighway, the Internet is the GII. This is an interesting statement, but I happen personally not to agree. I'm a great Internet fan, but I would be the last one to say that the Internet is THE information superhighway.

It is a nice highway, however many other technologies will come up before we see the real global GII. The Internet gives rise to inspiration but it should not be confused with the GII. Nor should, of course, broadband ISDN be confused with information superhighways or the GII.

My vision of the 21st Century GII is something that will be very challenging and very complicated. My vision is a combination of all of the technologies, and of all the services: a network of networks. I believe that this vision will come true.

However, in addition to being democratic, demonopolised and pluralistic with very good markets for all kinds of smaller and bigger industries in the world, this vision of the GII – how we should see it and when we start our work towards building it – is that it is extremely multifaceted, extremely complex. It is neither very concrete nor simple.

OECD Ambassador Vonya McCann

US Coordinator, International Communications and Information Policy, US Department of State

Introduction

It is an honour to address the first jointly sponsored symposium by APEC, OECD, and PECC. By the level of response, both in the number of participants and the quality of the presentations, this symposium has been a great success.

During the symposium a number of speakers have spoken of the Global Information Infrastructure (GII). They have referred to the key elements for its creation, the regulatory and economic factors that are shaping it, and the technologies that are driving it forward. We have heard of the many benefits to be gained from the GII in such areas as entertainment, education, medicine, and business.

Likewise, we have heard of the many important issues that will influence the substance of our economies' contribution to the creation of the GII: interoperability, interconnection, standards, intellectual property rights and many more. These issues, of course, are not limited to the APEC region, they are also well-known to the OECD – they are fundamental to the creation of a truly Global Information Infrastructure.

After listening to the discussion of the last two days, it seems that there is an inescapable synergy between the GII and the conclusions reached in November 1994 at the Leaders meeting in Bogor, Indonesia.

At the meeting, APEC Leaders declared their political commitment to achieve free trade in the region in goods, services, and investment by the year 2020.

Bogor Statement

The 1993 APEC Ministerial in Seattle based the vision of an Asia Pacific economic community on a recognition of the growing interdependence of this economically diverse region. In Secretary Christopher's words, it is a vision "of regional growth, driven by the dynamism of individuals and enterprises. It is a vision of regional integration, of bridges built across national boundaries, and of barriers removed between economies. It is a vision of open regionalism that can lead the global economy into the next century."

The Bogor Declaration of 1994 established a common frame of reference for achieving that vision – a political commitment to create a new economic architecture for the region. It is an integrating initiative designed to facilitate and liberalize the flow of goods, services, capital and investment in the APEC region.

Over the course of 1995, APEC Ministers will develop a blueprint for reaching this goal. That blueprint will in turn be reviewed by Leaders at the next Ministerial in Japan. With this Bogor statement, APEC has defined its mission, ensured sustained high-level political participation in the APEC process, and provided a target against which it can measure its movement toward more open trade and investment.

A key component of the Bogor statement calls for intensified work on issues such as human resources and information infrastructure development, and further inclusion of our private sectors into APEC's work program. Telecommunications and information related industries are at the heart of this economic growth and trade facilitation initiative.

Telecommunications and Information Services are Fundamental

The message from this symposium is clear: telecommunications and information service industries are an essential part of our economies' infrastructure. This is as true for developed as developing economies. Evidence to this effect in the APEC region is readily apparent. I read recently that countries in the Asia Pacific region will spend between $90 and $120 billion over the course of this decade to upgrade their switching and transmission facilities. In China, alone, there is a waiting list for telephones which would exceed 20 million lines and that figure is growing by two million annually. The Chinese government has initiated a project to increase the number of telephone lines to 100 million lines by the year 2000.

Returns on investment in the telephone infrastructure are impressive. In Singapore, as a result of infrastructure expansion and overall economic growth, telecom services revenues are increasingly by 15-20 percent annually.

Beyond basic telecom services, there will be a wealth of enhanced products and services that will fuel the telecommunications and information service industries. Enhanced online services, including electronic mail, online database, and EDI constitute a $45 billion dollar industry. It is projected that in the years to come this figure will increase considerably because of these and more advanced services.

The mobile/cellular market is another good example of rapidly growing services. No other region exhibits a rate of growth as rapid as the Asia Pacific region in the mobile and cellular markets.

