# THE EMERGING INFORMATION SOCIETY: A POLITICAL CHALLENGE

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## INTRODUCTION

Over the past few decades, the world has experienced an exponential proliferation of information. Thus, this era has been appropriately termed the 'Information Age' and has been likened in significance to the Industrial Revolution because of its impact on the entire modus operandi of the global system.

Advanced economies have become progressively specialised in the production, distribution and use of information. This specialisation is the source of substantial welfare gains. First, reliable information is essential if competitive markets are to work as a mechanism for efficient resource allocation. The concepts of individual choice and invisible co-ordination are essential to market economies. When information on the important variables of price, quality and technology is widely available, markets are much more likely to generate rational production and consumption choices and provide powerful signals to help co-ordinate economic activity. By contrast, information gaps and asymmetries create unemployment, misallocation of credit, economic rents, non-competitive technological choices and policy mistakes. Second, information is the basic factor for scientific and technological progress and is, hence, central to sustaining productivity growth throughout an economy. Information-based economies are therefore well positioned to compete in research and development, in knowledge creation and as economic laboratories for business and government innovation. Finally, economies that invest heavily in information may have higher long-run growth potential. Information can not be perfectly copyrighted, patented or kept secret. Therefore, the creation of information by one firm (or government) inevitably benefits the production of other nearby firms. On the other hand, given cross-border barriers to knowledge diffusion (e.g., language), this information externality may be an important cause of the productivity gap between high- and low-income economies.

Alongside the growth in demand for information, the structure and occupational profile of advanced economies is undergoing significant change. First, the information sector itself-media, communications, consulting services and the production of information technology-has grown very fast, and has become increasingly specialised. Information sectors in advanced economies generate a high volume of internal trade in a manner highly analogous to sophisticated financial markets. The global market for information goods, services and technology is now estimated at over $1.2 trillion. Second, and more pervasively, all sectors of the economy have become more information intensive, resulting in a gradual re-engineering of business and government functions. Information has substituted for other inputs (e.g., labour, energy, inventory expenses), and information technology has become a vital intermediate input in economies' aggregate production function. Consequently, there is a high income elasticity of demand for this technological input and the improvements that it brings to price/performance ratios are a significant source of economic growth. Third, the nature of

work has changed. In many OECD economies, employees whose primary task is to collect, process or transmit information now account for over 50 per cent of the workforce.1

Information technology is evolving toward a 'strategic' role with the potential not only to support chosen business strategies, but also to shape new business strategies.2 The large level of investment in computers and telecommunications indicate the definitive economic importance of information. The evidence is clear: those who utilise statistical information benefit substantially because this reduces the uncertainty that players face and therefore their risk is reduced. Banks, insurance companies and other financial institutions that adopted computers in their management processes early on are the best examples of such beneficiaries. In other words, the technical and institutional matrices influence the evolution of competitive decision making and the technical and institutional alternatives facing decision-makers are what determine outcomes.

Industrial restructuring, which is constantly occurring, along with innovation, relies heavily on information technology. During the 1970s and 1980s, the US, Japan and most of the OECD countries developed national IT programmes. Since the mid-1980s, IT applications have become commercially feasible and governments have increasingly recognised that IT development is a crucial factor in maintaining industrial competitiveness. Also, the increased number of IT programmes has encouraged collaboration between industry and research institutions.

The limitations faced by developing countries in creating effective information infrastructures are a major impediment to their further advancement. In this regard, one of the most effective contributions the world community could make to developing countries and to sustainable globalisation would be to ensure their access to the information super highways that the most advanced countries have under construction.

