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COMMITTEE FOR INFORMATION, COMPUTER
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INFORMATION TECHNOLOGY POLICIES:
NEW CHALLENGES FOR GLOBAL COMPETITION AND CO-OPERATION

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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FOREWORD

This report "New Challenges for Global Competition and Co-operation in the field of Information Technology Policies" has been prepared by the Secretariat in collaboration with Prof. Arndt Sorge, Humboldt University, Berlin, following the Special Session on Information Technology Policies organised by the Committee for Infomation, Computer and Communications Policy in October 1992. The document includes the comments and suggestions made by the Committee and those submitted by written procedure.

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NEW CHALLENGES FOR GLOBAL COMPETITION AND CO-OPERATION

REPORT ON THE SPECIAL SESSION ON INFORMATION TECHNOLOGY POLICIES: NEW CHALLENGES FOR GLOBAL COMPETITION AND CO-OPERATION

1. Context and highlights

OECD's Committee for Information, Computer and Communication Policy held its first Special Session on Information Technology Policies on 12-13 October 1993.[1] Based on recently completed ICCP work, emerging IT development concerns and usage patterns, this meeting addressed a wide range of prevailing technical phenomena and technological, economic, social and political issues. These issues were structured around four themes:

-- IT-Policy: Role and Goals for the 1990s;
-- Public Demand as the Lever for Decisions;
-- Strategic Applications for Global Problems;
-- Areas for Future International Co-operation.

Accordingly, after describing the scope of the conference and its evaluation of the global IT environment, the report presents as its point of departure the basic concern voiced by many participants: the international turmoil of the information technology (IT) industry and new avenues for development.

This turmoil gives rise to the need for new policy approaches to IT, the IT manufacturing industry and its relations with other industries, including public and private actors operating both nationally and internationally. These approaches are further developed in the report, presenting a nucleus for the discussion and policy analysis.

The discussions clearly showed that the problems, solutions and public and private action had to be considered within a global context. This is not to deny the need for locally, nationally or regionally specific perspectives, but typically, they all have international dimensions.

Similar to the national and international linkages is the need to consider what can be termed the cascading effects of IT production and use throughout the industrial chain. It is therefore no longer sufficient to look at individual industries or sectors, for example, electronic components, sub-assemblies, IT equipment, networks, other equipment containing IT, or software. The interrelationships between such products, industries and markets are crucial in any discussion of IT related problems and solutions.

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1. The 124 Delegates attending this high-level meeting came from 21 Member countries and the Commission of the European Communities, from various government ministries such as industry, commerce, science and technology, telecommunications, economics and the private sector. OECD's Business and Industry Advisory Committee (BIAC) and OECD's Trade Union Advisory Committee (TUAC) were represented; other observers were from Hungary and the World Bank.

In pursuing this approach, the Special Session identified issues or courses of action which merit attention in the future and considered the central lessons to be drawn from the contributions to the different sessions. Whilst previous discussions, both in the OECD ambit and elsewhere, have tended to place the emphasis on specific techniques, products or services, the Special Session illustrated the importance of reconciling requirements and policy modes that had previously been cast as distinct and very often as competing or conflicting with each other.

2. The scope of the Special Session

The discussions confirmed that information technology has now achieved a level of diffusion which makes it increasingly difficult to define boundaries between IT and other manufacturing industries and services. In fact, it is now virtually impossible to find sectors or industries that are not either producers or users of IT. Previous boundaries between IT and other technologies have been eroded. As a result, the IT field has become extremely complex and differentiated. In addition, it is necessary to consider the global dimension when discussing IT. IT has become a sector of globalisation but, in turn, is affected by globalisation with emergence of new players.

For policy analysis, the IT area can be approached from various angles. From a technical angle, the IT core components, which have the overriding function of generating, processing and visualising electronic or other signals (e.g. light), and the information these convey, comprise: electronic components and memories (e.g. in the form of integrated circuits or fibre-optic cables); computer or other electronic sub-assemblies; entire sets of IT equipment (such as computers, terminals, communication equipment); software; and information networks (either general or specific, public or private).

