Chapter 7
Development Trends of Digital Infrastructure

ABSTRACT

The goal of this chapter is to analyze the main trends in the development of information communication technology (ICT) infrastructure and to discuss ICT strategies for decision-making in the 21st century. The chapter begins with a discussion of the development of the internet and its impact on civilization and human society. Next, the chapter considers the development of smartphone applications as well as other technologies used for personal communication. After this, developments in hardware and machine software platforms are considered. The chapter concludes by analyzing three trends: developments in computer architecture, developments in computer design, and developments in IT design.

INTRODUCTION

Modern civilization, hitherto based on the infrastructure of roads and bridges, telephones, energy systems, waterworks, and others, has been enriched with digital infrastructure. This infrastructure is driving the development of many industries and education. It is ubiquitous, but malfunctions can cause it to crash, immobilizing companies, agencies, and people.

This chapter will discuss the main trends in the development of ICT infrastructure and strategies for operational decision-making in the 21st century. The essential elements of this infrastructure and the design trends include the following:

- The Internet of People and the Internet of Things,
- Smartphones and other personal communication devices,
- Hardware and machine software,
- Computer design,
- Digital infrastructure design.

This summary will also highlight problems of ICT infrastructure related to unreliability and security.

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THE DEVELOPMENT OF THE INTERNET

The widespread occurrence of internetization in the 21st century has been spectacular and has been, in principle, revered as a remedy for all socio-economic ills. Indeed, internetization has the following advantages (Figure 1):

- Strengthens users,
- Strengthens global business,
- Strengthens organizations,
- Strengthens society (but so far, only in the sense of responding to distortions).

It can, therefore, be concluded that ICT solutions live in symbiosis with other practical solutions; they are perhaps even more visible and spectacular for society.

The main network connecting people is the *Internet*. The development of the Internet has been particularly impressive, a development which includes a range of tools, services, and platforms that support both the work of software development teams and systems assisting specific areas of professional and private life. Next to the real world, a virtual world is consistently created, in which it is easier to get lost without realizing the consequences. An example is the loss of real-life communication (F2F, Face-to-Face), which has become the bane of modern young people. It can be said that the Internet has created a new direction of development, which can be called *internetization*. This concept covers both the development of the Internet itself as well as its users and their activities.

On one hand, internetization is a sensitive matter, for a significant failure in its development would disable many companies, agencies, and people. On the other hand, internetization supports the development of organizations and improves their activities. Figure 1 indicates both the advantages and disadvantages of the internetization process. Negative trends must be minimized. The trends in the development of this online community are as follows:

- **The intensification of Internet communication and the use of ICT services** will affect the majority of people on Earth, or about 5 billion (out of 7,6 billion) people, resulting in a high demand for all kinds of mobile devices, services, and applications. This guarantees trade and a great amount business for manufacturers of mobile devices (both hardware and software) and networks providing high-speed access to Internet services.
- **Growth in human-to-human and hybrid (human-robot) cooperation in different areas of human life** will occur as a result of personal and professional needs. This will occur regardless of existing distances and often at the expense of direct communication.
- **Creating different online communities through the ease of constructing different environments and online platforms that support the activities of communities with similar interests and missions** will ensure that they find their place in an unknown virtual world. The backdrop for this situation is that many cannot find a place for themselves in the *real world.* Unfortunately, many criminal e-communities are also being created.
- **The growth of a vast number of different types of data** will make it possible to discover and explore new forms of knowledge and to apply them anywhere and at any time for both research and novel practical applications, including day-to-day work, hobbies, and entertainment. Unfortunately, this will lead to *dataism (datamania)* and the sickness of internet addiction.