The Challenge of the Information Society: Its Impact on Economic Systems

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With the advent of electronic means of communication, information has become an important component of the production process be it in agriculture, manufacture, trade or services. As technology became more dynamic, it changed the value of information storage, processing and distribution by enhancing it. The term 'informatics' came to be applied to these activities. When information is transmitted over telecommunication channels through convergent technology, it is called 'telematics'. At an international level information technologies lead to far-reaching economic restructuring, diversification and concentration processes as a part of the strong growth dynamism exhibited in the information society.

This paper examines first the conceptual and theoretical framework of an information economy, then it analyses the international aspects of the integration of global markets through the application of information technology and finally it probes the challenge of an information society for developing countries. I concludes with a glimpse into the future of the global information economy.

A. The Conceptual and Theoretical Framework of an Information Economy

Traditional econmic theory has mostly ignored the problems of pricing information and dealing with information as a factor of production in addition to the conventionally recognized factors of capital, labor and natural resources. Stiglitz (1985) argues that information has so changed economic theory that it is not possible to maintain the validity of neoclassical economic theory in its application to market equilibrium. In other words, the laws of supply and demand no longer hold. This is because economic theory developed explicitly to incorporate information provides an explanation of phenomena

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about which traditional theory had nothing to say. Conventional economic theory did not give credence to information either as a commodity or as a resource.

Today we are at the threshold of an era characterized by the presence of a 'knowledge economy' (Machlup 1962) or a 'post-industrial society' (Bell 1973). Recognition of the importance of knowledge was the first step towards including information related activities as part of normal economic activities. Boulding (1966) in a seminal paper "The economics of knowledge and the knowledge of economics" recognized that changes in knowledge are endogenous to the economy.

Knowledge and information are playing a crucial role in capital formation and growth of gross national product (GNP) in most industrialized societies. As Walter Wriston (1985) aptly points out "to enter a business the entrepreneur in the information age needs access to knowledge more than he or she needs large sums of money". Highly specialized information structures are required to furnish knowledge for decision making. The definition of information is not confined only to that which is computer-carried and via telecommunications channels. It extends to information's pervasive influence on all activities that form part of the macroeconomy. Imperfect information can distort market equilibrium even as perfect information provides its owner with a competitive edge over rivals in the market. Therefore, information is priced and there are costs involved in gathering, processing and transmitting it. It is important not only for adapting to uncertainty but also for overcoming it (Hirschliefer and Riley 1979).

In its application this concept of an information economy is making a difference to the growth trends and productivity of those countries that are able to restructure their organization of industry and take advantage of information input. The impact of information technologies is proving to be a major driving force behind economic development for two reasons: firstly, it creates a highly dynamic sector which, in turn, generates wealth and employment; and secondly, its impact on established industries is, in most cases, a revitalizing one resulting in higher productivity, greater efficiency, and improved quality of output. This has become most apparent in the global integration of financial and data flows. Conceptually speaking, the declining cost of thinking enables shorter reaction time on the part of economic agents.

The information sector of even the developing countries, is moving from a

period of supply scarcity to one of abundant capacity. How should policymakers assess the probability of a further imblance between supply and demand in the near future? What are the risks associated with a continued decline in the cost of technology? Is there scope for international cooperation in averting the risks incumbent on accumulation of information technology in the high income countries and making supply available to low income ones which may or may not be ready to absorb it?

A growing information sector within the domestic economy covering the manufacturing services and agricultural activities entails the reallocation of physical resources and redeployment of skills. In turn, this places an enormous demand on policymakers as well as on the scientific and innovative capabilities of industrial organizers and managers. One of the most important effects of the pervasive progress of the declining cost of thinking is the change in the underlying conditions of production in terms of economies of scale and scope and thereby promoting the international integration of production processes and markets. This is placing a strain on the current competitive and regulatory framework of industrial organization.

In the political area, a growing, all pervasive information economy raises some fundamental political questions: How does it change the military and political relationships between countries in the international system? Does it create a new source of global power or merely reinforce the powers that already exist? Martinez (1985) raises the question with reference to telecommunications technology: does technology 'lead' politics, or does politics 'lead' technology? While these issues are not the subject of this paper, a growing information sector is a challenge which needs further research by scholars of political economy.