In addition to this core information technology sector, IT was also considered as the essential information, communication and control part of a broad variety of other products ranging from industrial production equipment to maritime buoys used for environmental monitoring. Similarly, the class of clients which use IT in their day-to-day activities has drastically widened, ranging from the international data bank user to the local chemist shop.

3. The IT environment

Technical matters were not in the forefront of debate. Emphasis was rather on international economics. IT development was linked with international trade flows: the stronger the domestic development and production capabilities in information and communication equipment, the more positive was the industry-specific and the general trade balance. Many governments therefore appear keen to promote import substitution policies in this area to attract IT manufacturers and related industries to establish research and production facilities in their country.

Within countries, IT is seen to have a significant effect on sectorial and regional economic activities, in both the development and location of various IT industries and the IT user industries. Regional development, for instance, may be greatly affected by home-working supported by computer and

communications and by the decentralisation of a potentially great number of services. However, these IT applications do not lead to a reduction of demand for transport services and thus reduce, as sometimes assumed, traffic congestion and pollution problems. In fact, over a longer time span, transport and communication tend to increase in conjunction. Nevertheless, the potential benefits of such IT applications are significant and promise to provide new opportunities for further social and economic development.

IT goods and services have to be looked at in the context of the full industrial chain. As inputs to other industrial or service production processes, IT goods and services are both substitutes for other inputs and complementary tools, extending the efficiency of the process in which they are used or embedded. A number of contributions went beyond this confirmed view of IT impacts and emphasised the need to devise new IT tools to meet innovation requirements in future economic activities. This approach implies a detailed analysis of user needs and a clear identification of the end user of IT: an organisation such as a firm, represented by its management or the employee on the shop floor.

Particular attention was given to the role of IT policy and the benefits of integrating industrial and technological policy. There was consensus that through the setting of standards, rules and conventions affect IT development and use. Policy also gives general direction to broader product development, production or commercialisation endeavours, through various forms of subsidies or other incentives, including those which are not, or not directly, of a financial nature. Of particular importance are initiatives which lead to the creation of networks of information infrastructure.

In the discussions it became clear, however, that the notion of policy should not exclusively be associated with the public domain. Similar functions, in the wider area of policy-making, result from changes in behaviour of public and private actors in most OECD Member countries. In addition, the issue of the legitimacy of policy formulation was raised, revealing a wide spectrum of perceptions and sensibilities: a legitimate objective of public policy in one country does not necessarily have the same footing in other countries. It was, therefore, suggested to define "policy" as forms of action which may occur both in the public and the private domain. Hence, policy stands for the strategic value of the directions it provides.

Participants appeared unanimous in emphasising that policy co-ordination between complex sets of public and private actors is crucial, but recognised the difficulty in establishing such co-ordination nationally, let alone internationally.

In addition to considering markets, regulation of markets, location of and access to technological research and production capabilities, participants also addressed human resources concerns including education, training, selection, recruitment and management of personnel. Without entering into a discussion of the intrinsic problems associated with different levels of technical sophistication, there was recognition that different categories of IT personnel existed in parallel, each with their own sets of skills and knowledge, education and training, work goals and career paths. Hence, it was argued, general or global policies for personal development would not be effective.

In a similar way to the emerging trends on the technology side, the human resources discussion confirmed that IT elements were increasingly mixed with other disciplines such as engineering, law, institutional knowledge and contextual knowledge (technical, industrial or other). The crux of IT issues were seen to reside in its linkage, and the cross-fertilisation in and between well-defined applications and broader areas of social and economic needs. As a consequence, it is necessary to influence IT developments by action in fields "inside and outside IT" to facilitate structural adjustments.

