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**USING INTEGRATED MODEL FOR EVALUATING THE SUCCESS OF INTERNET BANKING BASED ON TECHNOLOGY ACCEPTANCE MODEL AND THE SUCCESS EVALUATION MODEL OF DELONE AND MACLEAN (A CASE STUDY OF INTERNET BANKING CUSTOMERS, MELLAT BANK, CITY OF GORGAN, IRAN)**

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**ABSTRACT**

The aim of the present study was utilizing an appropriate conceptual model for using the internet banking system through the application of system features, services and information based on information system success model (Delone and MacLaine) as external variables and also, integrate the three dimensions of perceived usefulness, perceived ease of use and use intention of the technology acceptance updated model of Vakentash and Davis. First, analysis of conducted researches about use intention of information systems and then the monitoring research was performed by using questionnaire between internet banking users of Mellat bank, Gorgan, Iran. After collecting the questionnaires, the structural equation modeling was used to analyze the data collection, based on data analysis, the suggested factors were positively effective on use intention of internet banking system from costumers. Quality information, services and systems on consumer intentions were effective through mediating structures, perceived usefulness and perceived ease of use. It can be concluded that the higher perceived usefulness of higher customer will be more inclined to use Internet banking services.

**Keywords:** *Information systems, Internet banking, Technology acceptance model, Model of information systems success*

**INTRODUCTION**

Advances in technology have changed fundamentally the world, and have changed the ways in which people behave in their business and personal affairs (Bandura, 2002). In financial services and banking industry, providing services to customers via the Internet is growing (Erikson *et al.*, 2005). Since customers should change their behavior patterns for the use of Internet banking, the use of this technology can be very complex (Mahmoudi, 2009). Internet banking allow customers to have extent deal more fast and with lower cost in compare to traditional branches through bank website without time and local limitations (Krauter and Faullant, 2008). Another advantage of getting online in banks is savings in maintenance costs of traditional bank branches (Shih and Fang, 2004). Internet banking has faced many obstacles in acceptance such as other innovations. Since the success or failure of these technologies depends on the level of customer acceptance, it is necessary to examine the factors influencing the adoption of Internet banking customers (AbuShanab and Pearson, 2007). Identify factors that affect the planning of the use of internet banking services help banks to respond appropriately to these factors and apply marketing strategies to promote their internet banking that meets the customer needs (Wang *et al.*, 2003).

Davis *et al.*, (1989) introduced the Technology acceptance model for modeling user acceptance of information systems. This model is a modification of the theory of reasoned action that Davis (1989) has discussed it in his doctoral thesis. The addition of prediction models, this model has the descriptive approach, so managers can identify why a particular system may not be accepted and based on the recognition result, follow appropriate corrective steps (Yaghoubi and Shakeri, 2008).

Technology acceptance model is based on perceived usefulness and ease of use by the user of the technology; these two principles assume as fundamental assumptions of this model (Davis, 1989). Delone

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and MacLean in 1992, performed a comprehensive review of researches in the field of information systems success, they suggested a model of information systems success (Zaied, 2012). Later, Delone and McLean (2003) performed their model and reviewed and modified it. They defined the aspects of their updated model as: system quality, information quality, service quality, user satisfaction and user benefits (Zaied, 2012). The role of information systems, in presenting a competitive edge, has recently been the subject of speculation. However, it is argued that neither of information systems, but their use leads to competitive advantage. Also, since these systems are always in progress, so consider as the component systems which are costly. To reduce these costs, organizations must identify factors that affect the success of their information systems (Zaied, 2012). In this study, the researcher may apply for a new model for measuring the success of information systems, technology acceptance model and the model of success through the application of concepts such as Delone and Maclean model. The proposed model, evaluates the factors of success that are effective on internet banking adoption among bank customers. Therefore, the adoption of quality systems, services and information covered in the information system success model proposed by Delone and MacLean consider as exogenous variables and integrated with the three dimensions of perceived usefulness, perceived ease of use and intention to use consider as updated model. In this study, one evaluation model of internet banking information system will propose in order to recognize cause and related and effective relation effects on intention to use and presenting banks for evaluation, improvement and introduce internet banking system. As far as there is no research with this title in Mellat bank and the researcher which is a member of Mellat bank work force, decided to investigate the issue and with presenting solutions and suggestion help bank managers. The main research question was: whether the used components suggested model impact on the success and acceptance of internet banking among customer of Mellat Bank, city of Gorgan, Iran?

