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Presenting a Learning Model for Mobile Payments in the Bank

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ABSTRACT

In This paper, A learning model was defined for mobile payment in Persian Bank. Thus, based on the learning organization definitions, Searching different sources and interviews with experts in this field, 2 main factor of use of m- payment, perceived usefulness and ease of use were extracted.
Each of these variables, are calculated by number of measurable indicators. A questionnaire were prepared and filled by 76 experts, and analyzed using the PLS method.
Based on our results, the intention of being helpful and easy to use with its mobile payments, there is a significant relationship. Also based on the results, the perceived usefulness has the greatest impact on the intended use of mobile payments.
KEY WORDS: bank – PLS- mobile payment - organizational learning

1- INTRODUCTION

The rapid expansion of technology transfer in the context of mobile, and new services, such as GPRS, has transform Mobile Communications areas and consequently, provided opportunities and new challenges for financial institutions and credit of paid services (Changsu Kim a,2009).

Mobile payment, is an alternative method for paying bills of goods and services. It uses mobile devices and wireless communication technologies (Kim et al, 2009). Mobile devices can be utilized in a variety of payments. Mobile sets allow the users to connect to a server, perform authentication and authorization, make a mobile payment and subsequently confirm the completed transaction. (Antovski & Gusev 2003).

Mobile commerce involves the sale of goods, services, and contents via wireless devices, without time or space limitations (Au & Kauffman, 2008; Mallat, 2007). As mobile commerce increases in popularity, mobile payment will continue to facilitate secure electronic commercial transactions between organizations or individuals (Ondrus & Pigneur, 2006). In this study, mobile payment or mpayment is defined as any payment in which a mobile device is utilized to initiate, authorize, and confirm a commercial transaction (Au & Kauffman, 2008).

In this paper seeks to identify important factors influencing the user of this system, these factors using library studies and interviews with experts in the field of mobile commerce will be identified.

2. LITERATURE REVIEW

- **organizational learning**

Fyvl Vlylz (1985), has been defined Organizational learning as a process of improving actions through better knowledge and understanding.

Levitt and March (1988), believes that organizations with transforming the behavior of past experiences to the everyday activities, are assumed as a Learning organization.

According to Astata's view (1989) organizational learning through the views, knowledge and mental models and based on past experiences are formed.

Huber (1991), when a an institution learns that the scope of its behavior, through information processing change.

Such scattered deep in the organizational learning literature, prompted experts to develop a framework for their integration. However, However, even these efforts will also lead to more complexity. To explain further, Haber (1991) to integrate multiple views of organizational learning uses persuasion process in his theoretical framework. And Aystrbay - Smith (1997) in their theoretical framework are emphasized on different theoretical principles.
It is clear that many of these efforts in achieving its main objective, the development of an integrated and comprehensive perspective on organizational learning have failed.

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- **Mobile payments**

A mobile payment service comprises all technologies offered to the user to carry out payment transactions. A number of technology solutions have been proposed to improve cost, functionalities, scalability and security (Manvi, Bhajantri, & Vijayakumar, 2009; Massoth & Bingel, 2009; Mohammadi & Jahanshahi, 2008).

Payments fall broadly into two categories; payments for purchases and payments of bills (Karnouskos & Fokus, 2004). In payments for purchases, mobile payments compete with or complement cash, checks, credit cards, and debit cards. In payments of bills, mobile payments typically provide access to account-based payments, including money transfers, online banking payments, or direct debit assignments.

