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# CONSUMER APPROACH TO BANK PAYMENT CARD SECURITY AND FRAUD

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**Abstract.** Due to the rise and rapid growth in e-commerce in recent years, the use of payment cards for online purchases has dramatically increased the credit and debit cards market. This situation has led to an explosion in payment card fraud and it is causing billions of euros and dollars in losses in the card payment industry.

In addition to direct losses, the brand may be affected by fraud-induced decrease in consumer confidence. It is therefore important to know the opinion and consumer approach to security and payment card fraud. As a result of rising losses, financial institutions and card issuers are constantly searching for new technologies and innovations in payment card fraud detection and prevention.

This article provides several views on personal safety and quality of security that banks devote to payment cards and payment systems and the related research was carried out in an electronic form by means of selective examination in Slovakia in 2015. The study group consisted of 287 respondents, of whom 164 were men and 123 were women. The respondents were categorised by their age, education and job.

The study results can help the issuers of payment cards and banks as well as clients using payment cards, especially in order to increase the prevention of misusage of payment cards and fraud.

**Keywords:** commercial banks, security, customer satisfaction, bank payment cards, payment card fraud

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**JEL Classifications:** G21

## 1. Introduction

The transaction with payment cards may take place within minutes, but the side effects of fraud over phone lines or involves electronic communication is able to continue to exist for months, sometimes years in the form of long and costly legal proceedings.

When electronic fraud strikes, the losses are usually distinguished, while the client's reaction ranges from strong anger to distrust toward the bank which "has allowed" the fraud to happen. Trustworthiness is the essential determinant of efficient and stable banking.

Today, the sustainable and secure development has become an actual and urgent matter in many countries around the world (Štitilis, Klišauskas 2015; Kriviņš 2015; Munteanu, Tamošiūnienė 2015; Rakauskienė 2014; Vasiliūnaitė 2014; Baikovs, Zariņš 2014; Caurkubule; Rubanovskis 2014; Demir et al. 2014; Mačiulis, Tvaronavičienė 2013; Prakash 2013).

Personal economic and financial security can be mostly viewed as a matter of personal decision and common sense (Kalyugina at al. 2015; Njaramba at al. 2015). Currently, it is the phenomenon of globalization and diversification, which is becoming dominant, and that to such extent that the majority of economic subjects take action in accordance with what is called "rational inattention" (see Sims 2006). At the same time, personal debt and economic freedom have become the key elements of every society (Rakauskienė 2014; Starineca, Voronchuk 2015; Šileika, Bekerytė 2013; Vasiliūnaitė 2014, Prakash 2013; Tvaronavičienė, Grybaitė 2012; Dubauskas 2011, 2012; Radović Marković 2011).

It is created because this sector transports scarce financial capital for its optimal utilisation. Thus it exists only if there is a sufficient number of economic subjects willing to deposit their surpluses in banks along with a sufficient number of subjects relying on banks in case of money deficit. In that context it could be declared that a bank trades mainly with trust of their clients.

Security is connected to a large number of bank activities and is a significant issue in commercial bank management. Ensuring the security of banking is determined by various factors. Commercial bank security is a complex system including many activities, e.g. capital management in the context of credit, market and operational risks (i.e. capital adequacy management), etc. The security process is focused on operational risk defined as a risk of loss resulting from internal processes or human capital failure or from external conditions (Grubicka, Matuska 2015; Peker et al. 2014; Polouček et al., 2013).

Physical security is connected to the protection of cash in bank branches and ATMs. The system security includes all internal and external processes carried out by informational system. In this context, the security of individual customers´ deposits and their payments is crucial. The security of customers´ is the key factor of success for banks. The mentioned factor heavily influences acquisition, retention or loss of customers. For that reason, it is decisive for a commercial bank to undertake such measures to ensure a proper and efficient protection of customers.

The present situation demands from the commercial banks to pay extraordinary attention to payment cards security. The compliance with consumers' needs and requirements (Bilan, 2013), bank customers' satisfaction and comprehensive customer care are nowadays in the centre of attention of researchers and bankers. It is for this reason that it represents an important marketing instrument for many companies, notably those working at highly competitive markets. (Belás and Demjan, 2014) Researchers are trying to find the main determinants for bank customer satisfaction and examine these issues from various perspectives (Doležal et al., 2015; Kombo, 2015; Belás et al., 2015; Chochoľáková et al., 2015; Paulík et al., 2015).

## 2. Theoretical Background

Credit card fraud continues to be a significant and dynamic risk to financial institutions as a result of both new threats and the increasing regulatory interest in fraud management programs. Emerging fraud threats and solutions required to mitigate them are increasingly technically complex. To secure and maintain customers' trust, the financial institutions must prevent, detect and respond to fraud risk in an agile manner through fraud management technologies and predictive analytics. While the new US mandate of Europay, MasterCard and Visa (chip and PIN) technology will help decrease the risk of counterfeit transactions, financial institutions must

remain vigilant, as fraudsters will certainly be crafting new modes of attack.

When high rates are absent in economic growth, the most obvious signs of the critical state of the economic security appear and they have an impact on the country as a whole and its citizens, in particular. This phenomenon is described by many authors (see e.g. Hendley and Murrell 2015; Tsyganov et al. 2014; Bilan et al. 2012; or Mikhalev 1996). Very similar trends can be recognised in other transition economies, e.g. in countries of the former Soviet block (see e.g. Zhuk 2015; Crhova et al.2015; Tvaronavičienė et al. 2014; Clowes and Bilan 2014).

The expansion of payment cards has significantly changed the manner we shop and businessmen sell goods and services. Currently, payment cards are vital in most advanced economies. Amromin and Chakravorti (2009) suggest that extensive usage of debit cards has caused lower demand for small-denomination banknotes and coins. This process was seen in thirteen advanced economies. Payment surveys done recently also indicate that consumers are using payment cards instead of checks. Aside from making money transaction more comfortable, Juřík (2012) argues that the cards have been also used to increase the loyalty of customers.

Extensive usage and acceptance of payment cards leads to a growing number of consumers and at the same time merchants start to prefer payment cards to cash and checks.

In general, all payment tools possess special aspects such as cost, transaction speed, restraint, security, convenience, records keeping and acceptance (Schuh and Stavins, 2011; Ching and Hayashi, 2006; Borzekowski et al., 2006).

