EFFECTS OF TECHNOLOGY READINESS ON TECHNOLOGY ACCEPTANCE IN E-HRM: MEDIATING ROLE OF PERCEIVED USEFULNESS

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Abstract

The aim of this paper is to investigate the effects of technology readiness on technology acceptance in the e-HRM field. The data for this study were collected from 86 Human Resource (HR) managers representing top 500 largest private sector companies in Turkey. The research model was based on two theories: Parasuraman's technology readiness and Davis' technology acceptance model. The results of the study showed that optimism and innovativeness of technology readiness positively influenced perceived usefulness and perceived ease of use, but discomfort and insecurity have no positive effects on them.

Keywords: Technology readiness, technology acceptance, electronic human resources management (e-HRM)

1.Introduction

Using information and communication technologies in human resource services has become an important strategy to achieve competitive advantage for organizations. Information technologies are expected to provide the HR function with the opportunity to create new avenues for contributing to organizational effectiveness. It is observed that electronic human resource management (e-HRM) is gaining importance (Cedarstone, 2005) and the use of web-based technologies for human resource management practices, policies and processes is increasing within organizations. In spite of (e-HRM) systems that are being used with increasing frequency in organizations, there is relatively little research about e-HRM applications and consequences for individuals and organizations.

It can be stated that the acceptance of the use of HRM information technologies and systems by HR employees is a new and important research field. Therefore the purpose of the present study is to examine the effects of "technology readiness" on "technology acceptance". A research was conducted in the e-HRM field to test the effects of technology readiness on technology acceptance. The paper is based on two theories from complementary areas: Davis's Technology Acceptance Model and Parasuraman's Technology Readiness Index. Literature review, research methodology and findings were presented in the following section.

2.Literature Review

2.1.Technology Acceptance Model (TAM)

Determinants of technology use have been studied to predict and explain end-user adoption and acceptance of information technology and systems. One of the first theories in this field is Fishbein and Ajzen's generic Theory of Reasoned Action (TRA) that explains user's attitude towards technology in organizations. TRA argues that a person's behavior is predicted by his or her behavioral intention. Currently in this field the most prevalent model is Technology Acceptance Model (TAM) that was adapted from the Theory of Reasoned Action (TRA). TAM was developed by Fred Davis in 1985 to explain intention to use, and acceptance of new technology in organizations.

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TAM has three key variables: Perceived usefulness (PU), perceived ease of use (PEU) and behavioral intention to use (BIU). Perceived usefulness is defined as the user's subjective probability that using a specific application system will increase his or her job performance within an organizational context. Perceived ease of use refers to the degree to which the user expects the target system to be free of effort. Behavioral intention to use indicates an individual's requests and efforts to perform a behavior. TAM asserts that the influence of external variables upon user behaviour is mediated through user beliefs and attitudes.

TAM was chosen for this research because it has been tested empirically and supported through validations, applications, and replications (Venkatesh, 2000; Schaup et al., 2010; Lee, 2010; Yusoff, et. Al, 2010). TAM is one of the most powerful, robust and parsimonious mode for predicting user acceptance especially in IS context (Bueno and Salmeron, 2008). According to Venkatesh (2000), the parsimony of TAM combined with its predictive power makes it easy to apply to different situations.

2.2.Technology Readiness Index (TRI)

Previous studies show that individuals have different personality and attitudes toward the use of technology (Rogers, 2003:17). Technology readiness effects acceptance of information technology and systems. Parasuraman (2000) has developed technology readiness index (TRI) scale to measure the level of readiness to use technology. TRI is interested in the disposition of using technology, instead of the competency to use it (Parasuraman and Colby, 2001). TRI defines four groups of users on the basis of personality traits; optimism, innovativeness, discomfort, and insecurity. TRI defines these as follows:

Optimism: A positive belief about technology to increase control, flexibility and efficiency.

Innovativeness: A tendency to be the first using a new technology.

Discomfort: A perception of lack of control over technology and a sense of being overwhelmed by it.

Insecurity: Distrusting technology for security and privacy reasons and skepticism about its ability to work properly.