Udo *et al.*, (2010) in a study entitled "Evaluation of electronic customer service, perceived quality, satisfaction and intention" evaluated the quality of web services based on customer expectations and perceptions of electronic and most important finding of this study was that although perceived security may lead to favorable perception of the quality of web services, but not necessarily lead to customer satisfaction, and positive behavioral intentions. Computer skills of person may feel the impact of services, but it seems to have an effect on how customers evaluate the quality of web services, customer satisfaction, and behavioral intentions to use the services. Set of computer skills may impact on feeling ease of services but it seems has no effect on customer evaluation from web services quality, customer satisfaction and or behavioral intention of electronic services. Consent or indirect effect through the web, service quality and behavioral intentions actually are stronger than the direct impact of web services and the quality of behavioral intentions.

Pai and Huang (2011) in a study entitled "using technology acceptance model in introducing health and cure information" presents a model of integration of information technology acceptance model and a model for assessing the success of Dolen and Maclean, concluded that information quality, services and systems has effect through an intermediate structure and perceived usefulness, ease of perceived and user's intended.

Gerard *et al.*, (2006) in an article titled "Why customers not use internet banking: qualitative study" concluded that the main reasons for non-use include: risk perception, lack of demand, lack of knowledge, resistance changes in the availability of the Internet, human contact, price and difficulty in using information technology.

Hasan and Abuelrub (2011) performed an article entitled "Assessing the quality of the website" that proposed general criteria for evaluating the quality of web sites, regardless of the type of services they offer. Standards of quality content, design quality, quality, quality of user-friendly, These dimensions with a comprehensive index and check list can used by web designers and developers to create a list of web sites to improve the quality of e-services and the introduction of the Internet.

Zaied (2012) conducted a study entitled "the success of the integrated model for evaluating information systems in the public sector". Based on empirical findings, this study had several conclusions. First, the results of empirical analysis showed that the quality of information, with the strongest effect on the

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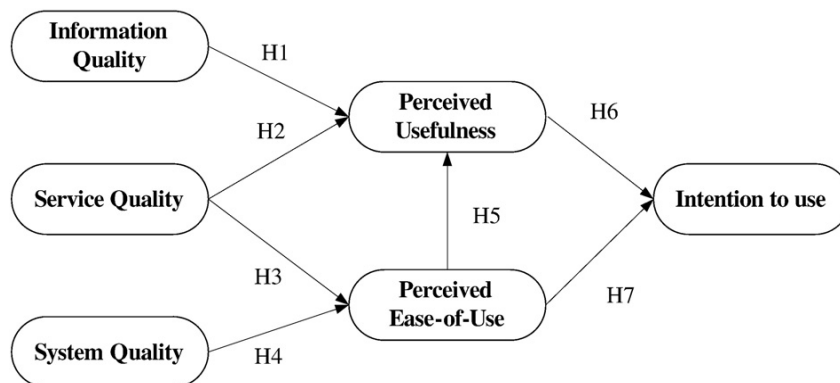
success of information systems. Second, the system design should be actively looking for ways to improve system security, system availability, adaptability system, privacy and system maintainability requirements. Third, the results showed that services quality impacts on information system success. In addition it can help to system users and it can result in information systems. Fourth, improving information systems, through increased data quality, perceived usefulness, quality of service and ease of use, increased user participation, user satisfaction and behavioral intentions. Finally, the proposed model and its related components showed that they could be a useful tool for decision makers to assess the implementation of information systems used in organizations.

Koo *et al.*, (2013) in a study entitled "evaluation of mobile and internet banking services: request for information systems success model" found that the quality system has positive effect on perceived usefulness and ultimate satisfaction for both internet banking and mobile banking.

Lagzian (2011) conducted a study entitled "evaluation of the success of Ferdousi university of Mashhad financial information system using the modified model Delone and MacLean". The findings suggest that the predictive quality of the financial information of the operating system is suitable for the use and satisfaction of users. The information system quality is negatively correlated with the individual effects. Quality information system is also directly related to the satisfaction of the users of the system, but there was no correlation between the quality of data and users.