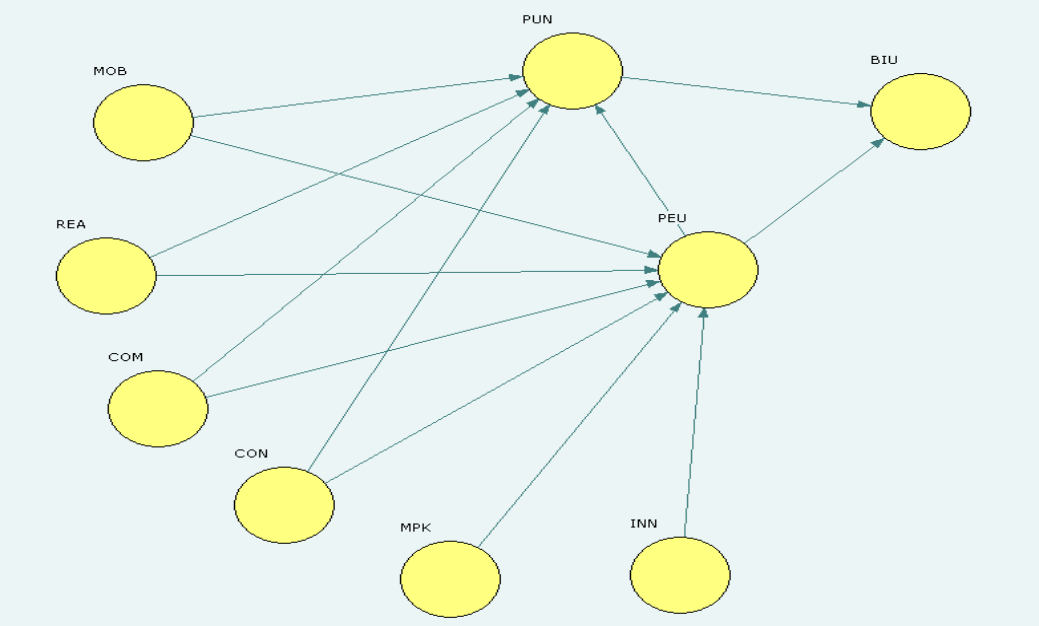
Several studies have been done in this regard, however,the previous studies tend to overlook the system characteristics and individual differences specially pertaining to mobile payment. More research is required to determine whether these factors influence the intention to use mobile payment.

Overall, the above-mentioned theoretical models have contributed to our understanding of user acceptance factors and behavior. However, there is still a need for further studies in mobile payment users' behavior. While UTAUT is a good candidate for our study, we believe that the extension of TAM serves our research purposes better than UTAUT. The constructs used in our model (i.e., individual differences and system characteristics) are more specific than the generalized constructs used in UTAUT. We posit that systems

characteristics and individual differences affect users' perception of m-payment. To investigate individual differences in detail, two factors, personal innovativeness and mobile payment knowledge, were identified. Along with these two factors related to individual differences, we also identified four system characteristics (mobility, reachability, compatibility, and convenience).

1. **Factors affecting the use of mobile payments (identified through library research and interviews)**

With different sources and interviews with scholars and experts in the field of mobile payments, two main factors, the use of m-payment, perceived usefulness and ease of use were extracted. Perceived usefulness and ease of use-dependent properties of mobile payment systems also are related to individual differences and characteristics of mobile payment systems.



- INN: INNOVATIVENESS
- MPK: M-PAYMENT KNOLEDGE
- MO : MOBILITY
- REA: REACHABILITY
- COM : COMPATIBILITY
- CON: CONVENIENCE
- PEU: PERCEIVED EASE OF USE
- PUN : PERCIEVED USEFULNESS
- BIU : BEHAVIOR INTENTION TO USE

The purpose of this paper reviews the relationship between these variables for this purpose, 13 hypothesis is defined as follows:

1. There is a significant relationship between MOBILITY and PERCEIVED EASE OF USE.
2. There is a significant relationship between REACHABILITY and PERCEIVED EASE OF USE.
3. There is a significant relationship between COMPATIBILITY and PERCEIVED EASE OF USE.
4. There is not a significant relationship between CONVENIENCE and PERCEIVED EASE OF USE.
5. There is a significant relationship between INNOVATIVENESS and PERCEIVED EASE OF USE.
6. There is not a significant relationship between M-PAYMENT KNOLEDGE and PERCEIVED EASE OF USE.
7. There is a significant relationship between PERCIEVED USEFULNESS and PERCEIVED EASE OF USE.
8. There is not a significant relationship between MOBILITY and PERCIEVED USEFULNESS.
9. There is a significant relationship between REACHABILITY and PERCIEVED USEFULNESS.
10. There is a significant relationship between COMPATIBILITY and PERCIEVED USEFULNESS.
11. There is a significant relationship between CONVENIENCE and PERCIEVED USEFULNESS.
12. There is a significant relationship between BEHAVIOR INTENTION TO USE and PERCIEVED USEFULNESS.
13. There is a significant relationship between BEHAVIOR INTENTION TO USE and PERCEIVED EASE OF USE.

answers to questionnaires filled out by 76 expert (from 85 questionnaires distributed, 76 questionnaires were returned).

In this section, with respect to the model, presented in the previous section, the model has been estimated and its validity was examined using PLS Path Modeling Technique.