The relative strength of positive drivers in technology readiness indicates a person's openness towards technology. Optimism and innovativeness are the positive drivers of technology readiness. They encourage individuals to use technological products/services, and to hold a positive attitude towards technology. On the contrary, discomfort and insecurity are the negative attitudes; they make customers reluctant or have less intention to adopt new technology (Yen, 2005).

2.3. Electronic Human Resource Management (e-HRM)

Electronic human resource management (e-HRM) is used interchangeably with virtual human resource management, human resource intranet, web-based human resource management, computer-based human resource management systems and human resource portals (Ruel et al., 2004). E-HRM can be narrowly defined as the administrative support of the HR function in organizations by using internet technology (Voermans and van Veldhoven (2007). E-HRM is also defined as a way of implementing HR strategies, policies, and practices in organizations through a conscious and directed support and/or with the full use of web-technology-based channels (Ruel et al. (2004). Another definition of E-HRM is using computer systems, interactive electronic media and telecommunications networks to fulfill HR functions (Strohmeier, 2007). A comprehensive definition of e-HRM is given here as: an

umbrella term covering all possible integration mechanisms and contents between HRM and Information Technologies aiming at creating value within and across organizations for targeted employees and management (Bondarouck and Ruel, 2009).

E-HRM is a rather new and growing academic field (Strohmeier, 2007). In 1980's HR function used IT for administrative processes, primarily payroll processing and later companies broadened the scope of HRM applications such as talent acquisition services, performance management and compensation management. Now e-HRM applications are commonly accepted as a part of a more complicated ERP systems (Bondarouck and Ruel, 2009).

It was reported that e-HRM is a common practice throughout Europe since two-thirds of all organizations have already adopted e-HRM. Major general determinants of e-HRM adoption are size, work organization and configuration of HRM (Strohmeier and Kabst, 2009).

E-HRM alleviates the administrative burden and improves the accuracy of results and quality of HR activities (Strohmeier, 2007). E-HRM usage brings value to organizations (Parry and Tyson 2011, Ruel et al. 2007) and it is one of the variables positively related to e-HRM effectiveness. Results of a study on144 HR managers from top 1000 Germanfirms emphasize the importance for an E-HRM that needs to be both effective in adequately filling vacancies and efficient in making best use of scarce resources (Laumer, et al., 2010).

In a model it was proposed that information flow, social interactions, perceived control and system acceptance affect the effectiveness and acceptance of e-HR systems (Stone, et al., 2006). An integrated model improves the explaining capacity of the construction of technology readiness and technology acceptance model in marketing settings(Lin, et al., 2005).

Contextual facilitating factors such as facilitating conditions, the data quality, HR's technology and HR policy also play a role in HRM value creation among e-HRM users (Ruel and Kaap, 2012).

The critical success factors behind the successful implementation were employee attitudes, organizational culture, characteristics and the process of collaborating these with HR and IT (De Alwis, 2010). Strategic partner and employee champion HR roles were related to positive attitude towards E-HRM systems. For managers, user support was also found to be a predictor of a positive attitude towards E-HRM (Voermans and Van Veldhoven, 2007).

In a study among HR professionals show that the only attitude found to influence the use of e-HRM technology is intention to use, and subjective norms and behavioral control have no influence per se. (Yusliza and Ramayah, 2011). It was found that compatibility and visibility were positively related and complexity was negatively related to the extent of use of the HRIS (Ramayah, et al., 2006)

HR technology is one of the competency that is critical to HR professionals (Brockbank and Ulrich, 2003). IT enables HR professionals to effectively access and disseminate information while influencing what is expected (Gardner, et al., 2003).

Most of the e-HRM studies are carried out in developed countries. Recently, some studies have been conducted in other parts of the world such as intention to use e-HRM among HR professionals in Malaysia (Yusliza and Ramayah, 2011); implementing e-HRM strategies in Mexico (Olivas et al., 2007) and empirical examination of technical applications of HRIS via content analysis in Turkey (Türetken and Demirörs, 2004). The results of the e-HRM study

in Mexico showed that in order to understand the way e-HRM is used in firms from emerging economies, local idiosyncrasies should be taken into consideration (Olivas et al., 2007)

In the literature there are some studies to measure technology readiness and technology acceptance (Massey et al., 2005; Hendry, 2000; Taylor et al., 2005; Caison et al., 2008; Walczuch et al., 2007) but there are limited studies about e-HRM applications.