Schuh and Stavins (2011) define security as "security against permanent financial loss or wanted disclosure of personal information when a payment method has been stolen, misused, or accessed without the owner's permission". According to the research by Zinman (2008), the improved security was a significant proximate of recent growth of debit card users. The customers tend to choose transactions which are secure because in their eyes the security is of crucial importance.

A lot of cardholders prefer holding bank cards as a preventive measure against loss, robbery, theft, or counterfeit money. As opposed to the latter approach, there are others who are still fond of using cash instead of cards, as they are afraid of becoming exposed to the risks of fraudulent activities when the cards are lost or stolen. Most of the clients feel secure because they are always protected by liability agreements with card issuers and merchants when these problems occur. The concern of security was highlighted in the research by Schuh and Stavins (2011) who presented their conclusion that people considering the payment method relatively more secure are more likely to adopt it and vice versa. Security is definitely important and necessary when it comes to understanding the consumer behaviour for using payment bank cards.

The unique explosion of Information and Communication Technologies (ICT) over the past few years has led to a body of innovations in the banking sector, while electronic banking and the use of payment cards are probably the most significant ones. This new distributional channel offers various opportunities in the field of new financial products development and their distribution to clients through the internet. The launching of new internet distribution channels gives wide space for extreme misusage, frauds, loss, and theft. It is a large challenge for the banks and card issuers to keep increasing the level of security for their clients and themselves. Implementation of advanced technology, widening of distributional channels and high flexibility bring about valuable effects on the quality of bank products and consequently on satisfaction of customer needs. (Sysáková and Šlahor, 2010)

Polouček et al. (2013) state that electronic banking can be defined as the provision of bank products and services to customers via electronic channels. Since the internet environment is more sensitive to system attacks, the utilisation of these channels has underlined the essential role of bank security (Koskosas, 2011; Dhillon and Torkzadeh, 2006). Koskosas (2011) claims that customers can find huge advantage in electronic banking

due to its simplicity and reduction of transaction costs, however it is necessary to respect the financial security.

Customers using internet banking have a non-stop access to their accounts, they can make payments whenever and wherever they are willing to, display the bank statement to a transaction, pay out their debts and carry out many more bank transactions electronically via webpages of their bank. (Belás at al.2016; Yoon and Occeña, 2014; Yoon and a Steege, 2013).

The use of electronic banking is tightly associated with the customers´ perception of his security which has an impact on his behaviour and attitudes (Grabner-Krauter and Faullant, 2008). The recognised absence of security is defined as a potential loss caused by fraud or internet banking hacking (Lee, 2009; Featherman and Pavlou, 2003). In this context, the security and privacy are considered to be two fundamental determinants of customer trust in electronic banking (Flavián and Guinalíu, 2006; Kruck, Gottovi, Moghadami, Broom, and Forcht, 2002).

IBCS model (Internet Banking Customer Satisfaction) created by Chen, Hsiao and Hwang (2012) is comprised of six essential parts: content, accuracy, format, simplicity of use, timeliness and security. This model emphasised that clients are highly sensitive to internet security. In order to meet the customer's expectations, the internet transaction needs to be carried out by using a user-friendly interface which has to be secure.

Security attributes of electronic banking and payment cards were examined by Hoffmann and Birnbrich (2012). Belás at al. (2016) argue "their research was focused on describing the conceptual and empirical relations among bank activities in the field of protection against third party attacks, customer relationship management quality and customer loyalty. The authors declare that security is crucial and is getting even more important in the current banking sector. The fraud prevention has become one of the priorities of banks, customers and even politicians as bank frauds harm both banks and customers. The results showed there is a positive relation between trustworthiness of a bank, its skills in the field of fraud prevention and customer relationship management quality. After all, customer relationship management quality has a positive influence on customer loyalty. There is a difference between younger and older customers in their knowledge about security measures of banks focused on fraud prevention. At the same time, the positive impact of this awareness on the customer relations quality is less significant in the group of older clients. The possible reason could be in a higher level of scepticism of older clients regarding the efficiency of the above-mentioned measures. Fraud prevention is vital in customer relationship management quality for all customers regardless of their education and income levels".

## 4. Research objective, methodology and data

The research was carried out in an electronic form by means of selective examination in Slovakia in 2015. The selective detection is a form of detection that requires necessary data to be obtained only from a part of units of the basic group, i.e. units which have been selected from the basic group in a particular manner. The estimations derived from results obtained by selective examination are loaded with selection error and thus cannot be as precise as results obtained by comprehensive detection. At the same time, the selective detection does not provide reliable data for signs that are present only sporadically in the studied units. However, selective detection, when compared to comprehensive detection, saves time, work and costs. It also enables the detection to be carried out in a more thorough manner. This is because the smaller extent of the detected group allows greater contents and more pieces of information can be obtained in greater detail. The comprehensive detection cannot be carried out when it leads to destruction, i.e. when as a result of statistical observation, the detected group becomes depreciated.

The study group consisted of 287 respondents, of whom 164 (57.14%) were men and 123 (42.6%) were women. The respondents were categorised by their age, education and job. Regarding age, the study group consisted of 113 (39.37%) respondents younger than 40 years (-40) and 174 (68.63%) respondents older than 40 years (+40). As to education, the study group consisted of 152 (52.64%) university graduates, 120 (41.1%) respondents with secondary educationand 15 (5.22%) respondents with elementary education. The category of

job divided the respondents into students (64; 22.9%), unemployed (64; 22.9%), civil servants (59; 20.56%), nongovernmental employees (64; 22.29%) and pensioners (36; 12.54%). The graphic image of respondents per category is shown in Figures 1 and 2.

Research hypotheses:
Hypothesis 1: A significantly greater proportion of university graduates, men and women younger than 40 years of age carry their PIN together with their payment card. The hypothesis has been proven right.

Hypothesis 2: A significantly greater proportion of men and women with secondary education older than 40 years of age carry their PIN together with their payment card. The hypothesis has been proven wrong.

Hypothesis 3: A significantly greater proportion of university graduates, men and women older than 40 years of age have changed their payment card PIN. The hypothesis has been proven right.

Hypothesis 4: A significantly greater proportion of men and women with secondary education and younger than 40 years of age have changed their payment card PIN. The hypothesis has been proven right.

Hypothesis 5: A significantly greater proportion of university graduates, men and women younger than 40 years of age usually choose their date of birth as their payment card PIN for the sake of easy recollection. The hypothesis has been proven right with no difference between men and women in either of studied categories.

