

**Czech University of Life Sciences Prague**

**Faculty of Economics and Management**

**Department of Economics**



**Diploma Thesis**

**Utilization of payment cards in a chosen market**

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## DIPLOMA THESIS ASSIGNMENT

Bc. Veronika Součková

Economics and Management

Thesis title

**Utilization of payment cards in a chosen market**

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### **Objectives of thesis**

Goal of this thesis is to evaluate market shares of individual credit cards companies and their prospects in the future. Also reasons for the use of credit and debit cards will be evaluated and related to possible growth or decline.

### **Methodology**

For the processing of a literature review will be used method study of literature and legislative standards and methods of synthesis, induction, deduction, and extraction. Information will be gathered both from foreign as well as Czech materials. Current information will be drawn from journals, internet sources and internal documents of the leading companies in the field. Utilizing the methods of description, comparative analysis methods and regression methods.

## **The proposed extent of the thesis**

60 – 70 pages

## **Keywords**

debit card, credit card, VISA, Mastercard, market share, payment methods

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Margaret Hall. 2008. Credit Cards and Checks. Heinemann Library



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## DECLARATION

I declare that I have worked on my diploma thesis titled “Utilization of payment cards in a chosen market“ by myself and I have used only the sources mentioned at the end of the thesis. As the author of the diploma thesis, I declare that the thesis does not break copyrights of any their person.

In Prague on 22<sup>nd</sup> March 2016

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# **Využití platebních karet na vybraném trhu**

## **SOUHRN**

Diplomová práce pojednává o dosavadním vývoji trhu platebních karet, informacích o jednotlivých vydavatelských asociacích platebních karet a platebních zařízeních. Vybrané kapitoly jsou dále věnovány základní charakteristice platební karty, výhodám a nevýhodám jejich použití a bezpečnosti. Také bylo provedeno porovnání využití karet na straně držitele karty a příjemce karty. Dále je provedena analýza současné situace na trhu platebních karet a jsou popsány jednotlivé platební metody. Cílem je provést predikci budoucího vývoje na trhu platebních karet v České republice.

## **KLÍČOVÁ SLOVA**

platební karty, debetní karta, kreditní karta, VISA, Mastercard, metody placení, bezhotovostní platební styk

# **Utilization of payment cards in a chosen market**

## **SUMMARY**

Diploma thesis deals with current development of payment card market, providing information about the largest publishers' associations of payment cards and payment devices. Selected chapters are also devoted to the basic characteristics of payment cards, advantages and disadvantages of their use and safety. Also, a comparison was made with use of payment cards on the side of the cardholder and the card recipient. Furthermore, an analysis of the current situation in the cards market and describes the different payment methods. The aim is to make prediction of future development in the payment card market in the Czech Republic.

## **KEYWORDS**

payment cards, debit card, credit card, VISA, Mastercard, payment methods, contactless payments

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# 1 Introduction

Payment cards have become a common part of life for many people. Mean for them comfort, safety, liberty and personal prestige. The growing public interest leads banks and payment card associations to a wider range of cards on the market, their greater security and higher utility value. In recent years, we experienced very dynamic development. Not only increased the number of cardholders, but also the number of business places that accept payment cards. It is possible to pay with them all over the world. It is no longer necessary to exchange domestic currency for foreign cash.

Future payment card promises even greater application and extension. Even today, the majority of customers in developed countries prefer to pay by payment cards before using cash. Payments via the Internet is rapidly developing, and lacks only a small step towards the introduction of cashless payments using mobile phones. Contactless technologies open up another location in the use of payment cards. Online shopping already make up a significant portion of all purchases and online stores are the biggest segment of the Czech economy, which is growing at this time. Contactless payments, although partially displace cash, but very few people realize that it also saves costs. A businessman who offers contactless payment, can save significant expenses because it cost fall to ensure the counting, transport and protection of cash. Need not address whether it has enough coins required and utilizes so saving time for other activities.

## **2 Objectives and methodology**

### **2.1. Objectives**

The aim of this thesis is to evaluate market shares of individual payment cards companies and their prospects in the future. Also reasons for the use of credit and debit cards will also be evaluated and related to possible growth or decline. The aim is to give an overview of the means of payment, to chart the financial market – particularly in the Czech Republic – and outline the development of means of payment. Defining payment cards position in today's world, their development, and based on the information answer the questions. Where will the development of payment cards in future directed? Are the payment cards and payments made by cards grow, stagnate or payment cards will cease to exist? How this trend will contribute to the technological development in the field of payment cards, which has benefits for users? Finally, the question of whether the money in physical form disappear from the Czech market or whether their use persist?

### **2.2. Methodology**

A prerequisite for the diploma thesis is to introduce the theoretical bases of the issue. Different methods will be used to evaluate the literature, including synthesis, induction, deduction and extraction. Processing literature review will be used method of studying scientific literature and legislative standards. Information will be gather from foreign literature, but also from Czech materials. First of all attention will be focused on explaining the fundamental aspects, which in turn determines the framework of discussed topic. Current information will be drawn from journals, internet sources and internal documents of the leading companies in the field. Utilizing the methods of description, comparative analysis methods and regression methods.

### 3 Literature Review

#### 3.1. History and the emergence of payment cards and cashless payment

Today, money is the obvious thing and is among the largest inventions of mankind. Without money, civilization would not have developed trade, crafts, agriculture or industry. Without money we were at a much earlier stage of development than we are today.<sup>1</sup>

Money was created to facilitate barter. With its emergence, money was divided into two separate acts – the sale and purchase. In economic terms, the money is such a goods, in a certain society serves as a generally accepted medium of exchange, a material possession which is subject to a large majority of indirect shifts in some communities is realized through this form. Money is an assets which have high liquidity and low risk.<sup>2</sup>

*“Everything must be assessed in money, for this enables men always to exchange their services, and so makes society possible”. – Aristotle.*<sup>3</sup>

The idea of paying for goods and services electronically is nothing new. Since 1970s and early 1980s, a variety of schemes have been proposed to allow payment to be effected across a computer network. After a period of exponential growth, millions of people have Internet access worldwide. The electronic payment system started at the end of 1996 and in the earlier part of 1997, a huge variety of different payment methods developed by both academic researcher and commercial interests. Cyber cash launched payment systems that achieved quite extensive deployment but failed to generate

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<sup>1</sup> RADU, Christian. *Implementing electronic card payment systems*. Boston, 2005, page 4

<sup>2</sup> SLAWSKY, Jeff H. *Developing and managing a successful payment cards business*. Burlington, 2005, page 2

<sup>3</sup> CARBAUGH, Robert J. *Contemporary economics: an applications approach*. 2014, page 325

an economic return. At the same time many companies started up new methods of payments for B2C sector.<sup>4</sup>

The path to the emergence of the first credit cards were very long and complicated, accompanied by many technical and business accomplishments that took place mainly in the United States of America. Therefore, the USA is considered the place of origin of first payment cards. Most of the international payment systems and technical solutions originated in the United States, with the exception of smartcards (French patent) and debits cards (Europe).<sup>4</sup>

### **3.1.1. Loyalty payment cards**

For the first predecessor of payment cards, such as we know them today, are considered so-called credit coin, sometimes referred to as marks (metal credit tokens, metal charge coins), whose origin is dated back to 1870. Retailers in the United States gave these coins or identification marks of their regular and loyal customers, who could then buy “on credit”. Retailer led loan account for each customer which had a credit coin. At the end of a predetermined period customer pay back all his loan. When the account has been settled, customer could repeat his “debt” again.<sup>5</sup>

The first payment card in the world was issued in 1914 by American telephone and telegraph company Western Union. It was made of sheet metal and was similar to the military identification labels that are used by many armies. Consequently, these cards have received title “metal money” or “shopper’s plate”. Western Union offered free calls to selected customers and allow them to make calls and send telegrams without immediate payment. Experience has shown that if a customer pays late or in installments, he is willing to pay more. The customer then received an inventory of phone calls and telegrams at the end of the month with their individual prices and the total sum that they once paid by check

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<sup>4</sup> SLAWSKY, Jeff H. *Developing and managing a successful payment cards business*. Burlington, 2005, page 3

<sup>5</sup> BLYTHE, Jim. *Consumer behaviour*. London, 2013, page 299

or bank statement. The company ensured that good customers would increase the use of its service with cashless payments. Therefore, these cards are generally called - **loyalty credit cards**.<sup>6</sup>

In the face of growing competition, the American retail chain, “Sears”, offered its clients hire purchase, initially in its mail-order business in 1915. Within two years, Sears offered some clients credit cards that they could use in its stores to pay. Other retailers soon followed Sears’s example. In 1942, General Petroleum Corporation of California (today known as Mobil Oil) enabled its customers to use a cashless payment system for fuel, spare parts, and a service network of its filling stations in the USA through its own frequent loyalty credit cards.<sup>6</sup>

The first payment cards were made of paper (excluding payment cards Western Union as was mentioned before) and their use allowed customers to spend with ease, no longer relying on cash or checks. The basic principle of their operation and utilization remained unchanged except for minor differences today. The payment process is as follows: clients present a credit card when paying and received from the merchant an account that is signed. The seller is subsequently verified by the issuing corporation comparing the customer’s signature with the signature on the reverse side of the card. If something was wrong, the seller verifies the customer’s identity based on the submitted documents. Control mechanism were added later where the merchant carried a list of invalid cards and was able to verify that a customer’s name was not on it.<sup>7</sup>

Loyalty payment cards have become one of the means competition, and therefore began to be offered by other companies, particularly department stores. They quickly spread throughout the United States. Their holders have become the feature of personal prestige. Their promising development slowed down the economic crisis in the 30th years. Temporary downturn then brought World War II. The war changed the lifestyle of American society. Despite its advantages, frequent flyer credit cards offer one major

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<sup>6</sup> BLYTHE, Jim. *Consumer behaviour*. London, 2013, page 299

<sup>7</sup> EVANS, David S a Richard SCHMALENSEE. *Paying with plastic: the digital revolution in buying and borrowing*. Cambridge, 1999, page 12

drawback. Their use was limited to the business network of the company that issued the card. This disadvantage was eliminated through universal **Charge Card**.<sup>8</sup>

### 3.1.2. Universal payment cards

If the year 1914 can be considered as the emergence of the first credit card, then 1950 can be considered as the year of the first universal payment card.

The year 1950 was the year of the first emergence of universally applicable payment cards, from the club called **Diners Club**. They published a universal credit card called Charge Card for cashless payments in restaurants and later on all contracted hotels, restaurants and shops, with the club included in the contract. By accepting the Diners Card, the risk of insolvency had shifted from the merchant to the retailer. Diners Club has vouched for his clients and bore the risk himself. Company also charged a fee from the amount the customer had paid the merchant. Payment cards have rapidly expanded since 1956 and have over 250,000 clients and more than 9,000 places where it was possible to use the card. Cards were possible acquire by applying throughout the United States, including Canada. The international character of Diners Club proved that they can compete with tourist checks and not be limited to specific regions or businesses. Thanks to an unrivaled number of users and the growing number of merchants who accept the card, its usage has continued to grow.<sup>9</sup>

**American Express** traveler's checks entered the market in 1958, which were subject to fierce competition from Diners Club Card. American Express eventually forced the Diners Club to enter the market with its own credit card. With the acquisition of Universal Travel Card and its own network of locations that accepted American Express traveler's checks, AmEx could offer a new credit card in the first year of operation to 17,500 acceptance points where cards were accepted. Given that American Express wanted

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<sup>8</sup> EVANS, David S a Richard SCHMALENSEE. *Paying with plastic: the digital revolution in buying and borrowing*. Cambridge, 1999, page 12

<sup>9</sup> BLYTHE, Jim. *Consumer behaviour*. London, 2013, page 305



to gain more acceptance locations than Diners Club, he offered to merchants a lower percentage of each transaction.<sup>10</sup>

Since it was possible to use the Diners Club cards in several countries, they were the first international payment cards. In 1965, Czechoslovakia became the first country of the so-called Soviet bloc, where the card company Diners Club was accepted.<sup>11</sup>

### **3.1.3. Bank's payment cards**

American banks began to be interested in credit cards beginning in the late 1940's. They started to investigate the possibilities for a new payment instrument issued by commercial firms. The oldest form of bank cards is considered Charge-It system developed in 1947 by the New York bank credit specialist Flatbush National Bank John C. Biggins. It was a paper document, intended to pay a network of shops in Brooklyn. Stores sold to customers after the submission of paper document from issuing bank, which later has paid to merchant the debt, and later demand this amount on his client.<sup>12</sup>

The first credit card, similar to those of today, released in 1951, was the Franklin National Bank in New York. The card bore the name of the holder and the amount of the credit limit. The card was issued free to trusted clients. After a short trial run, the Bank began offering its cards to clients based on an assessment of their creditworthiness. Clients received a free card and had to pay for purchases.<sup>12</sup>

