

Construction of Mobile Banking Satisfaction Model through Factor Analysis and Multiple Regression Analysis

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Abstract. This study examines influential factors that practical use degree gets to user's satisfaction about rising mobile banking at the present. And when these influential factors have interrelation, after examine closely whether change of influential factors makes effect that is some in satisfaction, forecasted the relative importance of influential factors affecting in mobile banking satisfaction. To analyze this, conducted first factor analysis because relative availability about mobile banking investigates questionnaire to 20s to 30s 177 people, and takes advantage of factor point that calculate and conducted multiple regression analysis.

Keywords: Mobile Banking, Satisfaction, Factor Analysis, Factor Point, Multiple Regression Analysis

1 Introduction

Due to the dissemination of smartphones, the number of mobile banking users is steadily increasing. Mobile banking usage rate for 20-30s is on the rise, and 93% of this age group use it at least once a month. Thus, financial institutions such as banks and credit card companies are developing and quickly providing various smartphone OS versions -including the iphone, android, window mobile- of the services provided through existing mobile or internet banking.

Following this trend, the very first mobile banking service in Korea was offered in November 1999, and by April 2000 most banks had implemented the WAP (Wireless Application Protocol) method mobile banking services. The IC chip in September 2003, the VM in April 2007 was introduced, and since December of 2009 smartphone banking is spreading at a very fast rate, and banks are responding competitively.

Thus, this study has derived 24 variables related to user satisfaction regarding domestic mobile banking provided during the past 10 years, and based on user survey concentrated their satisfaction rate to a few factors through factor analysis. Moreover, using the factor points drawn from factor analysis, Multiple Regression Analysis that analyzes the importance including relevance between overall satisfaction rate of users and the degree of mobile banking usage was conducted. Consequently, this study

attempts to draw mobile banking user satisfaction per factor and contribute to policies to future mobile banking services improvements by predicting importance among these factors.

2 Measurement and Research Design

In order to carry out an evaluation of satisfaction of mobile banking on people in their 20-30s who mostly have easy accessibility and usage of mobile banking, a list of measurements utilizing the 5 point Likert Scale that has mobile banking satisfaction level-related questions was developed, verified construct validity to determine whether these measurements may be collected into a few factors through data collection and analysis process, and then based on this formed a survey that can forecast how each concepts as the independent variable affects the dependent variable(overall satisfaction level). The survey is as follows. All questions are closed-ended. Using the 5 point Likert Scale, each assessment item is comprised of 1 very unsatisfied, 2 unsatisfied, 3 neutral, 4 satisfied, and 5 very satisfied.

The questionnaire for factor analysis includes that variable's 1 enough recognition regarding services, 2 active marketing, 3 delivery of utility, 4 separately conducted user training, 5 incentive program, 6 unlimited operating hours, 7 convenience of registration process, 8 convenience of transaction method, 9 site accessibility, 10 convenience of search method, 11 simplicity of device manipulation, 12 strengthened security, 13 necessity of private information protection, 14 transaction details confidentiality, 15 establishment of a secure transaction system, 16 fast connection, 17 fast processing speed, 18 supply of customized information, 19 necessity of providing customized service and information, 20 implementation of personal finance services, 21 ATM location positioning, 22 mobile payment system, 23 credit and cash card mobile integration, 24 mileage and point card integration.

Sampled surveys Factor analysis using SPSSWIN 18.0 –for the reliability of measurement scales- was conducted on sampled surveys and applying the produced factor points, Multiple Regression Analysis was conducted.

3 Factor Analysis Result and Discussion

3.1 Reliability Analysis and Factor Analysis Result

For factor analysis on survey questions, measurement targets were repeatedly measured at regular time intervals and to figure out the degree of consistency among measured values reliability analysis was conducted. Typically, Cronbach's α value is used to measure whether items have similar values, and therefore reliability.

Cronbach's α value is between 0 and 1, and generally speaking, if it is more than 0.6, reliability is high. Here, α value of the 24 survey questions are above 0.6, and the existing Alpha value is 0.771, and because all have Alpha value smaller than this value except for certain items, these variables are used, not excluded. Hence, it can be said that all variables have high reliability and all items may be integrated into one scale and be used for analysis.

Table 1. Item-total Statistics

Survey Questions	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation(R ²)	Alpha if Item Deleted(α)
x1.	97.89	60.778	.178	.371	.770
x2.	97.81	58.111	.407	.537	.759
x3.	97.87	59.591	.236	.519	.768
x4	98.40	55.479	.409	.475	.757
x5.	98.21	58.351	.286	.295	.765
x6.	97.67	62.587	.004	.282	.778
x7.	97.97	59.619	.199	.317	.771
x8.	97.81	59.789	.225	.418	.768
x9.	97.79	60.454	.179	.456	.771
x10.	97.89	57.908	.382	.558	.760
x11.	97.95	58.884	.362	.800	.762
x12.	97.65	57.502	.372	.821	.760
x13	97.62	58.602	.288	.825	.765
x14	97.87	58.375	.280	.651	.766
x15	97.93	20.909	.103	.341	.776
x16	98.03	58.664	.348	.603	.762
x17	97.99	57.966	.391	.735	.759
x18	98.31	56.102	.438	.692	.755
x19	98.42	56.905	.497	.696	.754
x20	98.61	55.432	.462	.580	.753
x21	98.46	58.022	.369	.479	.760
x22	98.21	58.351	.357	.464	.761
x23	98.55	57.147	.368	.640	.760
x24	98.50	58.240	.244	.627	.769
N of Cases = 177 N of Variables = 24 Alpha = .771					

The determinant of the correlation matrix, which indicates correlation among variables, is 7.31E-006. Since for a significance level of 5%, correlation coefficient

cannot be accepted if the significance probability is bigger than .05, the null hypothesis that correlation is '0' cannot be rejected.

