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# Predicting the acceptance of elastography machine technology

## *Elastografi makine teknolojisinin kabul görmesinin öngörülmesi*

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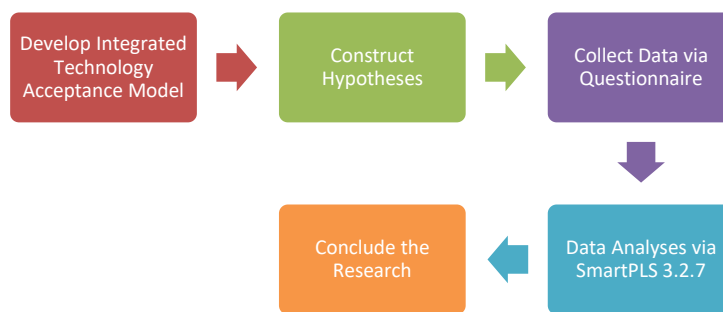
# Predicting the Acceptance of Elastography Machine Technology

## Highlights

- ❖ *The first technology acceptance study of elastography machine technology in Turkey.*
- ❖ *SmartPLS software was used.*
- ❖ *The study integrates information system and medicine areas.*

## Graphical Abstract

*In this study, a research framework was developed via integrated technology acceptance model. Then, 7 hypotheses were proposed; and in order to test the hypotheses, questionnaires were distributed. The collected data was analyzed via SmartPLS 3.2.7 software. The results and discussion were provided, which concludes the research.*



**Figure.** The summary of the research

## Aim

*The objective of this paper is to discover the antecedents of actual use of elastography machine technology.*

## Design & Methodology

*A sample of 145 users, who are randomly selected among the users in Turkey. Using SmartPLS was employed to confirm validity of the instruments and test the hypothesized relationships*

## Originality

*This paper aims filling the gap by exploring reasons predicting elastography machine technology acceptance in Turkey.*

## Findings

*Firstly, this study explores the most critical factors predicting the elastography machine technology acceptance in Turkey. Secondly, a few number prior studies focused on the behavioral intention to use elastography machine technology. Lastly, this paper indicated knowledge to be an important factor of PU which impacts BI of elastography machine technology usage significantly.*

## Conclusion

*The major results of the this study are highly interesting and important for the elastography machine technology users and scholars since they can help understand what makes people to use elastography machine technology.*

## Declaration of Ethical Standards

*The author(s) of this article declare that the materials and methods used in this study do not require ethical committee permission and/or legal-special permission.*

# Elastografi Makine Teknolojisinin Kabul Görmesinin Öngörülmesi

*Araştırma Makalesi / Research Article*

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## ÖZ

Elastografi makine teknolojiyi yardım, teknisyenlerin geleneksel tekniklerle mümkün olandan daha fazla hassasiyet, esneklik ve kontrol ile birçok karmaşık prosedürü gerçekleştirmesini sağlar. Mevcut çalışma, teknoloji kabul modelini (TAM) kullanarak, elastografi makine teknolojisinin fiili kullanımının öncüllerini keşfetmek için entegre bir araştırma çerçevesi önerdi. Bu çalışmada Türkiye'deki tekniker ve kullanıcılar arasından rastgele seçilen 145 kullanıcının görüşü alındı. Araçların geçerliliğini doğrulamak ve varsayımsal ilişkileri test etmek için SmartPLS kullanan yapısal eşitlik modelleme yaklaşımı kullanıldı. Bulguların çıkarımları ve ileri araştırmalar için öneriler tartışıldı.

**Anahtar Kelimeler:** Elastografi makine teknolojisi, kullanıcılar, teknoloji kabul modeli.

# Predicting the Acceptance of Elastography Machine Technology

## ABSTRACT

Elastography machine technology allows users to perform many types of complex procedures with more precision, flexibility and control than is possible with conventional techniques. Using the technology acceptance methodology (TAM), the current research proposed an integrated research framework to discover the antecedents of actual use of elastography machine technology. A sample of 145 users, who are randomly selected among the users in Turkey. Using SmartPLS was employed to confirm validity of the instruments and test the hypothesized relationships. The discussion of the results and suggestions for future work were discussed.

**Keywords:** Elastography machine technology, users, technology acceptance model.

## 1. INTRODUCTION

“Elastography machine technology is a fast and non-invasive imaging technique” [1]. This paper aims filling the gap by exploring reasons predicting elastography machine technology acceptance in Turkey. In spite of the increasing usage of a elastography machine technology, research on dynamics affecting its acceptance is limited. In order to construct a strong theoretic base to explore the elastography machine technology acceptance, this study proposed a novel theoretical model by extending the TAM.