"The reconstruction of industrial society" was identified as a major IT challenge. This would include shifts from one sector of industry and employment into another, new developments in the international division of labour, new forms of logistics and transport, new linkages between firms and markets, etc. In a similar vein, IT challenges include issues of trade flows and industrial location in non-OECD countries, in Eastern Europe and the "third world".

The reconstruction of industrial society is closely linked with that of environmental protection. IT permits closer monitoring of environmental hazards, adjustment of industrial production processes to reduce waste of natural resources and pollution, new forms of logistics and transport, decentralisation of economic activity to reduce urban traffic congestion, humanisation of work pattern and working conditions, etc. IT provides innovative solutions through more efficient monitoring, diagnosis, simulation, control and advanced logistics with just-in-time (JIT) and customisation strategies in production, delivery and consumption.

A further challenge to IT concerns data and communication security issues. Increasing accessibility of information in networks and ease of information transfer and linkage, extend the potential for intrusion into data archives, unauthorised acquisition of data, tampering and fraud. It was considered extremely important to assure the safety and security of information and networks.

The need to reconcile accessibility and privacy issues was discussed together with the possible trade-off between liberalisation and standardisation of IT-based equipment and networks. Standardisation of norms and conventions enlarges the potential accessibility of information, renders competitive situations more transparent, and may increase the size of markets, thus offering the possibility of lower prices and broader diffusion. At the same time, however, it may prevent or delay innovative solutions, and the creation of new products or markets by truly entrepreneurial firms.

Participants reinforced the need for transparency, cost efficiency and rapid diffusion of standardised configurations and for a healthy entrepreneurial environment unfettered by conservative regulations. These differing policies raises the challenge to public and private actors to find solutions at national and international levels which support standardisation and liberalisation. From a technological point of view this is now more feasible; gateways and recent hard- and software developments and new organisational and regulatory frameworks will provide promising opportunities to interconnect different public and private networks and software. Some expressed the need to consider standardisation from the economic and trade perspectives.

4. A key industry in turmoil

The discussion of the "state of the art" of the IT sector was dominated by a strong notion that the core segments of the IT industry had entered a crisis period in most of the OECD countries. This was in stark contrast with the telecommunications sector where profits and reserves were at an all-time high, and with earlier perceptions that there were no limits to the growth of the IT market. In the current recession even IT market-leader firms report stagnation and losses. In this respect, this conference -- compared with previous meetings dealing with IT -- was confronted with a totally new phenomenon. Core IT firms had previously remained a haven of prosperity even in periods of economic stagnation. All that seems to have changed: for the first time, a sectorial "crisis" in IT has developed in step with stagnation in nearly every industry and related activity.

The novelty of this situation spurred the search for causes. Evidently, cyclical factors alone cannot fully explain why the relative resistance of the IT boom during economic stagnation in the past has now disappeared. A possible explanation was seen in the fact that competition had greatly intensified, leading to reduced profit margins for relatively mature and comparable IT-based products, for example mainframe and personal computers, fax machines, printers, etc. However, the tendency for profit margins to fall rapidly after the initial introduction of a new product, has long been a common phenomenon of the IT market, particularly in the field of micro-electronic components. Steadily rising development and production plant costs have greatly increased risk as first-mover advantages are small or absent, reflecting the speed with which competitors have entered the scene.

A feature of a particularly international nature in this decline of profit margins has been the emergence of powerful competitors from more recently industrialised countries in East Asia, notably in PCs, printers and other IT commodity markets. It was therefore argued that the novel sectoral crisis is linked to the emergence of such new competitors, adding increased weight to the perennial problem of the IT industries: maturity and decline of profit margins tend to now occur earlier and life cycles of products have become shorter.

