
Security and Privacy Factors Affecting Customers Perception of Electronic Payment System- An Empirical Analysis

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ABSTRACT

It is usually believed that good security improves belief, and that the perceptions of good security and privacy will ultimately increase the use of electronic commerce. In fact, customers' perceptions of the security of electronic payment systems have become a major factor in the evolution of electronic commerce in markets. Primarily, security and privacy factors associated to the payment systems is believed to be the contributing factors to the low adoption rate. Hence, the present research aimed to examine perception related to electronic payment systems security and privacy factors from the view point of bank customers. This study includes both primary and secondary data. To analyze data collected from 300 respondents in Chennai city the factor analysis method is employed. The findings of the study help to provide some suggestions to the service providers in order to improve the electronic payment services.

Keywords: Banking, payment system, security, privacy

INTRODUCTION:

As India is a developing country, the interest is to be growing at an accelerated pace and be more competitive is paramount. In fact, advancement in technology and adoption of technology at micro or macro level of the country is seen as one of the critical success factors to obtain an edge and sustain in the digital economy. From a customer's perspective, technology such as the Internet gives greater value such as convenience, wider selection of products and services at lower prices. One of the technology based services provided by the banks which provide convenience in conducting transactions is the Electronic Payment system. Thus, E-Payment system is considered as one of the crucial support services in the supply chain scale of a digital economy.

Electronic Payment systems:

Electronic payment refers to the transfer of an electronic value of payment from a payer to payee through an electronic payment mechanism which allows customers to remotely access and manages their bank accounts and transactions, executed through an electronic network (Lim et al., 2006; Sumanjeet, 2009). The role of Reserve Bank of India plays a significance role for the development of India's growth in payment and settlement systems. It has been playing the role of a pioneer in making the cash and paper based clearing systems electronically and cashless by

introducing the Electronic Fund Transfer (EFT) system and Electronic clearing services in the 1990s. Another innovation towards the non-cash payment system in Indian banking sector was National Electronic Fund Transfer (NEFT) introduced in the year 2005 which is a more advanced version of Electronic Fund Transfer (EFT). The Real Time Gross Settlement (RTGS) system was introduced for large value funds transfer.

Security and Privacy issues in Electronic Payment System:

Security in payment systems refers to the national and personal information are transformed to a form that its disclosure to other groups is prevented and trust means whether the system is adequately strong not to lost the transactions or the money in case of black outs, server failures and network faults or unprecedented input from the users (S. Mousavi, 2007). McCartney (1997) declared that security influences the customer's attitude towards online transactions. As there is no face-to-face contact in online transactions, a kind of uncertainty in occurs among most of the customer's. Therefore, more security is necessary in online transactions than traditional transactions. According to Ranganathan, C and Ganapathy, S. (2002) security is one of the main concerns in business-to-consumer transaction. Privacy concerns comprise offensive data admittance, data compilation, and unauthorized data usage for online transactions Swaminathan et., al (1999). Therefore, security and privacy are important features in accepting the electronic payment system while lack of security is a great obstacle to accept. Thus security and privacy factors are the principal factors for analysing the customer's perception for electronic payment system.

SIGNIFICANCE OF THE STUDY:

Customer services and customer satisfaction are most important of any system. Information technology has given rise to new innovations in the product designing and their delivery in the banking and finance institutions. The change has been very productive for banks bringing in an increase in productivity and operational efficiency. With customers demanding 'anytime and anywhere' access to their finances and its information, banks have no option but to implement the wireless solutions in device-independent and network-agnostic ways.

STATEMENT OF THE PROBLEM:

The present research work aims to identify the security and privacy issues of technological payment system. Moreover, the study concentrates on analysing the customer perception level on security and privacy issues. The study also helps to bring out the various suggestive measures to banks to improve the customer satisfaction level.

OBJECTIVE OF THE STUDY:

- To study the security and privacy issues of electronic payment system faced by the customers of banks.
- To suggest the remedial measures to the banks to improve security and privacy issues.

LITERATURE REVIEW:

Kalakota and Whinston (1997) in their study explain that stealing money and personal information in the existing payment systems is easy through the Internet. This is mainly due to the availability of card details or payment account details and other personal information provided by the customers through online. This data is sometimes transmitted and used in an unsecured way. **Abrazhevich (2004)** attempted to study the attitudes of customers towards electronic payment systems in Netherland. The researcher explains security factor acts an issue of higher importance for most of the customers where they stop using a payment system if the customers heard about a security breach in the system.