Since the issuance of cards was very expensive and did not bring the expected profit, they soon halted their extradition. The first successful payment card issued by a bank was Bank of America in 1958 and the new cards were made of plastic. The client data on plastic cards were embossed. The cards were designed to be more durable, had a greater range of security features against counterfeiting and facilitating the process

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<sup>10</sup> GROSSMAN, Peter Z. *American Express: The people who built the great financial empire*. Washington, 1987, page 148

<sup>11</sup> BLYTHE, Jim. *Consumer behaviour*. London, 2013, page 306

<sup>12</sup> CARBAUGH, Robert J. *Contemporary economics: an applications approach*. 2014, page 131

of payment, and a mechanical sensor – imprinter. Procedure for payment was simple, when paying through a special copy paper imprinted information embossed on the card and the merchant's identification label was then printed on the receipt. This payment method removed most of the errors that arose in the normal course manually copying data from the card to the bill. This method of payment remained unchanged today.<sup>13</sup>

The great popularity of BankAmericard also had a negative impact. After the introduction of credit cards the bank estimated its losses at 4% but in fact in the first year it was 22%. They were clients who could not keep their commitments to repay on time, but also they were the cards that have become the target of fraudsters and counterfeiters. Change came in 1961 when the procedures for approving credit limits and the establishment of a new department for enforcement and administration of claims was created. In 1966, Bank of America offered a license to BankAmericard to other banks by providing through its subsidiaries. Banks that took advantage of the offer and purchased a license from the Bank of America saved the cost of developing their own payment cards.<sup>13</sup>

The success of Bank of America, which was followed by other companies inspired them to establish their own association. Then founded a company called California Bank Card Association, which could begin to compete with the famous BankAmericard. For this company later formed Interbank Card Association (ICA, which nowadays is known as MasterCard International). After successfully setting up their own associations for operation of credit cards offer banks the opportunity to purchase additional licenses and join the project.<sup>13</sup>

Issuing cards remained only in the banking sector until 1958 when things changed with the issuance of a non-bank credit card company American Express, which until then had paid tourist services. The credit card company saw a follower of classic traveler's checks, which at that time were used throughout the world. First, AmEx acted with

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<sup>13</sup> SLAWSKY, Jeff H. *Developing and managing a successful payment cards business*. Burlington, 2005, page 98-124

Diners Club to purchase a license, but after several failed negotiations it was decided to establish their own credit cards. The very rapid expansion and popularity of American Express credit cards had a big influence on frequent networks of branches throughout the world and its services were used by many large multinational corporations and wealthy tourists. The company decided to meet its customer's demands by issuing a premium gold card. In the 70 years of the last century there has been a significant development of payment cards and payment systems. American progress became an inspiration for other banks abroad. A successor first appeared in Japan, where the company Japan Credit Bureau (JCB) was founded in 1963.<sup>14</sup>

### **3.1.4. Payment cards in Europe**

The first payment card which gained international acceptance in Europe was issued in 1965 in the Westminster Bank of the United Kingdom. It was a charge card that was offered to select clients in cooperation with Diners Club International. A year after Barclays bought the license from Bank of America and was the first bank that bought such a license outside the US and Canada. In the next six months, Barclays Bank had issued more than one million credit cards, which was named Barclaycard. In the following years there was a strong growth of Barclaycard in the UK but also in other European countries. In 1971 Barclays issued more than 32,000 foreign cards. In 1967, Barclays Bank implemented the first ATMs, which at that time bore the name "Cash Point". The commercial success of credit cards in America fostered a response by European banks and companies to become a part of the trend. Eurocard International was founded in 1965 by the merger of two companies' named British English Hotel and Restaurant Association and the Swedish Rikskort. The registered office was originally in Sweden, where it later moved to Brussels, Belgium (today MasterCard Europe). In 1969 it was closed a strategic partnership with EuroCard International Master Charge (MasterCard).<sup>14</sup>

France became involved after the initial growth from the American companies and in 1967 the Société Marseillaise de Crédit issued punch cards that could be used to withdraw cash from the early forms of today's ATMs. In strong support of the Swedish

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<sup>14</sup> HALL, Margaret. *Credit cards and checks*. 2nd ed. Chicago, 2008, page 15

capital the company SOVAC started to issue gold cards as first in Europe. In 1973, the company SOVAC was purchased by Crédit Mutuel and Crédit Agricole, which was then transformed into society Eurocard France in 1978. At the time, French law forbade banks to charge a fee for issuing and clearing the check. This caused the French bank to seek a solution elsewhere.<sup>15</sup>

The Czech Republic waited some time for the first bank card because of the political isolation of the Eastern bloc. Historically, the first Czech card was a card for Tuzex accounts of Czech Trade Bank in 1988. It was addressed to a limited group of users. The first debit card arrived in 1989 with the Czech State Savings Bank. The card was designed exclusively for ATM withdrawals. The entry of Bank Austria Creditanstalt with Maxim credit card in May 2000 was the biggest rise of credit cards in the Czech Republic. In the last ten years, the Czech Republic has experienced a considerable expansion of payment cards and the number of bank cards.<sup>16</sup>

### 3.1.5. ATM's

ATMs (Automated Teller Machine) have played an important role in the development of computer technology. It was the first computing device served by lay people at a time when people did not have practical experience in using personal computers. They were also the first commercial device that used the encryption systems and were one of the first services that clients could use regardless of official hours of his bank. Therefore ATMs were rightly included in the list of 100 most important inventions of the 20<sup>th</sup> century.<sup>17</sup>

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<sup>15</sup> SLAWSKY, Jeff H. *Developing and managing a successful payment cards business*. Burlington, 2005, page 168

<sup>16</sup> JUŘÍK, Pavel. *Encyklopedie platebních karet: historie, současnost a budoucnost peněz a platebních karet*. Prague, 2003, page 148

<sup>17</sup> *Credit Union Times: 3 Million ATMs Worldwide By 2015: ATM Association* [online]. United States: ALM Media, 2014 [cit. 2015-02-15].

The father of the ATM is considered – John Shepherd-Barron, who resented the limited opening hours of banks. ATMs first saw the light in 1967. The ATM was launched under the name Barclays Cash at bank branch in London Einfieldu. Predecessors of today’s sophisticated ATMs operated on the principle of mechanical rotating cylinders with inscriptions “insert card” and “remove the money”. The client, however, first had to pick up a single partition perforated plate, along with a PIN that is inserted into the ATM, which then issued money folded in envelopes. In 1972, Lloyds Bank introduced the first online ATM, called Cash Point, attached permanently to the banking information system. ATMs read cards with a magnetic strip, which required the use of the most advanced encryption algorithm developed by IBM. In 1982 produced the first two ATMs network International Cirrus and Plus. These networks purchased in 1992 into Visa (Plus) and MasterCard (Int. Cirrus). By the end of 2015 the ATM industry Association predicted there would be 3 million ATMs and the total number of withdrawals of cash from ATMs globally would rise to above 8.6 billion per year.<sup>18</sup>

The basis of the extension of payment and ATM cards is their variable technology is able to meet the needs of individual users and with technical capabilities. These conditions must assign the economy of the entire system on the one and cost savings for unrealized cash transactions on the other. Credit cards change the order of the customer’s personal withdraw of money in the bank and replace it by submitting a document on a merchant’s transaction on the basis of the customer’s account is debited. This leads to simplified payment transactions and easy cash withdrawals.<sup>19</sup>

An ATM is a self-paying device that gives cardholders cash. It is operated via payment card being inserted into a special reader. After entering the PIN (numeric code) and selecting the desired amounts of banknotes, then machine issue money. Current ATMs are on-line and connected to the authentication system that verifies the authenticity of the information stored on the credit card, PIN and the correctness of sufficient cash

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<sup>18</sup> SLAWSKY, Jeff H. *Developing and managing a successful payment cards business*. Burlington, 2005, page 179-180

<sup>19</sup> *Credit Union Times: 3 Million ATMs Worldwide By 2015: ATM Association* [online]. United States: ALM Media, 2014 [cit. 2015-02-15].

balance in the account of the client. The standard functions allows you to perform certain non-cash ATM functions, such as simple payment instructions, account statements, change of PIN codes and depositing money as a deposit. This can be done also by so-called intelligent method, where banknotes are automatically recognized in the dispenser and are credited to the account of the client.<sup>20</sup>

ATMs can be divided into two basic types –the inside, which are installed at bank branches or in shopping centers, or on the outside which we meet on the streets. Both types can be either embedded in the wall or free-standing. The lifespan of an ATM is between eight to ten years. According function ATMs can be divided into mono-functional, multi-purpose, recycling and mobile.<sup>20</sup>

**Monofunctional** ATMs serve only to withdraw cash or to check the account balance. Previously, customers could only use their bank’s ATMs but now the possibility of using the network of ATMs of many banks around the world.

**Multifunctional** ATMs serves both to withdraw cash and to store cash. These devices are connected to the Internet and are not able to replace many functions of a bank branch, but they can also offer third party services. Outside the financial services offered, for example, determining the results of sporting events, reading reviews of films or even ordering catalogs. May sell postage stamps, tickets to cultural events, traveler’s checks, etc. ATMs enable cardholders to check the status of their normal or loan accounts and payment card accounts, collect money from them and buy directly from ATM’s of various branches.

**Recycling** ATMs offer customers the possibility to impose or collect bills through a bank card or other means, from their bank accounts. These banks are called recycling because they verify the authenticity and the use of banknotes (which can also be traced to their previous owner), and in the case of withdrawals may be issued banknotes that had been deposited by other customers.

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<sup>20</sup> SLAWSKY, Jeff H. *Developing and managing a successful payment cards business*. Burlington, 2005, page 180-182

**Mobile** ATMs are portable devices that are significantly different from conventional ATMs. The banking systems communicate wirelessly. Their operation is only required electric current and the presence of the data signal. An integral part of the ATM is a mobile stand that ensures not only stability, but also protect against tampering, theft or vandalism. Mobile ATMs are under continuous monitoring and provide the same range of services as standard ATMs. They are usually installed such as summer festivals and frequently visited tourist sites.<sup>21</sup>

ATMs are developing new features including the use for other active operations of the client when an ATM can conclude loan agreements, apply for a new type of credit card, recharge a cell phone, buy movie tickets etc. This is a special control system located directly in banking institute.

### **3.2. E-commerce**

It is a broad term used to describe all business transactions made over the Internet and other electronic devices. The basis for e-commerce online stores are primarily a problem that related to them. This includes most of the activities under the electronic marketing (e.g. online advertising, email marketing, activities to support Internet business and commerce, various affiliate programs – marketing tool for internet companies that works on connectedness seller of products or services with pages that service or product recommend a system based on product promotion companies through the pages of affiliate partners who are deemed to receive a share commission on sales). In the broader sense, until the concept of e-commerce include also any website that offers specific products or services and enable their order by e-mail, for example.<sup>22</sup>

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<sup>21</sup> SLAWSKY, Jeff H. *Developing and managing a successful payment cards business*. Burlington, 2005, page 182

<sup>22</sup> PEIRCE, Michael, Hitesh TEWARI a Donal O'MAHONY. *Electronic payment systems for E-commerce*. 2nd ed. Boston, 2001, page 140

Together with other programs, such as e-learning, e-commerce is part of e-business. Usually, we can also distinguished it according to the target group on e-commerce focused on retailers and e-commerce focused on end customers.<sup>23</sup>

With e-commerce is closely related an electronic payment system. Electronic payment systems are an electronic alternatives to traditional online payment methods. Their great advantage is that sensitive information is not getting through to the merchant and thus increased safety. Electronic systems can be divided by the time the funds are used to make the payment to:

- Prepaid payment systems
- Pay-now payment systems
- Pay-later systems

For prepaid payment system must first send the necessary funds for their account and can be then executed payment transaction. The other two alternatives mentioned are similar, it is possible to have it connected to your credit card (first you need this card in your user account to register) from which payments are made.<sup>23</sup> The world's most well-known payment systems are PayPal, Skrill or PaySec.

