



# **Information Society Technology Perspectives**

## **Project Outline**

**December 2006**

**Information Society Technology Perspectives**  
(a technology assessment project in Hungary)

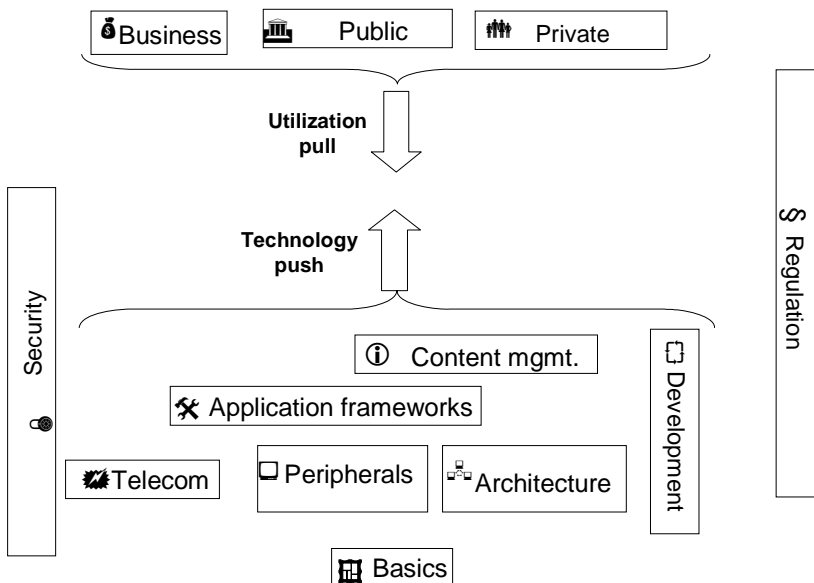
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The *National Council for Communication and Information Technology* (NHIT) is a high level board advising the Hungarian government on ICT issues. In 2005 NHIT initiated a project for a technology oriented study in order to assist the different planning and strategy making activities in the area of the information society. The project is titled “*Information Society Technology Perspectives* (IT3, according to the acronym of the Hungarian title). This study intends to survey the trends in the development and application of information and communication technologies, filtered by their expected impact on the information society in Hungary within the next decade

The first part of the IT3 study has been performed in 12 key areas, seven of which are representing the core technologies (*basic technologies, communication, peripherals, architecture, application frameworks, content management, system development,*). They provide a **technology push**, which is confronted with the **utilization pull**, coming from three key areas: *business, public services, private sphere*. The remaining two key areas deal with the cross-cutting issues of *security and regulation*.



In the First Volume of the IT3 study, an overall survey of the 12 key areas is given, subdividing each area into 6-8 subparts. The main development trends of the appr. 90 subparts are concisely described. Interconnections between the key areas are formulated in short statements presented in a 12\*12 matrix,

After describing the key areas, 20 topics have been selected for further study. For each of these topics, a “thesis” has been formulated describing a **technology change** likely to have considerable impact on the Hungarian information society during the 2010s.

A “drill down” analysis of each topic has been performed based on a common **template** as follows:

- the thesis
- short description of the topic
- state of the art
- effect of the expected change (illustrated on a time-diagram for 2005-15)
- technology preconditions
- examples of ongoing R&D
- influence on other areas
- societal-economical effect
- relevance to Hungary
- consequences

The 20 drill down analysis papers, together with a Glossary make up the Second Volume of the IT3 study.