On the basis of available literature, in Turkey there is not any study about the effects of technology readiness on technology acceptance not only in e-HRM but also other fields.

It can be observed that big scale organizations in Turkey have relatively advanced HRM systems and that they realize the effectiveness of e-HRM in Human Resource Management.. Therefore it is important to study the effects of technology readiness on technology acceptance in the HRM field in Turkey.

In order to achieve this, a research model based on the two theories was formulated: The first is Parasuraman's technology readiness index and the second is Davis's technology acceptance model. Research model can be seen in figure 1.

Figure 1. Research Model
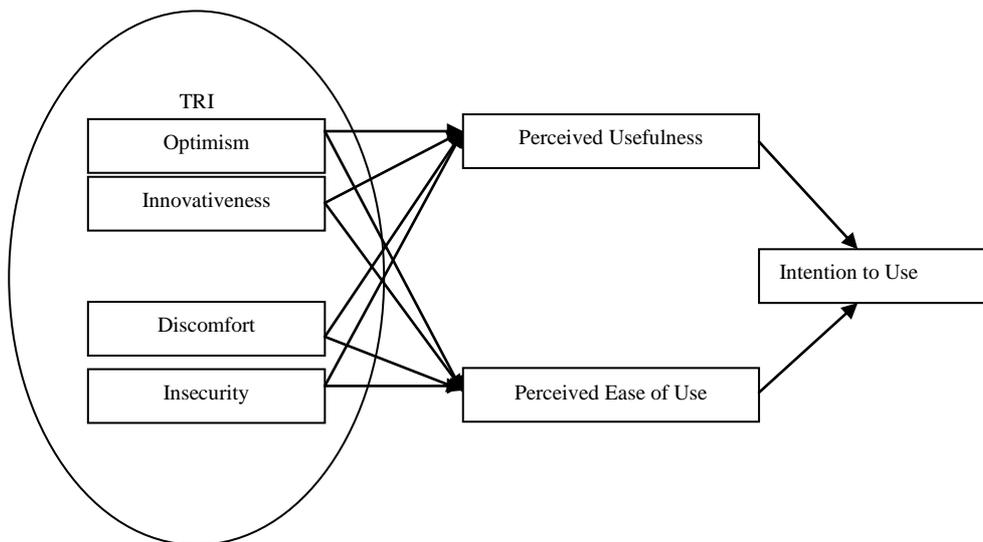
In order to test the influence of technology readiness on perceived usefulness and perceived ease of use in the e-HRM, the following propositions are articulated:

H1: High personal optimism about technology in general leads to higher perceived ease of use.
H2: High personal optimism about technology in general leads to higher perceived usefulness.
H3: High personal innovativeness about technology in general leads to higher perceived ease of use.
H4: High personal innovativeness about technology in general leads to higher perceived usefulness.
H5: High personal discomfort with regard to technology in general leads to lower perceived ease of use.

H6: High personal discomfort with regard to technology in general leads to lower perceived usefulness.

H7: High personal insecurity with regard to technology in general leads to lower perceived ease of use.

H8: High personal insecurity with regard to technology in general leads to lower perceived usefulness.

H9: Perceived usefulness of technology has positive impact on intention to use it.

H10: Perceived ease of using technology has positive impact on intention to use it.

H11: Perceived ease of using technology has positive impact on perceived usefulness of it.

H12 : Perceived usefulness of technology mediates the relationships between perceived ease of use and intention to use of technology.

3.Research Design

3.1.Sample

The data for this study were collected from a sample of Human Resource (HR) managers representing top 500 largest private sector companies in Turkey. The subjects included only HR decision makers about HRM. The participants from 86 companies in this study held a variety of positions within the HR profession. The participants were HR directors (26,7 per cent), managers (32,6 per cent), and experts (40,7 per cent).