Hypothesis 6: A significantly greater proportion of university graduates, men and women younger than 40 years of age have never encountered a hacker attack or banking fraud. The hypothesis has been proven right.

Hypothesis 7: A significantly greater proportion of respondents with secondary education, men and women older than 40 years of age have never encountered a hacker attack or banking fraud. The hypothesis has been proven right.

***Calculations and graphical results of research***

The above-mentioned hypotheses were validated by Pearson Chi-square test. The significance level (α) was estimated at 0.05. Further, graphs of frequency interactions and histograms of responses to questions were used.

**Figure 1:** Graph of frequency interactions in subgroup of women

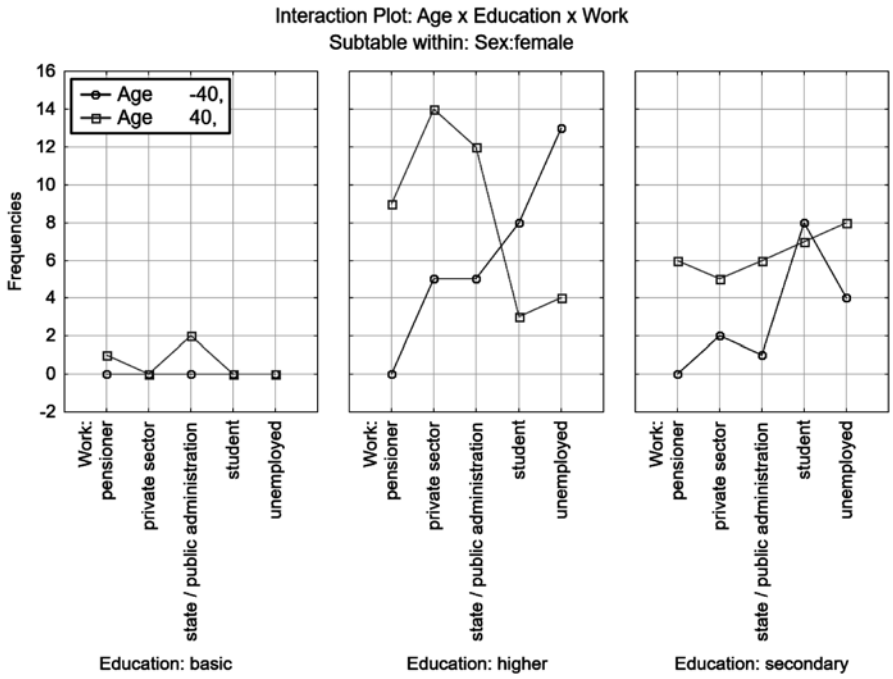
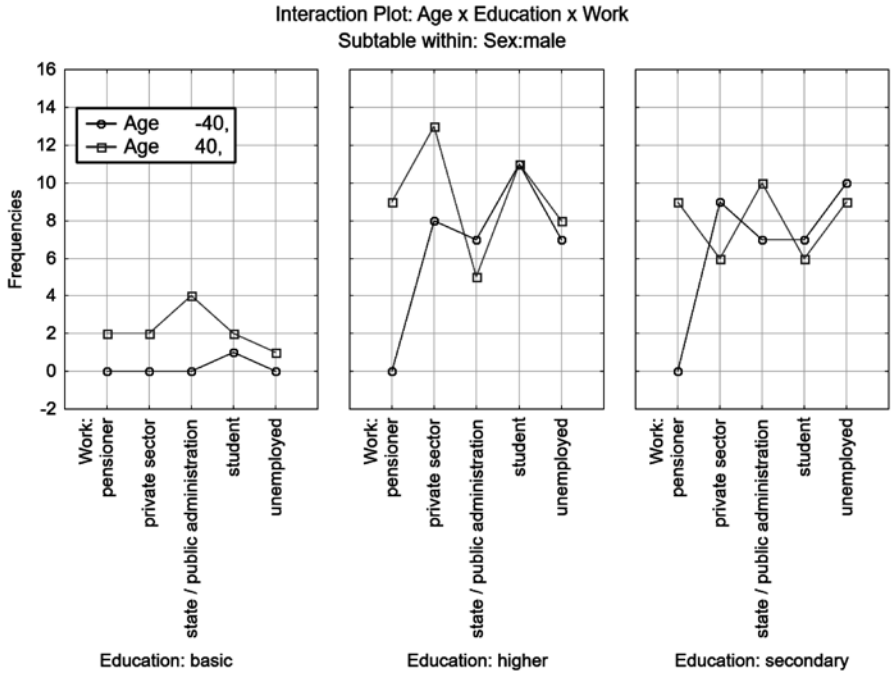



**Figure 2:** Graph of frequency interactions in subgroup of men




Histogram of responses to Question 1 as to whether the respondents carry their PIN together with their payment cards (per category, i.e. gender, age and education) is shown in Figure 3 for the subgroup of men and in Figure 4 for the subgroup of women. The table layout of histogram is shown in Table 1.

