Risks in ATM Transactions

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ABSTRACT

This paper aims to analyze risk factors in ATM transactions. Both qualitative and quantitative methods are employed to address risk factors and their origin, and then tailor some fundamental measures to tackle such risks. The study has pointed out some risks such as short-changing, robbery, wrong debit, ATM skimming, etc. in ATM transactions.

Keywords: Risks, transaction, ATM, banking

1. INTRODUCTION

In recent years, together with breakthroughs in IT and telecommunication techniques, the security and safety of card payment have raised great concerns to both card dispenser and users. In Vietnam, ATM-related risks have yet to be thoroughly considered and thereby wasting a great deal of time to investigate and tackle the problem, or even discrediting banking services and causing damages to both card dispensers and users.

Local newspapers and the Internet have written on plenty of lethal electric shocks in ATMs; and this is also a factor of risk to ATM users. Card-based payment modes contain some elements of risk. Together with IT development, ATM hacking has become more and more sophisticated. Gaps in the legal system have unintentionally been a shelter for hi-tech criminals who have caused tremendous damage to the national banking system and card users.

During the past two years, mass media have broadcast problems and risks related to ATM transactions, especially robberies. Not only do they snatch the money of card users, but they also use chain saw to cut the machines and heist money from ATMs. Moreover, bank staff has also partly contributed to the risks due to their mistakes. Banks are facing problems with card-based transactions every day.

Some research on risks in ATM transactions have been undertaken by Liang (2000) and Kolbitsch (2000). Nonetheless, they only focused on technical aspects of the ATM transaction system and IT development without discussing the human factor – a crucial determinant. In Vietnam, this issue has also been taken into account by Lệnh (2010), Thanh (2010) and many others, with the primary support of qualitative methods. It is a common knowledge that ATM skimming has become more and more sophisticated, and ATM skimmers have caused tremendous damage to the national banking system

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which still maintains many imperfections during the technological-transition period. Therefore, the study is to employ both qualitative and quantitative methods to address risk factors in ATM transactions and then suggest some solutions to this problem.

2. DATASET AND RESEARCH METHODOLOGY

In this study, both quantitative methods and expert interviews will be utilized. In terms of the quantitative method, the Kolbitschs's model (2000) is employed to obtain the following research model:

$$RR = \beta_0 + \beta_1 AH_1 + \beta_2 AH_2 + \beta_3 AH_3 + \beta_4 AH_4 + \beta_5 AH_5 + \beta_6 AH_6 + e_i$$

Where,

RR: ATM-related risks

AH1: The ATM is broken down (i.e. faults in ATM).

AH2: The amount receivable is not equal to the ATM transaction value (i.e. short-changing).

AH3: Cash is snatched at the ATM booth (i.e. snatched cash).

AH4: The ATM transaction account is debited without any withdrawal (i.e. ATM skimming).

AH5: The ATM cash tray is emptied out (i.e. ATM theft).

AH6: The ATM card is trapped (i.e. card trapping).

β_0: Constant

e_i: Statistical error

As Kolbitsch (2000) points out, risks to ATM transactions mainly derive from technical factors such as faults in ATMs (AH1), short-changing (AH2), card trapping (AH6). Apparently, he just focused on technical factors (i.e. networks, card structure, transaction procedures, etc.) without emphasizing the human factor. Therefore, human factors including AH3, AH4, and AH5 have been added to our model.

Human factors consist of card users, card administrators, and operatives (i.e. maintenance workers). In Vietnam, operatives have played a crucial role in the operation of the entire system, and thus a minute mistake, whether it is done intentionally or not, may cause a severe damage to involved parties. Besides, by their direct effects on the banking technical system, competence and responsibility of operatives and managers are decisive factors in effort to minimize technical faults. Regarding card users, their carelessness can sometimes cause serious damage to themselves and the whole banking system as well. In sum, it is apparent that these human factors, together with aforementioned technical ones, are main elements of risk in ATM transactions.

3. SAMPLING METHOD

By the end of 2010, Agribank has owned 1,702 ATMs (accounting for a market share of 17.5%), Vietcombank with 1,483 (a 15% market share), and Vietinbank with 1,042 (10.7%), whereas DongA Bank, ACB and Sacombank possess around 9% of HCMC-based ATMs.