## INFORMATION TECHNOLOGIES AND INFORMATION SYSTEMS IN THE GLOBAL ECONOMY

### Information Theory, Information Systems and Their Beneficiaries

Information systems are necessary at almost all levels in society. All organisations need a sufficient flow of information in order for decision-makers to take the many decisions that face them each day. Indeed, the entire decision-making structure depends on the free flow of information. The information system, to be useful to decision-makers, must be structured to promote the dissemination of information in a useable form and in a timely fashion. In the context of the present information age, an information system is considered successful according to its ability to condense the most significant information quickly for its users. Additionally, since decision making is usually an interdisciplinary process, the information used must suit the nature of this process and therefore be useful in this regard.

Existing social and economic phenomena affect individuals or decision-makers when making decisions. Once decisions are made and acted upon, the social and economic phenomena that form the basis of future decisions are changed. Alleviating these problems linked to decision making requires the analysis and quantification of social and economic phenomena within the context of understanding the complex interactions at the global level. Understanding these complexities necessitates also the use of the quantification methodology of the social sciences. The quantification in social sciences presents important difficulties, especially in the

context of the measurement and analysis of the individual and social behaviour. When examining information systems in the context of understanding social and economic phenomena, it is necessary to point out the uniqueness of social and economic phenomena at a point in time and space. This makes it difficult to undertake controlled experiments as in the natural sciences. Although recent literature has propounded the 'birth of a new science', where order and pattern replace what was formerly considered random,3 there still exist many gaps in our knowledge base. The issue is further complicated because of the close relationship between human behaviour and the existing social and economic phenomena.

Diagram 1 summarises the basic dimensions of the use of information networks. For example, the collection of data is one of the more standard and more responsive cases because, as collection abilities develop, the scope of the data will be enlarged. The less standard and more adaptive case made possible by the use of an information network is the development of new policy options or strategies and institutional structures. Technology networking may eliminate the hierarchical relation between the decision-makers and players within the economy. Without information networking, the player is at the bottom of the information hierarchy. The players act upon information flows they receive from the decision-makers. With an information network, the decision-maker also receives information from the player and at the same time, the players are responding to the environment (Diagram 2). This reduces the time lag for policymaking since the players' response is included in the decision-makers' information flow.

The relationship between the information structure and the decision-making structure must develop in such a way as to lead to continuous improvements in both structures. That is, information structures should provide the decision-making structure with the necessary information, whereas the decision-making structure should convey its demands on the information structure in a clear manner. Through this relationship, both structures should be able to focus on and sort out for decision-makers the information that is crucial from the numerous information sets that are seemingly relevant for policymaking.

It is insufficient for a human recipient to receive only raw data or even summarised data alone. There needs to be a way of processing and presenting data so that the result is directed towards the decision to be made. The result should be decision impelling.

Where and how else does information make its contribution? If a cost-benefit analysis is performed, it is clear that we can quantify some of the benefits but others are less tangible and difficult to quantify.
Even if we could quantify all of the benefits associated with improvements in information systems infrastructure, international comparisons would not be easy. Enhanced information systems and statistical infrastructure make their greatest contribution at all levels (international, countrywide and institutional) indirectly. A partial list of these indirect benefits includes the following:

- Open information on prices and markets,
- Access to new ideas and new theoretical and scientific models,
- Promotion and assurance of scientific integrity and independence,
- Government accountability to world as well as domestic public opinion,
- An informed public or electorate,
- Promotion of international harmony through a 'common language' or base of information that all nations share,

- Balancing of competing domestic interests and forces,
- A very low marginal cost of distribution-the value of information increases the more widely it is disseminated, and
- Competition among ideas, so refining and improving their effectiveness and applicability to new situations.

Any discussion of indirect benefits must consider how such benefits can be observed. We can only deal with observable reality, but what is dominant in an interdependent world is what we might call a 'targeted biased reality' that finds its sources in the balance of powers within a power structure. As long as we are able to eliminate this targeted biased reality and replace it with observable reality with a minimum margin of error, transparency and problem solving this will create less alternative cost in an approach that gives priority to human, economic, social, cultural development and the development of civilisation.