After extracting the answers, manifest variables were normalized as follows:

The original items Yi, scaled from 1 to 5, are transformed into new normalized variables

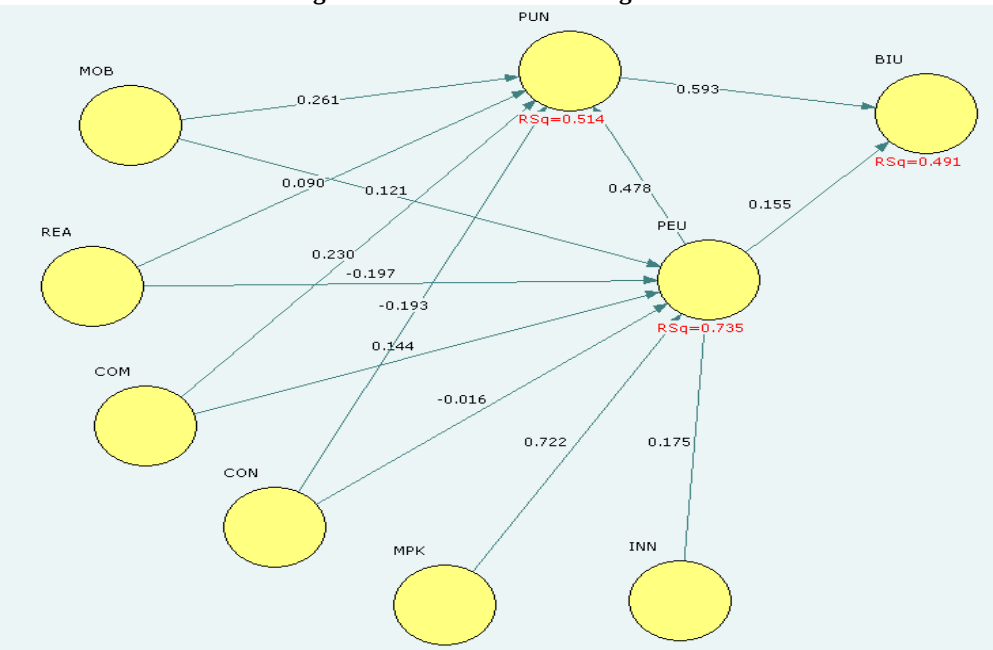
$$X_i - \frac{100}{4}(Y_i - 1).$$

The minimum possible value of X_i is 0 and its maximum possible value is equal to 100. If there are missing data for variable X_i, they are replaced by the mean of this variable.]

4- **RESULT**

After specifying the relationship between the variables of the model, using PLS Path Modeling Technique, all the coefficients and parameters were estimated. For this purpose, VPLS 1.04 software was used to estimate the relationship between the latent variables of the problem.

Figure 2- estimated model using VPLS



A PLS path model consists of a structural model and a measurement model. Then, the validation of a PLS path model requires the analysis and interpretation of both the structural and the measurement model. This validation can be considered as a two-stage process: the assessment of the measurement model, and the assessment of the structural model. (Henseler et al,2009).

3-1- Assessing the Structural Model

According to Chin's theory, R^2, that is just measured for endogenous variables and shows the variance of endogenous latent variables, can be interpreted as noticeable, average and weak for values of 0.67, 0.67-0.33 and less that 0.19 respectively. Also, in a specific model including endogenous latent variables with only one or two exogenous latent variable(s), average amount of R^2 is acceptable (Trujillo, 2009). In this study, R^2 value is equal to 0.74, Therefore, R^2 value of the model is acceptable, (Trujillo, 2009).

Table (1) R^2 of Model

Variance Explained and Predictive Relevance	
Dependent Variable	**R square**
PEU	0.735300
PUN	0.513700
BIU	0.490500

Also, average Redundancy of the model was estimated to be 0.28. High redundancy means high ability to predict(Trujillo, 2009).

3-2- Assessing Measurement Models

In this section, we must evaluate three aspects of reflective measures

3-2-1- Unidimensionality of the indicators

Some recent tools have been proposed to evaluate unidimensionality of PLS-PM reflective blocks (Sahmer et al, 2005), but the most common methods employed for this purpose are the following three indicators:

- Check the first eigenvalue of the MVs correlation matrix
- Calculate the Cronbach's alpha
- Calculate the Dillon-Goldstein's

In this paper, Unidimensionality of the indicators was measured using Cronbach's alpha coefficient. If the coefficient is more than 0.7 the reliability of the model is high and if the coefficient is smaller than 0.6, the model has low reliability (Henseler et al, 2009). Although Cronbach's alpha coefficient for PRO is less than 0.6, but the average of Cronbach's α coefficients of the model is more than 0.7, showing that the reliability of the model is confirmed in general.

