

# ELECTRONIC MEDICAL RECORD IN CENTRAL POLYCLINIC OF ISFAHAN OIL INDUSTRY: A CASE STUDY BASED ON TECHNOLOGY ACCEPTANCE MODEL

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## Original paper

### ABSTRACT

**Introduction:** Today, health information technologies are base of health services and Electronic Medical Record is one of them. The purpose of this paper is to investigate the Technology Acceptance Model (TAM) on EMR at Central Polyclinic Oil Industry that is a pioneer in implementation of EMR in Isfahan. **Methods:** This study was an applied and analytical survey that it was done at the Central Polyclinic Oil Industry. Because statistical population were limited, sampling has been done by conducting the census and the sample was according to the population. The data was collected by a researcher-made questionnaire that it was

validated by experts and its reliability was confirmed by test retest. The questionnaire was developed in 5 scopes including external factors (data quality and user interface), perceived usefulness, perceived ease of usefulness, attitude toward using, and behavioral intention to use. The Results analyzed by SPSS.

**Results:** There was a significant relationship between data quality with PU ( $r=/.295$ ,  $p</.0001$ ) and PEU ( $r=/.499$ ,  $p</.0001$ ). Also there was a significant relationship between user interface with PU ( $r=/.543$ ,  $p</.0001$ ) and PEU ( $r=/.477$ ,  $p</.0001$ ). PU and PEU had a significant relationship with attitude respectively ( $r=/.590$ ,  $p</.0001$ ;  $r=/.605$ ,  $p</.0001$ ). In addition attitude had a significant relationship with

behavioral intention to use ( $r=/.734$ ,  $p</.0001$ ). There was no significant relationship between data quality with attitude ( $r=/.161$ ,  $p>/.005$ ).

**Discussion:** The survey of the scopes in the polyclinic showed that there is relationship among user interface, perceived usefulness, perceived ease of usefulness, attitude toward using, and behavioral intention to use, but data quality has no relationship with attitude. It seems the system designers didn't consider to data quality characteristics. It is proposed that they consult with health information management professionals for improvement the existing system.

**Key words:** Electronic Medical record, Technology Acceptance Model, Ambulatory care.

## 1. INTRODUCTION

Today, increase of data production in respect of health care field leads to utilizing new technologies for proper benefiting from the data. One of these technologies is Electronic Medical Record (EMR) as a valuable system which has been created to access the patient's information in hospitals. EMR is an electronically medical record which is accessible through all computers of a network for the first aim of providing health care (1) and all hospital wards including screen room, conference room, emergency ward, nurse station, surgery room, recovery room, laboratory and radiology ward, the drug store and

medical record department should have complete access to it (2). EMR advantages contain improvement in care quality provided for the patients, better organization of data, and development in timely process, documentation correctness and completeness, patient's own access to EMR, avoidance of allergies and drug interventions, reduction of medical errors, instant access to information in different places, Decision Support System and improving the procedure of activity (3). But using EMR faces barriers in medical centers whose most common ones are financial expenses, being time consuming, users' acceptance resistance to using EMR, lack of proper

strategy for EMR implementation, doing more duties, limited access to computer and internet (3, 4). Given these barriers, physicians' acceptance will probably remain the significant one to choosing the system. However, it does not mean that all health care organizations are unable to decrease the physicians' resistance. In fact, what accounts in physicians' EMR acceptance is significant variables like powerful management support, persistent and primary training, enough time to learn system complexities. In addition, it is necessary that the physicians must be awarded about important of clinical software (5).

Based on previous studies, various

models and methods have been employed to review the effective variables upon information technology acceptance and the most valid one is TAM which considers the variables individually. TAM has been offered by Fred Davis who devised the model in 1986 for the first time during doing his PhD thesis and in 1989 published its practical results in two articles (6). The model provides an illustration upon effective variables on acceptance of technology by users and has been used inclusively in the same way.