The research subjects are 300 ATM users and 20 maintenance workers who are randomly selected from HCMC-based banks as follows:

Table 1: Number of research subjects

Financial institutions	Agribank	Vietcombank	Vietinbank	ACB	Sacombank	DongA Bank
Number of samples	70	60	50	40	40	40

The sample is divided into two groups. Group 1 includes direct ATM users who will let us know how popular ATM transactions are and how they evaluate the quality, shortcomings, and security of card-based transactions. Group 2 comprises experts who are working at the maintenance department of banks and randomly interviewed. These experts have to tackle any problems related to ATM transactions and they will give us an overview of risks.

The research is conducted in HCMC. In order to collate data, 310 questionnaires were distributed among ATM users and 20 ones for maintenance workers. After cleaning, there are 300 valid response sheets from ATM users and 20 ones from maintenance workers in return (Table 2).

Table 2: Number of appropriate response sheets of each group

Group	1	2
Sample size	300	20

Respondents of group 1 are randomly chosen at 20 HCMC-based ATMs which are numbered from 1 to 20. At each cash machine, around 16 respondents are interviewed.

For group 2, the author randomly interviews 20 maintenance workers of some HCMC-based commercial banks.

4. RESEARCH RESULTS

Table 3 shows that except for AH1 and AH6, regression coefficients of all other variables are statistically significant with the reliability of almost 100%. The variable AH3 (i.e. snatched cash) has the highest effect on ATM-related risk. If AH3 increases one unit, such the risk rises by 0.261 unit.

Table 3: Regression results

Variable	Non-standardized coefficients		Standardized coefficients	T	Sig. (P)
	B	Std. Error	Beta (β)		Std. Error
Constant	.540	.372		1.453	.147
AH1	-.104	.066	-.171	-1.575	.116
AH2	.198	.027	.336	7.210	.000
AH3	.261	.067	.460	3.876	.000
AH4	.175	.025	.311	6.976	.000
AH5	.128	.028	.207	4.628	.000
AH6	-.042	.061	-.075	-.681	.496

NB:

RR (risks in ATM transactions) is a dependent variable.

R^2=0.438 and F-test=38

The results show that AH2 (short-changing), AH3 (snatched cash), AH4 (ATM skimming), and AH5 (ATM theft) are expected to contribute to risks in ATM transactions. It reveals that the higher the frequency of these incidents, the higher the level of risk in ATM transactions, and the lower the reliability of such transactions. Hence, there is an urgent need to minimize such risk factors, and this is similar with what has been published in local papers. According to *Đất Việt* dated Aug. 14, 2010, Mr. Nguyễn Trần Huy Thông, was debited from his account despite failing to withdraw money from an ATM of BIDV. Similarly, Vietnamnet reported on Nov. 23, 2010 that Ms. Hà Thị Nguyên lost VND1.6 million even though she failed to withdraw money from a Thanh Hóa-based ATM of Agribank. Her complaint was then acknowleged and her money returned by Agribank. Local newspapers and the Internet have written on plenty of lethal electric shocks in ATMs. HCMC Electric Power Trading Investment Corporation discovered 60 ATMs with electrical faults. A fourth-grade student died next to an ATM of Agribank in Nguyễn Thái Bình St., District 1 of HCMC (see Vnexpress.net dated April 4, 2010). The number of ATM attacks is substantial. The cash tray of an ATM of TECHCOMBANK at 167A Lê Trọng Tấn, Kỳ Sơn Ward, Tân Phú District, HCMC was emptied out (see *Hà Nội Mới*, dated Nov. 27, 2010).

The study also consults different opinions of 20 experts who are ATM maintenance workers working for HCMC-based banks. Several questions have been asked, and their responses are reported below.

When evaluating the potential risks and damage to ATM transactions at present, 80% of experts state that such risks are at the low level; 15% of experts place them at an average level, and 5% of them believe that there is no risk at all. Accordingly, 95% of experts assert that shortcomings concerning ATM transactions contain elements of risks; and the level of risks is various. This result reaffirms the study's practicality.

Concerning ATM transaction to be mentioned at the present time, there are two most noticeable risks, which influence not only property but also human life and health: electric shocks (20%) and ATM attacks (80%). These results are in line with responses from the ATM users.

