The 18th INTERNATIONAL SCIENTIFIC CONFERENCE
INFORMATION TECHNOLOGIES AND MANAGEMENT 2020
April 23-24, 2020, ISMA, Riga, Latvia

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The economic impact of intelligent technologies in health care

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Abstract

The development of modern technologies leads to an increase in big data in the health sector. Healthcare systems face incredible challenges and need to improve health outcomes while containing costs. Medical data is being digitized, plus the volume of data from portable health monitoring devices is increasing significantly, which leads to such problems as the volume, speed, diversity, and reliability of data. With its ability to collect and analyze an enormous variety of data, Intelligent Technologies have the potential to have a tremendous and positive impact on doctors and patients in the healthcare industry. Research shows that even a relatively small investment in the mass adoption of BD technologies in this area can significantly improve the quality of life of individuals and support the active lives of the elderly and disabled in the short term. With Intelligent Technologies tools, out-patient and in-patient care costs can be significantly reduced, and productivity and efficiency in care can be improved. In this thesis, we consider what components will form the economic effect of AI application in the health care sector in Kazakhstan.

Keywords: intelligent technologies, health care, big data

1 General

The problem of population health management is strongly positioned as one of the highest-ranking among priorities of any state [1]. In developed countries, for information support to healthcare management tasks healthcare, Big Data (BD) analysis results are being used increasingly [2]. According to analysts of McKinsey Global Institute, the application of BD technologies in US healthcare will generate a $300 billion financial flow in cost equivalent, where two-thirds of which are made on account of cost reduction in the US healthcare system [3]. Studies show that even relatively small investments in the mass adoption of BD technologies in this area can significantly improve people's quality of life in a short time [4, 5]. Healthcare efficiency at all levels of management depends on the application of BD analysis results for decision-making [6, 7]. The resulting BD medical analysis models will be used in decision support systems for treatment and treatment management; information systems for evaluating drug use; mobile, body-worn devices; medical image recognition and analysis; medical navigation information systems; telemedicine; patient remote control systems, etc.

Application of BD analysis results in modern diagnostics and health screening will reduce substantially costs of out-patient and in-patient treatment, as well as costs of active living assistance for elderly and disabled people. The initiatives in the field are related to the application of information and communication technologies (ICT) [7, 8, 9, 10]. For instance, Active and Assisted Living Program - AAL is being implemented in Europe [11], uniting 123 projects with the joint purse of approximately €700 million;

in different countries, there were established communities and scientific institutions being oriented to acquisition and processing of gerontological data [12, 13, 14, 15, 16, 17, 18, 19, 20].

The volume of data from portable health monitoring devices is growing significantly, contributing to the development of the market for medical BD analysis tools, which according to the agency Ovum, may grow to $ 11 billion in 2018 with an average growth rate of 30%. At the same time, it is expected that up to 70% of the market will be occupied by technologies that assess health conditions [21]. The economic effect will consist of several components.

Firstly, the use of healthcare data will contribute to the emergence of a new market for services, the volume of which can be estimated at 1-5 billion dollars by analogy in the European market of gerontological services (300 billion) and taking into account the lower living standards in value terms and a smaller (approximately 30 times) population of Kazakhstan.

Secondly, the economic effect can be achieved from the implementation of the developed models and methods for the analysis of medicinal BD, including such as from data and software export. By analogy with the McKinsey Global Institute's analysis above, the market for services based on large healthcare data processing technologies could be as large as $100 million.

Thirdly, the system will aid to reduce state healthcare expenditures for older people (which make up to 70% of all healthcare expenditures) and to optimize systems of health insurance. Reducing these costs by only 1 percent will have an economic effect of about $2 million per year.

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