When we say that there is a very high positive correlation between informational infrastructure and democracy, the functioning of a market system, the solution of social problems and the structure of culture and civilisation, we are referring chiefly to indirect benefits such as those cited above. Further, it is important to consider these benefits not in the short-term but in the medium- to long-term. The criterion of benefit must be what it brings to human development in terms of security, economic and social development and efficiency in public and private management. Optimisation of world, national or institutional development would necessitate the endogenisation of the following vectors:

- Population and human development,
- Economics,
- Geo-strategic considerations,
- Science, technology, education, history, culture, civilisation, and
- Information systems and statistical infrastructure (the reliable flow of internationally comparable information).

Methods of arranging and rearranging information have been the area of computer scientists and information scientists. Algorithms that formally describe how to operate on information and how to construct better, faster, more efficient, more reliable algorithms, have been the subject of extensive academic and professional work.

A user of the information infrastructure, especially a decision-maker, faces on average a large amount of information. Obviously, not all of the available information is relevant to any given decision. There is also a degree of relevance associated with this information. In order to deal effectively with this information, the decision-maker must abstract a 'relevant' (and manageable) subset of data from this set of information. Such an abstraction (or filtering) is accomplished by the application of a model.

Clearly, a model is a simplified view of reality. It imposes an order or pattern or even a structure on a disordered mass of information. Available information does not have only one possible interpretation. Different models imposed on the same information may result in different interpretations.

## A POLICY FRAMEWORK FOR THE KNOWLEDGE-BASED ECONOMY

### The Changing Role of the State and Ethics in the Public Service

The inherent link between information and democracy makes the evolution of public management and the power structure, more specifically the changing role and functions of the state, a subject of intense interest. While one line of argument associates progress with reducing the role of the state to the provision of a handful of non-economic services (such as law and order and defence), there are also calls for the preservation of the essential parts of the role and functions the state assumed during the post-war era. However, it is clear that neither a nineteenth century type of liberalism nor post-war Keynesianism is warranted and that the dominant trend of opinion and actual development emphasises the transformation of the role of the state from one of provider of factors of development to one of an effective creator of its conditions. The more relevant part of the argument is about the instruments with which the adequate conditions for further progress can be created and the ways in which these instruments can be articulated and used. The assertion of the collective interest alongside and in some instances beyond sectional interests constitutes a further fundamental factor in the transformation of the role of the state.

National economies and the world economy have become increasingly complex processes, particularly because of the breathtaking pace of technological progress and internationalisation. Globalisation is not complete, but intensifying continuously. The functioning of the market mechanism and the forms of competition associated with it have acquired new characteristics. Under these circumstances, governance in general and the management of the economy in particular have also become increasingly complex matters. Good governance, whose importance and relevance is becoming increasingly felt, extends to a domain that is clearly broader than the economy. What is at stake now is obviously more elaborate than remedying instances of market failure or merely providing a level playing field for the existing economic actors, though both of these are highly relevant factors. For example, ensuring the existence of such factors as self-regulation, a highly developed technological infrastructure or a fair mechanism for the adoption of new technology standards in industry, are becoming increasingly significant. The way in which the state is to fulfil its role concerning areas such as education, health and income distribution is still subject to some controversy. While the responsibility of the state in these areas is seldom denied, the best ways of combining efficiency with equity are debated. One area in which this combination is most relevant is education since providing continuous adequate education to the largest possible section of the population ensures a larger eguity while it also meets the increasingly elaborate need for skilled labour.