**Conceptual Model of Research**

This model is based on external variables presented in Delone and Maclean, including information quality, service quality and system quality, and perceived usefulness, perceived ease of use and intention to use



**Figure 1: The conceptual model of research (Pai and Huang, 2011)**

**MATERIALS AND METHODS**

**Methodology**

The research was descriptive-comparative. The population of this study consisted in customers of Mellat Bank, Gorgan who use the bank's online services. Since the number of Internet customers of Gorgan branches was 12000, the sample size was randomly selected 375 individuals using by Krejcie & Morgan Table (Gorgi, 2010). Independent variables were information quality, system quality, service quality. Independent variable were information quality, system quality, service quality, and perceived usefulness, perceived ease of use, mediating variables and intention use were considered as the dependent variables. Data collection was performed by using Pai and Huang Questionnaire (2011). Pai and Huang designed a standard questionnaire containing 12 questions with cooperation of 15 experts. The Likert questionnaire has been used as the most widely used measure of the range considered in the design. The questionnaire was divided into 6 sections that measure the scale of information quality, service quality, system quality, perceived usefulness, perceived ease of use and intention to use. This survey was conducted based on questionnaire. So, questions of questionnaire were developed according to research hypothesis and confirmed by supervisor and co-supervisor.

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Cronbach's alpha was used to determine reliability. The Cronbach's alpha for the total scale was equal to 0.87 that the reliability was desired.

Also, The obtained alpha coefficient was varied between 0.72 to 0.85 for the subscale of information quality, service quality, system quality, perceived usefulness, perceived ease of use and. In this study, according to the research model, variables of data quality, quality of service and quality of were independent latent variables, intention to use was dependent latent variables and that are the dimensions shown in Vakentash and Davis updated technology model (Pai and Huang, 2011).

In this model, three variables, information quality, system quality, service quality, considered as the independent variable and two variables of perceived usefulness, perceived ease of use, mediating variables and intention use were the dependent variables. In this research, in addition to review research literature comprehensive, the comments of costumers were evaluated based on proposed model in order to finding out the factors effective on intention of use from internet banking system by users.

Perceived usefulness and perceived ease of use were considered as mediator variable. Data analysis was performed by structural equation modeling, including regression analysis, analysis of covariance or correlation matrix. All analyzes were performed at the level of  $p \leq 0.05$ .

## **RESULTS AND DISCUSSION**

### **Results**

Table 1 shows the mean and standard deviation scores of the participants in each variable. The correlation between the researches variables are presented in Table 2. It can be seen that the internet banking system factors were positively correlated with each other and the relationship was between 0.290 and 0.552.

The results of fit goodness indices of the structural model are summarized in Table 3 which demonstrated model fitness, because the amount of RMSEA less than 0.08 indicates an acceptable fit of the structural model. The values of CFI, GFI, AGFI, NFI, NNFI were all more than 0.9.

In order to understand the better relationships and the impact on other variables, path analysis was conducted using structural equation modeling.

The findings of the analysis demonstrated the results and findings of the correlation coefficients for research objectives. The following table shows the path coefficients and the significance of the variables. The following table shows the path coefficients between the variables. The result in Table (4) revealed that the path coefficients for each of the seven relation was obtained significant in 0.05 ( $t > 1.96$  and  $t < -1.96$ ).

Tables briefly indicated that the path coefficient was the relationship between information quality and perceived usefulness (0.40). T-statistic for the coefficient was 6.64 and it was higher than the significant threshold (1.96). Therefore, the positive and significant effect of quality information was confirmed on perceived usefulness. Path coefficient was obtained 0.21 between service quality and perceived usefulness (0.44).

T-statistic was 4.92 it can concluded that the obtained coefficients were significant. In fact, the quality of service has positive and significant effect on perceived ease of use. Path coefficient for the relationship between quality and perceived ease of use was obtained 0.44. T-statistic for the coefficient was 4.80, it can be concluded that the quality system has positive and significant effect on perceived ease of use.

Path coefficient of relationship between perceived ease of use and perceived usefulness was 0.31.

T-statistic for the coefficient was 3.20. So, there was positive and significant effect on perceived usefulness and perceived ease of use. The path coefficient was 0.20 for the relationship between perceived usefulness and intention to use. T-statistic for the coefficient was 2.48. In other words, perceived usefulness has a positive effect on intention to use. The path coefficient was 0.58 between perceived ease of use and intention to use. As far as, the t-value was 6.22 for this coefficient, it can be concluded that the obtained coefficient was significant. It can be concluded that there was significant effect between perceived ease of use and the use intention.