The mean age of the study group was 35,6; 55,8 per cent were men, 44,2 per cent were women, and more than 96,5 per cent had at least a university degree. Average position tenure was about 8 years.

3.2.Measure

The data for this study were obtained by using a questionnaire. The questionnaire was divided into two main parts: Technology readiness and technology acceptance. The survey instruments used in this study were Parasuraman's Technology Readiness Index (TRI) and Davis's Technology Acceptance Model (TAM).

A preface to each questionnaire explained (1) the objective of the survey, (2) the assurance of confidentiality and anonymity of respondents and, (3) the voluntary nature of respondent participation. The questionnaires were sent to 500 HR personnel of which 86 responded , which yields a total response rate of 17 per cent. Completed questionnaires were delivered by post or e-mail.

In order to identify the underlying structure of various measures a series of factor analysis were carried out. In this study exploratory factor analysis was used via SPSS 17. For confirmatory factor analysis and testing predicted model the PLS method was used via the PLS-Grap programme.

First, exploratory factor analysis was conducted to test the factor structure of the technology readiness index. It was found that the factor structure was different from the original four-factor structure. Second, 15 items, below .50, were excluded from technology readiness index and factor analysis was carried out again.

The original technology readiness scale of Parasuraman consists of totally 36 items and it is divided into four dimensions: Optimism (10 items), innovativeness (7 items), discomfort (10 items), and insecurity (9 items). Second factor analysis results showed that 21 items loaded on four factors similar to previous studies. KMO score is 0.785 and BT is 766,512. The four factors explained %61,1 of the common variance. Cronbach alpha score of TRI is 0.763. Factor analysis results of technology acceptance model indicated that a total of 13 items were

divided into three factors that were similar to the three-factor structure found in previous studies. Technology acceptance scale of Davis has 13 items and 3 factors: Usefulness (5 items), ease of use (5 items), and intention to use (3 items). All measures were in the category of self-assessment and a five-point Likert response format was used. KMO is 0.898 and BT is 804,926 for TAM. This explained %77,5 of common variance and Cronbach alpha score of .889.

3.3.Data Analysis and Hypothesis Test Results

PLS was used to analyze the collected data. The PLS method can be used with a limited number of data and it is more discrete or continuous variables. Therefore PLS is an appropriate method for analyzing operational applications. PLS is also a latent variable modeling technique that incorporates multiple dependent constructions and explicitly recognizes measurement errors (Karimi, 2009). Furthermore PLS is far less restrictive in its distributional assumption, It applies to situations where knowledge about the distribution of the latent variables is limited and requires the estimates to be more closely tied to the data compared to covariance structure analysis (Fornell & Cha, 1994).

Data analysis was carried out in accordance with a two-step methodology to avoid the possible interaction between measurement and structural equation models. The structural model describes the relationships among the theoretical constructs, while measurement model consists of the relationships between items and latent constructs they measure. According to this procedure, after the model has been modified to create the best measurement model, the structural equation model can be analyzed (Kwahk and Lee, 2008).

Item reliability scores of TRI and TAM and t-statistics using PLS-Graph and Composite Reliability and Average Variance Extracted (AVE) values are shown in Table 1.

Table 2 shows that item reliability scores of scales have high reliability that is higher than the accepted 0,60 level and T-Statistics level is higher than 2. It is expected that Composite Reliability value is higher than 0,7 and AVE is higher than 0,5. Composite Reliability and AVE values of scales are higher than the expected values.