Annual growth in the APEC region of cellular subscribers from 1989 to 1992 was 80 percent, and now remains steady at 50 percent. Paging services continue their rapid expansion throughout the region. In Hong Kong alone, there are over 800,000 paging service subscribers, with an estimated 35,000 subscribers being added monthly. China, already the world's fourth largest mobile/cellular market, will boast 1.2 million cellular subscribers and 10 million pager users by the end of 1994. By the end of the decade, it is predicted that China will have 10 million cellular and 30 million pager subscribers.

As policy-makers and leaders in the information industry, what should we do?

Over the course of this symposium, we have heard of five principles that form the core of the Clinton Administration's Agenda for Cooperation:

- encouraging private sector investment;
- promotion of competition;
- open access;
- flexible regulatory environments; and
- universal service.

We firmly believe these principles will help both to advance economic development goals and to increase economic growth. As the primary source of expertise and capital, the private sector will determine which technologies to pursue, set the pace of development, establish standards and develop new sources and applications. The role of government is to facilitate private sector incentives by creating a regulatory environment that supports investment and innovation, promotes competition and reduces barriers.

Whereas industry is needed to address and answer complex technological questions, governments should act to eliminate regulatory and policy barriers which may impede private sector creativity and innovations.

Along this theme, I should also acknowledge that the Pacific Business Forum identified APEC as an ideal forum for framing the critical issues surrounding the global information highway.

The Working Group of Telecommunications and the Bogor Vision

Within APEC, the Working Group on Telecommunications has several projects underway to promote telecommunications in the region. In particular, under instructions by Ministers, the Working Group established a common set of guidelines for promoting international value-added network services, and the harmonization of equipment certification procedures.

Also, it has projects that are encouraging the growth of EDI in the region, enhancing human resource development, identifying infrastructure needs and compiling data on member economies' technical and regulatory environments.

Over the course of the year, beginning with this meeting in Vancouver, the Working Group will embark on the important task of establishing the telecommunications and information infrastructure elements of APEC's trade and investment blueprint for the 21st century.

Conclusion

In conclusion, the goals of a Global Information Infrastructure and of the Bogor Declaration are complementary. Creating a global information network is an essential and fundamental step in the process of developing a free trade area in goods, services, and investment. It is incumbent upon us, representatives of this rapidly changing industry, in government and industry alike, to maximize our efforts to advance our economies toward the goals expressed in the principles of a Global Information Infrastructure and in the Bogor Declaration.

Tomorrow, the APEC Working Group on Telecommunications opens its first meeting since the Bogor Declaration was issued. Upon these officials will fall the task of implementing the vision of a seamless information infrastructure for the Asia Pacific region into the next century.

The future holds great promise. It is up to us to embrace this historical opportunity in order to provide our peoples with economic growth and an improved quality of life.

Ambassador Pasi Rutanen
Permanent Representative of Finland to the OECD

My talk will cover first the process of globalization, which will be greatly affected by the GII; second, a few words on the role of the OECD in the world of macro-economic areas (and by the way, the OECD is a global organization – perhaps not universal, but global). And third, a few words on our meeting and the most important issues for continuing our work.

Globalization

Globalization is something which has been chanted and lamented by governments and industry. It is also something which has been poorly defined. The OECD has carried out considerable work aimed at better understanding of the globalization phenomenon, which reflects a sense that more and more the world is truly participating in a world economy. This means increasing linkages among countries, trade, financial flows and foreign direct investments – it is a push for deeper processes. The GII could also become instrumental in this process. Globalization is a powerful motor, for world-wide economic growth, but it can also generate new sources of international friction which at an extreme could lead to systemic frictions and endanger the multilateral system which was created by the great visionaries after the World War II.

The effect of globalization may indeed go so far as to limit the capacity of national governments to pursue their national policy objectives. You could almost imagine, in the future, two world economic orders. One where national governments make decisions within their economic space; the other where transnational strategic alliances of industrial and financial activities operate as the only real global agents.

The challenge of an organization like the OECD is to create a mutually beneficial coexistence for these two future orders (if they emerge). I think this has been understood here, many speakers have stressed the importance of the cooperation between government and the private sector.

One final critical word on globalization and the GII – there is a popular belief that a simple touch of the infobahn on the keyboard is all that is needed to start production processes on the other side of the globe. However, as found in studies by the OECD, many companies that have become transnationals have discovered that global strengths must be matched by local touch, face-to-face contact. Behind the need for this social glue lies the same factors which make it difficult to comprehend, for instance, the mind-boggling statistics of East Asia, unless you have physically been there to feel it. You have to feel the dynamism of the Pacific Rim in your bones to envision where growth centres of the 21st Century will be.