Table (2) Cronbach's alpha of Model

Reliability and AVE	
Construct	Cronbach Alpha
INN	0.777196
MPK	0.686694
MOB	0.787090
REA	0.900739
COM	0.726490
CON	0.735025
PEU	0.676565
PUN	0.370195
BIU	0.515659

3-2-2- Check that indicators are well explained by its latent variable

In this case, We check it by means of three tools:

- Communality

Communality is calculated with the purpose to check that indicators in a block are well explained by its latent variable (Trujillo, 2009). In this research, The mean communality of the model, was estimated 0.5046 which is the average of all the block communalities.

- Composite Reliability

Composite Reliability is the criterion of the model reliability. For this criterion, value less than 0.6, indicating a lack of reliability (Henseler et al, 2009).
The value of this criterion in this study is more than 0.6, which shows the high reliability of the model.

Table (3) Composite Reliability of Model

Construct	Composite Reliability
INN	0.870678
MPK	0.812969
MOB	0.879896
REA	0.937546
COM	0.843240
CON	0.827439
PEU	0.800344
PUN	0.699430
BIU	0.728596

- AVE[1]

To calculate the convergent validity, Fornell and Larcker suggested AVE. AVE should be larger than 0.50 which means that 50% or more variance of the indicators should be accounted for (Henseler et al, 2009).
The AVE of the model is much more than 0.5; so the convergent validity of the model is confirmed.

Table (4)AVE of Model

Construct	AVE
INN	0.692279
MPK	0.522845
MOB	0.709494
REA	0.833469
COM	0.641970
CON	0.553329
PEU	0.448450
PUN	0.452225
BIU	0.455697

3-2-3- Assess the degree to which a given construct is different from other constructs

We evaluate the extent to which a given construct differentiates from the others. This is done by verifying that the shared variance between a construct and its indicators is larger than the shared variance with other constructs. In other words, no indicator should load higher on another construct than it does on the construct it intends to measure. We calculate the correlations between a construct and other indicator besides its own block. If an indicator loads higher with other constructs than the one it is intended to measure, we might consider its appropriateness because it is not clear which construct or constructs it is actually reflecting (Henseler et al, 2009).

[1] AverageVariance Extracted

Table 5- Correlation of Manifest and Latent Variables of the Model

Factor Structure Matrix of Loadings and Cross-Loadings									
Scale Items	**INN**	**MPK**	**MOB**	**REA**	**COM**	**CON**	**PEU**	**PUN**	**BIU**
INN1	**0.8231**	0.4224	0.2885	0.2477	0.2649	0.5060	0.3850	0.3184	0.2480
INN2	**0.8850**	0.4004	0.3424	0.3018	0.3624	0.4960	0.5443	0.5309	0.6093
INN3	**0.7850**	0.3938	0.5034	0.4967	0.2813	0.3094	0.3965	0.3744	0.4704
MPK1	0.5550	**0.6675**	0.4277	0.4103	0.5393	0.5588	0.5594	0.4657	0.5413
MPK2	0.4641	**0.6423**	0.0983	0.3360	0.2005	0.3396	0.4524	0.3169	0.2896
MPK3	0.2651	**0.7885**	0.2436	0.2125	0.0466	0.0233	0.6445	0.3839	0.2282
MPK4	0.1953	**0.7820**	0.2437	0.1822	0.2350	0.1771	0.6804	0.4191	0.1618
MOB1	0.3486	0.2320	**0.8537**	0.3987	0.3975	0.3222	0.3431	0.5188	0.4867
MOB2	0.4276	0.3575	**0.8372**	0.5463	0.2995	0.4186	0.3138	0.3201	0.5382
MOB3	0.3693	0.3355	**0.8359**	0.7578	0.1529	0.2646	0.2742	0.3925	0.3863
REA1	0.3842	0.3256	0.6972	**0.9020**	0.3293	0.4141	0.2067	0.4160	0.3621
REA2	0.3668	0.3264	0.6147	**0.9303**	0.2238	0.3483	0.1998	0.2971	0.2021
REA3	0.3721	0.3776	0.4749	**0.9063**	0.2411	0.3120	0.3083	0.3060	0.1200
COM1	0.2919	0.2225	0.2475	0.2868	**0.8011**	0.4979	0.2015	0.3049	0.2607
COM2	0.2966	0.3084	0.3232	0.1947	**0.8003**	0.5073	0.4262	0.3596	0.4159
COM3	0.2997	0.2722	0.2530	0.2453	**0.8023**	0.3876	0.3571	0.3816	0.4482
CON1	0.5090	0.2946	0.1227	0.3110	0.3692	**0.5173**	0.1764	0.1538	0.2586
CON2	0.3101	0.2625	0.3669	0.3509	0.4128	**0.7259**	0.2623	0.0578	0.0513
CON3	0.3930	0.2070	0.3222	0.1802	0.5269	**0.8665**	0.3933	0.3023	0.2938
CON4	0.4209	0.3580	0.3475	0.4505	0.3766	**0.8173**	0.2491	0.1837	0.1682
PEU1	0.3005	0.7432	0.1017	0.2678	0.2340	0.1329	**0.6767**	0.3053	0.2040
PEU2	0.3733	0.5679	0.3847	0.3306	0.2632	0.2681	**0.6691**	0.4938	0.2390
PEU3	0.3052	0.2573	0.4575	0.1694	0.4431	0.3242	**0.5178**	0.3847	0.4552
PEU4	0.3884	0.5458	0.2061	0.0664	0.1783	0.2015	**0.7514**	0.5053	0.4219
PEU5	0.4323	0.6019	0.1360	0.0762	0.3516	0.3632	**0.7098**	0.3879	0.4326
PUN1	0.3422	0.4291	0.1244	0.1944	0.1354	0.1243	0.4448	**0.5316**	0.3058
PUN2	0.4738	0.4624	0.4362	0.3234	0.4077	0.2121	0.5323	**0.8856**	0.7106
PUN3	0.1355	0.1993	0.4379	0.2327	0.3099	0.1963	0.2551	**0.5383**	0.2269
BIU1	0.4139	0.4110	0.1300	0.1409	0.3588	0.1993	0.4157	0.4341	**0.5800**
BIU2	-0.0221	0.0575	0.3436	0.1291	0.1654	0.1870	0.1115	0.0981	**0.1237**
BIU3	0.5250	0.3433	0.5013	0.2238	0.3469	0.2566	0.4590	0.5910	**0.8902**
BIU4	0.3597	0.2053	0.5618	0.2016	0.4077	0.1507	0.3396	0.5625	**0.8238**