### **3.2.1. Electronic payments (e-payments)**

It is a method of value exchange in electronic commerce, where the value is transferred via the Internet and communication technologies. The electronic payment systems have evolved from traditional payment systems and consequently the two type of systems have much in common. Electronic payment systems are much powerful, especially because of the advanced techniques in security that have no analogs in traditional payment systems. An electronic payment system denotes any kind of network service that includes the exchange of money for goods or services. E-payment is conducted

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<sup>23</sup> PEIRCE, Michael, Hitesh TEWARI a Donal O'MAHONY. *Electronic payment systems for E-commerce*. 2nd ed. Boston, 2001, page 140-142



in different e-commerce categories such as Business-to-Business (B2B), Business-to-Customer (B2C), Consumer-to-Business (C2B) and Consumer-to-Consumer (C2C).<sup>24</sup>

In order to participate in the electronic payment system the customer and the merchant should access the Internet and initially they have to register with the corresponding payment service provider. Here the gateway acts as the intermediary between the traditional payment infrastructure and the electronic payment infrastructure. Customer and the merchant have their bank accounts at the bank that is connected to the clearing network. The issuer bank actually issues the payment instrument that the customer uses for his payment. The acquirer bank acquires the payment records.<sup>24</sup>

The major reason for developing an electronic payments system is that it provides organisations and consumers with a means of integrating individual commercial services into an electronic market place. Companies and consumers will get benefit from the e-payment system. Consumers will benefit because on-line shopping is convenient and saves time and companies will benefit from virtual markets because the concept of online shopping can make their business communication easier and cheaper.<sup>24</sup>

### **3.3. Typology of payment cards**

Payment card refers to a small, plastic card with the data identifying its owner. In the broadest sense, it may be a name, photograph, signature, magnetic wand, but also chip or perhaps a thumbprint. Identification and authorization of payment of services or goods, and many others is now done by card.<sup>25</sup>

#### **3.3.1. Requirements of payment cards**

Nowadays, the credit card is defined as an instrument made from three-layer plastic (PVC), which must meet international norms and standards of ISO 3554, for which

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<sup>24</sup> PEIRCE, Michael, Hitesh TEWARI and Donal O'MAHONY. *Electronic payment systems for E-commerce*. 2nd ed. Boston, 2001, page 142-144

<sup>25</sup> CARBAUGH, Robert J. *Contemporary economics: an applications approach*. 2014, page 158

ISO standard specifies the exact physical properties of the card. Card size 85.6 x 54.0 x 0.76 mm, nominal thickness of cards 0.76 mm and rounding the edges with a radius of identification cards (such as the Czech Republic or identity cards driving licenses).<sup>26</sup>

In the bottom half of other front side card are all the identifying information. The first line is for twelve to sixteen digit credit card number (the standard Visa or MasterCard number are 16, but 12 numbers have for example Diners Club). The first two digits of the card express card issue area (eg. Visa credit card always start with the number 4, MasterCard starts with number 5 and 9 is for national systems). Another 5 numbers are reserved to identify the card issuer and card type of card association. Together with the first number of the cards are referred to as the Bank Identification Number (BIN). According monitored BIN credit associations, which the bank issued payment card and what type of payment card it is. On the second line must be stated expiration period of payment cards and only abbreviated “MM / YY”. The third line is for the name and surname of the cardholder, but given the size of the card is limited to a maximum of 27 characters, so it may happen that holders of a long name and surname on the card has only the initials of the first name. The last line is only for corporate/business purpose. The name of the company is for those whose account was published.<sup>26</sup>

The back side of the card contains the magnetic strip “magstripe”, which serves as a support medium for the identification data and is used in the implementation of electronic transactions. It also shows the three-digit CVV or CVC code that serves as a protective element for internet payments. As another on the back of the card is a space for a client handwritten signature that serves reference to prevent fraud.<sup>26</sup>

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<sup>26</sup> CARBAUGH, Robert J. *Contemporary economics: an applications approach*. 2014, page 158-160

### 3.3.2. Types of payment cards

During the development of payment cards, various kinds of cards were created and they expanded the possible ways of their usage, performance and security. Credit cards can thus be divided according to various criteria:<sup>27</sup>

- a. method for clearing transactions
- b. kind of record on the card
- c. method of their use
- d. scope of their use
- e. the type of user
- f. marketing
- g. association

#### **a. Method for clearing transactions**

Probably the best known and the most frequently used method of dividing payment cards is to show how the settlement proceeds. Payment cards can be divided into several groups:

- debit cards
- credit cards
- charge cards
- prepaid cards
- electronic wallet

#### **Debit cards**

Debit cards are payment cards issued by financial institutions for current and savings client accounts. They are linked directly to consumers' deposit or brokerage accounts, allowing instant access to cash from ATMs around the world and at many retail point-of-sale locations. Debit cards allow the customer to draw only their own funds to the client's account up to the amount of the available balance, to which is usually included as

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<sup>27</sup> MasterCard Worldwide: *All about payment cards* [online]. 2005 [cit. 2015-02-16].

an overdraft loan. Transactions are debited to the current account in real time or with minimal delay.<sup>28</sup>

### **Credit cards**

In the case of credit cards, it is not only a standard payment instrument in the form of a plastic credit card, as most people still mistakenly believe. A credit card offers consumers and businesses short-term lines of credit and a variety of repayment options. Having a line of credit gives consumers the ability to cover unexpected or large expenses as well as make basic everyday purchases. A credit card allows the client to draw credit in a pre-agreed maximum amount that can repay the client at any one time, or client can pay on a monthly basis in the form of regular payments. Credit cards do not offer its owner a convenient method for a loan in comparison with consumer credit or an overdraft of loans. Its use may be in addition to reimbursement also suitable for bridging short-term lack of finances, or the medium-term consumer loan, which will be the licensee agreed to pay regular installments.<sup>28</sup>

The drawn amount of the loan is then charged to the client in interest, except when the client repays the amount owed in the interest-free period. This period can last up to 60 days from the date the transaction takes place. Here the client must be careful on what types of transactions are covered by the grace period, usually the purchase of goods and services at retailers, online payments and in some cases even on cash withdrawals.<sup>28</sup>

### **Charge cards**

Charge cards are the oldest type of payment cards at all. The principle of operation is based on the fact that the cardholder may use the card to pay for goods and service, cash withdrawals, but does not receive money from his own account. The client has a pre-fixed period of between 14-50 days, and have a commitment to settle the card account in full and pay no interest, even though it is a short-term consumer loans. Client purchases are approved based on a variety of factors, including credit record, account history or personal resource.<sup>29</sup>

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<sup>28</sup> MasterCard Worldwide: *All about payment cards* [online]. 2005 [cit. 2015-02-16].

<sup>29</sup> CARBAUGH, Robert J. *Contemporary economics: an applications approach*. 2014, page 164

## **Prepaid cards**

Prepaid cards, also known as a stored-value card, are today's fastest growing payment method. A set amount of money is "loaded" onto the card prior to use. Many of prepaid cards can be reloaded repeatedly. During the transaction, the purchase amount is withdrawn from the card's value. Recognizing the flexibility and control offered by prepaid cards, companies are beginning to use them for employee benefits. There are two types of prepaid cards, single-purpose and multipurpose. Single-purpose cards are designed for a specific merchant or purpose. These include store-branded cards or benefits cards offered by employers. Multipurpose cards are prepaid for example to used to access cash at ATMs and to purchase goods and service wherever are cards accepted. As example of cards can be gift, payroll and EBT cards.<sup>30</sup>

## **Electronic wallet**

The electronic wallet is intended for the payment of small sums usually without being authenticated with a PIN code. The funds are not stored on any account, but are stored or uploaded directly in an electronic wallet. Clearing occurs once, meaning there is only a single charge and each transaction is immediately deducted from the electronic wallet. In practice, they are distinguished by two systems of electronic wallet, called centralized and decentralized systems. The principle of operation of the system is decentralized in immediate execution of the transaction without involving publisher wallets. This means that the payment is made directly from one electronic wallet to another. The great weakness of this system is the need for the appropriate hardware, but it can very easily replace cash. For electronic wallets take place clearing in a way, that the card issuer will issue an electronic wallet. The client then stores the cash for so-called "floating account" at the bank after the payment of merchant receive a summary of transactions that were made with him, and bank transfer fund from floating account to merchant's account.<sup>31</sup>

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<sup>30</sup> CARBAUGH, Robert J. *Contemporary economics: an applications approach*. 2014, page 164-165

<sup>31</sup> EVANS, David S a Richard SCHMALENSSEE. *Paying with plastic: the digital revolution in buying and borrowing*. Cambridge, 1999, page 44-46

## **b. Kinds of records on the card**

Another method is dividing payment cards based on the type of recording data on a credit card. It significantly affects the possibility of its further use. According to the data recording features of the payment card, it be divided into the following groups:

- magnetic record
- embossed record
- chip payment card
- laser payment card

### **Magnetic record**

Adding a magnetic strip on a payment card took place later in the 1970's. Nowadays, a magnetic strip is divided according to ISO 3554 on three tracks on which are encrypted payment card and client information. The first track contains 70 alphanumeric characters and is encoded with the full name and card number. The second track contains numeric characters. It was designed for so-called online transactions and is mostly used for the payments. The third track of magnetic stripe contains up to 107 numeric characters and is encoded currency, financial limit, publisher's country and other information. Magnetic strips are never encrypted PIN code. Due to the limited maximum capacity of magnetic strips (1288 bits) and relatively easy possibility of its misuse by the method called skimming, today's cards are mainly used in parallel with other security and recording features.<sup>32</sup>

### **Embossed record**

The record can be subdivided into embossed and non-embossed cards. Embossed cards have identifying information on the front of the card. Conversely, non-embossed cards are flat and identification data is printed on the card. This technology is in the personalization of cards called ident. The significant difference is in the use. With embossed payment card is possible to perform so-called paper-based transactions, which

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<sup>32</sup> EVANS, David S a Richard SCHMALENSEE. *Paying with plastic: the digital revolution in buying and borrowing*. Cambridge, 1999, page 61-62

are carried out by a mechanical sensor imprinter. This payment method was often used in the past but it is still possible to meet it. Its use is very easy for traders and is associated with the low cost of the hardware. Unfortunately, there are a wide range of misuse with this payment method.<sup>33</sup>

### **Chip payment cards**

Progress in the development of computer technology and microchips could not avoid payment cards. The chip on the payment card serves as a secure storage medium for recording and reading data. Smart cards can be further divided into two categories according to function. The banking sector mainly uses a programmable microprocessor with the highest level of protection of stored programs and data. Programmable microprocessor serves as a repository of data and communicates with the payment terminals and ATMs. Unlike magnetic strips, the PIN code is stored in the chip card with information on the available balance in the account of the client. The big advantage of smart cards is higher security compared to other types, which consists in verifying the transaction PIN code, available resources and enhanced utilization of the chip on the card for other application, such as electronic wallet.<sup>34</sup>

### **Laser payment cards**

Laser recording technology is the same technology used on the recording of compact discs (CD, DVD). Compared to smart cards, they have higher memory capacity that can be up to 4MB and thus there is a possibility to record large amounts of data. Large storage capacity carries certain limitations and disadvantages. Recording media covers a larger portion of the payment card and once recorded data can no longer be removed. Another disadvantage is that payment cards are not able to actively defend against copying, as it is common for some types of smart cards. The financial sector has not yet seen a massive expansion of this type of payment cards due to large disadvantages.<sup>34</sup>

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<sup>33</sup> EVANS, David S a Richard SCHMALENSEE. *Paying with plastic: the digital revolution in buying and borrowing*. Cambridge, 1999, page 62-68

### **c. Method of payment cards use**

There are several ways of using payment cards. These evolved according to cardholder's requirements and preferences and the institutions issuing the cards, which are: embossed and unembossed cards, electronic and contact-less cards.

#### **Embossed cards**

The card with the widest use which can be used on the imprinter. An imprinter is a mechanical sensor designed for embossed cards and fingerprint identification label on the merchant sales receipt in the implementation of cashless payment using of point of sales. It is a payment terminal at a merchant or bank branch to accept payment card for cash advance or cash back, at an ATM or over the internet. The card can be recognized easily by the raised lettering. Embossed cards bear the embossed indication of the card number, cardholder name, card validity and hologram of publishing association.<sup>34</sup>

#### **Electronic cards**

Technicians developed the idea of placing a payment card magnetic strip and using it to record data required for the transaction in the 1970's. This opened possibilities for the gradual computerization of payment cards and their transactions. The cards are designed to make withdrawals from ATMs, pay at electronic payment terminals, online payments and more recently some banks are beginning to offer the possibility of deposits in current account through an ATM. The cards are equipped with a magnetic strip, with information on the card holder and the validity of the card.<sup>35</sup>

#### **Unembossed cards**

Non-embossed card are designed for electronic transactions for payments on the internet and ATMs. At first glance it may look fake – the card is plain.<sup>35</sup>

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<sup>34</sup> EVANS, David S a Richard SCHMALENSEE. *Paying with plastic: the digital revolution in buying and borrowing*. Cambridge, 1999, page 81

<sup>35</sup> CARBAUGH, Robert J. *Contemporary economics: an applications approach*. 2014, page 192



## Contact less cards

Contactless payment is a transaction that is made by credit card or other payment device (eg. mobile phone or other contactless payment devices). This device does not need to be physically inserted into the payment terminal, but simply proximity to the terminal at a distance of several centimeters. The card has a built in chip and radio antenna. Account information is transmitted to the reader and subsequently processed in the usual way via a secure network to card receiver.<sup>36</sup>

Data is transmitted by contactless radio frequency identification technology (RFID – Radio Frequency Identification) based on global standards for contactless payments. Communication takes place when the card is accompanied by a few centimeters to the reader (up to 10 cm), the transaction takes about 5 seconds. Immediately after placing the card, a beep will receive confirmation of payment and the transaction is completed. Cardholder authentication via signature or PIN is usually required for a certain limited amounts. This obviously poses an increased safety risk of lost or stolen cards. The protection of client account balances in the form of the upper limit is therefore combined with the maximum number of payments to be done contactless offline and whichever limit is reached first.<sup>37</sup>

The main advantage of contactless payment cards is the speed at which payment is made. In most cases, the payment is made within five seconds, resulting in shorter waiting times at the cashier's desk of traders and in comparison with classical payment does not give the holder card from his hand. This payment is much safer because there is less likelihood of leakage and misuse of card data. Contactless payments are also convenient because the cardholder does not need to carry cash and all contactless payments are free.<sup>37</sup>

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<sup>36</sup> RADU, Christian. *Implementing electronic card payment systems*. Boston, 2005, page 228-231

<sup>37</sup> *Contactless Payments: Delivering Merchant and Consumer Benefits* [online]. New Jersey: Smart Card Alliance, 2004 [cit. 2015-02-18].

