4.0 HEALTH APPLICATIONS IN TURKEY

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Abstract:
4.0 Health means give a healthcare services with eHealt, mHealth, Big data, digital hospital and telemediciene. mHealth is to provide healthcare delivery, health-related data transfer, and health-related communications from long distances via smartphones, web pages, messaging services, tablets, wireless portable devices and applications. The aim of this study is to determine the role and the level of 4.0 Health applications, in the health care delivery in Turkey.
The data of the study were obtained using qualitative research method (analysis of secondary data and applications). In this context, the 4.0 Health applications that are actively used in health services in Turkey was assessed and good practice examples was studied in the study. As a result of the study, 4.0 health applications such as e-pulse, chronic patient monitoring system with mobile devices for home use, e-dietician, e-Eye diseases, mobile first aid and online disease consultation are actively used in Turkey.

Keywords: 4.0 Health, mHealth, e-Health

INTRODUCTION
Radical changes in the information and communication technologies along the last three decades have significant impact on all sectors. Service provision reached beyond space and time limitations. For instance, 50% of the mental patients in Netherlands are diagnosed and treated through the "Tele-medicine method (video conference)" without necessitating them to paying visit to hospital; and patient wait lines, hospitalization periods and health related costs have significantly reduced. Owing to eHealth practices harnessed by the most advanced health systems of the world, dependency to hospitals has reduced; instead, demand towards mobile applications and health technologies capable of providing 7/24 service and which could be accessed by everyone has significantly increased. For example, as of 2016, 20 EU-member countries employ eHealth system actively (Kılıç,2016).

DESCRIPTIONS
Industry 1.0,2.0,3.0,4.0: The First Industrial Revolution 1.0 industrial revolution in Britain came in to introduce machines into production by the end of the 18th century (1760-1840). This included going from manual production to the use of steam-powered engines and

water as a source of power. 2.0 industry dates between 1870 and 1914 (although some of its characteristics date back to the 1850) and introduced pre-existing systems such as telegraphs and railroads into industries. Perhaps the defining characteristic of that period was the introduction of mass production as a primary means to production in general. 3.0 industry is much more familiar to us than the rest as most people living today are familiar with industries leaning on digital technologies in production. However, the third industrial revolution is dated between 1950 and 1970. It is often referred to as the Digital Revolution, and came about the change from analog and mechanical systems to digital ones. Others call it the Information Age too. The third revolution was, and still is, a direct result of the huge development in computers and information and communication technology. Industry 4.0 represents the fourth industrial revolution in manufacturing and industry. Industry 4.0 describes the organisation of production processes based on technology and devices autonomously communicating with each other along the value chain: a model of the 'smart' factory of the future where computer-driven systems monitor physical processes, create a virtual copy of the physical world and make decentralised decisions based on self-organisation mechanisms (Europan Parlement, Policy Department,2016).

Health 4.0: Refers to virtualization and service aggregation. It shows how sensors, embedded systems, and cyber-physical systems are fundamentally changing the way industrial processes work, their business models, and how we consume, while also affecting the health and care domains(Thuemmler and Bai,2017). In other words give a healthcare services with eHealth, mHealth, robotic healthcare, big data, digital hospital and telemediciene.

eHealth: The European Union Health Commission describes the eHealth concept as "utilization of information and communication technologies (network connections, mobile software, Robotic practices, smart phones, data bases, video conference etc.) in health services to prevent diseases, diagnosis and treatment, monitoring and management of health" (www.*ec.europa.eu*). The "e" reference used in the beginning of the eHealth concept implies "Electronic, digital, internet-based, effective, fast, information-oriented and technology" nature of health services.

mHealth (Mobile Health): mHealth *(mHealth),* a component of eHealth concept, is abbreviation of *"Mobile Health"* word. According to the definition suggested by the WHO, mHealth is support to the medical and public health services by utilizing from smart phone, patient monitoring devices, digital devices (tablet etc.), other wireless tools (radio etc.) and mobile devices (www.who.int).

Telemedicine: Transfer of medical information through information technologies in order to evaluate and develop health conditions of individuals medical (American Telemedicine Association, 2015). Although it was harnessed for diagnosis and treatment operations conducted through information and communication tools in long-distance health services from the time when the Tele-medicine application was first introduced in 1960s until 2000s, it is used as a component of eHealth concept.

Robotic Healthcare: Owing to advanced robotic technology and applications, some processes of health services could be implemented by robots. Especially elders and handicapped individuals who need home care services, it is possible to receive service from robots in lithotripter, hair transplantation, consultancy and nursing services today. For instance, robots

with artificial intelligence, which provide home care service in Germany, are capable of establishing communication with patients; and of giving them bath and assisting them in bathroom needs. Even these robots could entertain elders and lonely individuals by dancing. On the other hand, robot nurses developed in Japan are capable of receiving blood samples from patients and giving them education. Robotic practices are available to meet doctors and other health professionals with technology to enhance their performances; put factors such as efficiency, productivity, speed and cost control into prominence so that more robust, dynamic, flexible and human-oriented health services could be provided.

Digital (Paperless) Hospitals: Digital Hospital is to integrate long distance health professionals and departments with each other so as to provide high quality health service through combining clinical and administrative work flows with information and communication technologies, carrying hospital services beyond physical hospital walls (homes, emergency stations etc.). Digital hospital is the concept contributing into increasing personnel productivity, accelerate hospital operations, enhance process quality and ensuring patient safety by integrating advanced technologies and applications such as medical devices, smart information, facility control and automatic material handling systems, location-based services, sensors and digital communication tools with processes (Netherlands, 2009). Paper-based practices are almost at the minimum level in a digital hospital. Patients' blood analysis results, x-ray, MR and tomography images are totally kept and maintained in a digital environment. Physicians at such hospitals could conveniently access health information of patients regardless of distance through cell phones, tablet and PCs. For example, a physician on duty at a digital hospital with the highest "Stage 7" level could regulate serum flow rate of an inpatient in any clinic by means of an application in his/her cell phone. According to specialists, digital hospital concept could bring 35% productivity to the hospitals (saglikbilisimzirvesi.org).

METHOD:The data of the study were obtained using qualitative research method (analysis of secondary data and applications). In this context, the 4.0 Health applications that are actively used in health services in Turkey was assessed and good practice examples was studied in the study.

RESULTS: As a result of the study, 4.0 Health Applications in Turkey such as digital hospital, telemedicine, e-pulse, digital pathology, chronic patient monitoring system with mobile devices for homecare, e-dietician, e-Eye diseases, mobile first aid and online disease consultation are actively used in Turkey.

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