This interpretation was not considered entirely convincing. New competition in the larger IT industry could have been accommodated if it had been possible to expand IT diffusion and had producers from OECD countries moved up-market, where the prospects for greater value-added and higher profit margins are generally better. This up-market movement, in the course of enhanced international division of labour, is a well-known phenomenon and strategy. Surprisingly, it has not happened sufficiently to compensate for a cyclical demand reduction and the appearance of new competitors on the scene. The lack of flexibility within large industrial systems requires further examination.

One explanation favoured by participants was that the development and production of IT products and services has too often become detached from the actual needs, requirements, possibilities and limitations of the customer or the potential customer. IT, as a larger sector, had not responded in time to the shift from technology push to demand pull. In fact, this might have been the only valid strategy to compensate for the increased competition referred to above.

The above observation demonstrates that continued growth in any industry, here the IT industries, depends upon careful co-ordination between its international division of labour and its pattern of international trade. Furthermore, as the industry grows, these interactions must reflect the shifting demands of the market and the changing needs of IT users.

5. Emerging demand: a new focus for analysis, discussion and policy

Whereas previous IT markets appear to have been mainly characterised by the dominance of standard products developed and manufactured on an increasingly larger scale, the domestic producers in OECD countries are now facing new markets and demand patterns:

-- Demand is much more differentiated, reflecting the specific technical, professional, institutional and market situation of the user or client, and the client's changing strategic objectives.

-- Demand patterns are much more complex, consisting of a concatenation of hardware, associated electronics, systems and applications software, user software elements and other factors. As a consequence, these components may have to be developed in conjunction around the new application needs rather than separately as in the past.

-- Demand is much more dependent on whether the supplier is able to meet specific user criteria, requirements and needs. However, given the growing number of intractable sets of professional, industry or firm specific forms of knowledge and skills which are often only tacitly present or only partly articulated, a proper system analysis is an increasingly difficult process.

-- New investment in IT is increasingly committed on more solid evidence of its relative economic merit than in the past, when such expenditure for new technology was often considered as quasi-inevitable.

-- Suppliers may have to pay more attention to the analysis of the problems which pull technology more minutely rather than focusing on future technical opportunities to an innovative solution that meets actual needs.

Concerning "fifth generation" computers, the opinion expressed by participants was that they are another important leap forward. They will make it possible to apply IT in situations for which it has been too unwieldy to date, specifically in a closer simulation of human intelligence. Other contributions implied greater interaction between human and machine intelligence, in the past considered to be separate categories, as a desirable trend for the future. The human mind and its capability to acquire experience and the computer, as a machine, will be brought to bear on each other in increasingly sophisticated ways. This may lead to new innovative tools to solve increasingly complex world problems.

6. IT and the international economy

The emergence of new markets and industry conditions described above will be heavily affected by the evolution of competition, economic order and regulatory systems (laws, agreements, etc.) in the international arena. More international standards and liberalisation of trade may mean increased competitiveness through new entrants, forcing domestic OECD producers to adjust to the new conditions. This may aggravate the crisis syndrome described, and lend even greater importance to the "new focus" suggested above. On the other hand, non-transparent nationally regulated markets and intensified trade and industrial location policies are attempts to stem the crisis, with each country taking care of its own self-interest -- but the question is whether this is realistic.

An important outcome of the discussions was the increased awareness of the interaction between domestic industrial situations and the international economy. In the past, some countries have prided themselves on the capacity to master an encompassing industrial apparatus of IT to cover the whole industrial chain from the microchip to the user software. This ambition has been present in many national industrial and technology policies. Even where these were not explicitly developed, most government procurement programmes have been designed to give spin-off advantages to domestic producers for non-governmental markets. The underlying philosophy was that national producers should carve themselves the biggest slice possible out of the total IT cake. Development of comparative advantages in selective and specific markets was considered very much a second-best option.

The trend towards more international trade and competition in virtually all production activities jeopardises such limited technology policies. Policy makers in both by public and private domains should avoid such explicit rear-guard action to limit competition and favour domestic suppliers.

