Chapter 43
Science and Innovative Thinking for Technical and Organizational Development:
From E-Health to Patient-Tailored Therapy through Intelligent Specialization

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ABSTRACT

Information technology becomes important part of the current state of the art within health sciences. It allows to gather and analyze biomedical signals and data sets in the more efficient way, and provide better insight into evidences due to metabases and decision support systems based on computational intelligence. Social changes, development of IT systems and shortages in number of specialists, specialistic equipment and budget can stimulate quicker development of cheaper semi-automated solutions increasing both accurateness of the diagnosis and the safety of patients. This chapter aims to describe the concept of the development of the heath care and professional training based on current achievements within technology, education, E-Health and patient-tailored therapy. The authors try to answer the question: how current results can be developed and incorporated into scientific research and clinical practice?

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INTRODUCTION

Development of the medical sciences and clinical practice involves methods, techniques and tools deriving from many other areas of science and technology. Information technology becomes important part of the current state of the art within health sciences. It allows to gather and analyze biomedical signals and data sets in the more efficient way, and (in selected cases) provide better insight into evidences due to metabases and decision support systems based on computational intelligence (formerly: artificial intelligence). Thus such systems can support wide implementations of the evidence based medicine (EBM) and evidence based practice (EBP) paradigms.

Current applications of the information technology within health care are mainly electronic medical records (EMRs), electronic prescribing and decision support systems. Social problems (e.g. increasing number of elderly people, disabled people and chronic ill patients), development of IT systems and shortages in number of specialists, specialistic equipment and budget can stimulate quicker development of cheaper semi-automated solutions increasing both accurateness of the diagnosis (where available) and the safety of patients. Barriers of further development include:

- Huge costs at the beginning,
- Complexity of e-health systems,
- Organizational issues,
- Lack of standardization, and associated problems with exchange of clinical data sets,
- Privacy concerns,
- Ethical issues,
- Legal issues (Anderson 2007).

Supported overcoming of the aforementioned barriers requires:

- Initial financial support (usually governmental) of the healthcare providers,
- Certification and standardization of devices, applications, and whole systems,
- Greater security of medical data,
- Standardization of the clinical data exchange,
- Discussion and common agreement concerning ethical barriers,
- Removal of legal barriers (Anderson 2007).

Innovative thinking constitutes key part of building blocks of the primary healthcare proposed by Bodenheimer et al. (Bodenheimer et al. 2014). Aforementioned ten blocks include:

- Engaged leadership
- Data-driven improvement
- Empanelment,
- Team-based care,
- Patient-team partnership,
- Population management,
- Continuity of care,