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Conference Article

The Assessment and Comparison of Health Information Systems in Turkey and in the World

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Abstract

Today, developments in the information Technologies not only have enabled information to grow and spread but also have increased the global competition. Businesses should follow the information technologies more than ever to keep up and continue their existences. The voters involved in the political decision-making mechanism are politicians, bureaucrats, groups violate existing legal religious moral and cultural norms in the society by providing private benefits. (1) Businesses, which provide health services, also get involved in this competition and knowledge of these businesses has grown rapidly with legal obligations and relations with the insurance companies, hospitals and healthcare organizations, and they have become unwieldly and costly. The development of information technologies helps management level make best decisions in this competition environment. Health information systems have importance in terms of the evaluation of data; determining the failing points of the system on time; determining policies regarding health; determining the priorities and problems of health sector; providing the best health services; monitoring income and expenses; proper mobilisation of resources; giving information to hospital administration to make strategic decisions and accessing the information in an effective and rapid way. In addition, with the effective use of information systems both in the world and in Turkey, it is aimed to avoid the waste of efforts and time of patients and health professionals, find a solution health management process and increase the financial productivity. Increase in the expectations of patients about health services, fulfilling the legal obligations and necessities such as providing the expected quality lead to a rapid increase in the hospital operation expenses. Regional differences have been tried to be solved with these agencies. (2) Healthcare organizations resort the integration of information technologies and information systems to balance between service quality and costs and increase effectively and efficiently the management performance. In this study, health information systems in Turkey and in the world will be analysed by making a literature review.

Keywords: Hospital 1, Information System 2, Health Information System 3.

1. Introduction

Most of the businesses use information technologies and information systems to increase service quality, productivity levels, their efficiencies in the sector and customer satisfaction, and decrease the costs. Information systems and technologies, indispensable parts of the information age that we are going through are used in every sphere of life. Health sector is also the primary sector that uses effectively these systems and technologies. Information systems, which are used in the health sector, are called Health Information Systems (HIS).

Health Information Systems are classified as functional and clinical information systems. Every functional unit, such as supply, marketing, selling, accounting, financing, personnel, public relations, makes use of distinctive modular functional information systems to perform. (3).

1.1. Health Information Systems

Satisfying the need in the health care services, effect of difficulties on the use of healthcare system and peaking of the information use, call forth health information system as a discipline. The terms of health information and medical information have been widely used in the world since 2000s. (4)

Health Information Systems (HIS) is the name, which is given to hardware, software and practices which are install to produce all kinds of information about the management and providing of preventive health services and therapeutic health care services, use and transmit them effectively. (5) HIS is important in terms of the integration of people who work for the management; transformation, gathering and expansion of information; principles and other sources in a healthcare organization. In addition, it has an important role in the organizational resource management and the development of patient records of healthcare organization. (6) Health Information System are classified into two main groups as Clinical Information System (CIS) and Diagnostic Treatment System (DTS) (Table 1). (7).

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Table.1 The Classification of Health Information Systems

Health Information Systems	Sub Systems	Functions
Clinical Information Systems	- Electronic Health/Patient Records, - Clinical Decision Support System, - Nurse Information Systems, -Medical Imaging Management and Storing Systems, - Patient Follow-up Systems, - Clinical Communication Systems - Telemedicine - Case composition - Virtual Reality Practices, - Smart Card Practices, - Hospital Information Systems, - Standards, -Clinical guidelines and Care Maps.	Systems that gather the clinical information about patients and make them usable
Diagnostic and Treatment Systems	- Imaging Systems - Laboratory Diagnosis Systems - Other Medical Technologies.	Systems that provide support in diagnosis and treatment

"Health Information Systems". Nobel Publishing. p.90. (3)

Table.2 Comparison of E-Health Practices in Turkey and in the World

COUNTRY	GOALS	E-HEALTH PRACTICES
The USA	It is aimed to generalize of the use of information technologies in the health sector nation-wide, make healthcare system more productive, decrease paper works for patients and physicians, provide everyone to access the most	National Health Information Network (NHIN), Certification Commission on Health Information Technology (CCHIT), American Health Information Community (AHIC)

	proper health care service nation-wide and healthy next generations. (21)	Regional information sharing projects, common infrastructure, electronic health record and promotion to health information technologies Safety & privacy cooperation, bio-observation (electronic health record for public health, chronic care (safe message transmission, strengthening of consumer (electronic record summary, electronic medical history), Electronic health records (laboratory data). (21)
ENGLAND	The aim of NHSDO is to help citizens understand the health and health care, offer suggestion about nutrition and individual protection, provide healthcare services in the area and best treatment websites, give information about issues, about which patients wonder, with frequently asked questions and interactive tools. (22)	NHSDO (Direct Online Division) program, launched by NHS, enables citizens and health professionals to access health information online. With smartphones, patients can create personal health record, access health record and consult physicians via video. (22)
GERMANY	Telemedicine application has decreased the hospital bed fee nearly by half and increased the lifetime and safety of patients. (23)	Patients with chronic heart problem and diabetic can be observed at home with the devices that they put on. By measuring the tension and blood levels of these patients, these devices send the results to Public Health Telemedicine Service via cell phones. (23)
ITALY	Preventing active diseases, building a national appointment system, making telemedicine more widespread in the healthcare system. (24)	Tele-pathology, tele-consultation, tele-diagnose and online training services are created. (24)
SWEDEN	Developing a software which help nurses define possible negative drug interactions in elderly patients. (25)	Nurses use pocket computer, installed mobile drug management software connected to FASS (Sweden National Drug Database). (25)
HOLLAND	Implementing new technologies to healthcare services according to scientific and financial studies. (26)	A web-based patient clinical system has been developed to anonymously scan people with the risk of having sexually transmitted disease. (26)