Davis and his colleagues have applied 2 significant variables to TAM. One of them is perceived ease of use which is defined as the member's belief of every organization in using a specified system without any problem. And another one is perceived usefulness which is defined as the every person's belief in regarding to increase their efficiency (7) (Figure 1).

As the figure shows, the external variables can have impacts on perceived ease of use and perceived usefulness of information technology. These external variables including organizational and social variables, features of computer systems like software and hardware and other people's contribution to using computer systems.

The results of Davis's, Bagozzi's and Warshaw's study showed that perceived usefulness has had impact on Attitude toward using ;whereas, perceived ease of use has had less impact on it. Besides, perceived ease of use affect perceived usefulness. Additionally, Attitude toward using also influences Behavioral intention to use and Actual system use (8).

Regarding this matter that significant use of this model for new technology acceptance is determined by those technology users, this model not only concerns with being accepted by users but also with explanations of variables. Therefore, researchers can decide why a specified system has not been accepted and must be modified. Also one of key goals of TAM is assigning the effects of external variables on internal perception, attitudes, intention to use, and recognizing the relationships among them in a way that in figure one you can see that Behavioral intention to use is under the influence of attitude toward using and perceived usefulness (8). The current article aimed to assign the effects of external factors on other variables directly and indirectly and to study the relationships between variables one by one.

## 2. METHODOLOGY

This was a practical, descriptive and analytical study. The population study were EMR users at the central polyclinic of Oil Industry in Isfahan. Because statistical population were limited, sampling has been done by conducting the census and the sample was according to the population. Tool for collecting data was research-made questionnaire obtained from previous studies in other countries specially the study of Haslina under the title of "Acceptance Model of Electronic Medical Record" (9). The questionnaire had two parts. In fact, the first part was related to demographic information, years of service at polyclinic, job environment and the second part was based on the five sections

of Technology Acceptance Model. External factors include data quality and those that are related to user interface factors involving several parts as screen, terminology, ease of learning the system, system capabilities, Perceived Ease-of-Use, Perceived Usefulness, attitude and behavioral intent to use. Scoring the questions ranges from very low score (1 score) to very high score (5 scores). The validity of study instrument was assessed through assigning content validity based on other related studies and the point of views of health information management and technology professionals, senior and middle managers of the clinic and other experts in this subject. To evaluate the internal consistency of the questionnaire, Cronbach's alpha of the data was calculated and it was 95.6. According to the opinions of respondents, factors affecting the acceptance and using computer-based systems have been categorized and analyzed by using descriptive and deductive statistics and the testing used was Co relational as well as Regression test.

## 3. RESULTS

### Demographic Information

In the current study, out of 62 present users, 31 persons (50 %) were female and 31 persons (50%) were male and the majority of population (24.56%) was 36-40 years old and the minority of population (16%) were over 46 years old. Furthermore, out of 62 users, 37 percent of them were the personnel of clinical wards, 39 percent were the personnel of Para clinical wards and 24 percent were the personnel of administrative wards. Thirty five percent of the population had the employment record of less than 5 years and 15 percent had the employment record from 6 to 10 years.

Given this matter that regression test was used to study the relations, the results are as the following.

### Quality of data and health information at EMR system

Pearson Correlation Coefficient showed that variables like data quality and health information have a meaningful and direct relation with users' perceived usefulness

