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On the Information Society and the danger of digital divide

Your Excellency the Chairman and the Honorable Members of the Royal Academy of Economic and Financial Sciences,
Your Excellency the Chairman of the Polish Academy of Sciences, my Honorable Colleagues,
Ladies and Gentelmen,

I consider it a great honor to be able to present to such honorable audience my thoughts on certain aspects of what is presently referred to as the Information Society and, in particular, on various dangers and pitfalls that are in my opinion associated with the use of modern information technologies.

To begin with I should mention that my background and research experience are in the field of information technologies, in particular in control and communication systems, and that I do not in any serious way research the sociological aspects of Information Society, or Knowledge Society, and whatever else could be current name of rapidly transforming capitalist liberal society that we live in. Yet, from my point of view I observe the evolution, perhaps even a revolution, in the way that multiple significant economic, political, educational and cultural activities are influenced and modified due to developments in information technologies and then in information systems basing upon those technologies. While there are undisputed great benefits gained by most of us and by the society as a whole due to those developments, there are also various phenomena that should be interpreted as symptoms of danger.

Just to make a point, I do not like personally that much the term Information Society as from the very beginnings of organized social life and related economic, political, educational and cultural activities people have been engaged in creation, distribution, diffusion and manipulation of information; in other words the Information Society is as old as any civilization on this globe. It would be perhaps better, as it seems to me, to talk these days about the Society Dependent on Information Technologies, in order to describe the current state of the world affairs and of the technology being used. Another, well related to present situation brief term, is Network Society, proposed by Manuel Castells, emphasizing growing role of the communication networks: in particular Internet and both stationary and mobile telephony in addition to broadcasting media, i.e. television and radio. Likewise, it would be better to talk about the information induced inequalities than to use the term digital divide. However, as the names are important but not that important; let us concentrate on the real issues.

The term digital divide is related to the gap between those people with useful, effective, access to information systems, mostly based upon digital information technology, and those without such access. This gap may assume multiple forms and the line of divide may be understood in different contexts: socioeconomic, generational, educational or geographical. In my opinion the meaning of the term digital divide should also cover the gap between those who know how to make proper use of the information systems and those who, being even

seemingly very enthusiastic users of those systems, misuse or even abuse them. This dimension of digital divide is quite important, especially that it is not so easily perceived and commonly understood.

The effective access to information systems requires first the access to technical devices, to a networked computer or to an activated mobile phone. This physical access to information carrying media is still a serious problem in many countries and communities. In my opinion, however, the information gap, the obvious manifestation of digital divide, due to the lack of this physical access to information media is obviously very important but still not the most important one. As with the access to the TV receivers the problem should be solved in time, largely due to rapidly decreasing costs of getting connected to Internet or to a cellular network and due to governmental subsidies and regulatory actions. In particular, according to my knowledge, in Poland, being by no means a leading country as far as the usage of modern IC technologies is concerned, the access to stationary or mobile telephony is by now above 90% while close to 50% of households are in possession of one or more personal computers.

Physical access to information media is, however, by far not enough. The effective usage of information systems for productive information provisioning/retrieval, information transmission, and then for information processing and assessment is another, much more complicated issue. Here, the gaps between the various groups of information technology users can be more subtle and more persistent. It requires both proper education and motivation, coupled with sufficient discipline and carefulness, to be able to use this technology in a proper and profitable manner. There are a number of pitfalls that one may fall into, and they are not to be easily avoided.

The first danger worth to mention is the common lack of ability to discriminate between useful, sound, information and a worthless, often harmful, stuff of which there is a lot around. In fact, all information carrying media are full of information that is of a low quality; quite often not precise or even false. The usage of such information to achieve a given objective may bring unwelcome results. In my opinion intensive educational and research efforts are required to make people better oriented in the growing sea of information and to be able to access the relevant data when required; in particular the Internet user should have the possibility to verify easily whether a given source of information is a reliable one, whether it can be trusted and relied upon or not. There is a need, in particular, to develop network search engines that would be able, upon request, to refer the user only to reliable, authorized, sources of information.

The second danger that may be perceived as a very serious one is what is known in control systems as information flooding. It is well known, for example, in the theory of design of optimal decision policies, that when at a given instant one has sufficient information to determine the state of the system being considered then any extra information is useless from the point of view of computing and exercising future optimal actions. Provisioning and processing such extra information can be then, in fact, harmful as it must engage available resources, mainly time and computing effort, and so may result, in particular, in delayed decisions and thus in less efficient control or management actions. Generalizing this observation it is possible to observe that in many situations we spend too much time and effort searching for and then processing a redundant information; and then are left with too little time and resources to perform the activity in which we are interested to begin with. In other words, in the extreme case, we know all about the stuff but are left with no time to use this knowledge in any effective way. In fact, this extreme case is not a hypothetical event; there are people who easily forget any productive purpose of accessing an information system and who immerse in such systems and spend a lot of time just to chase for more and more

information for its own sake. Educational effort is required to make people avoid such a trap. Another example of information flooding, in rather primitive form, known as spam, occurs when one is bombarded with unwanted, undesired, information; and must then spend considerable time to prune this information as, so far, the automatic filtering algorithms cannot be, unfortunately, fully trusted. Obviously, we need better protection against the information spam.

The next aspect worth mentioning is the phenomena that I observe as growing and name it as "a shallow rapid reaction" or a "hot-potato reaction". This is related to the speed with which we may now send and exchange the information. I can now exchange several messages during one day with a friend in US or elsewhere, while twenty years ago the same exchange by mail would take a month or more. This is great and very much welcome improvement in communication, yet when one receives a message concerning, say, some research issue, or review, an immediate reaction may be anticipated, in fact may be expected and even required. This, in turn, may result in a rapid but not well thought out, based on deep analysis, "shallow" answer. Again, we all need to be aware of this danger and be able to resist the pressure to exercise such shallow rapid reactions.

Finally, I would like to mention another very important aspect, in fact a range of phenomena that can be considered as quite alarming. As the capability to obtain large volumes of data and to process them rapidly grows we are increasingly inclined to let the computers to do the job more and more on their own. That is fine and very productive ... as long as we understand what the computers are doing and as long as we are able to discriminate between correct and incorrect results and recommendations. In particular, when solving complicated mathematical problems or when using complex models for decision making we should be able to understand and assess the solutions. It looks, alas, as increasingly this is not the case. For example, I have read recently in the Economist that current quite grave problems in finance, related to sub prime mortgages, collaterized debt obligations, credit default swaps and other complicated financial instruments, that have lead to massive losses and to credit crunch, and may well lead to a prolonged economic recession, can be to a large extent attributed to the misuse of mathematical models that had been not good enough and not sufficiently well understood. More widely observed phenomenon is the decreasing level of education in mathematics and of understanding of mathematical tools at schools and, even, at the universities of technology, as the students rely on computer software to provide solutions to the considered computational problems; they are then often not being able to validate those solutions. We need to find ways to revert this trend; this is not, however, easy to be done.

The conclusion would seem obvious: the information technologies, like many other great technological advances marking major milestones in the development of civilizations, must be used with care and not be abused or even overused. If the ICTs are not effectively used by the majority then the digital divide will grow and will continue to increase inequalities between the people. Hope this can be prevented.

It was a great pleasure for me to share the above reflections of mine with you.

Thank you for your kind attention.

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