I know this, I've read a lot of books about it. And, I am very happy to be in Vancouver where you feel the presence of this dynamism. It is fortunate that the host of this meeting is the Asia Pacific Foundation of Canada – it is a very proper host in this sense. While I hope that this meeting will break new ground for the G-7 and show that there is real osmosis between that particular group of countries and the OECD.

APEC and OECD as Partners

What is now happening in my part of the world, the members of the EU are still carrying the very heavy burden of the collapse of communist economies. Meanwhile Asia Pacific is creating new dynamic models for cooperation and decision-making within APEC. The principles guiding the cooperation within APEC make this organization an important and ideal partner for the OECD. Such joint meetings as this APEC-OECD-PECC Symposium, present a good model for future cooperation between OECD and APEC. This meeting, in terms of its topic, agenda, organization and private

sector involvement represents an image of dynamic and forward looking OECD and APEC as global networking organizations.

This is important in terms of the notion of the triad, and cultural gap which could emerge – not only between Asia and Europe, but also between North America and Europe. What is needed now is increased dialogue, networking and intellectual cooperation among regional groupings. In this way additional frictions, suspicions and protectionist tendencies can be avoided. This way, the cultural differences, tensions and misunderstandings can be diffused.

The GII can be of great help. In this interdependent world, we have to believe Benjamin Franklin's reasoning: "We must all hang together, or surely we shall all hang separately." The OECD can help us in hanging together. In the emerging triad structure of the Far East, North America and Europe, the 25 member country, OECD can play a role of linchpin, holding together the major macro-economic areas and their evolving regional organizations.

The OECD is running a systematic, extensive dialogue with the so-called, Dynamic Nonmember economies including the dynamic Asian economies. There is a dimension in the OECD work which is very useful with reference to regional cooperation within the globalized world.

US State Secretary Warren Christopher (before Bogor), recently insisted that the OECD can be a model and an instrument of wider integration in a post-cold war world and that it can also assume a new importance in the architecture of a global economy, as a bridge between Atlantic and Pacific industrial economies.

Key Areas for Further Discussion

There is a lurking Jurassic Park Syndrome: something is out there, something is loose – something unknown... And something should be done – something to recreate the balance... The future work utilizing the unique organizational structures of OECD and APEC could be built around three major areas:

- Policy discussions and dialogue;
- What is the regulator's role?;
- Analysis of the socio-economic impact of the GII.

Policy Discussions and Dialogue

This is important because we have to think about how to implement on a multilateral basis the GII, what is the content, common vision, common targets and so forth? We also have to realize that this is not only a business opportunity, but a goal for all humanity, while taking into account that the Information Highway means different things to different people, in different countries. For example, for some developing countries, it could mean unifying socio-economic and cultural differences.

We also have to recognize that the Information Infrastructure is still very much supply-driven, and not yet very user-driven.

Regulator's Role

Ellwood Kerkeslager listed ten different roles for the government which ranged from enlightened regulator to a facilitator. In his paper, he described quite well how governments can stimulate both national and global information infrastructures.

One point about this part of the government's role, something the OECD has been thinking about, is that in terms of 1990s issues and the knowledge-based society we are aiming for, there will be totally different and totally new interest groups which will communicate globally, will network globally, and which are becoming a new type of NGO, and a new

type of major players in future negotiations. We don't know how powerful they will be but they will be a powerful new factor in any international negotiations or discussions, in particular around discussion of GII.

Analysis and Socio-economic Impact of the GII

It is not only a network of networks that we are talking about. We have to think about, and have an analysis of the potential impact on the whole world economy.

Conclusions

The Canadian Minister, Honourable John Manley, made an important point around the ideas brought up by the OECD Job Study, where one of the major features is learning creativity and entrepreneurship. And these are also are part of the GII. What is crucial here, is that there should be access for first-graders, and for their teachers to the information highway. These first-graders will be the real users of the superhighway – about thirty years from now. Currently, we need to devise uses and incentives. However, for these first graders, using the superhighway will be natural, they will not need incentives.

Byung-il Choi

Team Director, International Telecommunications Policy, Korea Information Society Development Institute

I. Information Infrastructure and the APEC Economies

The information infrastructure is key for:

- Resource allocation
- Market access
- Technical Progress
- Social integration

Lack of proper measures leads to unbalanced levels of development in the information infrastructure, which is a critical problem for the vision and goals of APEC.

II. What is APII?

The APII is a regional cooperative body of APEC members, whose primary purpose is establishing, improving and expanding the information infrastructure among members, and mandated toward the uninhibited flow of information in the APEC region. The APII is more than a physical network. It is a cooperation mechanism for efficient information infrastructure, aimed at reconciling and streamlining divergent regulations and policies, and suited to facilitate flow of information between member economies.