Information economies have developed their own momentum drawing on the innovative resources of technological infrastructures resulting from massive investments in R & D in information technology. What then are the "right" policy choices? What is the ultimate objective of undertaking measurement of the information sector of Pacific Basin countries? Firstly, the forward and backward linkages of the information sector enable policymakers to link investment in the relevant sector with their strategy for overall economic development. Secondly, suppliers and providers of information goods and services need to become aware of market signals and users' needs so that all final consumption in the economy will benefit from efficiency of production

and distribution.

However, the measurement of information sectors is limited by the methods of computing social accounts even within advanced countries. The Standard Industrial Classification Code is outmoded. Silicon chips and computer software in the U.S. national income accounts are listed in category of stone, glass, and clay, and there is no code for biotechnology. A system that has outlived its utility is still being adhered to, and it is the purpose of this paper to highlight the need for devising a new social accounting system which takes note of information handling activities. Feigenbaum and McCorduck (1983) describe the application of information technology in the following way:

> "The world is entering a new period. The wealth of countries which depended upon land, labor, and capital during its agricultural and industrial phases will come in the future to depend on information, knowledge, and intelligence.
>
> In the control of all these processes will reside a new form of power which will consist of facts, skills, codified experience, and large amounts of easily obtained data, all accessible in fast, powerful ways to anybody who wants it—scholar, manager, policymaker, professional, or ordinary citizen. And it will be for sale."

The expression of such views marks the coming of age of information economics and offers strong encouragement to do research in this area.

The information component of advanced economic systems exhibits a more than cursory role in economic growth and development. If information activities are an integral part of a nation's economy we must account for the product originating from such activities. Organizational change is closely linked to technological change because as technologies become more sophisticated, organizations have to adapt their structure to become more competitive.

Such structural changes associated with the advent of modern information technology have resulted in the formation of both information-intensive and information-sensitive societies. Perhaps of greater importance are the marked socioeconomic changes accompanying the transformation of economic organizations based on the mass production of wage-goods to those based on the mass production of symbols. This is highlighted in the work of Marc Porat (1976) which confirmed the trend first explored by Machlup that the information value impact of such externalities on any one country's GNP. While

we know that knowledge as capital is accumulating rapidly and is critical to the growth of the economy, the numbers do not show up in the social accounting system, so that the stream of income cannot always be predicted with accuracy. Information is elusive, it cannot be easily quantified, it has no location in space and defies functional relationships. But the fact remains that whether an economy is based on free enterprise or centralized planning, it still uses knowledge or information as the base of its operations. In a command economy prices are mere accounting devices and not carriers of information about supply and demand. They are useless as indicators of market behavior. Yet without the input of information about resources and how these are to be invested, without information about strategies and priorities, no model of centralized planning can operate to give the desired results.

Structural changes in the economy are leading to a rejection of theoretical justification for certain forms of industrial organization. The concept of a natural monopoly was the basis on which AT&T served as a regulated provider of telecommunications in the U.S. This meant that economies of scale and scope could best be provided by a single monopoly organization than under competition. But with the onslaught of new telecommunication services and with computerization sweeping across markets, it was no longer possible to maintain the natural monopoly which guaranteed equal access and universal service. With the divestiture of AT&T, a trend for deregulation began and economic systems started to adapt themselves to innovative technological changes. The privatization of British Telecoms and similar trends in Japan and the Netherlands, make the PTTs of Europe feel threatened as bypass systems provide value-added networks. Economic theory is unable to fully explain the breakdown of the concept of a natural monopoly whether it is in the telephone service or economy of the U.S.A. is expanding.

Since Porat's study, results from similar studies based on occupational data have become available. In OECD countries it was found that information occupations occupy more than one-third of the total labor force, as also in some newly industrializing countries. East-West Center studies done for ten Pacific basin countries reinforce the hypothesis that more investment is being made in the primary information sector even as that sector continues to make a bigger contribution to GNP. The current methodology of measuring the value-added by information activities to GNP is to either measure the market

value or inputted value of information goods and services produced.