TAM, which is proposed in 1989 [2], is a frequently utilized methodology to measure users' acceptance of novel tools in different fields. The TAM includes the factors of AU, BIU, ATU, PU and PEU, where the PU and PEU are the main factors predicting the ATU and BIU.

Actual Use (AU)

AU is a plumb of the rhythm of the use of the new technic specified in one's job and the intensity of use at that frequency. The frequency and intensity of using this new technology also indicate the use of this method and thus the agreement of the new technic.

Behavioral Intention (BIU)

BIU is “the degree to which a person has formulated conscious plans to perform or not perform some specified future behavior” [3]. Earlier works showed the significant effect of BI on AU [4]. Therefore, the hypothesis is:

H1. “BI has a positive relationship with AU of elastography machine technology.”

Attitude Toward Use (ATT)

ATT is “individual's positive or negative feelings about performing the target behavior” [2, 5]. Prior studies indicated that behavioral intentions to use of a new technology were significantly influenced by the attitudes [5]. Therefore, the hypothesis is:

H2. “ATT would have a positive relationship with the BI of elastography machine technology use.”

Perceived Usefulness (PU)

PU is “the degree to which an individual believes that using a particular system would enhance his or her job performance” [2]. In the TAM, PU is a key element affecting the BIU. Prior studies indicated that PU has a positive relationship with the BIU and ATT [5,6]. Therefore, the hypotheses are:

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H3. “PU would have a positive relationship with the BI elastography machine technology use.”

H4. “PU would have a positive relationship with the ATT elastography machine technology.”

Perceived Ease of Use (PEU)

PEU “the degree to which a person believes that using a particular system would be free of effort” [2]. If a user feels that elastography machine technology is easy to use, there will be an optimistic attitude toward elastography machine technology use. Further, the easier it is to use, the quicker perceptions of the PU [7,8]. Therefore, the hypotheses are:

H5. “PEU would have a positive relationship with the ATT elastography machine technology.”

H6. “PEU would have a positive relationship with the PU of elastography machine technology.”

Knowledge

It is a familiarity, awareness, or understanding of someone or something. In the literature it has shown that knowledge affects PU positively [4,8]. Hence, hypothesis is:

H7. “Knowledge would have a positive relationship with the PU of elastography machine technology.”

The data was gathered using both paper and online surveys. The paper-based survey was distributed; besides, an URL address of the survey was provided via e-mail. The aim and context of this research were given to the participants. The sample involved respondents from various background who were using elastography machine technology. The sample was selected among the Turkish people.

The scale used in the study consists of 6 constructs and 26 items. The corresponding method empowers scholars to elucidate moderately novel situation even in the absence of hypothetical foundation. The PLS-SEM, which was utilized in the existing studies, gives precise estimations even the distribution of the data is not normal [9,10]. SmartPLS 3.2.7 programming was used as an analytical tool.

### 3. RESULTS

The reliability, convergent, and discriminant validity were examined to assess whether constructs are reliable and valid. Construct validity was assessed via factor loadings (FL). The threshold values for factor loadings were identified as .60 [11]. According to Table 1, all the factor loadings were greater than .60 and statistically

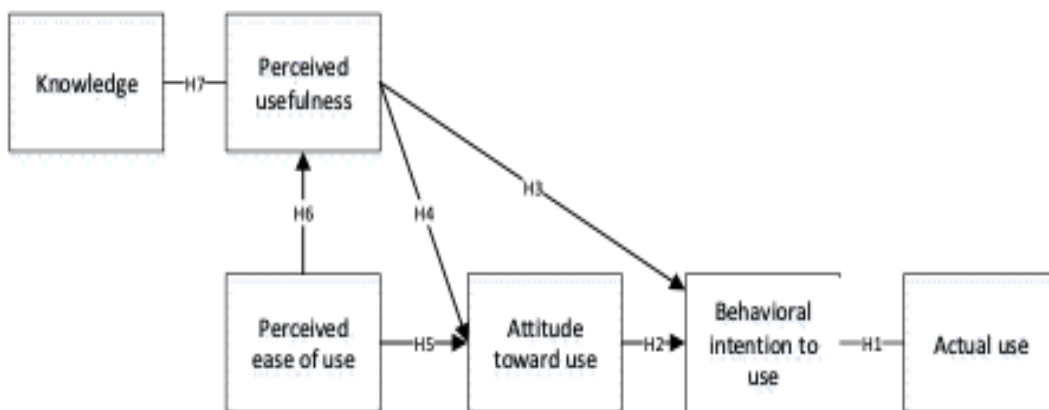


Figure 1. Research framework

The remaining of the paper is organized as follows: In the section 2, methodology is reviewed. In the section 3, results are discussed. In the section 4, discussion and recommendations are presented.