Concerning reasons for these risks, there are two different opinions from the experts. About 60% of experts state that the risks derive from the fact that managers seem destitute of thorough concern for this issue, and the number of maintenance workers is so small that it is impossible to cover all things to the best. The remainders blame technical problems (i.e. mechanical defects, unsteady electrical supply, hardware errors, etc.) for risks to ATM transactions. Meanwhile, 90% of ATM users blame mechanical problems for transaction failures. These two opinions are fundamentally not contradictory at all due to the fact that experts, as was analyzed above, consider human factors as the underlying cause of technical problems while ATM users ascribe transaction failures to mechanical factors.

Regarding measures to minimize risks in the near future, 70% of experts state that it is necessary to enhance the force of operatives and managers in terms of quality and quantity. It could be costly and impractical if we just aim to continually upgrade the technical system due to the fact that the effectiveness of machines must be proved over time; meanwhile, improving the workforce is suitable

with the national conditions and generate long-term economic values. In addition, around 15% of experts stand their ground of improving technical factors; and the remainder suggest boosting both simultaneously. The third opinion is apparently the best, yet it is impractical and incongruent with the research results. As was analyzed above, the first concern is just at an average level, and it is necessary to balance between safety and economic effectiveness (but safety should have priority).

5. CONCLUSIONS AND RECOMMENDATIONS

a. Conclusions:

The regression results express a correlation among the dependent variable (i.e. risks in ATM transactions), technical and human factors. Nonetheless, it is not the technical problems but human factors that are the main risks in ATM transactions. The experts have dispensed significant opinions which effectively consolidate the research's value. Human factors play a crucial role in minimizing risks in ATM transactions. Besides, ATM attacks have the greatest effects on those risks; the more ATM attacks there are, the higher the level of risks to ATM transactions. ATM users' carelessness or managers' irresponsibility facilitates AMT scams, making hackers easily skim money from ATM accounts. ATM thefts do not profoundly impinge on users but on banks themselves. Therefore, it is crucial to prevent ATM thefts to facilitate the healthy operation of the banking system. These risk factors are very fundamental and there are many other minor ones to be addressed such as card loss, PIN disclosure, etc.

b. Recommendations:

- For commercial banks:

Enhance the team of maintenance workers in terms of quality and quantity; regularly enable them to upgrade their knowledge and access state-of-the-art security methods.

Accept, check and quickly resolve ATM shortcomings for the users' convenience.

Raise users' awareness of self-protection during carrying out transaction at ATM booths; keep them informed of latest shortcomings, hackers' scams, how-tos, and self-protection measures, etc. via mass media.

Conduct banking conferences to share information about risks in card-based transactions, experience and measures to prevent such risks.

Bank managers should promote the responsibility and honesty of staff. If possible, it is advised to rotate personnel within the organization, deploy disciplinary measures for any cheating or activity that reduces benefits of both ATM users and banks.

- For governmental agencies:

Governmental agencies should enhance their inspection and control over locations and time of high ATM risks.

There must be a close collaboration among banks, ATM users, and governmental agencies.

A department of risk management should be established to collect and handle complaints from banks and ATM users.

- For technical problems of commercial banks:

Upgrade and maintain the mechanical system promptly, or invest in a state-of-the-art system if possible.

Thoroughly examine ATMs in the rainy season to prevent electric shocks.

Develop a strong security system to protect the electronic database from being skimmed or hacked, rights to access the database must be specified, no weird USB is allowed to plug in any computer of the bank, and regularly upgrade the operating system and system security software.

Ensure the safety of ATM users by installing card swipes to ATM booths, locate ATM booths in crowded area, install an emergency alert system on ATMs which can warn people of high temperature or any smash-and-grasp raid, and enhance the security of cash trays in ATMs■

References

Kolbitsch, Josef (2000), "Introduction to ATM Security", Graz University of Technology, Australia.

Liang Donglin (2000), "A Survey on ATM Security", Ohio State University, USA.

Nguyễn Đức Lệnh (2010), "Những giải pháp phát triển hiệu quả dịch vụ ATM", *Thị Trường Tài Chính Tiền Tệ*, No.18 (315):19.

Nguyễn Thanh (2010), "Các vấn đề an ninh khi sử dụng thẻ ATM", *Thị Trường Tài Chính Tiền Tệ*, No.21 (318):26