Without introducing statistics into this argument, it is necessary to recognize that as more and more telecommunication technologies change, it becomes less and less possible to construct reliable measures for describing the changing economic systems. For example, in economic theory the term productivity implies output per man hour, and was a useful concept applicable to the manufacturing sector. In the information age we are still groping for a meaningful measure of productivity because we have a large service economy and part of its is a self-service sector. It is difficult to measure the productivity of the financial service industry since it is being constantly changed by the use of electronic highways for funds transmission. It is information that gets remitted globally in a matter of seconds rather than actual funds. The 'money float', as bankers knew it, is being substituted by the 'information float'. In this case how do we measure productivity of the banking system? There are many externalities or spill-over effects of electronics funds transfer such as efficiency in the operations of transnational corporations and their off-shore installations and efficiency of trading operations and coordination of currency markets. How do we measure them in the communication satellite service. Information technology is reaching a critical mass. The result is that there are entirely new approaches to new product lines that did not seem logical extensions to existing business. For example, J.C. Penney processes credit card transactions for Shell Oil and Gulf Oil to leverage its investment in information networks.

As the information society becomes more pervasive, we find that telecommunications and computers come closer together thereby multiplying the potential of each for newer forms of service. Many success stories abound but one or two examples may show the changes in market economy of the U.S. consequent upon innovative networks. Merrill Lynch used telecommunications and computer convergence to create its most successful product-the Cash Management Account which combines information on customer's checking, savings, credit card and securities account into one monthly, statement as well as sweeping idle funds into interest-bearing ones. By 1995 the company expanded these accounts to manage $85 billion and 70 percent of liquid funds. Information power has given it an edge over its competitors. American Airlines provides a computerized Sabre reservation system which lists the flight schedules of every major airline in the world to 48 percent of all automated

travel agents, who pay $1.75 for every reservation made through Sabre. The network alone earns $200 million a year.

The basis for the spread of the Information Revolution is Schumpeter's theory of continued innovation. The firm that innovates maintains its economic superiority. This has led to the modern concept of the intrapreneur as different from the entrepreneur. The former is the innovator within the firm who is responsible for vast profits stemming from innovative ideas. The biggest beneficiary of such innovation is the customer. Information technology is the engine driving the corporate world and is increasingly involved in the information structure of the firm. Information economics is striving to correlate information systems with economic systems and with structural economic growth.

B. Global Markets for Information Technology and Its Products

The impacts of the information revolution has made domestic industrial and monetary policies as well as national income accounts of less relevance than before chiefly because economic activities are now linked closely together by telecommunications. Even low income and underdeveloped countries find their decision making processes influenced by market integration and satellite communications are drawing remote areas into the vortex of internatinonal policies. The "global village" of Marshall McLuhan is rapidly becoming a reality and so is the global market place. Money and information moves on electronic highways in seconds, bringing money markets into cohesion. Wriston (1985) believes that the failure to understand this massive change has caused more than a few economic forecasts to go awry.

The dynamism of the technology makes it difficult to measure the value of trade in information services and to define them in quantitative terms. Another difficulty that stands in the way of analyzing telecommunication services within the framework of international trade is the fact that historically the organization of telecommunication services has been to prevent rather than promote competition on the grounds that these are public services which can be delivered more efficiently under a public or private monopoly. In economic terms these services have the characteristics of natural monopoly. The cost savings under a monopoly supply were passed on to the consumers. There was a social justification for such monopolies like PTTs and AT&T

in that they met the needs of all members of the community in an equitable manner. International services were arranged on a bilateral basis between two countries much like trade in merchandise. The International Telecommunications Union provided rules for interconnection of services and common administrative procedures.

This entire system received a challenge when interconnectivity of computers became prevalent. Data and messages began to cross political boundaries without the use of regulations. Incremental changes in technology gave way to revolutionary changes. Telecommunication services are no longer shared on the basis of operating agreements—they are traded. Trade requires an exchange of products and services to justify a comparative advantage in the form of factor endowments or other specialized skills.

There are a growing number of services using the new convergent technology of computers and satellites which are traded but are not tangible, like finance, insurance, management consultancy and investment services. Information providers and buyers are not confined to data banks and data bases, but to a whole host of informaotn services which can be used for interbank financial transactions or which go into the process of producing tangible goods or which are in the form of consultancy services.

In 1985 sixty-three percent of the U.S. GNP was attributed to the services sector. How much of this was constituted by information services is not known. In like manner, one quarter of world trade, about $700 billion was accounted for by services. The problem of delineating information services stems from the fact that the conduit of telecommunication and the content of information are so closely intertwined that it becomes difficult to assign separate market values to each. Another difficulty arises from the characteristic of information trade in its being used for intracorporate flows of information. This happens because Transnational corporations (TNCs) set up their own value-added networks for exchanging informatoin between the headquarters and the subsidiaries. In such a case accurate records are not available about the volume and value of these flows. Control of the data market by TNCs creates an adverse impact on the balance of payments of developing countries because of hidden costs and transfer prices which are charged to subsidiaries in the host countries. Consequently LDCs are constrained to set up barriers against trade in information services. This situation becomes worse by the fact that balance of payments accounts do not cover such trade

in information services.