It is necessary to configure the changing role of the state in the context of the creation of adequate 'framework conditions'. The objective of the creation of such 'framework conditions' is to establish a non-distortionary policy environment including macroeconomic stability but also predictability. The existence of a flexible but healthy, fair and effective set of laws is a most critical element of this framework, notably in the area of privatisation. The taxation system is relevant from the viewpoint both of domestic and of international investment. The sufficiently uninhibited but properly regulated and equitable functioning of competition is at the core of the set of framework conditions. This is relevant for the functioning of the national as well as the international dimensions of the economy. The existence of effective public sector institutions and adequate competition among these is another prerequisite, as is transparency, democracy and sufficient and realistic degrees of decentralisation and participation. All these targets have acquired a new dimension at a time when new information technologies and processes are creating enormous new opportunities and also posing new problems in terms of safeguarding freedoms and creativity. At an even more general level, it is worth pointing out at this stage that it would be a pity and misleading to

perceive the emerging context as the sum-total of new technologies and technical policy instruments, however sophisticated these may be. In fact, no system pertaining to society has ever been and can ever be successful if the human dimension, the dimension of the human spirit and the ethical base are absent. Thus, the state's changing role cannot be conceived of as the management of a set of static inert entities through a set of conveniently determined rules and instruments. A multi-dimensional, considerably more complex phenomenon is involved.

Consequently, there is no simple recipe for defining the changing role of the state and that is what makes the task of streamlining the state's emerging new functions so challenging.

The historical background of a traditionally strong role played by the state creates both drawbacks and advantages. The drawback is that the transformation is confronted with strong resistance concerning the effectiveness and superiority of the new mechanisms. The advantage is that, to the extent this very state is genuinely ready to transform itself and give up some of its roles (like those in the direct provision of goods and services and direct economic controls associated with a command mechanism) in favour of functions related to the creation of the adequate framework conditions, it will have considerable strength to carry out these changes.

From the full magnitude of the adjustment challenge and the market-oriented reforms, particularly with reference to those in developing countries, we deduce that the benefits of reform can be realised at a lesser cost if these benefits are explained effectively to the various segments of society. In other words, reforms can be accomplished more easily when they are based on a consensus between the state and its citizens. This would depend not only on dialogue between the state and its citizens but also on the level and scope of transparency that the former will adopt in the implementation of its activities. Consensus will have been reached and maintained only if there is open communication and dialogue.

Today, most countries are concerned about declining confidence in government. The environment in which public management operates is continuously changing and public servants are facing increased demands from citizens, changing the private-public sector interface and changing accountability arrangements. The potential tensions between traditional notions and new forms of public management are starting to emerge mostly in the area of ethics. The goals of the three 'E's' (economy, efficiency and effectiveness) continue to be important but countries are clearly giving greater priority to a fourth 'E', ethics. Proper conduct is a prerequisite for good governance and thus the success of public management reforms and the overall confidence in the government will depend on it. In this context, increasing transparency involving the public as a watchdog and increased accountability by the authorities are of particular significance.4

The Dynamics of the Knowledge-Based Economy

When the nineteenth and twentieth centuries are evaluated within the context of scientific methodology and applications, we observe some basic misconceptions. Perhaps, the most outstanding of these is the misconception of regarding the 'laws' of social science in the same way as the laws of nature. This phenomenon, though not as extreme and evident as August Comte's efforts of constituting "social physics", became influential at various levels throughout the twentieth century. Mechanical approaches imposed a restricting impact on both social sciences and science in general. In recent periods, approaches like the application of chaos theory and 'chaos and complexity in the mathematical sense' provide a more reasonable framework for analyses in social sciences. In this regard, it is definite that the

concept of probability and probabilistic applications with their roots in mathematics provide elaborate solutions in comparison to the ones of the mechanical approaches.

Certain and strict borders between the different disciplines of science continued during nineteenth and twentieth centuries. This strict division delayed some of the developments especially in the second half of the twentieth century. In the twenty-first century, an 'interdisciplinary' approach, which will particularly be reflected in university level education, should be adopted for scientific methodology. Hence, in the area of problem solving, more integrated results achieved by mutual interaction will be used extensively.

The twentieth century has witnessed talented scientists, however it was short of renaissance men. A renaissance man can be defined as one who can contribute to his field of science at the international level and at the same time can horizontally relate other disciplines of science to his area of research, can perceive the interaction of science, art, culture and life, and apply and research these dimensions in the context of scientific consistency.
The process of bringing up renaissance men together with progress in the fields of information and communications will constitute the turning point of science in the twenty-first century. This will speed up the process of forming the knowledge-based society. In this sense, it is possible to state that the twenty-first century brings with it a process of revolution for the progress of science and consciousness.