Table 1.
Descriptive Statistics and Empirical Results Model

	Loading	T-Statistics		
Optimism 1	0,76*	8,87		
Optimism 2	0,71*	4,84		
Optimism 3	0,67*	6,43	Composite Reliability= 0,879	
Optimism 4	0,72*	5,82		
Optimism 5	0,60*	4,56		AVE= 0,500
Optimism 6	0,70*	6,94		
Optimism 7	0,75*	5,51		
Optimism 8	0,60	3,90		
Optimism 9	0,60	3,70		
Innovativeness 1	0,79*	6,54		
Innovativeness 2	0,74*	4,71		
Innovativeness 3	0,76*	4,75	Composite Reliability= 0,902	
Innovativeness 4	0,78*	4,67		AVE= 0,605
Innovativeness 5	0,82*	4,42		
Innovativeness 6	0,79*	5,60		
Discomfort 1	0,68*	3,94		
Discomfort 2	0,61*	2,54	Composite Reliability= 0,740	AVE=
Discomfort 3	0,81*	4,43		
Insecurity 1	0,75*	4,46		
Insecurity 2	0,65*	2,58	Composite Reliability= 0,796	AVE=
Insecurity 3	0,66*	2,99		
Usefulness 1	0,92*	37,53		
Usefulness 2	0,89*	31,30		
Usefulness 3	0,90*	30,24	Composite Reliability= 0,938	AVE= 0,753
Usefulness 4	0,75*	6,10		
Usefulness 5	0,88*	31,98		
Ease of Use 1	0,80*	9,92		
Ease of Use 2	0,85*	22,73		
Ease of Use 3	0,80*	12,88	Composite Reliability= 0,926	AVE= 0,715
Ease of Use 4	0,90*	28,25		
Ease of Use 5	0,87*	18,12		
Intention to Use 1	0,92*	28,27		
Intention to Use 2	0,93*	49,17	Composite Reliability= 0,935	AVE=
Intention to Use 3	0,88*	31,29		

Loading significant at the 0,05 level

The correlation matrix shown in Table 2 indicates Pearson's correlations for dimensions of technology readiness and technology acceptance.
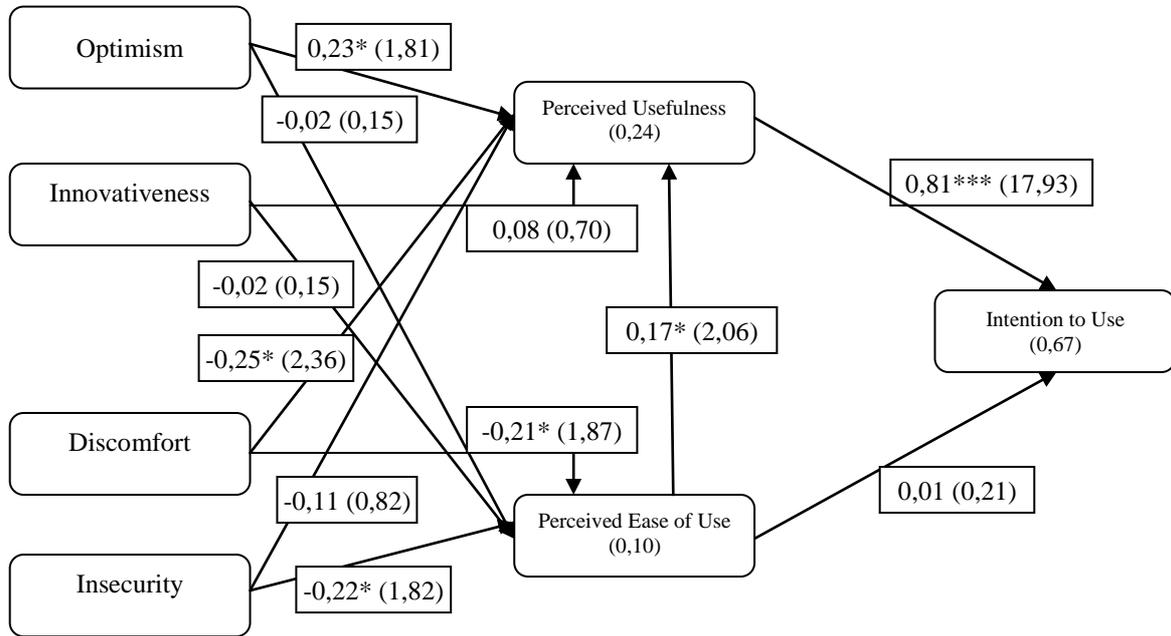
Table 2.
Correlation Matrix and Construct Level Statistics

Variables	Means	1	2	3	4	5	6	7
1) Optimism	4.07	1						
2) Innovativeness	3.53	,555**	1					
3) Discomfort	2.53	-,147	-,110	1				
4) Insecurity	3.36	-,169	-,077	,208	1			
5) Perceived Usefulness	4.19	,287**	,223*	-,319**	-,185	1		
6) Perceived Ease of Use	3.95	,024	-,032	-,179	-,231*	,237*	1	
7) Intention to Use	4.30	,372**	,300**	-,307**	-,174	,813**	,203	1

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Figure 2. PLS Results for the Hypothesized Model

*p<0.05; **p<0.01; ***p<0.001

Structural equation model results and conclusion of hypothesis tests are seen in Table 3.