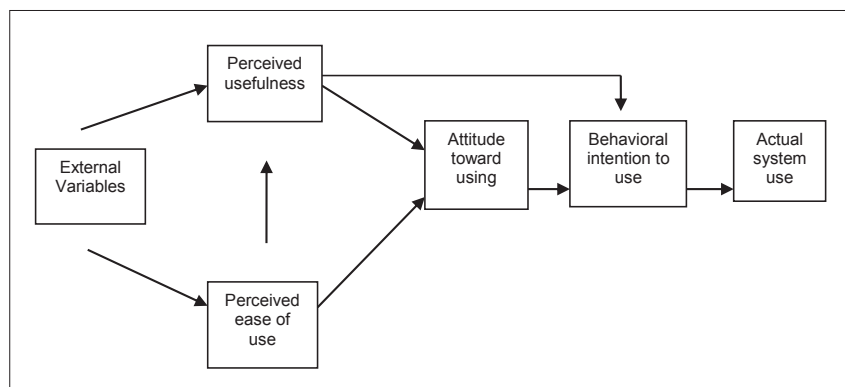


Figure 1. Davis', Bagozzi's and Warshaw's TAM

Variables	User Interface Factors	
r	P_value	
/543.	< /001	Perceived usefulness
/477.	< /001	Perceived ease of use
/387.	/001.	Attitude toward using
./482	< /001	Behavioral intention to use

**Table 1:** Pearson Correlation Coefficient between user interface with other variables

Variables	Perceived ease of use	
r	P_value	
./440	< /001	Perceived usefulness
./605	< /001	Attitude toward using
./662	< /001	Behavioral intention to use

**Table 2:** Pearson Correlation Coefficient between Perceived ease of use with perceived usefulness, attitude toward using and behavioral intention to use.

( $r=0/295$ ), users' perceived ease of use ( $r=0/499$ ) and behavioral intention to use EMR system ( $r=0/280$ ).

However, data quality factors and health information don't have meaningful and direct relation with users' attitude toward EMR system with  $r=0/161$  and  $p\text{-value} > 0/05$ .

#### User interface factors

Results obtained from the user interface have been identified in Table 1.

#### Perceived usefulness

Pearson's Correlation Coefficient showed that there is a meaningful and direct relation between perceived usefulness with attitude towards using ( $r=0/590$ ) and behavioral intention to use ( $r=0/616$ ).

#### Perceived ease of use

Results obtained from users' perceived ease of use have been demonstrated in Table 2.

#### Attitude toward using

Pearson's Correlation Coefficient showed that Attitude toward using has a meaningful and direct relation with Behavioral intention to use ( $r=0/734$ ).

### 3. DISCUSSION

The results of the current study concerning the relation between study variables as effective ones upon technology acceptance, and The structure of model is parallel with Ajzen's and Fishbein's opinions (7) as well as Davis's, Bagozzi's and Warshaw's (8) Park's (10) and Selim's and Colleagues'(11).

This study was identified the practical results of effective factors upon EMR acceptance based on Technology Acceptance Model. The results have been studied because existing variables underlying effective structures upon EMR acceptance in the population study have been recognized and noticed the most. In fact, these effective variables include individual variables like perceived ease of use, perceived usefulness,, Attitude toward using and Behavioral attention to use. Also in this course, recognition of other variables which has significant role in people's attitude toward information technology usefulness and ease of use as well as in other variables has been considered. These variables include data and health information quality, clarity of medical record screenplay characters, consistency and appropriateness of terms used in EMR system, consistency and appropriateness of data used in EMR system, ease of learning EMR system operation, and EMR system capabilities (12, 13).

Given the role of variables like perceived ease-of-use and perceived usefulness in order to improve technology acceptance/EMR status, it is suggested to health care administrators to notice these 2 variables in choosing information technologies, and to select the technologies that are both useful and easy to learn.

Considering the effect of perceived usefulness variable on behavioral intention to use, it is suggested to health care administrators that before choosing and employing different kinds of information technologies, study the selected technology from different views so that technology usefulness will be approved.

Given the effect of attitude toward using upon behavioral intention to use, it is suggested to health care administrators that in choosing and employing technologies for health care systems, study the staff's attitude toward the technology and through this those technologies that cause to raise staff's intention to use be entered into the system.

It is also suggested to notice the acknowledging upon importance and benefits of employing technology in health care systems; as a result, the

staff will be inspired to start using different kinds of technologies.

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