On the other hand, regarding that the weight of the manifest variables of the model are all positive, all measurement indicators have explained their own Latent variable correctly.

4- Conclusion and Discussion

After verifying the validity and reliability of models, the relationship between the variables in this model has been studied. Based on the results of model, t statistic is calculated for the relationship between variables. If the t statistic estimated at 95% significance level is up to of 1.96, the relationship between two variables is approved and if it's less than 1.96, the hypothesis is rejected at the 95% confidence level.

Table 6- t test

	2.Structure Model		T-statistics
1	,	INN->PEU	3.6909
2	,	MPK->PEU	9.2679
3	,	MOB->PEU	2.1950
4	,	REA->PEU	-1.8293
5	,	COM->PEU	2.7630
6	,	CON->PEU	-0.2328
7	,	CON->PUN	-1.6181
8	,	COM->PUN	0.6455
9	,	REA->PUN	3.8649
10	,	MOB->PUN	2.7751
11	,	PEU->PUN	3.4885
12	,	PUN->BIU	4.8396
13	,	PEU->BIU	1.9844

Considering that the t statistic associated with hypothesis 4, 6 and 8 are less than 1.96, therefore, the hypotheses is rejected and other hypotheses are confirmed. So about relationships between variables can be said**:**

14. There is a significant relationship between MOBILITY and PERCEIVED EASE OF USE.
15. There is a significant relationship between REACHABILITY and PERCEIVED EASE OF USE.
16. There is a significant relationship between COMPATIBILITY and PERCEIVED EASE OF USE.
17. There is not a significant relationship between CONVENIENCE and PERCEIVED EASE OF USE.
18. There is a significant relationship between INNOVATIVENESS and PERCEIVED EASE OF USE.
19. There is not a significant relationship between M-PAYMENT KNOLEDGE and PERCEIVED EASE OF USE.
20. There is a significant relationship between PERCIEVED USEFULNESS and PERCEIVED EASE OF USE.
21. There is not a significant relationship between MOBILITY and PERCIEVED USEFULNESS.
22. There is a significant relationship between REACHABILITY and PERCIEVED USEFULNESS.
23. There is a significant relationship between COMPATIBILITY and PERCIEVED USEFULNESS.
24. There is a significant relationship between CONVENIENCE and PERCIEVED USEFULNESS.
25. There is a significant relationship between BEHAVIOR INTENTION TO USE and PERCIEVED USEFULNESS.
26. There is a significant relationship between BEHAVIOR INTENTION TO USE and PERCEIVED EASE OF USE.

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