Convergence between telecommunications, information technology and broadcasting has created a new environment that enables consumers to access new services and equipment. However, technological innovation and convergence force governments to reshape their traditional sector policies related to the new information sector. Policymakers cannot resist the trend towards creating pro-competitive regulatory frameworks, diminishing state monopolies and allowing new entrants.

Information and communications technologies have the potential to affect every aspect of the economy as well as social, cultural and political life.5

Liberalisation of Telecommunications Infrastructure

Governments share a broad consensus that the liberalisation of telecommunications services can make a positive impact on economic growth and development, technological innovation and efficiency in the provision of telecommunication services.6 The OECD countries are the pioneers of this liberalisation process, which was initiated over a decade ago. By the year 1998, the EC countries, with some exceptions, had opened their market to competition from new entrants. Consumers will certainly be the beneficiaries of this action: they will get new services along with substantial rate reductions. The liberalisation of telecommunications services will create an appropriate environment for ensuring the information highway meets the needs of the new emerging information society.

EURO-MEDITERRANEAN INFORMATION SOCIETY

The EU first began supporting research and development into the new information and communication technologies with the Esprit programme in the early 1980s. The Maastricht Treaty, which came into force in 1993, envisaged a trans-European network for telecommunications as well as for transport, energy and the environment. However, the very

particular nature of the challenge implied that the Union would soon have to develop a rather more extensive role in the development of information networks than in other sectors.

Finally, by 1995, the eight basic principles of the EU's policy on the information society became definite:

- Market forces must drive progress to the information society,
- Universal service must be ensured together with network connector,
- The task of financing the information society lies chiefly with the private sector,
- Cultural and linguistic diversity should be protected and promoted,
- Personal privacy must be protected and information must be communicated and processed securely and confidentially,
- Co-operation should be developed with developing countries,
- Economic operators must be made aware of the new opportunities that the information society presents to them,
- A similar awareness is needed among the general public.

The EU has also developed an action plan based on these principles. The constituents of this action plan are the following:

- Developing a regulatory and legal framework,
- Stimulating applications of information and communication technologies,
- Monitoring and analysing the societal, social and cultural impacts of the information society,
- Promotion of the information society.

Starting from mid-1990s, the EU, while forming a Euro-Mediterranean Partnership, has also been energetically pursuing an international strategy designed to lead a global information society, based on the sixth 'co-operation principle' and the action plan. The Ministerial Conference of the G7 group of leading industrialised countries, hosted by the European Commission in February 1995, agreed on the need to establish the basis for a global network and to help the developing countries participate in the information revolution.

Later, in 1997, at a Ministerial Conference in Bonn, Ministers from the member states of the EU, members of the European Commission and ministers of EFTA and of the countries of Central and Eastern Europe reiterated the need for international co-operation, given the fundamentally trans-national nature of global information networks. However, the EU is quite aware of the fact that a comprehensive and challenging project like the Euro-Mediterranean Partnership can not be materialised in our era without utilising information society services.

Given the fact that the Euro-Mediterranean Partnership would provide for free trade among the non-member Mediterranean countries by 2010 and co-operation in areas ranging from the industrial, scientific and environmental to co-operation in the liberalisation of capital movements, in tourism, illegal migration, terrorism, etc., together with financial assistance for these to be realised, it seems that the information society has the potential to be the most important medium in attaining these goals.

Above all, establishing a functioning free trade area in the region necessitates extensive communication. If this can be materialised electronically, the time and cost saved by the

participating countries might lead them to invest in productive areas that can enhance their commercial links. Furthermore, global information networks have also paved the way for a new form of trade, electronic commerce. If the Mediterranean countries can establish the necessary legal, institutional and technical infrastructure for electronic commerce and make use of global information networks in this direction, the possibility of the success of the partnership regarding the establishment of a free trade area will surely increase.