Changsu Kim et al. (2009) examined security and trust issues in the context of E-payment systems of consumer's perception in Korea. The results clearly explain that the role of consumer's perceived security is building the trust of consumers, and there is positive impact of both perceived security and perceived trust on using E-payment system. **Alireza Chavosh, et, al., (2011)** studied the satisfaction of E-payment Services between Degree Holder and Non-Degree Holder Customers in Penang, Malaysia. The researchers identified the two major issues security and privacy concerns while advantages as convenience, cost reduction and time reduction. The study also revealed that most important issue for Non-Degree Holder Customers in using E-payment services is feeling inconvenience, while Degree Holders concerned about security issues.

Rachna and Priyanka Singh (2013) identified the issues and challenges of electronic payment systems. The lack of usability, lack of security, lack of trust, lack of awareness, highly expensive and time consuming are the major issues and challenges faced by consumers. **Maqableh M et al. (2015)** in their study reveals that four factors namely reputation, security, familiarity, and ease of use were found to have a positive effect and the remaining three privacy, size and usefulness were not have similar effects.

LIMITATIONS OF THE STUDY:

This study is conducted in India and as a result the findings are based on the Indian culture and environment. The time and cost limitation also can be consider as another constraint in collecting data for the study. Therefore the population of the study was geographically limited to Chennai city.

RESEARCH METHODOLOGY:

The present research is based on both primary data and secondary data. It analyses the available literature on security and privacy factors of banking technology and its innovative products offered. The research instrument for this study was survey questionnaire and the measurement of Likert's five point scale is used in this study. The questionnaire contained questions which are close-ended and relatively simple to tabulate and analyze. Primary data is collected from the commercial bank customers of the Chennai city in the state of Tamil Nadu. The secondary data is collected through journals, periodicals and websites.

ANALYSIS AND INTERPRETATION:

For the purpose of study the data has been collected from the customers of commercial banks, and the collected data were tabulated and analysed using SPSS 16th version to draw a meaningful conclusion. The reliability of the data as per Cronbach's alpha for the variables is 84.9%. The analysis and interpretation of the study is presented in the below tables.

Table 1: Demographic Profile of the Respondents

		Frequency	Percentage			Frequency	Percentage
Age	Less than 30	119	39.7	Qualification	Matriculate	41	13.7
	31-40	84	28		Graduate	108	36
	41-50	53	17.7		Post graduate	89	29.7
	51-60	30	10		Professional	48	16
	Above 60	14	4.7		Others	14	4.7
	Total	300	100		Total	300	100
Gender	Male	195	65	Marital Status	Single	128	42.7
	Female	105	35		Married	172	57.3
	Total	300	100		Total	300	100

Source: Primary data

From table 1 it is found that the male respondents (65%) are quietly more than female respondents (35%), 39.7% of the respondents are less than 30 years of age, 42.7% of the respondents are single, whereas 36% of the respondents are graduates and 36% of the respondents are post graduates.

Table Showing the Chi-Square test for Gender of the respondents and Security and Privacy factors of Technological payment system

	Chi square value	P value
It is password protected	15.407	.004
I feel technology payment system is secured	7.037	0.071
I accept that it protects my privacy	22.142	.000
Security guidelines are displayed before using technology payment services	23.744	.000

CVV of my card can't be hacked	8.823	.066
OTP is required while making third party payments	17.400	.002
OTP is always required while adding beneficiary	2.494	.476
My PIN can't be hacked while using electronic payment systems	24.655	.000
Whenever something gets automated, I feel that my transaction is secured	14.955	.002
I have a fear of providing personal and sensitive information	12.920	.012
I worry that information I send over the Internet will be seen by other people	8.512	.075
Source: Computed Data *95% level significance		

H_0 - There is no significant association between the gender of the respondents and the security and privacy factors.

It is inferred from the above table that the p-value is less than 0.05 for technological payment system is password protected (.004), protects privacy (.000), Security guidelines are displayed before using technology payment services (.000), OTP is required while making third party payments (.002) and PIN can't be hacked while using electronic payment systems (.002). Hence null hypothesis is rejected and it is concluded that there is significant association between the gender of the respondents and the security and privacy factors.