**Figure 3:** Histogram of responses to Question 1 per category of respondents in subgroup of men

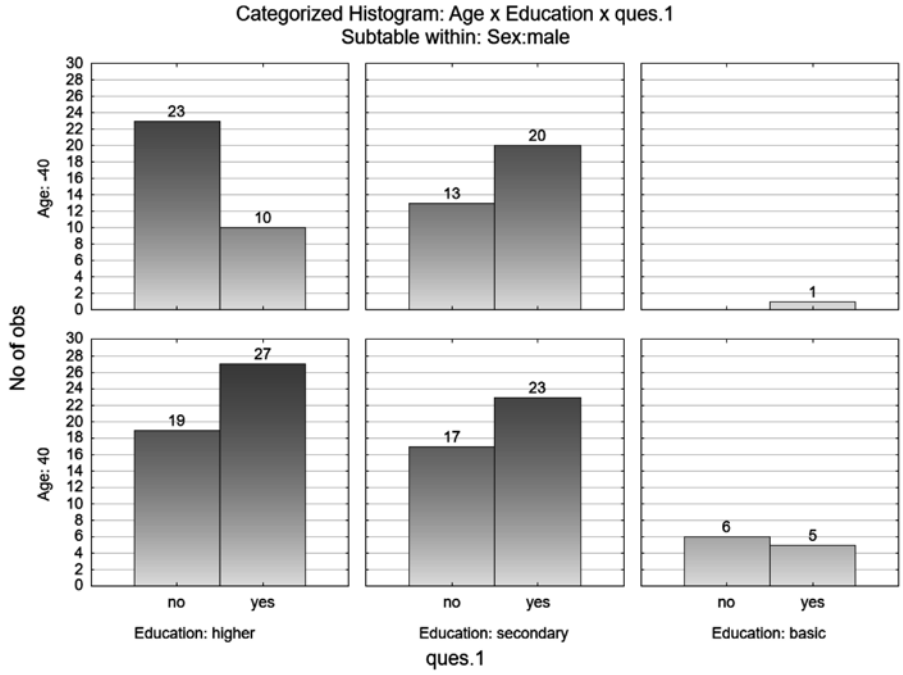



**Figure 4:** Histogram of responses to Question 1 per category of respondents in subgroup of women

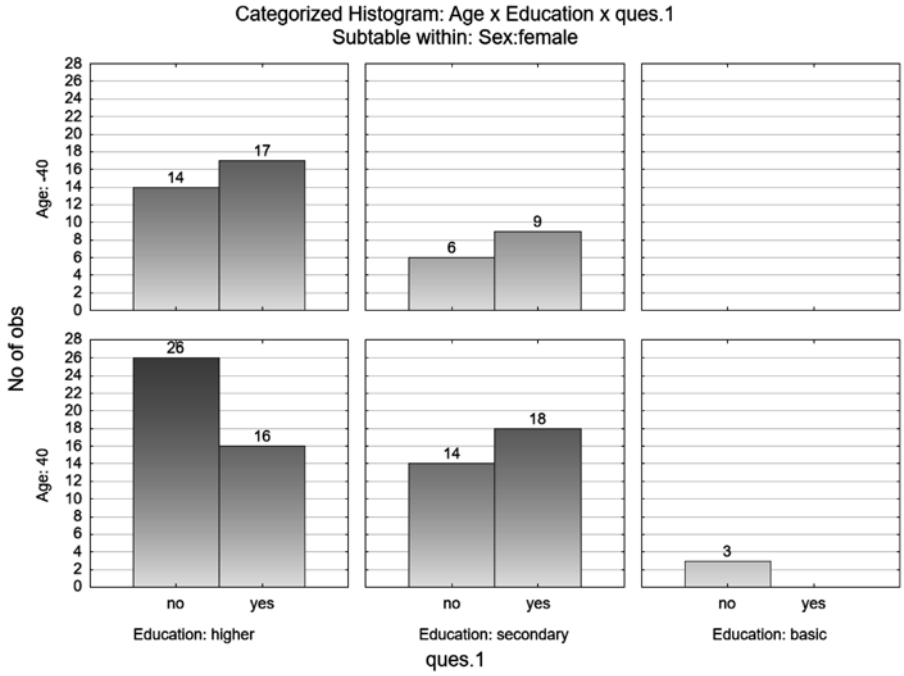


**Table 1:** Frequency table of responses to Question 1 per category of respondents
(Question 1: Do you carry your PIN together with your payment card?)

| Sex | Age | Education | ques.1 no | ques.1 yes | RowTotals |
|---|---|---|---|---|---|
| male | -40 | higher | 23 | 10 | 33 |
| male | -40 | secondary | 13 | 20 | 33 |
| male | -40 | basic | 0 | 1 | 1 |
| Total | | | 36 | 31 | 67 |
| male | 40 | higher | 19 | 27 | 46 |
| male | 40 | secondary | 17 | 23 | 40 |
| male | 40 | basic | 6 | 5 | 11 |
| Total | | | 42 | 55 | 97 |
| female | -40 | higher | 14 | 17 | 31 |
| female | -40 | secondary | 6 | 9 | 15 |
| female | -40 | basic | 0 | 0 | 0 |
| Total | | | 20 | 26 | 46 |
| female | 40 | higher | 26 | 16 | 42 |
| female | 40 | secondary | 14 | 18 | 32 |
| female | 40 | basic | 3 | 0 | 3 |
| Total | | | 43 | 34 | 77 |
| ColumnTotal | | | 141 | 146 | 287 |

**Analysis of Hypothesis 1**

Based on the analysis of histogram of responses to Question 1 per category of respondents shown in Figures 3 and 4 and Table 1 by means of Pearson Chi-square test in frequency distribution table $\chi 2 = 3.945$ ($p = 0.047$), it can be stated that in the group of university graduates younger than 40 years of age there is a significant difference between responses of men and women (selected level of significance of $\alpha = 0.05$) to the question as to whether they carry their PIN together with their payment card. Hence, we do not have sufficient evidence for refuting the Hypothesis 1 provided by us and therefore we accept it on the level of significance of $\alpha = 0.05$. This result can be rationalised by the fact that male university graduates younger than 40 years of age when compared to women of the same category carry their PIN together with their payment cards less often due to higher awareness of safety and protection of payment systems, payment cards included.

**Analysis of Hypothesis 2**

Based on the analysis of histogram of responses to Question 1 per category of respondents shown in Figures 3 and 4 and Table 1 by means of Pearson Chi-square test in frequency distribution table $\chi 2 = 3.729$ ($p = 0.053$), it can be stated that in the group of respondents with secondary education older than 40 years of age there is no significant difference between responses of men and women (selected level of significance of $\alpha = 0.05$) to the question as to whether they carry their PIN together with their payment card. Hence, we have sufficient evidence for refuting the Hypothesis 2 provided by us and therefore we refute it on the level of significance of $\alpha = 0.05$. This result can be rationalised by the fact that men and women with secondary education older than 40 years of age are insufficiently aware of security risks associated with payment.

## *Customers´ evaluation of the changes personal security measures from the point of view of selected social groups*

Histogram of responses to Question 2 as to whether the respondents (per gender, age and education) have changed their payment card PIN is shown in Figure 5 for the subgroup of men and in Figure 6 for the subgroup of women. The table layout is shown in Table 2.