Likewise, it is very difficult to materialise the flow of information that is essential to secure co-operation in the aforementioned areas. Especially, if the EU is willing to introduce decentralised co-operation covering all of the Mediterranean non-member countries, the importance of the utilisation of electronic information networks becomes much more significant.

Therefore, in addition to its above stated objectives, the technical and financial assistance being provided to the Mediterranean non-member countries and territories, has also to focus on the development of the necessary infrastructure for the information networks. This should be complemented by a significant amount of financial assistance directed at education and training in information and communication technology.

## CONCLUSION

The world is entering an era of globalisation, where local and national economies are becoming increasingly interdependent, and economic, technological, and social trends are quickly transcending regional and national boundaries.

Globalisation is occurring very rapidly primarily because a new element in the global system has been introduced, namely disaggregated information flows at unprecedented levels.8 Because of this, there is also an entirely new system of explanatory variables. This implies that there will continue to be rapid change in both economic theory and quantification techniques, which will thereby incur a transformation in these areas. With respect to the social sciences, the impact will be, through an interdisciplinary approach, that it will soon be possible to explain the interaction between the global structure and the subset structure as well as other social sciences.

This makes it imperative for each country to harmonise its interests with others and thereby to have updated information on the latest developments and advances.

Many of the current processes are concerned with reporting the status quo as opposed to evaluating technical change. So, in order to compare indicators of any type, it is necessary to first create solid structural networks with similar correspondences in the classification systems. What we are aiming for then is an integrated system of evaluating indicators. A correlated system of information collection and processing will then lead to our ultimate goal of comprehensive evaluation.

It is certainly true that the convergence of several streams of technological developments has dramatically increased the ability to record, store, analyse and transmit information in ways that permit flexibility, accuracy, immediacy, geographical independence and complexity and volume. However, the challenge for social scientists is to restructure the formulation of the specification methodology in quantitative and qualitative analysis so that it is formed in

relation to the data collection process according to the needs of the science, the business and the government.

In light of the abundance of the free flow of disaggregated information, the current economic theory and quantification methods can be reformulated to better understand the global structure with the available tools and, perhaps, with the creation of newer and more efficient tools. It is inevitable that there will be changes in the theoretical and quantification methodologies of the social sciences since the world, the global structure and therefore the basis of our theory and techniques are changing.

The era of information will mark a higher level in the progression of mankind because an inseparable link has been formed between statistical infrastructures and democracy. Freedom of opinion and expression lie at the centre of establishing scientific and transparent information flows. These freedoms allow the creation of information and its subsequent transmission to occur in an optimal manner. This benefits decision making and the decisional structure at the highest level because it broadens the scope for the realm of data in methodology specifications.

Furthermore, in market economies, where decentralised decision making is inherent to the system, the existence of reliable and timely information reduces market uncertainties to viable levels. By reducing the imperfections in the market structure through optimising the use of information flows, the market structure functions more efficiently and this results in an improved allocation of resources. Increases in the volume of information flows also mean that problem solving will occur at increasingly disaggregated levels and, by using the appropriate quantitative techniques, there will be a revision of the economic theory and of the quantification techniques that will best suit the needs of democracies and free market economies as they attempt to address the challenges of human development and optimal global change.

In conclusion, the relevance of a modern informational infrastructure to the economic and social well being of a society cannot be underestimated. Optimal choices, be they economic, social or cultural must be based on the best available information. The quality of the information determines the effectiveness of any given choice. In the public sphere, access to credible information is a prerequisite for pluralistic and participative democracy, human development, economic and social transparency, and the evolution of culture and civilisation. Information infrastructure promotes a dialogue of ideas. It is only in an atmosphere where reliable facts and figures are available that citizens can form opinions, express preferences, hold government officials accountable for their actions, and that democracy can thrive and reach a consensus on the policy options towards desired objectives.