CZECH REPUBLIC	To develop a system which help patients and health professionals make the best decision by cooperating. (27)	With a system, called IZIP, people can access their electronic health record online. There are hospital visitations, dental treatment, laboratory and imaging records in the electronic health records of patient. (27)
INDIA	With the widespread tele-medicine attempts, it is aimed to provide health care, which is not reachable otherwise, to citizens in case of emergency or accident by connecting to big hospitals, primarily in very small towns and villages. (28)	This project enables the connection with the leading hospital in India via mobile VSAT (Very small Aperture Terminal) stations. With this technology, practitioners, in villages and towns, can consult interactively with specialists in big hospitals. (28)
HONG KONG	It is aimed to remove paper consumption and minimize the faults by electronically recording all drug prescriptions and electronically transmitting them to pharmacies. (29)	Besides the medical history of patient, CMS also develops the patient protection. Clinical decision-making support function warns nurses and physicians about drug-food interactions and drug-drug interactions. (29)
SINGAPORE	It is aimed to create a paper-free environment; decrease the problems in the admission to hospital; increase the productivity in the control of contagious diseases; develop the determination period of vital findings and abnormalities of patients; provide an online assessment about the medical condition of patient; decrease the faults in documentation; increase the operational efficiency and patient safety in the Sing Health Organization by developing technology-based point-of-care practices. (30)	Digital Ward project is developed to provide health professionals clinical information and transform access path. (30)
TURKEY	It is aimed to establish an efficient, qualified and accessible health policy and increase patient satisfaction, improve health indicators and protect from financial risks (T.R. Ministry of	Health-NET. Family Practice Information System (AHBS), Central Physician Appointment System (MHRS), Telemedicine, Drug Follow-up System, Decision Support

	Health, Department For Administrative And Financial Affairs, E-Health Information and Communication Portal).	System (KDS), Ministry of Health Communication Centre (SABİM), Unified Accounting System (UAS), Basic Health Statistics Module (TSİM), Core Resource Management System (ÇKYS), E-Prescription, Electronic Dispatch System (T.R. Ministry of Health, Department For Administrative And Financial Affairs, E-Health Information and Communication Portal).

Health information system plays a key role in providing quality healthcare services. (8) The aim of these practices about healthcare services is to increase providing of service, efficiency and productivity in terms of management. Carrying of administrative and medical services into the electronic media is important in terms of healthcare policies. Easy access to necessary data for planning, financing and management of providing of healthcare services enhances the decision-making mechanisms. (9)

1.2. Hospital Information Management System

With the development of technology, opportunity of access to patient and hospital increases, productive service delivery is provided and the usage of health data system gets easy. Decrease in workload provides savings in terms of both service providers and service receivers. Hospital Information Management Systems (HIMS) are complicated structures, which should perform functions like radiology and laboratory systems, follow-up medicine and medical equipment, clinical decision support; as well as administrative function such as human resources management, planning, financing and accounting, materials management. (10)

The main aim of HIMS is to create a harmonized work environment between all units by enabling all sources of healthcare organizations to be used effectively and rapidly evaluating data in a safe environment. HIMS is a technological and sociological process that requires the participation of personnel from each level by providing daily activities of health care organizations to be carried out in an orderly manner and leading decision-making and control mechanisms of healt care organizations. (11)

1.3. E-Health

Besides technological functions that primarily include a big part of health information, the term of e-health, which has been used from the beginning of 2000s, is related to clinical information, maintenance and services. (5) There are many definitions for the e-health concept, which is under the classification of health information. The main definitions are as (12):

The more comprehensive definition of e-health of WHO is: “It is the cost-effective and safe use of information and communication technologies in every area related to health such as supporting health and healthcare systems; health observance, health literature; health education; medical knowledge and health surveys” (WHO).

National E-Health Transition Authority (NEHTA) defines e-health as; “Electronically collection, management, use, storage and share of health information”. (13)

E-health has two main aims. The first one is to give more responsibilities, power and information to patient and the latter one is to increase the interaction between patient and healthcare provider in the primary and secondary health care by providing the effective use of information and communication technologies. (14)

1.4. Digital Hospitals (E-Hospital)

Digital Hospital is a fully-integrated hospital that includes hospital information system, digital medical records, PACS, digital medical archive, barcode, RFID technologies, medicine and equipment follow-up, mobile and tablet computers, medical technologies, building, energy, lighting technologies and information systems, communication systems, data, technologies of sound, image and multimedia, TELEMEDICINE, TELE-TRAINING, virtual autopsy, virtual operation, virtualization and management elements such as management services, consultancy, guidance, garden, parking area and all kinds of integrated services. (15)

Digital hospitals, whose first examples can be seen in the USA, has started a new period in the health sector with the use of mobile technologies. With the use of cell phone in the USA, general examination technologies has made a breakthrough with its cost-free and effortless features in the world. Although there are many great and small healthcare organizations around the world, the examples of digital hospitals are limited and cannot reach the expected standards. (16)

In the modelling of digital hospital, the primary aim is to use heath information in an effective and easy way. (17) Due to the developments of mobile technologies, digital hospital system provides rapid access opportunity to patient record for physician, patient and other medical personnel from everywhere. In addition, there are many advantages like low cost, minimum fault, patient and personnel satisfaction, diagnose and treatment success. (18)

Healthcare Information and Management Systems Society (HIMSS), well accepted around the world, which works for the

organisation of membership in the health sector, especially the improvements in the health sector, is focused on the most effective and proper use of information in health sector. HIMSS evaluates (from 1 to 7) digital processes in the transformation of both public and private hospitals, which apply to them, and determines how digitalized they are, with the well-accepted accreditation and standard systems in the worldwide. Hospitals, which complete their digital processes up to six and seven levels, are graded. (19)

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