**Figure 5:** Histogram of responses to Question 2 per category of male respondents

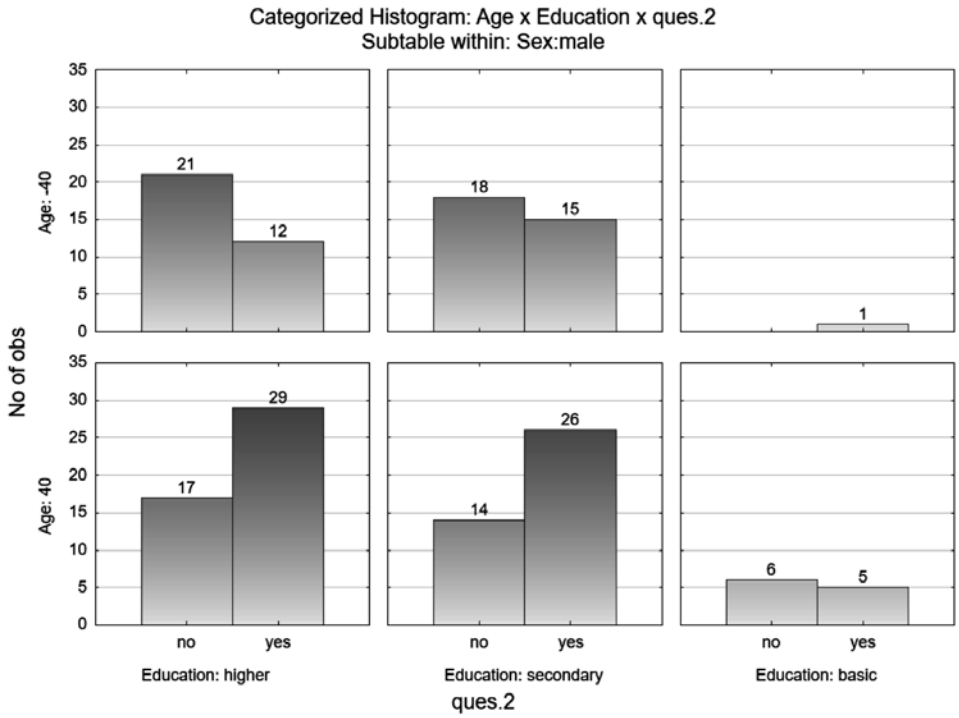



**Figure 6:** Histogram of responses to Question 2 per category of female respondents

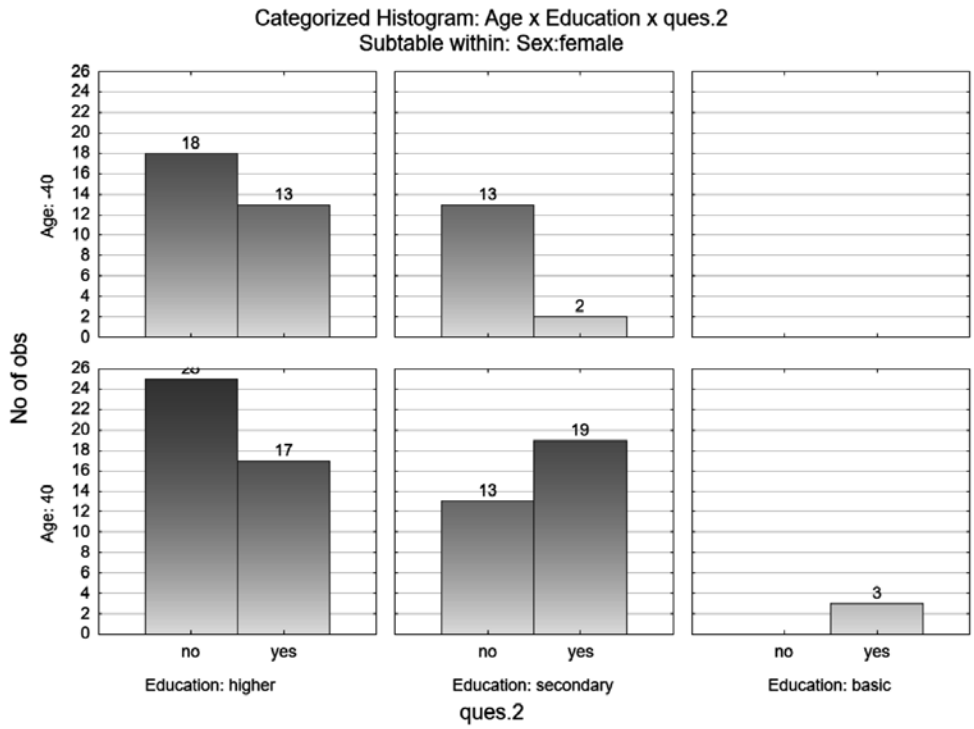


**Table 2:** Frequency table with responses to Question 2 per studied category of respondents (Question 2: Have you ever changed your payment card PIN?)

| Sex | Age | Education | ques.2 no | ques.2 yes | Row Totals |
|---|---|---|---|---|---|
| male | -40 | higher | 21 | 12 | 33 |
| male | -40 | secondary | 18 | 15 | 33 |
| male | -40 | basic | 0 | 1 | 1 |
| Total | | | 39 | 28 | 67 |
| male | 40 | higher | 17 | 29 | 46 |
| male | 40 | secondary | 14 | 26 | 40 |
| male | 40 | basic | 6 | 5 | 11 |
| Total | | | 37 | 60 | 97 |
| female | -40 | higher | 18 | 13 | 31 |
| female | -40 | secondary | 13 | 2 | 15 |
| female | -40 | basic | 0 | 0 | 0 |
| Total | | | 31 | 15 | 46 |
| female | 40 | higher | 25 | 17 | 42 |
| female | 40 | secondary | 13 | 19 | 32 |
| female | 40 | basic | 0 | 3 | 3 |
| Total | | | 38 | 39 | 77 |
| ColumnTotal | | | 145 | 142 | 287 |

## Analysis of Hypothesis 3

Based on the analysis of histogram of responses to Question 2 per category of respondents shown in Figures 5 and 6 and Table 2 by means of Pearson Chi-square test in frequency distribution table $\chi 2 = 4.482$ ($p = 0.034$), it can be stated that in the group of university graduates, men and women older than 40 years of age there is a significant difference between responses of men and women (selected level of significance of $\alpha = 0.05$) to the question as to whether they have changed their PIN. Hence, we do not have sufficient evidence for refuting the Hypothesis 3 provided by us and therefore we accept it on the level of significance of $\alpha = 0.05$. This result can be rationalised by the fact that male university graduates older than 40 years of age when compared to women of the same age and education category are more aware (by 49.3%) of payment systems security including the payment cards.