Table 3.
Estimation Results of Structural Model

Relationship	Path Coefficient	t- Value	Conclusion
Optimism – Usefulness	0.23	1,81	H1 Supported
Optimism – Ease of Use	-0.02	0,15	H2 Not Supported
Innovativeness – Usefulness	0,08	0,70	H3 Not Supported
Innovativeness – Ease of Use	-0,02	0,15	H4 Not Supported
Discomfort – Usefulness	-0,25	2,36	H5 Supported
Discomfort – Ease of Use	-0,21	1,87	H6 Supported
Insecurity – Usefulness	-0,11	0,82	H7 Not Supported
Insecurity – Ease of Use	-0,22	1,82	H8 Supported
Ease of Use – Usefulness	0,17	2,06	H9 Supported
Ease of Use – Intention to Use	0,01	0,21	H10 Not Supported
Usefulness – Intention to Use	0,81	17,93	H11 Supported

The results of correlation analysis showed that optimism was positively correlated with innovativeness, perceived usefulness and intention to use (r=.55, .28 and .37, all p values

<.01). Innovativeness was positively correlated with perceived usefulness and intention to use (r=.22, p value <.05 and .30, p value <.01). Discomfort was negatively correlated with perceived usefulness and intention to use (r=-.32, .30 and -.30, all p values <.01). Insecurity was negatively correlated with only perceived ease of use (r=-.23, . p value <.05). Moreover the results showed that perceived usefulness was positively correlated with perceived ease of use and intention to use (r=.23, p value <.05 and .81, p value <.01).

In order to test the hypotheses, we conducted a partial least squares (PLS) path modelling analysis.

In figure 2 path coefficients and t-scores of PLS graph are presented.

Table 3 shows the correlations between TRI and TAM variables and the results of the hypothesis tests. It shows that Optimism effects Perceived Usefulness positively but it has no effect on Perceived Ease of Use. These results indicate that H1 hypothesis was supported but H2 hypothesis was not supported. Innovativeness has no effect on Perceived Usefulness and Perceived Ease of Use. H3 and H4 hypothesis were not supported. Discomfort effected Perceived Usefulness and Perceived Ease of Use negatively as it was expected. This result shows that H5 and H6 hypotheses were supported. Insecurity effected Perceived Ease of Use negatively, H8 hypothesis was supported, but insecurity has no effect on Perceived Usefulness, H7 hypothesis was not supported.

When looking at correlations between TAM variables there is a significant correlation between Perceived Ease of Use and Perceived Usefulness. This means H9 hypothesis was supported. Perceived Usefulness effected Intention to Use and H11 hypothesis was also supported. Since Perceived Ease of Use has no effect on Intention to Use, H10 hypothesis was not supported.

3.4. Mediation Effect of Perceived Usefulness

After the path analyses it was found that there was no relationship between PEU and IU. On the contrary there were significant relationships between PEU and PU, and PU and IU. In this situation we decided to test mediation effect of PU. For mediation effect the following conditions must be provided (Baron and Kenny, 1986):

First, a direct link must be established between the independent and dependent variable to ensure there is a relationship to be mediated. Second, a direct relationship must be established between the independent and mediator variable. Third, the mediator must be shown to be related to the dependent variable. Last, the relationship between the independent and dependent variables must be significantly reduced when the mediator is added.