Factors Analysis pertaining to Technological Payment systems:

An exploratory factor analysis was performed on the 11 variables included in the questionnaire in order to determine the security and privacy issues affecting technological payment system. Principal component analysis with varimax rotation was conducted. The factor loading matrix is presented in the below tables, and also includes tables on KMO and Bartlett's Test, Communalities, Total Variance Explained, Component Matrix and Rotated Component Matrix. The analysis of the data in these tables is presented below.

Table: 4 showing the Table showing KMO and Bartlett's Test and Total Variance explained for Factors of Technological Payment systems to identify Security and Privacy Factors

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.796
Bartlett's Test of Sphericity	Approx. Chi-Square	1509.289
	df	55
	Sig.	.000

From the above table 4 it is found that Kaiser-Meyer-Olkin Measure of Sampling adequacy is 0.796, Bartlett's Test of Sphericity with approximate chi-square value is 1509.28 is statistically significant at 5% level of significance. The KMO statistic indicates that correlations are relatively compact. Bartlett test also signifies that there is relationship between the 11 variables. In this context of the present study, Principal component analysis is performed for the Factors of Technological Payment systems to verify whether it is possible to reduce the variables into few significant variables.

Table 5: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.608	41.892	41.892	4.608	41.892	41.892	3.285	29.86	29.86
2	1.574	14.31	56.202	1.574	14.31	56.202	2.605	23.679	53.539
3	1.165	10.591	66.794	1.165	10.591	66.794	1.458	13.255	66.794
Extraction Method: Principal Component Analysis.									

In the present study, Principal component analysis is performed for the factors of using technological payment systems by customers to verify whether it is possible to reduce the variables into few significant variables. Thus from the above table 5 it is found that before extraction for 11 components is 41.892% of the variance whereas subsequent factors explain small amount of extraction. It is clear that three factors can be extracted. Before rotation factor 1 accounted for considerably more variance than the remaining three (33.133% compared to 1.574%, and 1.165%). However after extraction it accounts for only 29.86% of variance compared to 23.679%, and 13.255% respectively. This implies that 11 variables are reduced into 3 predominant factors with the following variable loadings. The individual variances of these variables are given in the following table.

Table 6: Rotated Component Matrix^a

	Component			Communalities
	1	2	3	
I worry that information I send over the Internet will be seen by other people	0.858			0.759
I accept that it protects my privacy	0.855			0.764
OTP is always required while adding beneficiary	0.760			0.674
My PIN can't be hacked while using electronic payment systems	0.738			0.592

I have a fear of providing personal and sensitive information	0.681			0.476
Security guidelines are displayed before using technology payment services	0.544			0.546
I feel technology payment system is secured		0.866		0.767
It is password protected		0.801		0.790
OTP is required while making third party payments		0.705		0.698
Whenever something gets automated, I feel that my transaction is secured		0.681		0.661
CVV of my card can't be hacked		0.599		0.620

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations

It is understood from the above table that the communalities of 11 variables range from 0.476 to 0.790. This implies the variances of these 11 variables range within the limit of 47.6% to 79% indicating large amount of variance has been extracted by the factor solution. Using varimax orthogonal criterion and by suppressing the factor loadings less than 0.5 the rotated component matrix is obtained and is given in table 6. It is evident that all the variables are highly loaded in the 3 components. In other words, 11 variables are grouped into three predominant factors on the basis of the relationship among themselves.

From the above table 6 it is found that Factor 1 is loaded with 6 variables: The customers worry that information sent over through internet are seen by other people. It is also understood that the factor 1 includes that technological payment system protects privacy and provides security guidelines before using the technological payment system. OTP is always required to add beneficiary for funds transfer and PIN cannot be hacked while receiving through a message. The personal and sensitive information in the accounts will not be shared. Therefore this factor can be called as "Privacy factor". Factor 2 is loaded with 5 variables: The technology payment system is secured and password protected. It also specifies that factor 1 includes whenever something gets automated customers feel that the transactions are secured. OTP is required for making third party transaction and CVV also is not hacked. Therefore this factor can be called as "Security factor".

FINDINGS OF THE STUDY:

The demographic profile of the respondents reveals that most of the respondents in the study are in the age group of less than 30. Most of the respondents are male and also unmarried. Most of the respondents are graduates who at least have a degree. It is understood from the chi-square test that there is significant association between the gender of the respondents and some of the security and privacy factors. The KMO test reveals that sampling adequacy is 0.79 and Bartlett's

Test of Sphericity with approximate chi-square value is 1509.28 is statistically significant at 5% level of significance. The factor analysis was conducted where the 11 variables are reduced into two predominant factors named as security factor and privacy factor of technological payment system.