## Analysis of Hypothesis 4

Based on the analysis of histogram of responses to Question 2 per category of respondents shown in Figures 5 and 6 and Table 2 by means of Pearson Chi-square test in frequency distribution table $\chi 2 = 4.652$ ($p = 0.031$), it can be stated that in the group of men and women with secondary education younger than 40 years of age there is a significant difference between responses of men and women (selected level of significance of $\alpha = 0.05$) to the question as to whether they have changed their PIN. Hence, we do not have sufficient evidence for refuting the Hypothesis 4 provided by us and therefore we accept it on the level of significance of $\alpha = 0.05$. Similarly to Hypothesis 3, this result can be rationalised by the fact that men with secondary education younger than 40 years of age when compared to women of the same age and education category are more aware (by 49.4%) of payment systems security including the payment cards.

### *Customers´ evaluation of the changes PIN from the point of view of selected social groups*

Histogram of responses to Question 3 as to whether the respondents (per gender, age and education) have chosen their date of birth as their payment card PIN is shown in Figures 7 for the subgroup of men and in Figure 8 for the subgroup of women. The table layout is shown in Table 3.

**Figure 7:** Histogram of responses to Question 3 per category of respondents in the subgroup of men

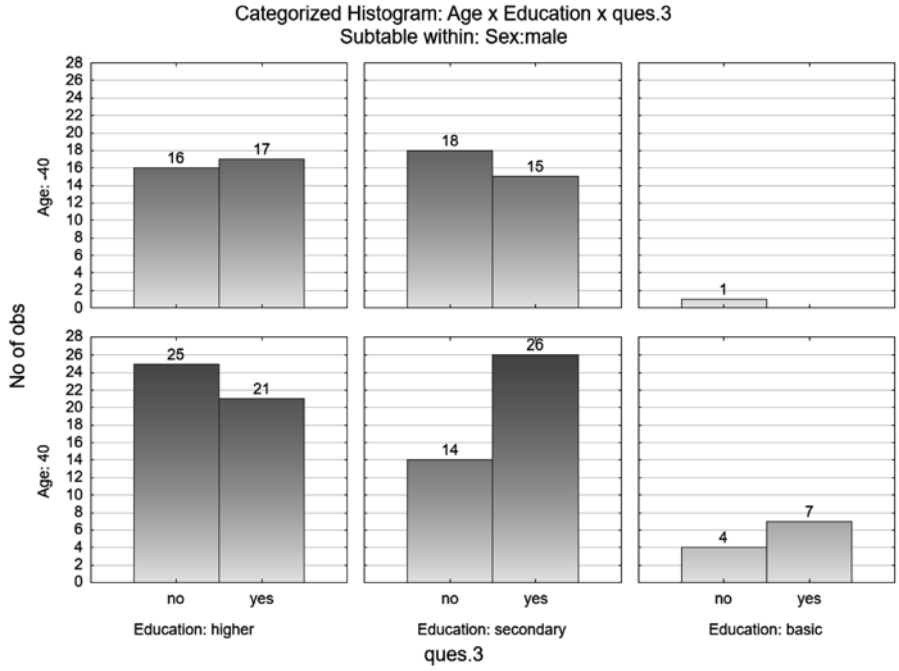
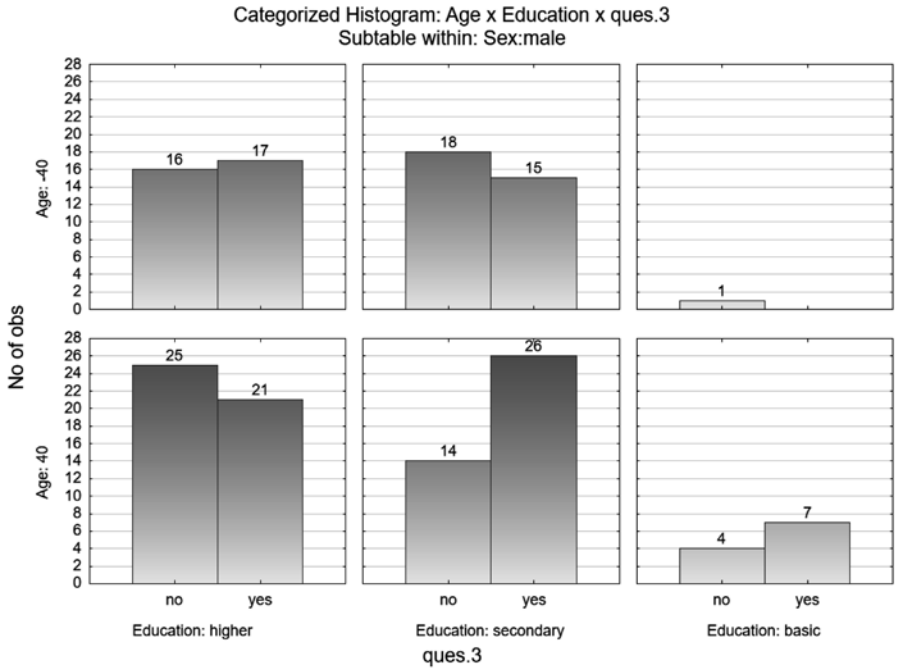



**Figure 8:** Histogram of responses to Question 3 per category of respondents in the subgroup of women



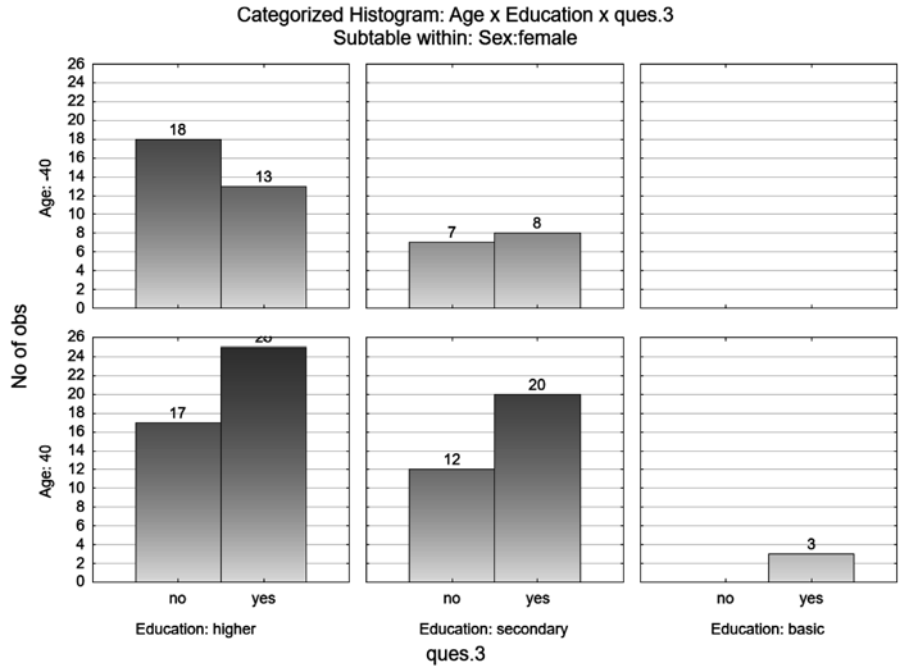



**Table 3:** Frequency table with responses to Question 3 per studied category of respondents
(Question 3: Do you usually choose your date of birth as your payment card PIN for the sake of easy recollection?)