The Sobel test has been a traditional method of testing the significance of mediation effects (Preacher and Hayes, 2004). The Sobel test is used in this study because it is the most widely employed. The significance is measured by the following formula (Baron and Kenny, 1986):

z-value = a*b/SQRT(b2*sa2 + a2*sb2)

This formula requires the unstandardized regression coefficient (a) and the standard error (sa) of the relationship between the independent variable a, and the unstandardized regression coefficient (b) and standard error (sb) of the path from the mediator to the dependent variable.

The steps and results of Sobel test, the values of indirect effect and total effect were given.

(1) a direct path from PEU to IU;

(2) a direct path from PEU to PU;

(3) a direct path from PU to IU; and

(4) a direct path from PEU to IU, and an indirect path from PEU to PU then from PU to IU.

Table 4.
Mediation Effect of Perceived Usefulness

Steps	Paths	Beta	Std Error	t
1	PEU-BIU	0,22	0,10	2,07
2	PEU-PU	0,16	0,08	1,96
3	PU-BIU	0,82	0,03	22,67
4	PEU-BIU	0,01	0,06	0,20
	PEU-PU	0,17	0,08	2,05
	PU-BIU	0,81	0,04	17,93

Sobel Test	z	p
PEU–PU–BIU	1,99	0,02
Indirect Effect= 0,16*0,82		0,13
Total Effect = direct effect + indirect effect		0,35

It was found that in the first step the effects of PEU on IU is (0,22; p<0,05), in the second step the effect of PEU on PU is (0,16;p<0,05), in the third step the effect of PU on IU is (0,82; p<0,001). Although in the fourth step the effect of PEU on PU is (0,25; p<0,05) and the effect of PU on IU is (0,81; p<0,001), these were still significant, the effect of PEU on IU was close to zero. Therefore, it can be claimed that PU is a mediator variable between PEU and IU. It was found that mediation effect that was also called indirect effect PU on the relationship between PEU and IU was 0, 13. The direct effect of PU on the relationship between PEU and IU was % 59.

This finding showed that if users perceived technology as useful, PEU will effect IU. This implies that PU is a mediator between PEU and IU.

CONCLUSION

The purpose of this paper was to examine the effects of technology readiness on technology acceptance in e-HRM. The findings of this study showed that technology readiness has an impact on technology acceptance in e-HRM. This finding is similar to earlier studies (Walczuch et al., 2007). More specifically personality of e-HRM user has an impact on usage intention of e-HRM (Chen and Le, 2010).

User's optimism has a positive impact on Perceived Usefulness (PU) of e-HRM as it was expected. User's optimism has no impact on Perceived Ease of Use (PEU) of e-HRM. This result was not expected and it is different than the earlier studies.

Innovativeness has no impact on both PU and PEU. This was not expected either and it is different from the current literature (Walczuch et al., 2007). Discomfort has a negative impact on both PU and PEU. These findings are also similar to current literature.

Insecurity has a negative impact on PEU. This is in line with the literature. Insecurity has no impact on PU. This finding is different from the current literature.

PU and PEU were expected to influence intention to use. In this study PU has a strong positive impact on the intention to use but PEU has no impact on it. PEU has an impact on PU. This finding supported Lin et al., (2005). These findings showed that those individuals who perceived e-HRM useful have a positive tendency to use e-HRM but those who perceive e-HRM as easy to use has no intention to use it. It was also found that the ease of use has a positive impact on perceived usefulness. This showed that perceived usefulness is a mediator between perceived ease of use and intention to use. It should be emphasized that perceived usefulness is important in an e-HRM adoption. This finding was similar to previous studies (Ruel et al., 2007; Kwahk and Lee, 2008; Mathieson, 1991).

Managerial implications

Personality of user has an impact on technology use. This shows that managers should take personality differences into account when adopting technology. This is also true in e-HRM. The findings of the study provided evidence for the value of using socio-technical systems (STS) theory when adopting e-HRM. Our findings emphasize the importance of taking users' personality into account and their readiness for technology acceptance.

In e-HRM implementation process managers should persuade employees about the usefulness of the technology. Perceived usefulness had influenced IU and it was also a mediator between PEU and IU.

Limitations

There were some limitations to his study. The results reflect only a small sample of Turkish users further research is necessary to see if the results are also compatible with other countries. Also, this study group was small and may not be enough to make a generalisation.

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