SUGGESTIONS:

- ❖ Banks must make awareness programmes for the customers to enhance the knowledge on the security guidelines of electronic payment system.
- ❖ Banks should provide detailed instructions when logging into the online transaction.
- ❖ Banks should provide assurance that online transaction is safe and secure like traditional transaction. Protecting the pin number is equally important as protecting hard cash.
- ❖ The parties involved in online payments, transactions should used to make digital signatures in order to ensure authentication of transactions.
- ❖ Risk of hackers and risk of system failures is higher in technological payment system. The banks must make initiatives to reduce the risks involved in using technology payment system which benefits the customer's ease of use.

CONCLUSION:

As elaborated earlier in this study, the electronic payment systems in India during the past few years have undergone progressive technological developments. The outcome of the study shows that security and privacy factors also play a major role in customer perception towards electronic payment system. Even the banks are making every effort to ensure to provide more security and privacy guidelines. As consumers seek out new ways to make effective use of the guidelines, the issues in innovative electronic payment solutions can eliminate or reduce some of the problems they faced. Banks must come across new ways to reduce the hacking of services in order to meet the customers' satisfaction, needs, and smooth operating payment systems. Hence security and privacy issue must be considered more carefully by bank employees and e-payment service providers in India.

REFERENCES

- i. Abrazhevich, D. (2004), "Electronic payment systems: a user-centered perspective and interaction design", PhD thesis, Technical University of Eindhoven, Eindhoven.
- ii. Alireza Chavosh, Anahita Bagherzad Halimi, and Shahriar Espahbodi (2011), Comparing the Satisfaction with the Banks E-payment Services between Degree Holder and Non-Degree Holder Customers in Penang-Malaysia International in *Journal of e-Education, e-Business, e-Management and e-Learning*, Vol. 1, No. 2, June, 2011, pg103-109.
- iii. Changsu Kim, Wang Tao, Namchul Shin , Ki-Soo Kim (2009), An empirical study of customers' perceptions of security and trust in e-payment systems, *Electronic Commerce Research and Applications*, pg no 1-12 doi:10.1016/j.elerap.2009.04.014.

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- iv. Kalakota, R. and Whinston, A. (1997), *Electronic Commerce: A Manager's Guide*, Addison- Wesley, Reading, MA.
 - v. Lim, B., Lee, H. and Kurnia, S. (2006), "Why did an electronic payment system fail? A case study from the system provider's perspective", available at: www.collector2006.unisa.edu.au/Paper%2011%20Benjamin%20Lim.pdf
 - vi. Mahmoud Maqableh, Ra'ed Moh'd Taisir Masa'deh, Rifat O. Shannak, Khalid M. Nahar, Perceived Trust and Payment Methods: An Empirical Study of MarkaVIP Company, Int. J. Communications, Network and System Sciences, 2015, 8, 409-427 Published Online November 2015 <http://www.scirp.org/journal/ijcns>.
 - vii. McCartney, L. (1997), "A Safety Net", *Industry Week*, pp. 74-78.
 - viii. S. Mousavi, "electronic payments," the fourth national conference on e-commerce, Tehran, 2007.
 - ix. Rachna and Priyanka Singh (2013) Issues and Challenges of Electronic Payment Systems, Rachna et al. / International Journal for Research in Management and Pharmacy, Vol. 2, Issue 9, December 2013 (IJRMP) pg no 25-30.
 - x. Ranganathan, C., & Ganapathy, S. (2002). Key dimensions of business-to-consumer web sites. *Information and Management*, 39(6), 457-465.
 - xi. Sumanjeet, S. (2009), "Emergence of payment system in the age of electronic commerce: the state of art", available at: http://globip.com/pdf_pages/globalinternational-vol2-article2.pdf
 - xii. Swaminathan, V., Lepkowska-White, E., & Rao, B. P. (1999). Browsers of buyers in cyberspace? An investigation of factors influencing electronic exchange. *Journal of Computer-Mediated Communication*, 5(2). <http://jcmc.indiana.edu/vol5/issue2/swaminathan.htm>.