| Sex | Age | Education | ques.3 no | ques.3 yes | Row Totals |
|---|---|---|---|---|---|
| **male** | -40 | higher | 16 | 17 | 33 |
| **male** | -40 | secondary | 18 | 15 | 33 |
| **male** | -40 | basic | 1 | 0 | 1 |
| **Total** | | | 35 | 32 | 67 |
| **male** | 40 | higher | 25 | 21 | 46 |
| **male** | 40 | secondary | 14 | 26 | 40 |
| **male** | 40 | basic | 4 | 7 | 11 |
| **Total** | | | 43 | 54 | 97 |
| **female** | -40 | higher | 18 | 13 | 31 |
| **female** | -40 | secondary | 7 | 8 | 15 |
| **female** | -40 | basic | 0 | 0 | 0 |
| **Total** | | | 25 | 21 | 46 |
| **female** | 40 | higher | 17 | 25 | 42 |
| **female** | 40 | secondary | 12 | 20 | 32 |
| **female** | 40 | basic | 0 | 3 | 3 |
| **Total** | | | 29 | 48 | 77 |
| **ColumnTotal** | | | 132 | 155 | 287 |

## Analysis of Hypothesis 5

Based on the analysis of histogram of responses to Question 3 per category of respondents shown in Figures 7 and 8 and Table 3 by means of Pearson Chi-square test in frequency distribution table $\chi 2 = 0.589$ ($p = 0.443$), it can be stated that in the group of university graduates younger than 40 years of age there is no significant difference between responses of men and women (selected level of significance of $\alpha = 0.05$) to the question as to whether they use their date of birth as their pyment card PIN. Hence, we have sufficient evidence for refuting the Hypothesis 5 provided by us and therefore we refute it on the level of significance of $\alpha = 0.05$. The reason why male and female university graduates younger than 40 years of age react in almost same manner is that

they either prefer other combinations of numbers or do not change their PIN for other reasons.