## 2. METHODOLOGY

The questionnaire consisted of three sections. The covering letter and informed consent form were included in the first section. The next section includes the demographic inquiries. The third section comprised of the Technology Acceptance Model related questions. The questionnaire included no personal details that could possibly indicate a specific respondent’s identity.

significant ( $p < .05$ ), that confirms construct validity at the item level.

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**Table 1.** Reliability and validity

Construct	Item Code	FL	CA	CR	AVE
ATT	ATT01		.853	.900	.695
	ATT02	.928			
	ATT03	.768			
	ATT04	.822 .807			
AU	AU01	.928	.823	.894	.739
	AU02	.807			
	AU03	.839			
BIU	BIU01	.938	.858	.914	.780
	BIU02	.845			
	BIU03	.864			
Knowledge	KNOW01	.933	.840	.903	.757
	KNOW02	.830			
	KNOW03	.844			
PEU	PEU01	.903	.877	.908	.622
	PEU02	.757			
	PEU03	.805			
	PEU04	.779			
	PEU05	.715			
	PEU06	.760			
PU	PU01	.923	.895	.918	.618
	PU02	.779			
	PU03	.715			
	PU04	.725			
	PU05	.786			
	PU06	.776			
	PU07	.780			

In this paper, the Cronbach’s alpha (CA) coefficients were higher compare to the .7; therefore, internal consistency was satisfied. The compote reliability (CR) is defined as “how well the items measure a construct” [12]. The threshold value of CR is .70; an in this study, the CR values were above .7. Average variance extracted (AVE) is defined as “the variance captured by the construct in relation to the amount of variance attributable to measurement error”, and it should be over .50 [12]. In this study, AVE measures are satisfying the minimum requirements. The results confirmed the convergent validity. The discriminant validity, which tests to what degree constructs differ, was also checked. Table 2 indicates the discriminant validity.

A PLS-SEM method is utilized. The hypotheses, standardized parameters, and respective t-statistics are summarized in Table 3. Hypotheses with a p-value lower than .05 were supported.

ATU and PU predicted the BIU, thereby Hypotheses 1 and 7 were supported. BIU estimated the AU, thereby Hypotheses 2 was supported. PU estimated the ATU, thereby Hypotheses 6 was supported. On the other hand, PEU did not predict the ATU; so Hypotheses 4 was unsupported. PEU and knowledge predicted the PU, thereby, Hypotheses 3 and 5 were supported.

**Table 2.** Fornell-Larcker criterion

	Actual use	Attitude towards use	Behavioral intention to use	Knowledge	Perceived ease of use	Perceived usefulness
AU	.859					
ATT	.477	.833				
BIU	.714	.641	.883			
Knowledge	.366	.505	.358	.870		
PEU	.301	.486	.384	.461	.789	
PU	.421	.657	.556	.662	.649	.786

**Table 3.** Summary of hypotheses

Hypothesis	$\beta$ Coefficient	p-values	Supported (Yes/No)
H1	.712	.000	Yes
H2	.485	.000	Yes
H3	.241	.008	Yes
H4	.591	.000	Yes
H5	.441	.000	Yes
H6	.106	.238	No
H7	.460	.000	Yes

#### 4. DISCUSSION AND CONCLUSION

The objective of the paper is to evaluate the acceptance of elastography machine technology. The study proposed a theoretical model by extending the TAM. The path analysis implied that the results were similar to the earlier TAM literature by presenting that PU, PEU, and ATU are positively and significantly affecting the BIU.

The study has three main contributions to the existing literature. Firstly, this study explores the most critical factors predicting the elastography machine technology acceptance in Turkey. Secondly, a few number prior studies focused on the behavioral intention to use elastography machine technology. Lastly, this paper indicated knowledge to be an important factor of PU which impacts BI of elastography machine technology usage significantly. These findings are highly interesting and important for the elastography machine technology users, users, and scholars since they can help understand what makes people to use elastography machine technology.

Some limitations should be considered for further studies. First, the observations presented in this paper ought not be generalized since this study is conducted only in Turkey. The outputs may differ when the same research model is tested in an alternate location, or in an alternate culture. Therefore, as a further study, the model may be tested with diverse participants in another country, and thereby, the results can be compared. Second, the model did not consider demographics gathered through questionnaire as a factor or element. Therefore, the role of gender, age, etc. can be tested in the model in a future study. Additional domain specific factors such as volatility, government support, and scalability may also be included in the model and tested in a future study.

#### DECLARATION OF ETHICAL STANDARDS

The author(s) of this article declare that the materials and methods used in this study do not require ethical committee permission and/or legal-special permission.

#### AUTHORS' CONTRIBUTIONS

**Kadir Öymen HANÇERLİOĞULLARI:** Conducted the study, collected the data, analyzed the results, wrote the manuscript.

#### CONFLICT OF INTEREST

There is no conflict of interest in this study.

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