THE SOCIO-ECONOMIC ASPECTS OF TECHNOLOGY

Antonio López Peláez
Department of Sociology, Universidad Nacional de Educación a Distancia, Madrid, Spain

Keywords: Technological paradigm, Technology, Science, Socialisation

Contents

Summary

There is a structural relationship between the Economy, Technology and Society. In this chapter we analyze the characteristics of the technological system, technological resources, and the impact of scientific-technological innovation on contemporary society. The systems of scientific-technological innovation cannot be separated from actions of the State, given the magnitude of investment they require, the role they play in stimulating the economy, and the social debate regarding the impact of the new technologies. For that reason, we have analyzed the evolution and challenges confronting the scientific-technological policy in societies of the twenty-first century.

1. Introduction

In current societies, technology is one of the main elements to understand the characteristics of the world around us. The action of human beings on Nature is based on the comprehension of reality, on the intellectual and material strategies to transform it, and on the organization of the aforementioned process of transformation. That is why technology must be analysed as a complex social process, closely related to science and to work, around which we build our lives.

Every society has developed ways of knowledge directed to the comprehension of reality and also to make possible the achievement of the practical aims of their creators. Usual distinctions among *Science*, that can be described as the human knowledge of the physical and the spiritual worlds, of their laws and their application into human activities to improve the standards of life, *Technique*—those activities that are related to the exploitation of Nature, construction or manufacturing of any kind of goods, and *Technology*—technique for specific activities, that can be found in any dictionary, cannot make us forget that they are closely related, to the point that contemporary sociology talks about socio-technical development, in which science, technology, power and the social interest in conflict are joined.

The sociological analysis of technology can be grouped into two great approaches. One that analyses the logic inside technological development and its influence on the configuration of society, and the other that analyses technology as a social process, that does not have a prior logic and that responds to the social interest in conflict. Anyway, the influence of technology on contemporary societies has lead to define them by means of the aforementioned concept, identifying the new emerging social pattern with technology in general (defining it as 'technologically advanced society' (Tezanos, 2001)), or describing it by means of a specific technology ('informational society' (Castells, 1995)), or highlighting the new pattern of organization that comes from the interaction between new technologies, organizational transformation and the new structure of global capitalism ('net society' (Castells, 1997)), or else characterizing it by means of the new social challenges that the incorporation of advanced technologies brings about ('Risk society' (Beck, 1998)). From the perspective of socio-economic development, technology plays an outstanding role in the evolution of society and of current economies, to the point that it has become a central element of economic evolution.

The analysis of technology demands talk about 'technologies', about the institutions in which they are developed and applied, about technological policies as the main characteristics of advanced societies, and about the interaction among science, technology, economy, and society. Inside the wide scope of technologies that can be carried out in the beginning of the twenty-first century, three of them must be pointed out: the new technologies of information and communication, genetic engineering and robotics. The advances in these three fields (by the way, closely related) have led to an unprecedented transformation in the field of communication and information processing, with a deep impact on the conception of time and space in which we are immersed as human beings; in the field of work, establishing a new pattern of labour substitution and of personal interaction that will change, during the coming years, both the fields of work and of leisure; and in the field of human nature itself, making way for a new 'genetic' revolution that affects the very foundations of our lives.

From this point of view, we will analyse technology as a social fact/process, by means of its relation to economy, to institutions, and to the transformation of our societies. In this sense, the new possibilities and risks that are derived from technological advances, and the pressing need of taking decisions about future applications that will have an important impact on our societies, have led in recent decades to the development of 'Prospective', 'Evaluation of Impacts' and the denominated 'Future Studies', in which

the probable scenarios to increase the available information related to decision-making are analysed, (decision-making that will lead to one or another probable future). The methodological difficulties that the investigation about future in the context of human societies imply—societies that produce and that are product of technology in a complex process of reciprocal influences—cannot obviate the importance of the analysis of probabilities: "the knowledge of the most probable is what makes possible, by means of other aims, the achievement of the less probable. By playing consciously with the logic of the social world it is possible that the probabilities that do not seem to be inside this logic happen. The real political action consists in using the knowledge of the probable to reinforce the possibilities of the possible" (Bourdieu, 2000). In a social context characterised by the rapid technological evolution, prospective has became a strategic tool to face changes, and as such, it has been developed in the field of technological investigation. The uncertainty about the impacts of new technologies is closely related to the awareness that current patterns of managing new technologies are facing strong challenges that can even invalidate them. The great potentials, but above all the range of the new risks that contemporary societies have to face, make the aforementioned 'anticipation', which could be a mere intellectual exercise, become a strategic tool to interfere in the development of future events.

2. Technology, Economy and Society

The interaction of technology, economy and society has generated a new social context, in which the social structures that had characterized industrial societies are redefined: 'the emergence of the net society, as a new dominating social structure in the information era, is a worldwide phenomenon' (Castells, 1997: 24). In a context of accelerated transformation, the sociological analysis must take into account predictions about the impact of technology in the coming years, to be able to face the probable consequences and to contribute with information that allow us to adapt ourselves to a context characterized by the increase of uncertainty.