One should not omit the fact that the information society is not only characterised by radical change in technology, the most visible manifestation of which are global information networks, but also by its high potential to strengthen social and democratic values. Therefore, enhancement of the capacity of the Euro-Mediterranean Partnership in the area of the information society, without threatening the traditional social and cultural values, will possibly contribute to a peaceful and stable environment in the region that is of the highest priority for Europe.

For the efficient reflection of contemporary and social values, like democracy and rule of law in relations between individuals, in the interaction of individuals with their own societies and

in inter-state relations in the Mediterranean region, the EU countries have to share their relatively more advanced experiences in this area with their 'partners' and thereby contribute to the promotion of such values within the Mediterranean basin.

REFERENCES

Casti, J.L. (1994), Complexification, New York: Harper Collins.

EC (1997), 'Building the European Information Society for us all', Final Policy Report of the High-level Expert Group, Directorate General for Employment, Industrial Relations and Social Affairs, Unit V/B/4.

EC Commission (1995), Strengthening the Mediterranean Policy of the European Union: Establishing a Euro-Mediterranean Partnership, Supplement 2/95 to the Bulletin of the European Union, Luxembourg.

Frischtak, L. and Atiyas, I. (eds.) (1996), Governance, Leadership and Communication: Building Constituencies for Economic Reform, World Bank, Washington D.C.

Güvenen, O. (1997), 'The Impact of Information and Communication Technologies on Society', Perceptions, December 1997-February 1998, pp. 28-45.

Güvenen, O. (1994), 'Anticipation and Comparative Analysis in a Decisional Structure: the Interaction between Econometrics, Information Theory, Information Systems, and Statistical Infrastructures', The Econometrics of Information and Telecommunications, Proceedings from the Applied Econometrics Association, March 24-25, Osaka, Japan.

Güvenen, O. (1994), 'Importance of Information Systems and Statistics in an Interdependent World', paper presented to the UNDP Development Study Programme, Roundtable on Global Change, Stockholm.

Güvenen, O., and Akta? Z. (1993), 'Globalization and Information Systems', State Institute of Statistics, Ankara.

K›rdar, U. (ed.) (1992), Change: Threat or Opportunity?, Volumes I-V, United Nations, New York.

King, A. and Schneider, B. (1991), 'The First Global Revolution', A Report by the Council of the Club of Rome, Simon and Schuster, London.

Klein, L.R. and Park, J.Y. (1993), 'Economic Forecasting at High Frequency Intervals', Journal of Forecasting, Vol. 12, pp. 301-309.
Moussis, N. (1997), Access to European Union, Euroconfidentiel, Brussels, 1997.
OECD (1996a), 'Ethics in the Public Service: Current Issues and Practice', Occasional Papers, No. 14, OECD, Paris.

OECD (1996b), Regulatory Reform in Telecommunications Services, DSTI/ICCP(96)21.

OECD (1997a), Information Technology Outlook 1997, OECD, Paris.

Pedersen, D.J. (1993), 'The EC and the Developing Countries: Still Partners?', in O. Nørgaard, Pedersen, T. and Petersen, N. (eds), The European Community in World Politics, Pinter Publishers, London.

TÜB‹TAK, (1997), Türkiye'nin Bilim ve Teknoloji Politikas› ve TÜB‹TAK'›n Misyonu, TÜB‹TAK, Ankara.

World Bank (1997), World Development Report 1997: the State in a Changing World, World Bank, Washington D.C.

World Bank, (1993), Turkey: Informatics and Economic Modernization, World Bank, Washington D.C.

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1OECD(1997a).

2 Güvenen,O.,andAktaşZ. (1993).

3 Casti, J.L., (1994).

4 OECD,(1996a).

5 EuropeanCommission, (1997).

6 OECD, (1996b).

7 Klein, L.R. and Park, Y.J., (1993).