While we can appreciate the desire on the part of developing countries to protect their newly formed data industry as an infant industry and to safeguard their privacy and sovereignty over information exports, the actual institution of trade barriers by these countries becomes a hit-or-miss process, since there is no acccounting system by which such barriers can be supervised. A large number of services are simply not recorded because they are new and have not featured in trade before. Economic theory also has lagged behind in this regard and not introduced provision for technological innovations.

There are certain properties of information trade that makes it different from other tangible trade in commodities and services. First of all, information lacks a physical construct. Secondly, it is bought and sold because it gives the user an advantage over his or her competitors. Thirdly, it is proprietory information that is traded on a contractual basis between two or more parties in two or more countries. Finally, the value of this information depends on scarcity at a given point in time. Due to these reasons the expansion of trade in information requires structural adjustments to be made in economic systems which deal in such trade. The convergent technology used for computerized trade in data (transborder data flows) depends on the joint supply of three resources—computer systems, telecommunicaton networks and data. There is a set of complementary products that generate economies of scale. Suppliers of information services enjoy cost advantages inasmuch they sink considerable costs into the networks. These costs serve as barriers to entry for their competitors.

Even GATT (General Agreement of Tariff and Trade) which oversees trading agreements between countries does not have rules or procedures to govern such invisible barriers to invisible trade. However new perceptions of national interest are emerging specially as strategic global partnerships are taking place between corporations in different countries. SWIFT (Society for Worldwide Financial Telecommunications) and SITA (Societe Internationale de Telecommunications Aeronautiques) deliver a homogeneous service through single networks spread over many countries. But they are closed user groups that provide services only to their own members and operate like exclusive clubs. What is of significance in the context of global markets is the fact that such networks not only reduce the costs of doing business, but also diversify the risks. As society becomes more vulnerable and risk prone, in-

formation trade intensifies the economic imbalance between countries, so that a few corporations dominate the global market.

C. The Information Economy and Development

While we can correlate communication variables with indicators of economic development, we are unable to establish a cause/effect relationship. The analytical tools of economics can be used in the choice of economic systems, in the pricing of communication services, and in the measurement of the impact of information on economic systems. Most developing countries use the interventionist approach by assigning a bigger role to government in manipulating market outcomes. The interventionist doctrine helps developing country governments to create institutions and to protect contracts which, according to Arrow (1979), is the role of government in development. Trading-institutions, brokers, banks, stocks, and commodity exchanges are all part of the institutional network. Institutions will emerge with development because of potential benefits arising from scale economies and minimization of transaction costs, subject to efficiency differentials. The information society borrows from both the educational and the commercial world and, as the Nora Minc Report (1978) affirms, "...the transition to an information society is inevitable." Developing countries have found through experience that such a transition is necessary for their survival in an interdependent world.

So far, conventional measures of development have historically relied on the use of quantifiable variables like changes in the composition and structure of the economy. Now we find that economic indicators of change do not tell the whole story and that there is a growing interdependence of communication and development variables. But these variables vary from country to country and we need to construct a few key indicators if we want to make international comparisons. Economic variables for GNP accounts were determined over fifty years ago by Simon Kuznets when he measured the GNP of the United States. But with the information explosion these are changing within the system of national accounts.

In addition to the existence of an income gap between high-income and low-income countries, there is a very real technology gap, chiefly because of the barriers to communication between countries or because of inappropriate technology transfer. It can be argued that even if there were no communic-

ation gap, developing countries still lag behind in technological change for development because of capital scarcity and labor abundance. These countries face the constraints of an inadequate growth of both scientific attitudes and institutions for fostering research and development. Streeten (1981) maintains that the effective transfer of communication technology has to be suitable to the recipient country's development strategy. The development effects of television in Indonesia, as a consequence of the Palapa domestic satellite system, have influenced neighboring countries like Malaysia and Thailand to lease transponders. India, having experimented with SITE, has a multipurpose satellite INSAT I B built by Ford Aerospace and launched by NASA in 1983. This trend indicates that LDCs are trying to telescope the stages of growth by expanding their services sector and moving towards information societies. The major issue, however, is can they afford to become part of the global information society? It appears as if many of them can. Even with a measure of selectivity in telecommunications technology, their investments are growing so rapidly in these directions that their markets are becoming increasingly attractive for exports from industrialized countries. This is particularly true of the Asia-Pacific region.