To the extent that this re-orientation is successful, international trade can go hand in hand with growth and employment at home. Welfare gains from international trade for every participant presuppose a flexibility in the domestic industrial fabric that must be more consciously pursued. In practice, this may mean the following:

-- The shift away from commodity markets to value-added intensive, more customer-specific market segments has to become part of business strategy. Service and maintenance networks become vital given lower production cost disadvantages, absence of first-mover advantages, longer lead times to market and weaker sales.

-- There is a case for using more selective international alliances and mergers to try to constitute large markets and to preserve specific domestic facilities. Alliances and mergers also make reduction of over-capacity less painful for individual suppliers and countries. They may also stop the reduction of profit margins that would endanger future investment, or that might expose industries to the risk of exaggerated leverage financing of investment. This is particularly acute when interest rates are high.

-- Large and concentrated national producers, operating on a world scale, can establish themselves to the extent that their linkage with

intermediate and applying industries and services is intensified. This implies a higher degree of customisation, as a cushion to soften the impact of increased capacity and competition in commodity markets. This way, the diversification of demand can lead to market extension and can stabilise commodity production up-stream.

Increasing international division of labour is then compatible with the development of domestic capacities. It reconciles welfare gains on the basis of larger markets, lower costs and prices, with the goal of achieving market growth despite "saturated" commodity markets, and with the maintenance of domestic industrial and service capacities.

7. Cascade effects in industry

For the scenario presented in the previous section to be realistic, greater attention has to be directed towards what may be called the cascading effects in industrial chains. This means, in a nutshell, that every link in the industrial chain can only be as strong as its weakest link. For example, demand for a given component will depend on the extent to which its development and production are geared to national or localised demand outside the core electronics industry. The strength of IT development and production will be determined by the strength of software engineering and other consultancy or maintenance services. The strength of software generation will be dependent on its articulation with practice, experience and expertise in a range of fields of application.

It is the overlap and the linkage between successive stages in the industrial chain which bolsters future growth of various IT industries. Such overlaps and linkages, then, have to be conceived with the end user as a point of departure rather than the other way around. These overlaps and linkages are crucial between firms in different industries and between separate professions and work functions. A viable concept for a strong industry or firm cannot only be a concept for a specific industry. It has to relate the focal industry or firm to preceding and subsequent stages in the industrial chain, up- and downstream. The image of the cascade evokes the fact that spill-over from a higher step in the cascade can only usefully be absorbed by the next step down, if it is targeted at, and adjusted to, the absorptive capacity of the downstream step.

This is not to deny the need for adjustment concepts for firms and capacities in specific industries at specific levels of the cascade. However, a more pronounced emphasis is required on inter-industry linkages, which, according to some participants is still under-developed. Although such considerations are not new, they are more crucial at a time when new demand will only unfold if supply bears more specific regard to its more differentiated contingent and embedded characteristics, and if it considers itself as moved by problem pull rather than technology push.

A decisive twist in this argument is that the further growth of technology production can only be conceived of as a universal phenomenon in a restricted sense. As much as IT has clearly become a global industry, and will continue along its international path, its continued growth now requires that it be geared to meet national, local, professional or otherwise specific requirements.

8. In conclusion: policy problems and issues

Though there were some attempts to explain current industrial problems in philosophical terms, participants stressed pragmatic policy schemes appropriate to deal with this industry in crisis. It was proposed to link future IT initiatives to emerging economic, social and related political goals. IT policy formulation then might have to take into account that:

-- Global and local issues and problems are interdependent. Matters of international trade and the situation in IT world markets require solutions which, in turn, trigger specific adaptation of national and local producers, paying more attention to their customers. In this process new market niches emerge. Further advance of IT requires a much greater attention to needs and requirements on the part of (potential) users. IT development increasingly has to be cast following a problem or demand pull, rather than technology push, approach.

-- Application of IT is dependent on an infrastructure which provides instant and economically viable exchange of information. This infrastructure needs to be developed further both at the national and the international level. IT infrastructure is established and maintained by different groups of actors, both public and private.

