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# Social trends of the information and communication technologies in Spain

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## Abstract

This article presents the results of a technological forecast program conducted at the Universidad Nacional de Educación a Distancia (UNED, Madrid) during the last three years. The research covered three main technological areas: Information and communication technologies (ICTs), Manufacturing (robots), and Health and life science (biotechnology); but the focus here is only on ICTs. After examining theoretical dimensions of the ICT/society relationship, data gathered and analysed from Delphi surveys are used to examine this transformation in Spain in relation to six main trends: computerized homes, teleworking, tele-education, health, friendly technology, and personal communications. © 2000 Elsevier Science Ltd. All rights reserved.

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## 1. Introduction

The emergence of a new “techno-economic paradigm” [1,2] and the information society [3] is now taken for granted. There are two fundamental arguments on which this claim is based: the strategic importance information technologies [4], and the high value placed on information and knowledge in general by contemporary society [5].

Information and communication technologies (ICTs) cover a range of techniques, instruments, and methods that allow us to obtain, transmit, reproduce, transform or modify information. In very broad terms, we can identify three distinct categories into which ITCs can be compartmentalised: basic technologies: (microelectronics

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and fibre-optic communications systems); information technology proper (computer design, software, artificial intelligence and interfaces); and telecommunications.

The inherent potential of these different information technologies has been greatly augmented in recent years due to the nature of its link with the telecommunications field. The process of integration between computer-based technologies and telecommunications has given a new significance to information technologies. The growth of IT-based technologies as a means of communications has eroded the conventional boundary lines between computers, telecommunications and the communications media. On the one hand, the computer provides an economical and efficient way of processing and storing information, and on the other, the main function of telecommunications systems is to move this information from one location to another at great speed. Information is definitely the common denominator, the common point of departure between IT and telecommunications, and the factor that accounts for their integration. A recent study, by the Information Society Task Force formed under Spain's National Association of Telecommunications Engineers, indicates that Spain is well equipped for the transition to the information age [6].

This paper, based on a study undertaken at Universidad Nacional de Educación a Distancia, examines how ICTs will change the future of Spain and what their impact will be on Spanish society.

## **2. Developments in ICT in Spain**

The study is based on a Delphi survey that examined six main trends: computerised homes, teleworking, tele-education, health, friendly technology and personal communications. We have covered a wide range of technological innovations and applications. Altogether 32 specialists drawn from the academic and business worlds and research institutions, most of them with a technical background, were polled during the Delphi survey; their forecasts are summarised in Table 1. Further predictions are summarised in Table 2.

The developments highlighted in our Delphi survey are mainly focused on technology that is expected to be implemented over the short term, that is, between 2001 and 2010. The social areas most affected by this change are related to traffic safety, the environment, the automated household, the workplace, accessibility, education and training, and the humanisation of technology.

The specialists identified the introduction of a secure system for commercial transactions as a key development, implying that telematic networks will become a platform for currency transfers. In effect, this is to have a substantial impact on the buying and selling of all types of goods and services. We should devote some thought to the administrative and organisational consequences of such a development, one that is set to render superfluous a large part of the intermediate stages on the distribution chain and a good deal of paperwork that such commercial transactions require. The impact of home Internet shopping will increase as computers find their way into more and more Spanish homes. The specialists predict that by 2010, the majority of Spanish households will have personal computers or some other functionally equivalent-

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