There is considerable divergence of opinion on whether communication is a dependent or an independent variable. For the process of economic growth there is no conclusive evidence on whether communication can be treated as an independent variable like capital and labor. Economists have been disillusioned from time to time by placing total reliance on any single indicator of development for this reason they have not abandoned their indicators. Development planners realize need for increasing the allocative share of investment resources for communication. It is anticipated by them that informational efficiency will promote performance efficiency for the overall economy. Economic development concerns itself with the mobilization of resources. As long as telecommunication promotes resource mobilization through improved division of labor, it becomes an agent of development.

To those who claim great social benefits for communication satellites and computers in social transformation, Schiller (1981) poses the question 'Who Knows'? There are conflicting forces in the information economy which tend to overlook the hegemony of transnational corporations in the spheres of programming and software, which are the applications of technology that induce social transformation even in developing countries. Schiller provides

empirical evidence to show the control of the global distribution of the mainframe computer, semiconductor, and data base industries. This control is mainly centered with American transnatinonals like Citibank, Exxon, IBM, AT&T, and RCA. This may involve privatization of scientific and technical knowledge in order to make information a profitable commoditty. The question of "who knows?" gets answered by "who can pay." Those who can pay are again large corporations like the U.S. library system, global financial and data networks, and remote sensing satellite systems. Does that involve greater inequalities in the distribution of information resources depending on private corporate growth? It appears as if the information economy may experience problems of unequal distribution of income and wealth between core and periphery societies, as well as within core societies to some extent. Therefore, the question of to what extent the information revolution impacts on the process of development requires further critical research within periphery societies of the Third World. From data available from the World Bank (see Saunders 1981), it appears as if investment in telecommunications is 0.3. percent of GDP(gross domestic product) whereas investment in research and development is less than 0.2 percent of GDP. The reasons stem from paucity in the supply of investment resources and the high opportunity costs of telecommunications. The economic rate of return on investment in telecommunications is increasing to 18 percent on an average and equipment costs are declining, but there is inadequate research into the overall social benefits of telecommunications to justify the high opportunity costs. Benefit-cost criteria need to be applied to assess the development effect of rural telecommunications and to ascertain its impact on reducing the rural-urban dichotomy. There are non-financial indicators that have not been fully researched. If output for basic needs satisfaction is one of the goals of development then selective communication technology transfer may be a beneficial strategy for policymakers. Within the framework of opportunity costs, communications systems for development need to be analyzed in two categories, namely, development support systems and those which directly generate socioeconomic development.

Like the definition of information economics, the definition of development is open-ended. In general, development is conceived of as societal change for which conventional social sciences are unable to set parameters. Just as Keynesian economists sought a solution to development problems through the

use of incremental investment levels leading to higher rates of GDP growth, so also communication scholars pinned their hopes on the mass media to provide multiple development. When the UN development decades failed to make any sizable dent on poverty, the very idea of aggregate growth with its trickle down effect was called into question as a social objective. The dominant paradigm was passing even as the use of the investment multipler failed to improve the physical quality of life index.

The MacBride Commission, in its final report(1980), emphasized the organization of local newspapers and community media as part of the developing information societies' provision of greater and more equitable access to information. How far should such information societies grow from indigenous models is another vital issue that warrants research.

The connection between telecommunication infrastructure and development is vividly apparent from the data on telephones available to the inhabitants of LDCs. According to *The Economist*(January 26, 1985: 69) the 26 million people who live in Tokyo metropolitan area have more telephones than the 500 million inhabitants of the 600 million telephones in the world, three quarters are owned by nine industrialized countries. Two thirds of the world's population havo no access to telephones at all.

There are very few countries in the modern world that have not been directly or indirectly affected by the industries and services that make up the information sector. The impact of this sector's growth, both in size and scope, is felt in virtually every facet of society even as it has reverberated through the economies of the technologically advanced countries.