#### **d. Scope of payment cards use**

The first credit card was only made possible in the publisher's network. Bank cards could only be used in ATMs issuing bank, as they were not built with sufficient conditions for verification and settlement of transactions between banks themselves. Then, when it came to solving this problem, banks began to address issues of acceptance of their cards abroad and so the emergence of international payment cards was created. The cards can be divided according to their scope of use:<sup>38</sup>

- only business network of supplier
- regional cards
- national cards
- international cards

#### **e. Division according to the type of user**

According to the type of user can be divided payment cards as follows:

- personal cards
- business cards
- cards without identification

Personal cards are the largest group of payment cards. These cards are issued to the name and are not transferable. The holder can use them for everyday payments. Business cards are issued to employees of companies or state institutions. These cards are used to cover expenses associated with the performance of job duties. Cards without identification do not label on the holder and are portable. Today, they are used as a marketing tool for a variety of competitions, which is a chance to win a prepaid card for a certain amount or they can be used as a prepaid gift card.<sup>39</sup>

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<sup>38</sup> RADU, Christian. *Implementing electronic card payment systems*. Boston, 2005, page 238

<sup>39</sup> CARBAUGH, Robert J. *Contemporary economics: an applications approach*. 2014, page 201

**f. Marketing division**

**Basic cards** are achievable for most clients. These include debit cards for cash withdrawals from ATMs and electronic payments. They are issued for the current account and they are not a separate product without the account.

**Prestigious cards** are offered to very financially secure customers and the conditions of their release are stricter than for standard types of cards (typically for embossed cards).

**Exclusive cards** are offered to a narrow circle of top clients (eg. different gold or platinum card).

They play an important role as complementary services to the cards, such as personal accident and travel insurance or insurance necessary medical expenses that increase the utility value of the card and its competitiveness.<sup>40</sup>

**g. Co-branded and Affinity cards**

One of the bases of success is proper market analysis and client segmentation. Marketing general products with increased competition and market saturation becomes less effective and more expensive. It is important, therefore, to have knowledge of the customers and their maintenance; it is 8 to 10 times cheaper than getting a new customer.

**Co-branded cards**

Cards are issued in conjunction with the bank or other financial institution in cooperation with commercial institutions. They focus on both sides of business. They were introduced in the late 80s. Many features are shared with Affinity card but some are different from them. The most significant difference is that the target cardholder is usually a very good customer partner. Often holders of co-branded cards former are users of payment or loyalty cards, department stores, airlines and others.<sup>41</sup>

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<sup>40</sup> RADU, Christian. *Implementing electronic card payment systems*. Boston, 2005, page 241-242

### **Affinity cards**

These cards are issued by banks or specialized organizations, together with non-commercial entities, such as interest or charitable organizations. Their goal is for the payment cards issuer to obtain specific group of people who share a common occupation, common interests or membership in special interest clubs. To have a successful card, programs must be members of the target group bring special value addition.<sup>41</sup>

### **3.4. Payment card security**

Just like existing types of payment (coins, banknotes, checks) or stamps, even credit cards have not escaped the attention of criminals. From the beginning the misuse of cards occurred and quality forgeries were different. It is therefore necessary to introduce ways to protect them against possible abuses. A series of security measures were developed to ensure protection against unauthorized card use or counterfeiting. Card issuers and associations that operate payment systems have extensive teams of experts, which deal with the investigation and detection of unauthorized transactions and also take care of the continuous development of safety measures and elements that have resulted in the prevention of these fraudulent transactions.<sup>42</sup>

No payment system is now able to absolutely prevent damage resulting from misuse of credit cards. The main objective is to achieve control over the offenses. Protective measures must be such as to overcome them by requiring fraudsters to incur large financial costs. The positive result of measures introduced is a long-term declining rate of losses from fraud. At the same time, the actual level of risk arising for the bank is associated with the type of payment cards.<sup>43</sup> There is great hope that smart cards will provide several orders of a higher degree of security than cards with magnetic recording. A number of fraud involved direct marketers, whether voluntarily or under duress. The new security measures significantly decreases losses from the misuse of stolen and lost cards and non-delivery of cards to the client by mail. A large number of banks currently pass

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<sup>41</sup> RADU, Christian. *Implementing electronic card payment systems*. Boston, 2005, page 241-242

<sup>42</sup> BRENTON, Chris a Cameron HUNT. *Mastering network security*. 2nd ed. San Francisco, 2003, page 40

cards to clients exclusively on its branches and possibly by mail upon written request of the client. In 1981, MasterCard introduced the world's first card protection against counterfeiting, the dimensional image (hologram). In subsequent years, its example was followed by VISA and by other issuing association.<sup>43</sup>

Protection of payment card systems can be divided into several areas that blend together:

- Protecting your data against alteration and forger
- Protection against card misuse by a person other than the holder

### **3.4.1. Card misuse by an unauthorized person**

Fraudsters exploit the situation when the card is found or stolen or impersonates the cardholder. Any loss is the responsibility of the cardholder under the terms of the bank that issued the card. In the European Union, the risk is restricted with 150 euros, further damages are carried by the card issuer. This also applies if the client did not cause damage through gross negligence or complicity in the offense. It is very important that the cardholder check whether it still owns the card and in the event of loss or theft immediately inform bank institution which issued the card. Banks do this through the declaration of loss carry out a so-called stop list of card. The card can not be immediately used in the payment terminal or ATM. Unfortunately, there is still the possibility of misuse of cards imitating the signing of a transaction imprinter. Fraudsters now focus on how to obtain the card as well as to acquire holder's PIN code.<sup>44</sup>

The past twenty years have seen an increase in studying biometrics and verifying the identity of the cardholder. Biometric systems identify the right person. It is based on the fact that different parts of the human body are unique for each person and therefore can be used for the verification. The advantage of biometrics is its reliability (proven technology), practicality (nothing to lose or forget), zero operating costs, no possibility to deceive, speed (no need to look for anything). Among the best known biometric methods include fingerprint, record of eye retina, dynamic signature analysis,

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<sup>43</sup> *Cyber Source: Online credit card fraud trends and Merchant's response* [online]. 2002 [cit. 2015-02-22].

an analysis of the voice. For example the method of analysis of voice has been used by First National Bank in South Africa at ATMs designed for illiterate population. Although it is expected that biometrics will play an important role in securing payment card against misuse stranger, none of the current methods, meets the banking requirements.<sup>44</sup>

### **3.4.2. Misuse of counterfeit card**

This criminal activity is mainly carried out by organized groups of fraudsters, mostly of the international character. Data cards, which are incorporated in the chip and magnetic stripe can be copied. These data are recorded on the card in another country and it is used mostly for cash withdrawals via ATMs without EMV standards.<sup>45</sup> Very dangerous form can be a contactless payment card. For a short distance can copy the data that can be recorded within seconds on a counterfeit card. Producing a card difficult protective elements such as a hologram, a special signature strip sensitive to chemicals and gumming or chip cards with programmable microprocessor can help prevent fraud.<sup>45</sup>

### **3.4.3. Misuse of delivering cards**

Payment cards are usually delivered by mail. Fraudster may authorize such cards prior to delivery and sign the signature strip. Card can be use to make purchases when fraudster pretends to be the owner of the card. Currently, banks protect that PIN and payment card when forwarded separately and more clients card picks up in person at bank branches.<sup>45</sup>

### **3.4.4. Fraud without the presence of card**

These scams are becoming more prevalent and continue with the development of online shops. Cheaters in this environment need not see the card. Information about the card and cardholder can be obtained by a variety of ways, such as e-mail.<sup>46</sup>

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<sup>44</sup> *Cyber Source: Online credit card fraud trends and Merchant's response* [online]. 2002 [cit. 2016-02-15].

<sup>45</sup> BRENTON, Chris a Cameron HUNT. *Mastering network security*. 2nd ed. San Francisco, 2003, page 45

### **3.4.5. Misuse of personal data on the card**

The fraud follows the theft of personal data which are compromised in two ways. Fraudster asks the bank on behalf of holders for new card and he will use it for payments. Another case may be that a fraudster convinces the bank to change the data of the card, and issue the second card. In the second case there is a change of data which causing instant access to account of the true cardholder.<sup>46</sup>

## **3.5. Card associations**

International association are organization owned by financial institutions that licenses payment cards for a specific brand. These associations also perform operational functions for its members. It can be transaction processing, authorization or interchange settlements and fee processing. The best-known bank card associations, Visa, MasterCard, American Express and Diners Club have become publicly-traded companies. They compete between themselves with other companies issuing payment cards. (Investopedia – bank card association).

### **3.5.1. American Express**

In October 1958, after a long discussions in company “The American Express Credit Card” was published on purple paper. The current green color was not obtained till 1967. The acceleration of manual transactions and counterfeiting made it harder to bring plastic emossed card in 1959. The company brought in the card industr’s many innovations and rightly called a pioneer. Despite the difficulties, many companies managed to create one of the most recognized global brands and retain primacy in the sale of traveler’s checks.<sup>47</sup> American Express issued already around 112.2 million payment cards worldwide. The company’s principal products and services are charge and credit pamynet card products and travel-related services offered to consumers and usinesses around the world.<sup>48</sup>

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<sup>46</sup> *Cyber Source: Online credit card fraud trends and Merchant’s response* [online]. 2002 [cit. 2016-02-15].

<sup>47</sup> *American Express: About American Express* [online]. 2015 [cit. 2015-02-15].

<sup>48</sup> *American Express: Number of payment cards in circulation worldwide* [online]. 2015 [cit. 2015-02-15].

### **3.5.2. MasterCard**

In 1960 the Interbank Card Association was founded. This association was established by banks that were not part of a payment system owned by Bank of America. This subsequently was repurchased with exclusive rights to use the trade name Master Charge (since that was the name of MasterCard – originally established in 1979). During the first year company notionally divided the front of the credit card. One half is provided to publishing institutions for free use and second part is filled with the MasterCard logo. MasterCard was the first association that added in 1981 hologram to his emblem which serves to this day as the security and protective element.<sup>49</sup> It currently has issued 721.4 millions cards and include MasterCard, Maestro and Cirrus. MasterCard cards are the most widely accepted payment cards in the world with more than 30 million acceptance locations and 1 million ATMs. Is a technology company connects consumers, financial institutions, merchants, governments and business around the world. The Company enabling them to use electronic forms of payment instead of cash and checks. Also it provides a variety of products and solutions that support payment products that customers can offer to their cardholders.<sup>50</sup>

### **3.5.3. VISA**

The history of Visa cards start in 1958. Meeting were held in September 1974 in Canadian Vancouver which resulted in the founding of the International Bank Americard Incorporated (IBANCO). Later in 1977 rename to VISA (VISA USA and VISA International). Visa card provides a simple and secure way to pay for small things of everyday life. It is accepted everywhere in the world and today is the larges international payment card system. The company provides a variety of payment solutions that support payment products that issuers can offer to their accounts. It can be paid now with debit card, or in advance with a prepaid card or paid later with credit products.<sup>51</sup> VISA payment cards have issued around 883.5 milions. This number include VISA Electron, VISA Classic and VISA Gold. The company provides its service to consumers, businesses,

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<sup>49</sup> *Master Card: About us* [online]. 2015 [cit. 2015-02-15].

<sup>50</sup> *Reuters: Master Card profile* [online]. [cit. 2015-04-25].