-- IT standardisation should be strengthened at the international level. Standardisation of computer components, equipment, software, protocols, etc., has largely been addressed in an informal way. In the interest of customer benefits, this process can be strengthened while not impeding entrepreneurial freedom and technical innovation.

-- Data privacy and network security have to be considered further if communication networks are extended. Growing size, complexity and accessibility of computers and networks will aggravate privacy and safety problems. Acceptance of technology will increasingly depend on the extent to which needs for privacy and security are met.

-- Co-ordination between public and private actors should be intensified. A multitude of actors are involved in the regulation, promotion, development and application of IT products and services. Co-ordination between these actors is often found to be deficient and has to be intensified. This applies both within countries and at the international level.

-- IT should be developed further as a tool to reconstruct industrial society, e.g. for more energy-saving techniques through better process control, improved monitoring of environmental effects, improvement of transport and logistic systems. IT could be used more intensively to facilitate decentralisation of working activities, but it is not likely that the demand for transport goods and services will decline in conjunction with IT application. It may, however, be performed in a more resource-saving and environmentally friendly way.

-- A new synthesis of concentration, competition and co-operation is required with firms engaging in all of these at the same time. Concentration will continue in the large, global industries of electronic components and standard computer equipment linked with co-operation or alliances in specific fields. Numerous producers will have to shift their competitive approach to catering for more differentiated market niches and increasing their attention to potentials and requirements downstream. In addition to the existing competitive parameters in the industry (price, time to market, quality), others become more salient, such as adaptation to customer requirements and context of application.

-- The sectorial crisis in IT is not purely cyclical, in that it can be overcome by conventional measures such as temporary shake-out of surplus capacity. There is need for a combination of policies (integrated policies, policy mix) and strategies to strengthen the application-user-IT industry link to better exploit the qualitative potential of IT equipment, systems and services. This would involve, in particular, the development of user-friendly and economically viable new IT-based goods and services.

-- Tele-work is a potential market to be looked at more closely as is its potential for industrial restructuring. Tele-work refers to the use of advanced computer network infrastructures "to bring work to the people as distinct from bringing people to the work". Such infrastructures are expected to reduce some of the social costs of current forms of industrialisation including congestion, pollution, waste of resources and time, etc. They furthermore may become strategic tools for regional development including rural areas both in OECD and developing countries. Ultimately, high performance computing networks could develop into intelligent infrastructure (electronic information highways) upon and through which the innovation system of advanced economies would operate and, as a spill over, represent huge markets for the IT and related industries.

Beyond basic diagnoses and recipes, the discussions brought forth some suggestions to guide further research and policy discussions. The sentiments and opinions which prevailed in the heyday of IT no longer apply. These sentiments had often been one-sided and mostly of a technology push nature.

There have been arguments for or against regulation, for or against the displacement of other techniques by IT, etc. The Special Session, however, was characterised by a pragmatic absence of head-on clashes of doctrine. This was by no means a sign of exhaustion or resignation, but one of reconciliation.

A first case in point is the complementarity of globalisation and localisation tendencies mentioned above. Further expansion of global markets may require greater local adaptation. Globalisation, instead of displacing local specificity, then, must be seen as complementary.

A second case is the conventional conflict of authority between the private and the public sphere. The construction of publicly accessible networks shows this to be outdated. Globalisation has tended to bring in public actors as stakeholders in private and public enterprises and makes them important promoters of technical change and location decisions.

A third case is the conflict or trade off between openness/transparency and security/privacy of networks. Individuals and organisations will make use of open networks to the extent that needs for security and privacy are safeguarded.

A fourth case is the often supposed opposition between IT and other technologies. Rather than displacing other techniques, IT is now seen as a functional complement, permitting enhanced monitoring and control of industrial and transport processes, for instance.