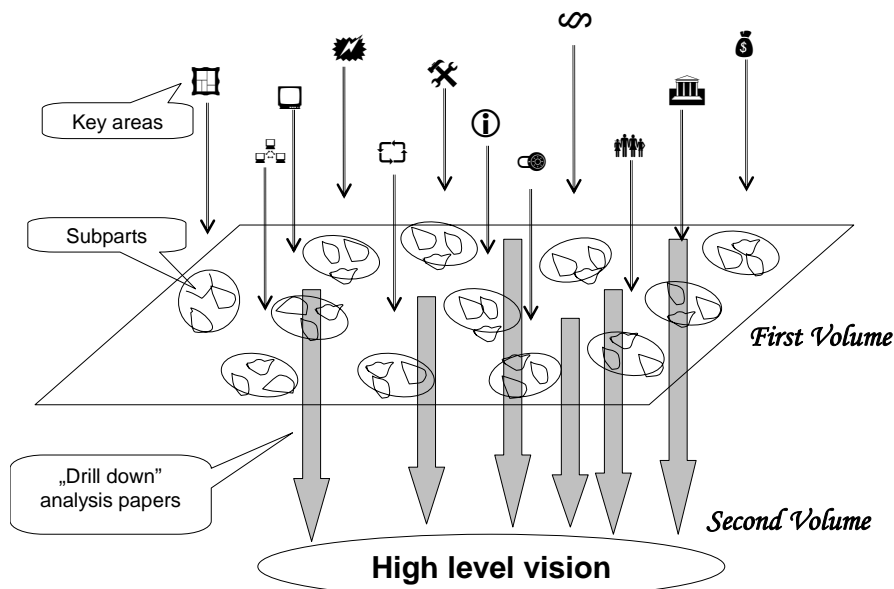
The titles of the 20 topics are the following:

1. Unlimited bandwidth and storage capacity
2. New generation networks (NGN)
3. Integration of IT and biology
4. Nanoelectronics - opportunities and limitations
5. Plastronics
6. Multitude of terminal equipments
7. Flexible human-computer connections
8. Semantic technologies
9. Service-oriented application development
10. IT utility services
11. Sensor networks
12. Agent-based technologies
13. Virtual reality and virtual worlds
14. Personal identification techniques
15. Long range data archiving
16. Intellectual public goods (“Open source”)
17. Collective content production
18. P2P solutions and the content industry
19. Privacy enhancing technologies (PET)
20. Security-conscious development and operation

Additional drill down analysis papers being prepared after closing of the Second volume include

21. IP based television (IPTV)
22. The Web 2.0 phenomenon (and all what is behind it)
23. Radiofrequency identification (RFID)
24. Autonom and mobile robots
25. *ICT implants<sup>1</sup>*
26. *Embedded systems, intelligent environments*
27. *Business intelligence and data mining*
28. *Text understanding*

The process of study development is illustrated by the following diagram:



The **high level vision** about the Hungarian information society of the next decade comes from summarizing the results of the “drill down” analysis papers.. The following main trends can be identified (see details in the Annex):

- I. Practically unlimited **performance** parameters (processing power, storage, bandwidth)
- II. Total **connectivity**
- III. Processing and communication capabilities of “**ambient**” objects
- IV. Increasing **intelligence of systems**
- V. **Service** orientation on all levels
- VI. **Collaboration** between users
- VII. Importance of all aspects of **Trust** and **Security**

<sup>1</sup> Titles in *italics* are being prepared.

The key method of work has been **desk research** plus focus workshops with a wider range of experts. Apart from data available on the Internet, the main information sources has been the Gartner studies ([www.gartner.com](http://www.gartner.com)) and the FISTERA technology database ([fistera.jrc.es](http://fistera.jrc.es))

Present activities of the IT3 project include:

- getting more expert **feedback** on the studies, by sending out questionnaires and organizing expert workshops
- preparation of further **drill down** analysis papers for additional topics (those indicated by *italics* above and others)
- development of (horizontal) **application visions** for certain areas of utilization
  - a vision on “**intelligent home**” has been completed,
  - an other one on “*enterprise working*” is being prepared)
  - more topics are planned from the areas of *public administration, health and transport*
- new materials are published in the Third Volume and previous volumes are being updated by continuous **follow-up** of the development trends .

As a useful by-product, a bimonthly newsletter “**IT3 Korkep**” (IT3 panorama) is being published containing actual news items relevant to the topics of the project.

All materials of the IT3 project are available (in Hungarian) at <http://www.nhit.hu/szakmai>  
English versions of some materials may appear in the future.