<sup>51</sup> *Visa: About Visa Int.* [online]. 2015 [cit. 2015-04-25].



financial institutions and governments in more than 200 countries and territories for payments.<sup>52</sup>

#### **3.5.4. Diners Club**

Diners Club International was founded in 1950 when they released the first universal payment card usable at multiple venues. After a year the company issued more than ten thousand cards and these cards were accepted in Canada and the United States. Diners Club payment cards are accepted in more than 18 million contract partners in 185 countries and are accountable in seventy local currencies. Around 5.8 million payment cards circulates worldwide. In addition, holders of Diners Club card have the choice to withdraw money in more than 1 million ATM machines or at bank branches and exchange in offices worldwide.<sup>53</sup>

#### **3.5.5. JCB – Japan Credit Bureau**

The JCB company was founded in 1961 in Tokyo, Japan. JCB established dominance over the Japanese payment card market. Since 1981, JCB has been expanding its business worldwide. JCB brand is accepted in 190 countries and territories, with more than 20 subsidiaries and representative offices and alliances with more than 250 business partners worldwide. Over 89 million people around the world use JCB cards and it is accepted by 29 million merchants.<sup>54</sup>

Visa and MasterCard companies have dominated the world payment card market. Together, they share on purchase transactions for about 84.74%. In 2014, Visa had a 58.14% market share on purchase transactions and MasterCard 26.6% but according to information from the association, more MasterCard cards are in circulation than Visa cards. Their only competitor currently is American Express (AmEx) with a 3.61% share.

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<sup>52</sup> Reuters: *Visa Int.* [online]. 2015 [cit. 2015-04-25].

<sup>53</sup> *Dinners Club: About us* [online]. 2015 [cit. 2015-04-25].

<sup>54</sup> *JCB: About the JCB brand* [online]. 2015 [cit. 2015-04-25].

**Table 1. Worldwide market share on purchase transactions of cards associations from 2009 to 2014**

	<b>VISA</b>	<b>MasterCard</b>	<b>American Express</b>	<b>Diners Club</b>	<b>JCB</b>
<b>2009</b>	64.79%	26.5%	3.29%	0.14%	0.73%
<b>2010</b>	66.01%	25.18%	3.71%	0.13%	0.71%
<b>2011</b>	63.21%	25.87%	4.04%	0.38%	1.1%
<b>2012</b>	61.20%	26.08%	5.01%	0.5%	1.1%
<b>2013</b>	60.31%	26.43%	3.7%	0.8%	1.6%
<b>2014</b>	58.14%	26.60%	3.61%	0.9%	1.6%

Source: Own data processing; internal materials from MasterCard association

## 4 Practical Part

### 4.1. Payment cards and payment systems in the Czech Republic

Citizens could meet in 1968 with payment cards when the travel agency ČEDOK started to accept payments by Diners Club cards. The cards were accepted in the network of branches (in ČEDOK), in stores Tuzex, in ČSA offices and in other places. This was followed by American Express and in 1990 Eurocard/MasterCard, JCB, VISA and others followed. ČEDOK was the mediator who concluded contracts on the acceptance of payment cards with selected merchants, trained personnel, provided imprinters, receipts, authorization and clearing with foreign traders. The first payment cards issued in 1988 Živnostenská Banka, which was the only bank had a branch abroad (in London). In 1989 offered the Czech and Slovak State Saving Bank to its employees the card to their giro accounts, which was used to withdraw cash from an ATM. The first ATMs operated offline and financial limit and PIN have been recorded on the magnetic stripe. Physically was ATM located in its headquarters on Wenceslas Square. Since 1990, ATM card has been offered to all owners of giro accounts.<sup>55</sup>

Payment cards are now completely standard products that financial institutions offer to their clients. They allow us to make payments at merchants, withdraw money from ATM's and other transactions among themselves without having to carry cash. Under the umbrella term "payment card" find more kinds of cards of different features and services linked to them. Payment cards can be divided into groups according to various criteria. The basic division are debit cards and credit cards. Another division is possible by way of postings or the way the bank to the money that had been spent using the card, mechanisms such as embossed cards or e-cards, breakdown by issuing association and model, according to the territorial division of force and, not least, by the technology used.

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<sup>55</sup> JUŘÍK, Pavel. *Encyklopedie platebních karet: historie, současnost a budoucnost peněz a platebních karet*. 1. vyd., 2003, page 12

In 2014 the Czech Republic had around 11,027,000 payment cards. This stems from the statistics of the Bank Card Association. By the end of September, clients of banks owned 8,700,000 debit cards, more than 2 million credit cards and 276,000 charge cards. The Czech market is issued 7.4 million contactless cards, which can be used for contactless payments at nearly 60,000 points of sale. This represents a year-on-year increase of 7.58% between years 2013 and 2014.

**Table 2. Development of cards issued in the Czech Republic from 2005 until 2014**

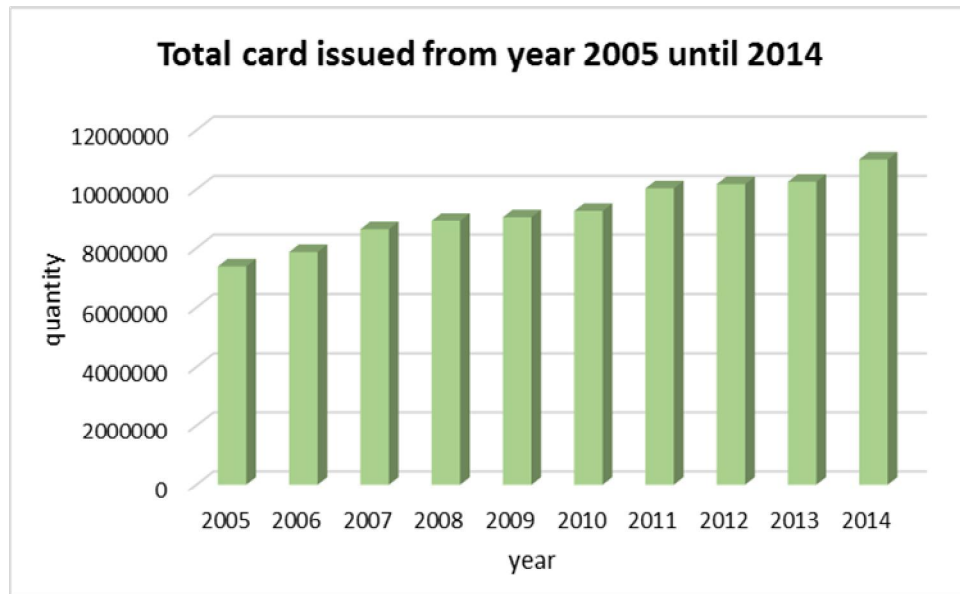
	2005	2006	2007	2008	2009
<b>Total</b>	7,390,357	7,865,453	8,623,124	8,931,872	9,054,308
<b>Debit</b>	6,418,446	6,602,775	6,974,147	7,220,667	7,372,327
<b>Credit</b>	614,542	885,266	1,212,401	1,276,714	1,224,814
<b>Charge</b>	357,369	377,412	436,576	434,491	457,167

	2010	2011	2012	2013	2014
<b>Total</b>	9,268,914	10,030,193	9,853,681	10,250,651	11,027,590
<b>Debit</b>	7,400,919	7,454,543	7,533,938	7,945,804	8,731,223
<b>Credit</b>	1,564,430	2,288,981	2,073,352	2,075,106	2,019,394
<b>Charge</b>	303,565	286,669	246,388	229,741	276,973

Source: Own data processing; *Sdružení bankovních karet*. Available at: [http://www.bankovníkarty.cz/pages/czech/profil\\_statistiky.html](http://www.bankovníkarty.cz/pages/czech/profil_statistiky.html)

Continual growth and expansion of intensive mobile technologies at the end of the year can be expected. VISA implementing contactless payments through technology payWave, MasterCard has PayPass. Extended becoming mobile payments where the mobile phones include an application for communication with the terminal.

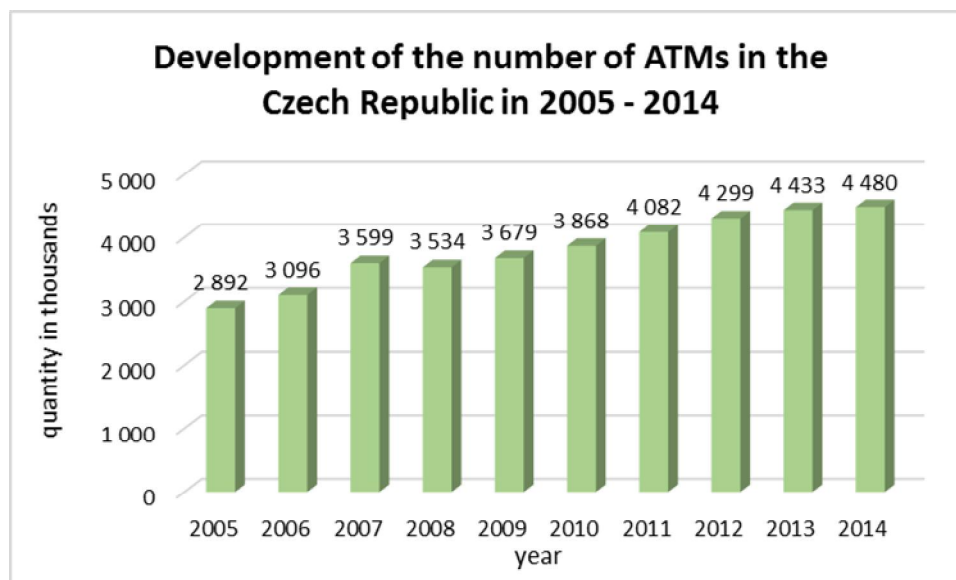
**Graph 1. Total number of cards issued from year 2005 until 2014**



Source: Own data processing; *Sdružení bankovních karet*. Available at: [http://www.bankovnikarty.cz/pages/czech/profil\\_statistiky.html](http://www.bankovnikarty.cz/pages/czech/profil_statistiky.html)

On the Graph 2. we can see the trend in the number of ATMs in the Czech Republic during the years 2005 – 2014, which testifies to the interest of clients to use their services. It shows a gradual increase in volumes and transactions that have been made in recent years through the ATM. They not only mediate withdrawals but also information about account balances, allow payment orders and serves as a marketing channel to promote bank products. With the usage of some new ATMs it is also possible to insert money into the account. The account owner does not have to go to a bank and wait in the queue until it is their turn. This new technology will influence the number of new ATMs in the coming years.

**Graph 2. Development of the number of ATMs in the Czech Republic in 2005 – 2014**

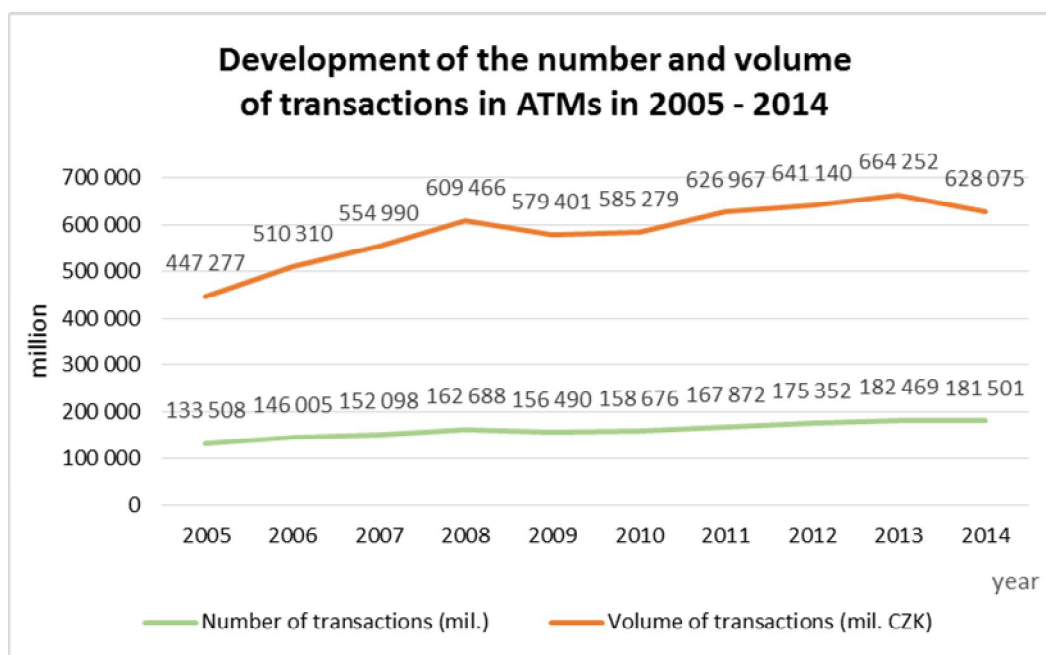


Source: Own data processing; *Sdružení bankovních karet*. Available at: [http://www.bankovnikarty.cz/pages/czech/profil\\_statistiky.html](http://www.bankovnikarty.cz/pages/czech/profil_statistiky.html)

Statistics show that clients not only use payment cards for expensive good, but also for small purchases. On the Graph 3. we can see that the volume of cash withdrawals from ATMs grew more rapidly than the increase in the number of transactions. However, trends show us that the average withdrawal amount is decreasing. While in 2005 the average transaction was 3,350 CZK, in 2010 it was already 3,688 CZK. In 2014 the amount of the average withdrawal transaction was 3,460 CZK, indicating that with the influx of new technologies and with a greater number of acceptance points, the amount for withdrawing gradually decreases. This is a year-to-year decrease of 0.53% in the number of ATM withdrawals. People are keeping less money in their wallets than before.