A fifth case is the contrast between regulation and freedom. In the new economic context, with IT often as cause and consequence, industrial activities increasingly require some amount of voluntary or governmental co-ordination. In defining flexible competitive parameters to allow market growth and competition, they increase market transparency to all actors and users. There is a large grey area in which informal or voluntary standardisation or regulation shades into formally agreed or statutory regulation. The internationalisation of IT makes this grey area larger than it would be in nationally closed economies through the combination of different national demarcations of public and private domains.

In summing up the discussions, the Chairman stressed that in the field of information technology, the globalisation process is characterised by strong international competition and, at the same time, co-operation among the major suppliers of IT through so-called strategic alliances, pre-competitive R&D and development consortia. This phenomenon poses new problems to policy-makers in areas such as R&D policies, competition policies, intellectual property protection, privacy protection and information systems security. The need for more international co-ordination to explore areas where international rules-of-the-game in information technology would be appropriate was also expressed. During the course of the Special Session, a number of suggestions were made for the future role of the OECD. Among others, these included:

-- monitor the development of international trade practices and its implications;

-- analyse the impact of national policies and activities for the enhancement of informativity (e.g. the productivity gain from application of IT);

-- clarify the roles that governments may play in IT, R&D, production and usage on national and international levels;

-- explore the ways that IT and the IT industry may be instrumental in contributing to the solution of social and economic problems of critical importance.

In conclusion, solutions had not become easier to formulate, residing as they do on systematic pragmatism, rather than single-minded pursuit of a specific goal. There was a need to monitor actual developments, analyse evolving tendencies, compare national evolutions and best practice, and international trends and to suggest policy options. The feeling was that the Information, Computer and Communications Policy Committee was one of the few international bodies where policy-makers could examine the issues openly and in-depth with special attention on economic, trade and social implications.

ANNEX

Listing of ICCP Publications since 1982

Outlooks

Communications Outlook 1993 (Also available on diskette)
Information Technology Outlook 1992

ICCP Series

No. 33 The Economics of Radio Frequency Allocation (1993)

No. 32 Economic and Trade Issues in the Computerised Database Market (1993)

No. 31 Usage Indicators: A New Foundation for Information Technology Policies (1993)

No. 30 Information Networks and New Technologies: Opportunities and Policy Implications for the 1990s (1992)

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No. 12 Information Technology and Economic Prospects (1987)

No. 11 Trends in the Information Economy (1986)

No. 10 Computer-Related Crime: Analysis of Legal Policy (1986)

No. 9 Software: An Emerging Industry (1985)

No. 8 An Exploration of Legal Issues in Information and Communication Technologies (1984)

No. 7 Microelectronics, Robotics and Jobs (1983)

No. 6 Information Activities, Electronics and Telecommunications Technologies: Impact on Employment, Growth and Trade (1981)

No. 5 Micro-Electronics, Productivity and Employment (1981)

No. 4 Handbook of Information, Computer and Communications Activities of Major International Organisations (1980)

No. 3 Policy Implications of Data Network Developments in the OECD Area (1980)

No. 2 The Usage of International Data Network in Europe (1979)

No. 1 Transborder Data Flows and the Protection of Privacy/Les Flux de Données Transfrontières et la Protection des Libertés Individuelles (1979)

DOCUMENTS ON SALE

ICCP Reviews of Information and Communications Policies: Finland (1992)

The Changing Public Policies in Information Technology: Canada, The Netherlands and Sweden (1992)

Protection of Intellectual Property in Central and Eastern Countries: Legal Situation in Bulgaria, CSFR, Hungary, Poland and Romania

Venture Capital in Information Technology (1985)

Telecommunications: Pressures and Policies for Change (1983)

Guidelines on the Protection of Privacy and Transborder Flows of Personal Data (1981)

In co-operation with the International Telecommunication Union:

Telecommunication Indicators of the Former Soviet Union (1992)
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