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**Table 1: Descriptive statistic of research variables**

Variable	Mean		Std. Deviation		Variance
	Statistic	Std. Error	Statistic		Statistic
Information quality	4.3419	0.03448	0.62538		0.391
Services quality	4.5213	0.03482	0.63161		0.399
System quality	4.3131	0.03707	0.67230		0.452
Perceived usefulness	4.6748	0.03107	0.56364		0.318
Perceived ease of use	4.4894	0.03440	0.62399		0.389
Usage intention	4.6702	0.03126	0.56705		0.322

**Table 2: Correlation matrix between research variables**

		IQ	SEQ	SYQ	PU	PEU	IU
IQ	Pearson Correlation	1					
SEQ	Pearson Correlation	0.290**	1				
SYQ	Pearson Correlation	0.298**	0.478**	1			
PU	Pearson Correlation	0.479**	0.482**	0.346**	1		
PEU	Pearson Correlation	0.293**	0.552**	0.531**	0.473**	1	
IU	Pearson Correlation	0.207**	0.345**	0.342**	0.422**	0.550**	1

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

**Table 3: Results of investigating fit goodness of the structural model**

Fitness index	Acceptable range	Amount	Result
$\frac{\chi^2}{df}$ (chi-square relative to its degree of freedom)	3<	2.11	Appropriate
CFI (Comparative Fit Index)	0.9>	0.95	Appropriate
GFI (The goodness of fit index)	0.9>	0.96	Appropriate
AGFI (The adjusted goodness of fit index)	0.9>	0.95	Appropriate
NFI (Normed fit index)	0.9>	0.98	Appropriate
NNFI (Non-normed Fit Index )	0.9>	0.98	Appropriate
RMSEA (Root Mean Square Error of Approximation )	0.08<	0.053	Appropriate

**Table 4: Results of the direct relationship and significant coefficients of model hypothesis**

Path	Sign	Path Coefficient	Sig.	Test result
Information quality--- perceived usefulness	PU---IQ	0.40	6.64	Accept
Services quality---Perceived ease of use	PU --- SEQ	0.21	2.28	Accept
Services quality--- perceived usefulness	PEU --- SEQ	0.44	4.92	Accept
System quality---Perceived ease of use	PEU --- SYQ	0.44	4.80	Accept
Perceived ease of use---perceived usefulness	PU---PEU	0.31	3.20	Accept
perceived usefulness---use intention	IU --- PU	0.20	2.48	Accept
Perceived ease of use--- use intention	IU --- PEU	0.58	6.22	Accept

**Conclusion**

The purpose of this study was using integrated model for evaluating the success of internet banking based on technology acceptance model and the success evaluation model of Delone and Maclean, a Case Study of Internet Banking Customers, Mellat Bank, city of Gorgan, Iran. The results showed that the quality of



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information had a positive effect on perceived usefulness. This result was consistent with results of previous studies. Delone and Maclean (2003) developed information system success based on technology acceptance model. They believed that users' behavioral intention in information system was effective of perceived usefulness and individual view to the system. When users have more positive attitudes about data quality, data replication will increase the perceived usefulness. As a result of this work has been asserted in time introduced and Internet banking systems, the following aspects should be emphasized: the availability of sufficient information on the availability of suitable design for the interface and ensure updating of the updated information on the system.

Therefore, banks should not only consider the factors influencing the course and delivery system, but also, they must continuously improve the quality of its services. All of these cases affect feelings and perceptions users to information systems. Through continuous improvement of quality of service, the system will be able to reach their full potential and performance. The results of present study showed that users of the system had a positive effect on perceived ease of use.

They concluded that the quality system had a significant relationship with perceived ease of use. They included that quality system had significant relation with perceived ease of use. Their system quality is called the design quality, time response and availability. The quality of the design is the role of system query and file transfer speed. Online response time means that any reaction how much has been done so quickly and how long it lasted. Accessibility refers to the fact that whether the hardware and software are available from the website or not. Based on the above analysis, how the user be more satisfied from system quality, the ease of use it will be better understood and therefore more attention should be focused on stabilizing internet banking system, the information provided replication of the flexibility of the information in order to improve the ease of ability integration use of the system among users.

Perceived usefulness and perceived ease of use has a significant impact on the intention of users. These results suggest that the use of management information system can improve performance, productivity and effectiveness for these users. In contrast, the frequency and the frequency of using system will increase by users. These results demonstrated a positive relation and perceived usefulness and intention to use it by users. In addition, these results suggest that perceived ease of use has a positive and significant impact on the perceived usefulness. Finally, the intention of the system user has a direct and positive effect of perceived usefulness and perceived ease of use that define the absolute importance of perceived ease of use. In introducing time and presenting Internet banking system are required users to be encouraged to use the system by simplifying procedures and operating system interface and the ease of learning. In the present study, the success of information systems and technology acceptance model is united in order to define and determine the technology acceptance theory for Internet banking system. Although, there are several factors that can affect the structure of information system, there are varieties of limitation which can effect on information system success model structure. For example, the response speed can affect the quality of services.

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