An increasing average amount of withdrawal cash was undoubtedly affected by the introduction of higher fees at ATMs operated from another bank or institution than the issuing bank. The number of transactions did not noticed any fluctuations in terms of increases or slumps and did not affect the introduction of higher charges. One example is the implementation of a fee per transaction by Komerční banka where the ATM withdrawal was withheld by 5 CZK and when the client payed the merchant by his card, the bank then paid 5 CZK back to client.

**Graph 3. Development of the number of transactions and volume of transactions in ATMs on the Czech market between years 2005 – 2014.**



Source: Own data processing; *Sdružení bankovních karet*. Available at: [http://www.bankovnikarty.cz/pages/czech/profil\\_statistiky.html](http://www.bankovnikarty.cz/pages/czech/profil_statistiky.html)

## **4.2. Analysis of the current situation on the Czech market**

Constant competition among banks leads to offering other services so that clients save time and sometimes money. Bank are competing, which converts the client's bank account from another bank to himself. Banks are trying to convince clients that only she has the card with individual design, that only with her it can negotiate these additional services and that only the card is really the right one. New technologies are making it easier for banks to convince clients to join their side but it is also now easier for clients to compare them with each other.

### **4.2.1. Overview between years 2013 and 2014**

In 2014 the Czech Republic used payment cards more for payments at merchant's that for withdrawals from ATMs. This ratio is reversed for several reasons: the bank debits favored various bonuses, for ATMs withdrawal you pay a fee, they have increasingly expanding network of merchants who accept payment cards and more people

use new technologies to enable fast payments. The number of card payments at the merchant has increased to 479 million which is increase by 26.92%, ATM withdrawals decreased by 0.53% to 181 million. ATMs issued about 375 billion in cash, which was almost twice more than people paid by cards at merchants. The total number of cards issued at the end of 2014 was over 11 million. This is an increase by 7.58% over the preview year. As we can see, issuing debit cards and charge cards is still increasing with big growth in charge cards by 20.56%. We can explain this with the companies' increasing interest issuing charge cards.

**Table 3. Overview of changes for 2013 and 2014**

	<b>2013</b>	<b>2014</b>	<b>change in %</b>
<b>Number of ATMs</b>	4,433	4,480	+ 1.06%
<b>Number of transactions in ATMs</b>	182,469,036	181,500,665	- 0.53%
<b>Volume of transactions in ATMs (thous CZK)</b>	664,252,317	628,075,293	- 5.45%
<b>Total cards issued</b>	10,250,651	11,027,590	+ 7.58%
<b>Debit cards issued</b>	7,945,804	8,731,223	+ 9.88%
<b>Credit cards issued</b>	2,075,106	2,019,394	- 2.68%
<b>Charge cards issued</b>	229,741	276,973	+ 20.56%
<b>Number of transactions in merchants</b>	377,920,819	479,675,371	+ 26.92%
<b>Volume of transactions in merchants (thous CZK)</b>	321,826,663	374,752,411	+ 16.45%

Source: Own data processing

#### **4.2.2. The structure of payment cards on the Czech market**

The overwhelming majority of cards issued in the Czech Republic bears the logo of the International Association VISA or MasterCard. Card acceptance for both of these companies is almost identical. Problems can occur when traveling abroad. It is always important to inform VISA or MasterCard and find the number of ATMs and merchants that accept the brand. Besides the card brand we distinguish the class or model. It affects both,



the price of card as well as requirements on the creditworthiness of its owner and the amount of maximum levels for payments. The higher the model, the more expensive for better customers and with higher limits.

The family of MasterCard cards includes: Maestro, MasterCard Electronic, MasterCard Unembossed and MasterCard Standard. They also issue the prestigious MasterCard Gold; MasterCard Platinum, World Signia and MasterCard Business Card.<sup>56</sup> VISA offers electronic VISA Electron and VISA Classic embossed. For upper class clients VISA Gold, VISA Platinum and VISA Infinite.<sup>57</sup> These two brands are among the world's best-known card companies as well as the Diners Club, JCB (Japan Credit Bureau), AmEx (American Express) and Discover Financial. These companies are generally intended for solvent clients and are to a certain extent an exclusive payment instrument. These cards are also used by foreign companies which have a branch, thus providing their employees access to corporate account. As example we can use ABB Ltd. (Swiss company with offices around the world). Employees in all countries of the world use one brand cards – AmEx and have access to corporate special accounts from which travelers can draw money. Since the Czech Republic used AmEx only in certain retailers, the company had to make an exception and give to employees a VISA card that is accepted by the vast majority of merchants. This exception applies to additional countries, where similar problem occurred.

The majority of users own a debit card in the Czech Republic. Over 6 million users own a MasterCard. For the most part this is because not in all stores is possible pay by MasterCard or VISA payment cards, but rather preferred Maestro cards (which belong under MasterCard company). VISA payment card is the second most widely used. There are more than 4 million users in the Czech Republic. VISA card is more preferred for acceptance in the world. Diners Club, American Express and JCB has remained at a very low number of owners. Although the cards are accepted at almost the same number of places as MasterCard and VISA, they are not as well known and do not have enough advertising to ensure that it is used by more people. These cards are more for corporate

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<sup>56</sup> *Master Card: About us* [online]. 2015 [cit. 2015-02-15].

<sup>57</sup> *Visa: About Visa Int.* [online]. 2015 [cit. 2015-04-25].

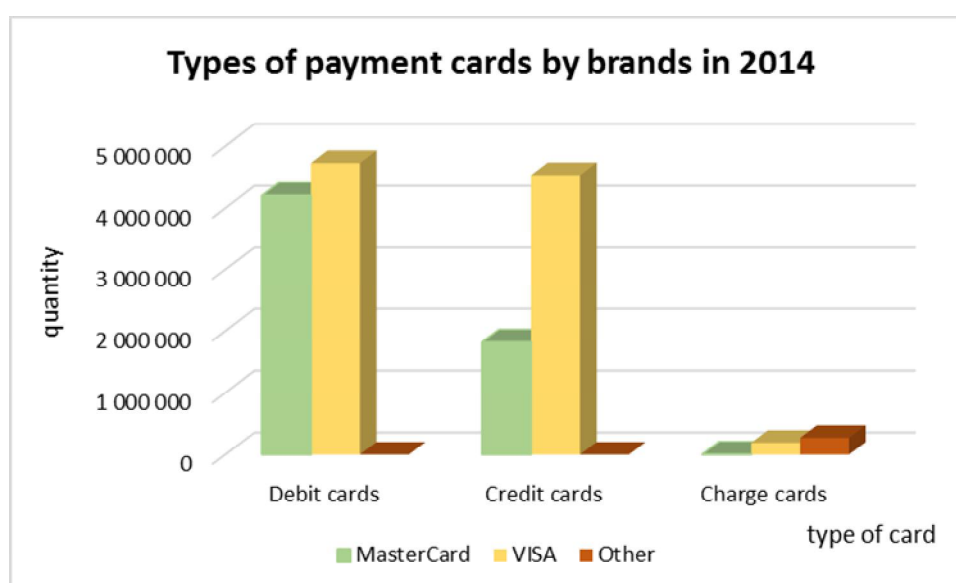
use. Debit cards in the Czech Republic number almost 9 million. Exclusive card issuers are MasterCard and VISA. In regards to credit cards, their number does not exceed the number of issued debit cards. MasterCard and VISA are again mostly exploited by publishers. However, with credit cards, there exist a well appreciable proportion of smaller associations, mainly Diners Club, American Express and JCB. Charge cards are the least extended payment cards in the Czech Republic. The most used are VISA cards – 3,148 cards were issued for the 2014. Other charge cards are divided between many small issuing companies or associations.

**Table 4. The structure of the cards issued by brands in 2014**

	MasterCard	VISA	Diners Club	Ostatní	Celkem
<b>Total</b>	6,016,301	4,727,738	10,806	272,745	11,027,590
<b>Debit</b>	4,199,291	4,531,931	0	1	8,731,223
<b>Credit</b>	1,815,929	192,659	10,806	0	2,019,394
<b>Charge</b>	1,081	3,148	0	272,744	276,973

Source: Own data processing; *Sdružení bankovních karet*. Available at: [http://www.bankovníkarty.cz/pages/czech/profil\\_statistiky.html](http://www.bankovníkarty.cz/pages/czech/profil_statistiky.html)

**Graph 4. Types of payment cards by brands in 2014**



Source: Own data processing; *Sdružení bankovních karet*. Available at: [http://www.bankovníkarty.cz/pages/czech/profil\\_statistiky.html](http://www.bankovníkarty.cz/pages/czech/profil_statistiky.html)

The vast majority of payment cards issued in the Czech Republic have international validity. The withdrawals from ATMs and cashless financial transactions are thus useful not only in the Czech Republic but also abroad. The share of cashless transactions executed with payment cards since 2001 has steadily risen. In 2001, only 12% of total transactions were made by bank transfer and in 2014 the figure was 51%. Above average cash withdrawals from ATMs grew, since 2001, the amount was 1,503 CZK for withdrawal. Since 2008 the amount fell slightly and in 2009 withdrawals numbered 3,702 CZK, in 2014 only 3,460 CZK. Even if the current trend of growth in the volume of cashless payments increased by about 3% from 2009 compared to the world average, the majority of funding is still withdrawn in the form of cash. The reason why the Czech market lags behind the world average, in my opinion, is due to historical reasons. People are still not used to paying by cards but keep cash in wallets. The Czech Republic started to issue payment cards more than 70 years later than some banks in United States, Canada or in Japan. With established fees for ATM withdrawals the Czech Republic is slowly reaching the world average.

**Table 5. Comparing the use of payment cards, the Czech Republic and the world in 2014**

	Volume of cashless payments	Volume of cash withdrawals
<b>World</b>	72%	28%
<b>Czech Republic</b>	51%	49%

Source: Own data processing; *Sdružení bankovních karet*. Available at: [http://www.bankovnikarty.cz/pages/czech/profil\\_statistiky.html](http://www.bankovnikarty.cz/pages/czech/profil_statistiky.html)

### Credit cards

Credit cards are the fastest growing product, which leads to more and more household debt. Debit cards are drawn from customers own money in their own account. Alternatively, credit card customers borrows from banks, thereby incurring the loan, which must then be repaid. The interest rate is around two percent p.m. This number can not be easily compared with the annual interest rate, with which otherwise is met more often. To convert monthly rates annually compound interest must be added to the equation:

$$\text{Annual interest rate} = 100 \times ((\text{monthly interest rate} : 100 + 1)^{12} - 1)$$

Most banks provided the interest rate into monthly and annual rates. Annual interest on credit cards corresponds to 25-30 percent, which is a relatively high percentage of interest than a normal loan, the interest rate currently ranges usually around 12 percent.

### **Charge cards**

Charge cards are credit card with a deferred payment. It works much like a credit card, difference being that after the accounting period, the bank must repay the entire debt at once. The amount drawn does not charge any interest. One of the oldest types of cards in the Czech Republic is already in widespread use. It primarily serves to corporate clients such as business cards. Shopping payment cards issued by non-bank institutions form a proper use of payment cards. Since its banking sisters differ mainly in price, the amount of interest is restricted, for example, the Premia card, Aura card or MoneyCard Gratis. The last prepaid card works on the same principle as the well-known prepaid cards of mobile operators. The card is first inserted for a certain amount and the cardholder with a card then uses it until it is empty. Cards can be recharged.

### **Prepaid cards**

Prepaid cards can be used as a gift cards (eg. gift card IKEA store, H&M store etc.) are used as a pocket money for young people or for employees as benefit cards (eg. for sport, doctors etc.). Some banks cooperate with shopping centers, for example, UniCredit Bank and shopping center Palác Flora.

### **Virtual cards**

This card is suitable for people who want to shop online, but who would not otherwise be eligible to receive a traditional debit or credit card. It is also ideal for people who want to keep their spending on the internet separate from their major credit or debit cards. With a prepaid virtual card, in fact, no physical plastic card is received. Instead, the publisher will provide details on the card's account (such as the card number, expiration date and security code) that you will use on the Internet. Publishers on the Czech market are for example Cetelem, Visa or MasterCard.