This same revolutionary change is now sweeping across the developing countries of the world, especially those of South-East Asia and the Pacific region. The effects of innovative communication technology are visible to a greater extent in the newly industrializing countries(NICs), i.e.; Singapore, Hong Kong, Taiwan, and South Korea. They have become centers of production, assembly, and design in telematics activities and are beginning to rival the region's two economic giants: Japan and the U.S. There is also an evident increasing desire on the part of the region's less developed countries(LDCs) to become involved in the information revolution and thereby reduce their sense of remoteness from the world's political, financial, and technological arenas. This trend has significant ramifications for trade relations, employment patterns, and growth of multinational corporations(MNCs)

as well as changes in factor productivities and demand for human capital.

An information base forms the foundation on which policymakers and researchers draw to evaluate the impact of new trends initiated either by technology change or by policy change. The value of such an information base relates to the identification of key sectors in the economy and their interaction with the rest of society (Jussawalla, 1986). The increasing reliance on information introduces significant changes in the structure of an economy as well as the product mix.

There are specialized functions in producing, acquiring, and disseminating information which are a part of routine economic activities. These functions are adding greater value to the GNP than the traditional sectors like agriculture, mining, and manufacturing. The economic implications of telecommunications innovations include the creation of new markets, changes in existing one, and increases in national productivity. Neo-classical economics assumed perfect knowledge. But even with perfect knowledge, uncertainty is difficult to eliminate because prediction requires signals other than prices.

The next significant step in information economics came with the view that information itself is a marketable commodity subject to neo-classical general equilibrium theory. Informational efficiency then is an important characteristic of decision making under uncertainty. However, if we strive for information efficiency, we often have to forgo neo-classical principles of rational choice such as profit-maximization. But, if the institutional structure of any economy is stable, then conventional judgment is used instead of rational choice. Perfect knowledge is not always a precondition of rational choice.

D. Future Trends

As information services become more abundant, business becomes more dependent on telecommunications. "Electronic highways" facilitate the flow of information in a way hitherto unknown, and they create new opportunies for audio and video conferencing, for tele-education, telemarketing and greater efficiency. The users of the highways have multiplied in magnitude over the years covering manufacturing, mining, and accounting firms. In a very fundamental way information technology has almost eliminated barriers of space and time and national boundaries have come much less formidable than they were in the past. With greater homologation of technical standards

in the future, the problem of compatibility of networks will also be solved. All end-users will reap the benefits of interconnectivity, for business and personal use.

Energy and information are in a basic way the ultimate factors of production because informaitn today is both a commodity and resource. As a commodity, (we have seen in section B) it is traded on visible and invisible markets and exhibits some characteristics of a public good. The central process of change is not so much an information explosion as a more subtle process termed 'informediation' by the Gamma Study (1979). By this is meant the processing, storing and transferring of information by high technology methods.

We have already seen that convergence of technology has led to decreasing unit costs, increasing capacity of equipment combined with miniaturization. This has resulted in what is called the Maslow-Engel Effect. From Maslow comes the concept of a hierarchy of psychological needs predominating after physical needs are met and from Engel comes the concept that, as income increases, the proportion spent on necessities decreases and that spent on luxuries increases. Since the information society has its costs along with its benefits, a well-articulated public policy is required to minimize the risks and maximize the benefits. For example, Japan has mounted a "Teletopia" program to explore and understand the impact of new information technologies and its socio-economic implications. The ubiquity of micro-electronic computers has transformed the modes of both production and consumption. Economic systems in technologically advanced countries have to grapple with the socio-cultural effects of robotization of manufacturing, as it penetrates the factory, the office and the home of the future. The implementation of Integrated Services Digital Network (ISDN) and its eventual evolution into an integrated broad band communication (IBC) network will change telecommunication systems worldwide. Future trends, therefore, concern not just the role of individual governments in telecommunications, but the responsibility of governments towards each other. Within a global context, national policies for telecommunications will have to be balanced with internatioal policies in order to avoid or reduce conflict of interest between competing economic organizations. In a way, the challenge of the information society induces international division of labor which, in the long run, may reduce trade barriers and lead to a coordinated international regime for regulating the

stronger players and supporting the weaker ones. What is needed for meeting the future challenge raised by changing technology is a comprehensive approach within which the economic benefits of a plausible international division of labor can be balanced against its costs. The cost-effective use of new technologies and its impact on global markets is an issue that needs research and negotiations. Do nations have a choice in selecting their policies or are they driven dy technology to opt for an information society? Will the costs of opting out be higher? Can members of societies with cultural differences make the right choices and having made them can these be rationalized? Different economic systems will exercise an overriding influence on how the challenges of the information age can be met.

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