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Examining the effects of technology anxiety and resistance to change on the acceptance of breast tumor registry system: Evidence from Turkey

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ABSTRACT

It is believed that IT applications can improve quality, reliability, efficiency, sustainability, effectiveness and research environment in healthcare industry.

This study addresses the effects of technology anxiety and resistance to change on acceptance of newly introduced breast tumor registry system (BTRS) in Turkey. It is an electronic health recording (EHR) especially design for breast tumor. As the deployment of this system is not a legal obligation, its spread and utilization depend on its acceptance. A modified Technology Acceptance Model (TAM) is introduced with the aim of explaining effects of aforementioned factors role in acceptance of this technology. PLS-SEM is used in model testing. Resistance to change appeared as insignificant whereas technology anxiety is a significant role player in adoption.

1. Introduction

The improvement opportunities in healthcare industry provided by information technologies are highly discussed and generally accepted in literature. Innovative IT applications not only improve service environment in terms of service quality, system reliability, efficiency of personnel, sustainability, and service effectiveness but also enable a fruitful research environment. Changing demographics push healthcare service providers to innovate and integrate technology into healthcare practices. The potential of IT applications are not only limited by the capability of the state of art technology but are also determined by mostly the level of healthcare professionals' acceptance of IT applications [1–3].

Recent studies show that healthcare professionals do not fully believe in the potential of technology. Although they do not contradict with using technology in professional practices, they do not know how to create solutions by integrating technology into their professional lives. In their busy work environment, it is hard to keep their knowledge about technological advancement up to date. This knowledge gap generates technology anxiety and resistance when healthcare professionals have to use a new technology [4–6].

On the other hand, issues related healthcare service provision continue to grow. Breast cancer is one of the most common in women in Turkey, which is life threatening. A growth in the number of women affected by breast cancer is expected as well. Breast cancer risk changes with geographic, economic, social, and cultural factors. This illness requires intensive trace, and proactive approaches [7].

This study addresses the effect of technology anxiety and resistance to change on technology acceptance for a newly introduced breast tumor registry system (BTRS) in Turkey. The deployment of this system is not a legal obligation; its spread and utilization are highly dependent on its acceptance. It is known that healthcare professionals have a tendency to reject the digitalization of health data and information [8]. The system, subject to this study, is at its introduction phase. Only three hospitals has adopted it. Thus, the findings of this study are considered as an early warning system, which may provide insights to overcome barriers and negative attitudes towards the system. The main intention is to identify the effect of technology anxiety and resistance to change on adoption of this newly introduced system.

With this aim, firstly, a literature review on electronic healthcare recording (EHR), health information technologies (HIT) and alternative models, explaining people attitudes towards technology, was conducted. With the guidance of previous researches, a research model was proposed by adding aforementioned two constructs, which are named as “technology anxiety” and “resistance to change” to TAM. “Technology anxiety” and “resistance to change” were the most commonly mentioned barriers by the provider team of this new system. Thus it was especially desired to trace the effects of these two barriers on acceptance. In order to test the model, data was collected by conducting questionnaire survey and Partial Least Squares-Structural

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Equation Modeling (PLS-SEM) was applied to test it. Finally, findings were discussed in the light of existing literature.

2. Electronic health recording

EHR is defined as "a longitudinal electronic record of patient health information generated by one or more encounters in any care delivery setting. Included in this information are patient demographics, progress notes, problems, medications, vital signs, past medical history, immunizations, laboratory data, and radiology reports" [9].

The potential of EHR and HIT is highly discussed in scientific and professional publications. Most of these publications conclude with positive effects of information technologies (IT) on outcomes of healthcare systems [10]. The advantages provided by EHR systems can be investigated at clinical, organizational, and societal levels [11,12].

Healthcare professionals prefer to access full clinical information about the patients while interpreting or reporting their own findings in order to be more consistent and reliable [13]. The importance of availability of complete medical records is more crucial especially for the patients who have multiple conditions [11]. At clinical level, the advantages of EHR are the reduction in incident of adverse events, reduction in wrong medication, increase in quality of care, improvement in patient safety, and improvement in communication and coordination. For standardized procedures, reminders also work as an assistant [11,12,14,15].

Not only medical data reliability but also administrative data reliability increases with EHR. Recording errors in material follow, billing, and other administrative processes minimized. Thus increase in profit, and reduction in operating costs can be realized. Besides financial gaining, these systems provide a flexible environment for easy adaptation to ongoing legal arrangements. Thus, EHR systems can result in organizational improvements as well [12].