## Co-brand cards

The Czech Republic belongs between the co-branded cards, for example, credit card from Master Card Citi ČSA from Citibank (partner with Czech Airlines), Visa Renome from UniCredit Bank (the largest publisher of co-branded cards), T-mobile Bonus from Komerční banka and others.

### 4.3. Components of payment cards on the Czech market

Banks also offer their customers cards that allow fast and convenient contactless payment. **Near field communication – NFC**, is an abbreviation for electromagnetic wireless technology, which is used for exchanging data over short distances between two electronic devices. Projected use of NFC technology is mainly active in the field of electronic equipment (payment terminals, mobile phones, tables and other devices).<sup>58</sup> If the merchant has the necessary technology it is not necessary to put the card into the terminal and enter the PIN. Simply attach the card to the reader and wait for the confirmation. There is no need to enter a PIN when payment is smaller than 500 CZK. The number of transactions that can be carried out without entering the PIN, is limited in order to avoid misuse. The card has a built-in dual-chip with an antenna that communicates in a split second with a contactless reader at the merchant's terminal.

The Czech Republic is not only one country with a limit on payment. Almost all countries set up their limits. In Table 6, we can see that each of these limits in countries are in the range from 500 CZK to 1000 CZK; after conversion. Anyway, the Czech Republic set up a rule, for every three consecutive contactless transactions PIN is needed. This should avoid emptying the account in case of stealing the card.

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<sup>58</sup> *Contactless Payments: Delivering Merchant and Consumer Benefits* [online]. New Jersey, 2004 [cit. 2016-02-15].

**Tab. 6 Contactless card payment limit according to countries**

<b>Country</b>	<b>Limit for payment without PIN</b>
<b>Czech Republic</b>	500 CZK
<b>Slovakia</b>	20 EUR
<b>Finland</b>	25 EUR
<b>Switzerland</b>	40 CHF
<b>Croatia</b>	100 HRK
<b>United Kingdom</b>	30 GBP
<b>Australia</b>	100 AUD
<b>United States of America</b>	25 USD
<b>Canada</b>	100 CAD

Source: Own data processing; *The Guardian*. *Contactless card payment limit se to rise*. Available at: <http://www.theguardian.com/money/2015/feb/12/contactless-card-payment-limit-rise>

A special form of payment card is a **contactless payment sticker**. This is a special form of payment card, designed for contactless cashless payment for goods and services on electronic cash desk terminals that enables cashless payment for goods and services in shops. When using payment stickers is especially advantageous optional location such as a mobile phone, memory stick or other object which people are used to carry wherever they go. This is similar to stickers is small payment card which is possible to hang on keys.

#### **4.3.1. M-commerce**

Mobile phones have given rise to a new market of **m-commerce** (mobile commerce). The number of mobile phones reached worldwide by the end of 2014 almost 4.3 billion.<sup>59</sup> Mobile phones are used to pay for goods and services that have been around for decades. We distinguish here two variants of payment:

- Remote Payments
- Contactless Payments

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<sup>59</sup> *Internet Retailer: Mobile commerce* [online]. 2015 [cit. 2015-11-12].

## **Remote payments**

Mobile phones customers might use the DMS (donation message service), people using them for sending messages in benefits concerts or to associations helping to communities or animals. Technology USSD (unstructured supplementary service delivery), is used for sending inquiries for the amount of remaining credit for prepaid SIM cards activated by code. USSD is used also together with WAP (wireless application protocol).<sup>59</sup> Mobile phones initiated payment, which is then implemented through a technical center operator. Based on instructions, the customer will provide chartered services (such as SMS – short message service) ticket for public transport and carry out the payment by bank transfer mobile operator’s bank account provider. Remote payments may be made a number of technical ways:

- premium SMS
- direct debit from account of your mobile phone
- mobile payments (WAP)

The use of these services in developed countries will gradually decline, thanks to new technologies. Conversely, underdeveloped countries, (eg. Kenya) it will grow. This technically inexpensive solution would need investments in infrastructure. The world is still looking for a universal technology, easy to use anytime and anywhere, not only by banks, but also the mobile operators are looking for solutions that would compete with cash. Statements of some operators claim they do not compete with payment cards but with cash do not reassured anyone at the market.

## **Mobile contactless payments**

Mobile contactless payments are payment transactions that take place not only in the virtual world, but in the current business network for payment of goods and services in the network of “bricks and mortar” stores.<sup>60</sup> For mobile operators, this is a welcome source of additional income for banks on the contrary, increase competition in their traditional services – payment transactions. Banks and mobile operators looking to models of mutual

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<sup>60</sup> *Internet Retailer: Mobile commerce* [online]. 2015 [cit. 2015-11-12].

cooperation with difficulties. Operators sees the m-paymnets as a chance to other income, and therefore many of them have applied for a license bank or payment institution. Banks logically don't see operators as partners but as "invaders" and therefore a new kind of payments approach hesitantly.

Mobile payment systems are experiencing rapid development around the world, and improvements have been presented by companies like Apple, Google and Samsung. However, most of their systems are still not working in the Czech Republic. In the background of these applications are also the card associations and banks which also offer both custome applications. Recently, it was one of the largest providers of mobile payments in the Czech Republic, a system for mobile payments – **Mobito**. This system was not interesting for users and the company reported that project Mobito ends at the end of 2015.<sup>61</sup>

In 2013, MasterCard Mobile, now MasterPass, launched its services. MasterPass works as a mobile application, which is free to download for smartphones. It allows payment for merchants supported through scanning the QR (quick response) code on the recharge supported by the (virtual) operators. Once you enter the card details into the application, your next online purchase pay anywhere via mobile devices. Security is very sophisticated and effortless for the user.<sup>62</sup> This services supports more than 250,000 merchants in 25 countries with around 4,000 merchants in the Czech Republic. The biggest Czech partners include Alza, České dráhy and DámeJídlo.cz, supported among operators, enabling recharge include TescoMobile, O2 or BleskMobil. Despite the fact that this service cost for MasterCard Europe, it is possible to insert a paymentcard of VISA association, or more cards together. The system operates in the Czech Republic with ČSOB with partners Wincor Nixdorf. MasterCard association is still improving this system and because it is relatively new in Czech market, there is not enough data to analyze.

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<sup>61</sup> *Mobito: Peníze v mobilu* [online]. 2015 [cit. 2015-11-12].

<sup>62</sup> *Master Pass: Mobile wallet* [online]. 2015 [cit. 2015-11-12].



### 4.3.2. QR codes

QR code became part of using smartphones. The mobile phone can link to the website, in America you can enter at the parking lot or in China provide information about the items in the shop. The Czech Republic was the first country in the world where the phones themselves can fill in the payment order, mainly used in mobile phone bill payments. The smart phone takes photos, then with the help of mobile applications, the bank completes the payment order and the payment is received. The QR code can carry information about the bank account number, variable symbol, identification and more.<sup>63</sup> QR codes are also used for sales of payments cards in shops or completed transaction, e.g. cinema or theater tickets.

**Picture 1. Taking of QR code into mobile phone**



Source: QR Platby: *Grafický manuál*. Available at: <<http://qr-platba.cz/graficky-manual/>>

### 4.3.3. NFCs in numbers

ATM withdrawals are equally a linked to payments cards. Payments at merchants have become very important source of income of banks and they enjoy great popularity with customers. The number of business locations accepting payment cards went through a great development. Locations accepting payment cards steadily increasing every year, as can be seen from the table below.

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<sup>63</sup> QR Platby: *Grafický manuál* [online]. 2015 [cit. 2015-11-12].

By the end of 2014, 11 million cards were issued in the Czech Republic, 6 million of these were contactless. Further, there were 91,109 merchant locations accepting payment cards, of which 48,678 accepted contactless cards and NFC devices (wireless technology).

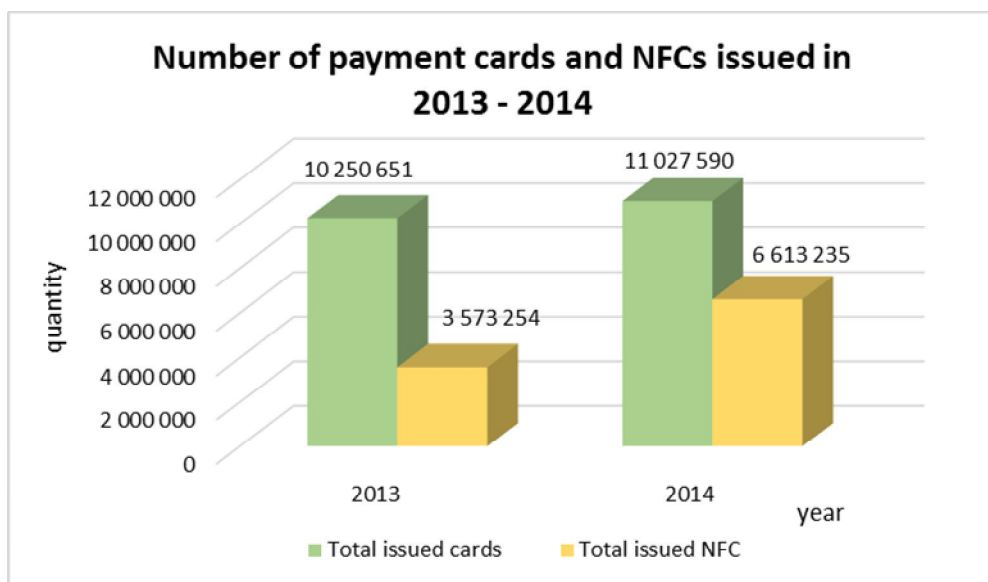
**Table 7. Number of places accepting NFC and issued NFC devices in 2014**

	MasterCard	VISA	Others	Total
<b>Places accepting NFC</b>	48,676	48,676	47,842	48,678
<b>NFC devices issued</b>	3,722,816	2,890,419	0	6,613,235
<b>Payment cards issued</b>	6,016,301	4,727,738	283,551	11,027,590

Source: Own data processing; *Sdružení bankovních karet*. Available at: [http://www.bankovníkarty.cz/pages/czech/profil\\_statistiky.html](http://www.bankovníkarty.cz/pages/czech/profil_statistiky.html)

During 2014, almost every second transaction was carried out by contactless payment card or by NFC technology. By contrast, in 2013, it was every third transaction which was carried out by contactless payment card.

**Graph 5. Comparison of number of payment cards and NFC devices issued in 2013 - 2014**



Source: Own data processing; *Sdružení bankovních karet*. Available at: [http://www.bankovníkarty.cz/pages/czech/profil\\_statistiky.html](http://www.bankovníkarty.cz/pages/czech/profil_statistiky.html)

Statistics show that clients were not only using payment cards but they were also using contactless devices for payments. The volume of NFC transactions is growing rapidly. In 2014, more than 86 billion transactions occurred. With constant increase of issued NFC we can expect an increase in volume of transactions. The average transaction in 2014 was 519 CZK.

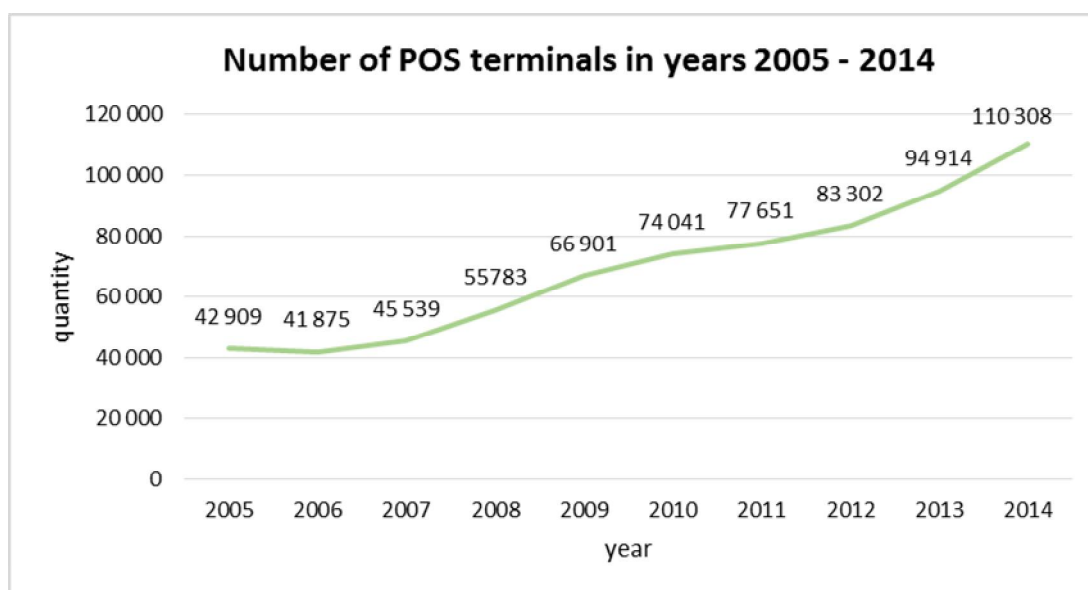
**Table 8. Payments via NFC devices in 2014**

	<b>MasterCard</b>	<b>VISA</b>	<b>Other</b>	<b>Total</b>
<b>Number of NFC transactions</b>	102,559,603	64,515,433	0	167,075,036
<b>Volume of NFC transactions (thous)</b>	54,271,134	32,512,208	0	86,783,342

Source: Own data processing; *Sdružení bankovních karet*. Available at: [http://www.bankovnikarty.cz/pages/czech/profil\\_statistiky.html](http://www.bankovnikarty.cz/pages/czech/profil_statistiky.html)

The main reason for the growth of the number of business locations is the fact that technological progress is being expanded by option of installation terminals even in places where it was previously not possible. An example may be the self-service terminals in public transport, tobacconist but also portable POS terminals that can be used by merchants which do not have a permanent premise, craftsmans or others. The impact of new technologies and manufacturing processes also mean that for the past several years, POS prices declined substantially and are thus accessible even for traders who previously could not afford them. The growth of POS terminals between year 2013 and 2014 was around 16.22%.