The Varimax rotation method, which conducts not rotated factor analysis and minimizes variables of high loading regarding each factor, was used as factor extraction method.

If you see the element matrix of factor loading value for each item on mobile banking satisfaction level and rotation results from thrice repeated calculations by principal component analysis and Varimax method, survey questions x13, x12, x14, x15 can be grouped into factor 1, factor 2 is x20, x19, x21, x18, x4, factor 3 is x11, x16, x17, factor 4 is x24, x23, x3, factor 5 is x8, x9, x10, factor 6 is x7, x6, x5, factor 7 is x1, x2, x22, and each can be grouped into common categories of 'information as well as privacy security', 'customer service management', 'speedy processing procedure', 'card use utility', 'usability', 'convenience of joining', 'need for marketing'. Consequently, after mobile banking user satisfaction level survey and factor analysis, commonality of variables belonging to each factor were determined and 7 factors were extracted concerning mobile banking satisfaction. How these factors affect the general level of satisfaction should be figured out and taken into consideration for increasing the satisfaction level.

4 Multiple Regression Analysis Result and Discussion

The Multiple Regression Analysis result of relevance test between overall satisfaction and mobile banking is as table 2.

Table 2. Total Variance Explained

Mobile Banking	Factor Satisfaction	R Square	F	Sig.	B	t	Sig.	Research Hypotheses
Total Satisfaction	(Constant)				4.056	48.061	.000	-
	Information and secret security				.582	6.878	.000	Accept
	Customer service management				.162	1.973	.050	Reject
	Rapid procedure	.298	10.235	.000	.211	2.490	.014	Accept
	Usefulness of using card				.003	.034	.973	Reject
	Use convenience				.210	2.486	.014	Accept
	Subscribe convenience				-.065	-.762	.447	Reject
	Marketing necessity				.232	2.736	.007	Accept

Level of satisfaction and information as well as privacy security correlation coefficient is .443, with .000 significance probability, and correlation exists between these two variables at .05 significance level. In addition, correlation coefficients among independent variables are .000, significance probability values are .500,

correlation does not exist among each independent variables at .05 significance level, and the issue of multicollinearity among independent variables was resolved.

Information as well as privacy security, speedy processing procedure, usability, need for marketing demonstrate significantly high relevance to overall satisfaction level of mobile banking. Hence, it can be predicted that mobile banking satisfaction can be increased through these factors. In particular, information as well as privacy security has the highest impact, followed by need for marketing, speedy processing procedure, usability in order of impact.

5 Conclusion

Through the above analysis steps, this study extracted several satisfaction factors needed for a more satisfying utilization of mobile banking for both users and service providers. The 7 extracted factors are 'information as well as privacy security', 'customer service management', 'speedy processing procedure', 'card use utility', 'usability', 'convenience of joining', 'need for marketing'.

Furthermore, the impact on user satisfaction level (the dependent variable) was predicted according to degree of importance by utilizing these factors, Four significant factors were determined out of them all, and analysis indicated that in terms of general satisfaction, information as well as privacy security first and foremost has the highest impact, followed by marketing necessity, speedy processing procedure, usability. Such research results will prove to be very useful for mobile banking service users as well as providers, and is expected to contribute much to further developments in mobile banking.

References

1. Dong-Il Tak, Study on Satisfaction Determinant Factor of Mobile Banking Service Users Using Smart Phone, *Journal of Finance & Knowledge Studies*, Vol.12, No.2, pp.253-275. (2014)
2. Kim, Jinbaek, Research Issues in Mobile Banking in the Smart Phone Era: Korean Case and Literature Survey. *Entrue Journal of Information Technology*, Vol.10, No.2, pp. 223--235 (2011)
3. Luarn, P., Lin, H., Toward an understanding of the behavioral intention to use mobile banking, *Computers in Human Behavior*, Vol.2, pp.873-891. (2005)
4. Morawczynski, O., Miscione, G., Examining trust in mobile banking transactions: The case of MPESA in Kenya, *Social Dimensions Of Information And Communication Technology Policy*, IFIP International Federation for Information Processing, Vol. 282, pp. 287-298. (2008)
5. Nicole Koenig-Lewis, Adrian Palmer, and Alexander Moll. Predicting young consumers' take up mobile banking services, *Informational Journal of banking Marketing*, Vol.28, No.5, pp.410-432. (2010)
6. Sulaiman, A., Jaafar, N. I., Mohezar, S., An overview of mobile banking adoption among the urban community, *International Journal of Mobile Communications*, Vol.5, No.2, pp. 157-168 (2007)