III. Major Components of APII

- Construction and expansion of a regional information infrastructure;
- Technical cooperation;
- Efficient flow of the information;
- Exchange and development of human resources; and
- Coordination and harmonization of national telecommunications and information-related policies and regulations.

IV. Vision and Goal of APII

Current Situation

- Growing Demands for Liberalization of Trade and Investment
- Vulnerability of information Infrastructure

Strategic Policy Means

- Establishment of APII

Expected Results

- Revitalization and Increase of Regional Trade and Investment
- Expansion and Enhancement of Regional Information Infrastructure

Vision and Goals

- Co-Prosperity: Development of Community of Asia-Pacific Economies

V. Underlying Principles of APII

- Creativity and originality of member economies;
- Sharing of responsibility between the advanced and developing economies;
- Narrowing infrastructure gap among the advanced and developing economies; and
- Participation of the private sector and competition-driven environment.

VI. In Perspective

The Road Towards Co-Prosperity

APII should be achieved through joint-efforts of all member economies. Important characteristics underlying these efforts include:

- Constructiveness and open-mindedness;
- Creativity and originality;
- Careful consideration for missing links; and
- Spontaneous policy coordination.

APEC member economies will be the ultimate beneficiaries of this information infrastructure, through 'harmonization and cooperation and competition' – the spirit of APII.

Acronyms

ACS	Automated Commercial System
ACTS	Advanced Communication Technologies and Services
APEC	Asia Pacific Economic Cooperation Forum Members: Australia, Brunei, Canada, Chile, China, Hong Kong, Indonesia, Japan, Republic of Korea, Malaysia, Mexico, New Zealand, Papua New Guinea, Philippines, Singapore, Chinese Taipei, Thailand, US (will not be admitting new members until after 1996)
APF	Asia Pacific Foundation (Canada)
APII	Asia Pacific Information Infrastructure
ASEAN	Association of South East Asian Nations Members: Brunei, Indonesia, Malaysia, Philippines, Singapore, Thailand (with Laos and Vietnam as observers)
ATM	Asynchronous Transfer Mode
BSEG	Broadband Services Expert Group (Australia)
B-ISDN	Broadband ISDN
BOT	Built Operate Transfer Scheme (Philippines)
CANARIE	Cooperative Advanced Network for Research, Industry and Education (Canada)
CCIA	Computer & Communications Industry Association
CHINAPAC	Packet-switched Data Network (China)
DDN	Digital Data Transmission Network
EDI	Electronic Data Interchange
FDI	Foreign Direct Investment
G-7	Includes: Canada, France, Germany, Italy, Japan, UK, US
GATT	General Agreement on Trade and Tariffs
GATS	General Agreement on Trade and Services
GDP	Gross Domestic Product
GII	Global Information Infrastructure
HCN	Health Communication Network
ICCP	Committee on Information, Computer and Communications Policy (OECD)
IDRC	International Research an Development Centre (Canada)
IPR	Intellectual Property Right

ISDN	Integrated Services Digital Network
ISO	International Standards Organization
IN	Intelligent Network
ITU	International Telecommunications Union
JIT	Just-in-time (delivery)
KII	Korean Information Infrastructure
LAN	Local Area Network
NBIS	National Basic Information System Projects (Korea)
NII	National Information Infrastructure
NIIT	National Information Infrastructure Testbed (US)
NMP	Nordic Mobile Telephone
OECD	Organization for Economic Cooperation and Development Members: Argentina, Australia, Austria, Belgium, Brazil, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, UK, US
PECC	Pacific Economic Cooperation Council Members: Australia, Brunei, Canada, Chile, China, Hong Kong, Indonesia, Japan, Republic of Korea, Malaysia, Mexico, New Zealand, Philippines, Peru, Russia, Singapore, Taiwan, Thailand, US (with Colombia as Associated Member)
PSTN	Public Switched Telephone Network
PTO	Public Telecommunication Operator
PTT	Postal, Telephone & Telegraph Authorities
QR	Quick Response
R&D	Research and Development
RACE	Research in Advanced Communications in Europe (European Commission)
SMEs	Small and medium sized enterprises
TACIS	Technical Assistant Programs
TRIPs	Trade Related Intellectual Property
UNESCO	United Nations Educational Scientific and Cultural Organization
USO	Universal Service Obligation
VAN	Value Added Network
WIPO	World Intellectual Property Organization
WIPO	World Intellectual Property Organization