The data collected by EHR systems are available for reuse. Huge amounts of reliable data become easily available for scientific researches [16]. As the quality of data improves, findings of scientific researches become more consistent [12].

With the aim of realization of these promising, governmental programs were established. Healthcare organizations have been adopting numerous EHR systems [10,17]. But the performance results appeared to be contradicting instead of being encouraging. The resistance of healthcare providers usually points the problems of adopted systems, which were not considered during development or deployment phases.

First of all, EHR systems require huge investments such as initial cost, replacement cost and maintenance cost. Benefits of information technologies expand with their interconnectivity and interoperability capabilities. But when there is lack of standardized presentation of medical data, applications fail to communicate. This results in inefficient utilization of HIT and interface development as a new cost item [2,14].

Besides the financial constraints, the benefits of these systems mostly occur in 'back-office' functions, instead of clinical applications. Thus, healthcare staffs that directly deal with medical processes do not benefit from these technologies [14]. On the contrary, disruption of workflow in the deployment phase creates a negative attitude and disinclination towards EHR among healthcare staff [12]. Openness to violations in patient privacy is another frequently mentioned problem of EHR [14,18–20].

As a last issue, in some cases, effective IT utilization may cause decrease in income for some healthcare professionals while it turns the income advantage to insurance companies [15]. All these factors slow down the adoption of EHR and prevent effective utilization of HIT.

3. Theoretical background

It is generally believed that IT applications improve efficiency and effectiveness of organizations in case of proper utilization regardless of industry they are applied [21]. For that reason, researchers keep trying to explain how to enhance productive utilization of IT in different settings [1]. In literature, there is a nice accumulation of models, which aim to explain issues related IT acceptance. Information system success model, IT-organization fit model, human-organization-technology fit model, theory of planned behavior, TAM are well known and commonly accepted models [22–24].

Technology acceptance is described as "an individual's psychological state with regard to his or her voluntary or intended use of a particular technology" [25]. TAM aims to explain acceptance or rejection of computer usage of individuals after a short period of human computer interaction. This model is based on theory of reasoned action and it is especially designed to explain the acceptance or rejection of computer system whereas theory of planned behavior describes attitude in general terms [21]. After its introduction, many researchers have used TAM model for explaining the acceptance of different IT system [1]. TAM has a wide application range in HIT literature whereas the applications of other models are limited [15]. It provides consistent results, and it is capable of explaining significant relationship [26].

Applicability of TAM in healthcare settings is also discussed and approved in a number of scientific researches. For example, Pai and Huang benefited from TAM to study the effects of information quality, service quality, and system quality on technology acceptance in healthcare [27]. Dünnebeila and his colleagues investigated technology acceptance for e-health in ambulatory care for physicians [15]. Egea and González added trust and risk factors into TAM to examine the acceptance of electronic recording systems [19]. For the proposed model of Holahan and her colleagues, named as "Effective Technology Use Model", TAM formed the basis [28]. Ahlan and Isma explored the acceptance of HIT in developing countries by applying TAM [29]. The number of examples accrues as the researches in this area continues. All these examples proof the appropriateness of the model. Thus, TAM is chosen as the basis of this research.

Technology anxiety and resistance to change are as old as information technologies [5,30,31]. Poor management of change, negative effects of failure experiences, fear of losing power mainly end up with resistance and anxiety [2,32–34]. Recent researches show that they keep playing significant role in technology acceptance. Aggelidis and Chatzoglou researched effect of anxiety on each construct of TAM [1]. Lin et al. studied effects of anxiety and resistance to change on HIT adoption through negative feelings [5]. Sarlan et al. examined the relationship between anxiety and ease of use [35]. Kou, Liu, and Ma defined discomfort as a very similar construct to anxiety and extended TAM with discomfort construct [6]. Dünnebeila et al. tried to explain why physicians resist to nation-wide telemedicine infrastructure [15]. All these researchers concluded with significance and importance of technology anxiety and resistance to change.

4. Model development

Theories explaining intention mainly base on the same concept. According to this concept, technology adopters firstly develop positive attitude towards the subjected technology, which is a reaction created in first use or trial. Consequently, their adoption intention, which is the tendency to use the technology, occurs as a result of this positive attitude. In case of negative attitude, adoption does not occur. Thus, attitude is a strong predictor of intention [36,37].

H1. Attitude toward BTRS use has positive direct effect on intention to use.

In TAM, attitude is shaped by "perceived ease of use" and "perceived usefulness". Perceived usefulness appears as the most effective construct on attitude in most of the TAM based studies. It is defined as the advantage gained by using a specific technology in a specific setting. Utilization of proper technology, which is defined as useful technology, results in both performance increase and quality improvement.