**Main trends of information technologies development**

The **main trends** identified in the IT3 analysis are shortly outlined, together with listing of the drill down analysis **studies**, bearing relevance to the given main trend. **Significant changes** expected from each trend, and its **dangers** are outlined in simple terms.

**I. Performance**



The extremely fast increase of all performance parameters of the infocommunication systems (processing power, storage, bandwidth etc.) continues, and is supported also by new paradigms of computing and system organization.

Relevant studies:

- Unlimited bandwidth and storage capacity
- Nanoelectronics - opportunities and limitations
- Plastronics
- Integration of IT and biology

<b>Significant changes</b>	<b>Dangers</b>
Any limitations caused by the performance parameters of such system practically cease to exist	Limitless possibilities of usage may contribute to various kinds of dependencies on infocommunication services.

**II. Connectivity**



Global connectivity becomes universal, resulting in the fact that practically all computers can always be connected to any computer in the world, having access to an unlimited wealth of information.

Relevant studies:

- Unlimited bandwidth and storage capacity
- New generation networks (NGN)
- IP based television (IPTV)
- The Web 2.0 phenomenon (and all what is behind it)
- P2P solutions and the content industry

<b>Significant changes</b>	<b>Dangers</b>
There will be practically no separately operating computers, all information will become available	Violations of the private sphere become increasingly possible.

### III. Ambience



**Information processing and communication capabilities appear - besides the (personal) computers – also in the objects of our environment, being able to communicate with each other and the outside world independently of human users („ambient intelligence”)**

Relevant studies:

- Multitude of terminal equipments
- Flexible human-computer connections
- Sensor networks
- Radiofrequency identification (RFID)
- ICT implants*
- Embedded systems, intelligent environments*

<b>Significant changes</b>	<b>Dangers</b>
People are connected with information technology not only through computers, but IT is appearing in all areas of our daily life	Human beings may feel being driven by the computers.

### IV. Intelligence



**Different forms of intelligent behavior appear more and more often in our IT systems and services, increasing the efficiency of information processing and also enhancing the convenience of human-computer interaction**

Relevant studies:

- Semantic technologies
- Flexible human-computer connections
- Agent-based technologies
- Integration of IT and biology
- Autonom and mobile robots
- Business intelligence and data mining*
- Text understanding*

<b>Significant changes</b>	<b>Dangers</b>
Behavior of IT systems is becoming more similar to human thinking (and not the other way round)	People may get used to avoiding independent thinking

## V. Services



The operation of infocommunication systems is increasingly based on services which different organizations (or devices) provide to each other (e.g. web services, hosting, utility-type services etc.)

### Relevant studies:

- Service-based application development
- IT utility services
- Intellectual public goods (“Open source”)
- The Web 2.0 phenomenon (and all what is behind it)

<b>Significant changes</b>	<b>Dangers</b>
In most areas of infocommunication technologies the role of products is gradually replaced by services	We are depending on others increasingly.

## VI. Collaboration



The users of infocommunication services are increasingly communicating with each other, making use of different forms of collective activities (communication, creation, control etc.) and organizing virtual communities.

### Relevant studies:

- Collective content production
- P2P solutions and the content industry
- Intellectual public goods (“Open source”)
- The Web 2.0 phenomenon (and all what is behind it)
- Virtual reality and virtual worlds

<b>Significant changes</b>	<b>Dangers</b>
Users play a more active role in creating IT services and their content (they become actors rather than users)	Many services and contents of bad quality may appear..

## VII. Safety and security



Increasing dependence of the users (and of the society) on infocommunication services creates increasing challenges towards all aspects of trustworthiness of our systems, including faultless operation, preserving data integrity and secrecy and also protecting personality rights.

### Relevant studies:

Security-conscious development and operation

Privacy enhancing technologies (PET)

Personal identification techniques

Long range data archiving

Radiofrequency identification (RFID)

*ICT implants*

<b>Significant changes</b>	<b>Dangers</b>
Safety and security tools are being built organically into all our ICT systems	The operation of such tools may significantly decrease the efficiency and usability of the systems.