***Levels of customers´ experience with hacking attacks according to selected social groups***

**Figure 9:** Histogram of responses to Question 9 per category of respondents in the subgroup of men

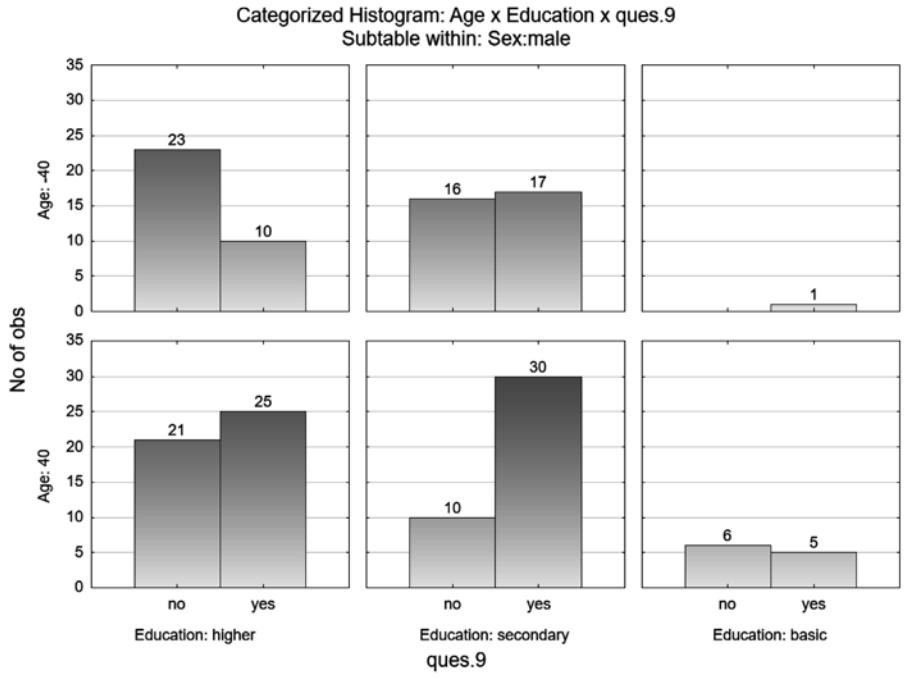



**Figure 10:** Histogram of responses to Question 9 per category of respondents in the subgroup of women

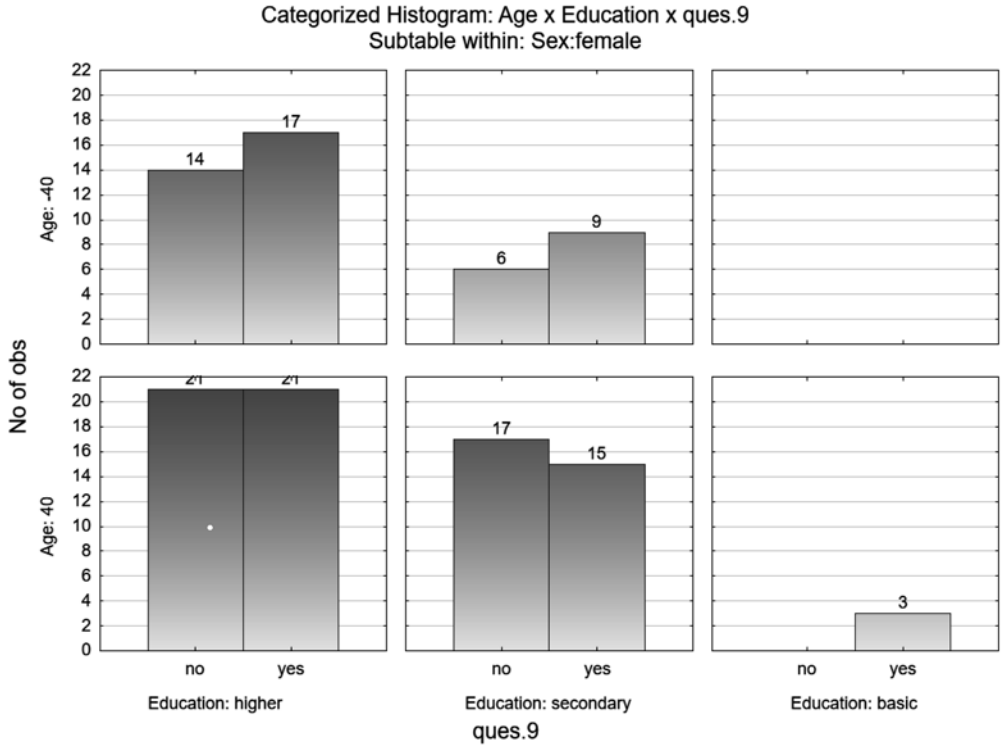


**Table 4:** Frequency table with responses to Question 9 per studied category of respondents (Question 9: Have you ever encountered a hacker attack or banking fraud?)

| Sex | Age | Education | ques.9 no | ques.9 yes | Row Totals |
|---|---|---|---|---|---|
| **Male** | -40 | higher | 23 | 10 | 33 |
| **male** | -40 | secondary | 16 | 17 | 33 |
| **male** | -40 | basic | 0 | 1 | 1 |
| **Total** | | | 39 | 28 | 67 |
| **male** | 40 | higher | 21 | 25 | 46 |
| **male** | 40 | secondary | 10 | 30 | 40 |
| **male** | 40 | basic | 6 | 5 | 11 |
| **Total** | | | 37 | 60 | 97 |
| **female** | -40 | higher | 14 | 17 | 31 |
| **female** | -40 | secondary | 6 | 9 | 15 |
| **female** | -40 | basic | 0 | 0 | 0 |
| **Total** | | | 20 | 26 | 46 |
| **female** | 40 | higher | 21 | 21 | 42 |
| **female** | 40 | secondary | 17 | 15 | 32 |
| **female** | 40 | basic | 0 | 3 | 3 |
| **Total** | | | 38 | 39 | 77 |
| **ColumnTotal** | | | 134 | 153 | 287 |

## Analysis of Hypothesis 6

Based on the analysis of histogram of responses to Question 9 per category of respondents shown in Figures 9 and 10 and Table 4 by means of Pearson Chi-square test in frequency distribution table $\chi 2 = 3.945$ ($p = 0.047$), it can be stated that in the group of university graduates younger than 40 years of age there is significant difference between responses of men and women (selected level of significance of $\alpha = 0.05$) to the question as to whether they have encountered hacker attack or banking fraud. Hence, we have no sufficient evidence for refuting the Hypothesis 6 provided by us and therefore we accept it on the level of significance of $\alpha = 0.05$. This result can be rationalised by lower alertness to compliance with internet payment safety rules in the subgroup of female university graduates younger than 40 years of age when compared to male respondents of the same category.

## Analysis of Hypothesis 7

Based on the analysis of histogram of responses to Question 9 per category of respondents shown in Figures 9 and 10 and Table 4 by means of Pearson Chi-square test in frequency distribution table $\chi 2 = 6.000$ ($p = 0.014$), it can be stated that in the group of respondents with secondary education older than 40 years of age there is a significant difference between responses of men and women (selected level of significance of $\alpha = 0.05$) to the question as to whether they have encountered a hacker attack or banking fraud. Hence, we have no sufficient evidence for refuting the Hypothesis 7 provided by us and therefore we accept it on the level of significance of $\alpha = 0.05$. This significant difference (50%) can be rationalised by the fact that at the extent and frequency of payments of men with secondary education older than 40 years of age they do not pay sufficient attention to protection and safety of internet payment.

## Conclusions

Criminal acitivity associated with abusing the banking payment cards is variable. It is conditioned foremostly by technical advancement of culprits, inattention from the side of payment card holders of payment cards and technologic progress of society. Financial losses caused by misusing the banking payment cards are very high world-wide. Therefore, all preventative organisational and technical measures focused against this form of criminal acts are important. Professionals though cannot exclude the possibility of new, up-to-now not known forms of criminal acts in association with payment cards.

Compared to any other time in its history, the payment card industry faces an increasing variety of security challenges as the transaction environment grows in size and complexity. With more stakeholders, payment channels, and people driving the use of payment cards, the need to enhance the integrity of an increasingly dynamic system while ensuring global acceptance is more important than ever.

On a global level, fraud continues to migrate from more secure to less secure regions and channels. This obvious shift is accelerated by an increasingly adept and organized criminal community that seeks to exploit security vulnerabilities and commit fraud. Criminals are targeting not just unmonitored, stand-alone, point-of-interaction devices, but also launching sophisticated attacks on the private networks of well-known entities, such as major data processors and top-tier merchants. All of these factors can lead to fraud attacks that can cause an erosion in confidence and global acceptance as financial institutions seeking to avoid risk may move to block transactions at a country or regional level.

Since, one of the biggest concerns relating to security in e-commerce applications is the use of the credit/debit cards; the failure to secure the card information can cause a major damage to the organization in terms of financial fraud, identity theft, legal regulations, loss of consumer confidence, etc.

Our own research has shown that in case of Hypotheses 3 and 4 as to the Question 2, i.e. whether the respondents have ever changed their payment card PIN, all men irregardless of age and education responded almost with identical results. The difference in the responses associated with both hypotheses in men and women exceeds 49% in favour of men.

The aspects of payment card protection against counterfeit and misusage begins already with card issuers. The production of payment cards requires safety conditions identical to those of banknote printing.

It is an obligation of every client to protect his/her payment card against theft and consequent misusage. Also the banks themselves make effort to protect their clients from illegal misusage by other person. Every bank has therefore on their websites instructions on how to use payment cards safely.

These instructions could protect the client sufficiently against theft and misusage of payment card. The extent alertness with which the client handles the payment card has to be similar to that required when handling cash. Payment card holders often do not follow the instruction relating to PIN code safe-keeping.

Many clients are afraid of forgetting the PIN code and consequently make an error of writing it down on a piece of paper and carry it together with their payment card. In this way the clients expose themselves to misusage of their payment cards.

The results of research and performed analyses clearly document the limitations of payment card users in association with their protection and safety. The protective measures from the side of payment card issuers and banks are not sufficient because it is the personal attitude towards the level of safety and protection of data associated with the usage of payment cards that is the most important factor.

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