Perhaps the processes of change we undergo are better expressed than in any other place in managerial management and in the new methods of production and organization that the intensive application of new technologies permit. Technologies demand a reorganization that leads to a change in managerial culture, a change that in many cases is lethal for the managerial systems themselves, particularly for those systems that have become obsolete and that look in new technologies for a solution to problems that can only be solved with them. This is truth, but it has a price: the disappearance of the aforementioned systems. Current debates on post-fordism and lean production illustrate this evolution, as well as the impact and the logic of this technological system. On the other hand, the development of new technologies—although it can seem safe—puts at risk, when maximising, the basic patterns of redistribution criteria in our capitalist societies.

The spread of new technologies is not restricted to highly industrialized countries: globalization implies that the emergence of societies and economies that are technologically advanced happens at the same time all around the world, offering new chances, and at the same time, projecting new shadows on the development of different regions of the world. The analysis of the relation among technology, economy, and

society must take into account two variables: the shortage of funds at world-wide level, that demands more competitiveness (both in prices and *mainly* in human resources), and the specificities of the markets, of their own ideas and attributes, what enables the creation of new choices of work and of leisure. The importance of public policies favouring innovation and training, as well as the creation of economies compatibles with the environment, and the creation of places for leisure that are internationally attractive, show the importance of the government duties, and the need for prospective tools that allow us to contribute with contrasted information to help decision-making related to the assignation of available resources.

We must face the need for defining the features of the new societies, and to the need for deciding how we want to undergo the crisis of wealth redistribution (related to salary) that are characteristic of industrial societies. The keys to success or to failure, in terms of support of new society and of new economy, depend on the articulation of suitable responses from the institutions. In relation to the theme of employment in the society of the future (and to quality employment, allowing self-fulfilment, Freeman and Soete (1996) are emphatic when pointing out the importance of institutional changes, highlighting the need for adequate institutional management (public and private): 'the rate of expansion and the subsequent possibilities for job creation will doubtless depend on general economic policies and on specific policies for institutional transformation in fields related to TIC (Technologies of Information and Communication) that would be adopted next years'.

The patterns of implantation and management of new technologies are not predetermined. Certain examples of new multinational companies in media technology (where image is decisive, as well as design, presentation and adaptation to audience—they create patterns of beauty and a determined fashionable image) point out a different use of new technologies that can make us independent of the most common patterns and trends of management. For instance, one feature of technological societies is the virtual definition of reality, the importance of mass media and the subsequent need for investment in advertisement to create opinion, because opinion cannot be created in any other way. However, the case of the Spanish company *Zara*, that does not invest in TV advertisement, proves the opposite thesis—against the massive investment in advertisement made by other Spanish companies such as *El Corte Ingles*. In the case of the Galician company, the word of mouth works with an absolute success, and not only in Spain. The so called *Zara phenomenon* has become one of the examples to follow and, as such, it is analysed in the best universities around the world.

The concept of 'technologically advanced societies' tries to define the emerging society, which is in a state of constant growth and development, very different to former industrial societies. We are talking about post-industrial societies, with new methods of production, communication and management. In these societies, the main patterns of socialization that are characteristic of the most recent past are redefined. Different authors have suggested different designations for this new society: 'informational society', 'net society', 'post-industrial society', etc. Beyond the debate on terminology to define the technological society in which we are immersed, and on the date to place its historical origin, all the approaches prove the transformation of the socioeconomic reality on the basis of technologies, in a way that it is sometimes unpredictable and

therefore incontrollable. Transformations underway demand new institutions, new laws, and new methods of management.

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Biographical Sketch

Antonio López Peláez (born in Malaga, 1965) is a full University Professor (area of specialty: Sociology) in the Department of Sociology III (Social Trends), of the Faculty of Political Science and Sociology, at the National University for Distance Education (UNED), Madrid (Spain). He has a Doctorate in Sociology (UNED, 2001), and in Philosophy (UNED, 1993). He is an external evaluator of the periodical known as Sistema Social Sciences Journal (Sistema Revista de Ciencias Sociales). He is currently the Academic Secretary of Studies in Social Work at the Faculty of Political Science and Sociology at the National University for Distance Education, Madrid, and since 1995 he has been the Secretary of the post-graduate course: Science, Technology and Society: sociologic prospects, offered by the Sociology Department III (Social Trends). In this course particular attention is given to the study of the characteristics of emerging technological societies, analysis of technological policies and interdisciplinary perspectives. Some of his recent work is as follows:

López Peláez, A., (2003). Nuevas tecnologías y sociedad actual: el impacto de la robótica, Madrid, Ministerio de Trabajo y Sociales;

López Pelaéz, A. and Krux M. (2002). "Future Trends in Health and Safety at Work: New Technologies, Automation and Stress", in the IPTS Report, edited by European Commission, no. 65, pp. 24-33.

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