**Graph 6. Development of the number of POS terminals in years 2005 - 2014**



Source: Own data processing; *Sdružení bankovních karet*. Available at: [http://www.bankovnikarty.cz/pages/czech/profil\\_statistiky.html](http://www.bankovnikarty.cz/pages/czech/profil_statistiky.html)

#### **4.3.4. Payments on the Internet**

The internet is now the largest and fastest growing method of payment for goods and services “at a distance”. Security online payments developed several methods. This method of sale is also the most widespread, and it is hardly surprising that just MasterCard and VISA pioneered a new method of secure Internet payment 3D Secure in 2001: MasterCard SecureCode and Verified by Visa. Both payment systems established the rules for the liability of the card issuer and the merchant banks account for e-commerce transactions. If the card publisher uses the card technology 3D Secure and the bank of merchants not, is responsible for misuse of the card on merchant’s bank “acquire (and vice versa).<sup>64</sup> This rule is valid on bank side from 2008 and on card issuer from 2004 in the Czech Republic.

Online purchases in the Czech Republic have increased by 6% in the last two years bring the total to 90% of the population. The best know portals of e-commerce among the Czech internet users are Aukro.cz, Alza.cz, Slevomat.cz and Heureka.cz. Each of these

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<sup>64</sup> *Cyber Source: Online credit card fraud trends and Merchant’s response* [online]. 2002 [cit. 2016-02-15].

sites belong to a different category of service. Users buy online frequently in e-shops. More than half of users tried prices grader or discounted portal.<sup>65</sup>

**Alternative payment systems (APS) or payment gateways** are used more than in past and in comparison to fees for transaction can compete with banks. Banks are also developing their own APS for fast payments via the Internet. The largest APS in the world are PayPal and Moneybooker. Their alternatives in the Czech Republic are PaySec, WebPay, GoPay or AGMO as well as PayU.

### **PaySec**

The above mentioned payment systems PayPal and Moneybooker are the dominant payment systems worldwide. The payment system PaySec is the modern Czech alternative. The disadvantage is that it focuses only on Czech users. It is available to owners of all accounts in all Czech banks, but users are not able to make payments outside the country.<sup>66</sup> PaySec is a member of the financial group of ČSOB. PaySec is used by several big e-shops as Alza.cz or Kasa.cz.

### **PayU**

PayU is a payment gateway operated by the South African corporation Nasper which operates in many countries in the field of online media and e-commerce. Gate is a fast and secure transfer of funds for the purchased goods. PayU appeared in the Czech Republic in 2011 and is licensed by the Czech National Bank pursuant to a license for the provision of electronic payment services. PayU using e-shops as Heureka, Aukro.cz, Mall.cz and other. The payment card transaction is fully supported solution of 3-D secure – international standardized process for processing payments using payment card on the Internet for safety purposes. Price of PayU gate for implementation in online store retailers is set at 3,900 CZK.<sup>67</sup>

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<sup>65</sup> Wincor Nixdorf internal materials

<sup>66</sup> *PaySec: Okamžité placení na internet.* [online]. 2016 [cit. 2016-01-06].

<sup>67</sup> *PayU* [online]. 2016 [cit. 2016-01-06].

## **AGMO**

Payment gateway AGMO is engaged in the Czech Republic with phone and payment cards payments and also with bank transfers. The Czech National Bank is registered as a small scale payment service provider. It currently works with a large number of banking institutions in the country: Česká spořitelna, GE Money bank, UniCredit Bank, Raiffeisenbank, Komerční Banka, Fio Banka, Sberbank, mBank, Poštovní spořitelna, ČSOB, Air Bank or Equa Bank. With AGMO cooperate for example Tescoma, Ticketstream and Seznam.cz.

## **WebPay**

Payment gateway WebPay allows domestic and foreign payment card association MasterCard, VISA, Diners Club and American Express. It corresponds to global standards and meets the stringent security requirements of MasterCard SecureCode, Verified by VISA and SafeKey defined by American Express. These standards are known as 3D secure.<sup>68</sup> Credibility of WebPay gateway evidenced by partnerships with major Czech banks (ČSOB, Komerční Banka, Raiffesenbank and UniCredit Bank), offers it to its customers and is overseen by the Czech National Bank. WebPay usies e-shops such as Dámejídlo.cz, ISIC, Slevomat or Alza.cz.

## **GoPay**

GoPay is the most versatile payment gateway on the market in the Czech Republic. Like other payment gateways GoPay enables customers to pay via payment keys and payment cards. It is not just a payment gateway but also an electronic wallet. Fees are an individual matter, and depends on the volume of paymnets. The standard charge is around 2% of sale payments. Within the system GoPay is currently no charge.<sup>69</sup> GoPay cooperate with skylink, levneelektro.cz, idnes.cz and with other companies.

In attempt to compare different payment gateways we can see in Table 9. that GoPay has the largest number of users who use their e-shops as a gateway. However, the number of transactions was detected only by PayU gateway. We can assume that GoPay

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<sup>68</sup> *GB WebPay* [online]. 2016 [cit. 2016-01-06].

<sup>69</sup> *GoPay: Platební brána* [online]. 2016 [cit. 2016-01-06].

will have 6 times more transactions than PayU. Most transactions took place through a payment gateway GoPay. Again, it is because of the number of merchants who utilize this gateway. GoPay is used mainly because it supports most payment methods. We can assume that GoPay is one of the most favorite payment gateway on the Czech market and it would be interesting to follow its changes in next years.

**Table 9. Comparison of payment gateways in 2013**

	<b>PayU</b>	<b>AGMO</b>	<b>GoPay</b>
<b>Number of merchants</b>	1,300	810	6,271
<b>Number of transactions</b>	1,250,000	-	-
<b>Volume of transactions</b>	660,000,000	418,000,000	3,183,730,000
<b>Supported payment methods</b>	14	8	24

Source: Own data processing; Internal material of Heureka.cz. 2013

#### **4.3.5. Comparison of methods of payments in the 4 largest online stores**

There are more than 37,200 e-shops in the Czech Republic,<sup>70</sup> but only the four biggest of them held more than a quarter of the total turnover of online stores in 2014. Table 10. compares what forms of payments are offered by these largest online stores.

All four e-shops accept cash at branches, which is commonplace. Likewise, all also accept payment cards from all issuing associations. Even though e-shops are the largest on Czech market, only one - Alza.cz - offers payments to international payment system PayPal. This system has more user friendly set up, but the fees for accepting payments in this form are too high. For success we can also consider that all four e-shops offers a method of payment by payment gateways. It shows that gateways are attractive both for customers and for merchants. Compared with payment cards, there is a lower commission per transaction.

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<sup>70</sup> Heureka.cz: *Obrat českých e-shopů* [online]. 2015 [cit. 2016-01-06].

**Table 10. Payment methods offered in 4 largest e-shops**

	Cash at merchant	Payment card at merchant	Cash on delivery	Payment card online	QR codes
<b>Alza.cz</b>	yes	yes	yes	yes	yes
<b>Mall.cz</b>	yes	yes	yes	yes	-
<b>CZC.cz</b>	yes	yes	yes	yes	-
<b>Kasa.cz</b>	yes	yes	yes	yes	-

	Payment gateways				
	PaySec	PayU	AGMO	GoPay	WebPay
<b>Alza.cz</b>	yes	-	-	-	yes
<b>Mall.cz</b>	-	yes	-	-	-
<b>CZC.cz</b>	-	yes	-	-	-
<b>Kasa.cz</b>	yes	yes	-	-	-

Source: Own data processing; *Možnosti placení*. Available at: Alza.cz, Mall.cz, CZC.cz, Kasa.cz

#### **4.4. Advantages and disadvantages of payment cards**

The advantages from a **merchant** perspective is the higher turnover. The customer is not limited to using cash, which customer has in his wallet. This fact is related to higher value purchases where the customer is not forced to think about the amount of their spending. Payment by payment card is linked not only with comfort, but the customer can also choose whether to pay cash or use cashless payments. In the case of contactless payments, it considerably accelerates clearance of customers waiting to pay at the cash register. Payment of goods is much easier for foreign customers. Part of cashless payments is finally greater safety while reducing the volume of cash in hand at the store, reducing the risk of theft or robbery and subsequent transportation of cash into the banking institution. Also, there is a limit of cash shortfalls due to incorrect transactions or by returning cash. By using payment cards, the risk of receiving fake banknotes is limited. There is a time saving when transporting cash in the bank and the bank charges for depositing cash into the account.

The disadvantages from the perspective of the merchants are bank charges from each card transaction. The initial disadvantage may appear to buy another payment



terminal to cashier location. The need to ensure payment terminal connection to the authorization center of card transactions and the necessity to preserve and store paper receipts, while there is already a possibility to store only the so-called “electronic receipt”.

The advantage of using a payment card from a **customer** perspective is its convenience. Funds deposited in the account are available at any time – it is possible to pay by card at different venues, restaurants, and ATMs. They are applicable nationwide, and most of them allows the use abroad. Payment cards holders do not need to carry around large sums of cash and the card is protected against misuse not only with a legal limit for cash withdrawals, but especially a PIN that is known only to its owner. Specimen signature on the back of the card offers additional security. The indisputable advantage when traveling abroad is time saving when it is possible to pay “anywhere” and it is not necessary to go to the exchange and pay fees for cash exchanges. Preferred are also emergency services in case of loss or theft of the card. While in case of theft or lost wallet with cash you will never meet it again, the card can be almost immediately blocked, so there is no withdrawal of money from the account and when processing the necessary formalities then will be issued a replacement card. Many payment cards have additional services such as travel or accident insurance. With credit and charge cards can purchase or withdraw cash on credit and overcome short-term lack of cash. With a choice of cash loan is linked also disadvantage. A credit limit is established when the card is issued. This limit each installment of this amount automatically increases, so you can draw on the loan repeatedly, so called “revolving” without it, it would be necessary to re-apply for a loan. A guarantor is not necessary to obtain a credit card. The Bank provides client limit (credit limit), to the amount of credit card which can repeatedly draw funds. It is basically on client the way money runs out whether pay the merchant for goods or services, or to withdraw cash from ATMs. Usually the bank is within the credit limit restricting the ability to withdraw cash up to a maximum cash limit, for example, half of the total limit.

Credit cards are intended primarily for non-cash transactions and cash withdrawals from ATMs. It is therefore usually associated with a higher fee than the bank's demand for withdrawal from debit cards (payment cards, which clients get to your current account through which they can dispose of funds which in this account have). Interest free period

last 40 to 55 days, depending on the card. If by this time the client manages to return the spent money, no interest will be added. A credit card has many discounts and actions of a few percent, which is positively reflected in the condition of the client's account. These are various discounts at specific retailers. Disadvantages associated with the use of credit cards are quite a lot of high interest for loans, if the client does not manage to repay a specific amount of time. A credit card is therefore suitable for clients who have a certain payment discipline, have a financial reserve, and an overview of financial products and know how to deal with the card.

Generally, payment cards are enticing on spending when shopping at the client may lose the feeling that gives money and invites him to buy more stuff than they need. Other disadvantages of payment cards may be card fees for maintaining card account or for withdrawal fees from ATM.

#### **4.5. Payments at merchants**

Merchants who accept payment cards are increasing. Last year, there were already over 80 thousand, ie. an increase of more than 9 thousand acceptance points. Almost 480 million transactions with a volume of 374 billion CZK were carried. Average payment at a merchant declines. In 2012 it was 920 CZK, in 2013 only 851 CZK and in 2014, the average payment is only 781 CZK. The downward trend may develop through payment technologies, in which customers can pay contactless even in small amounts, which is convenient for them. In comparison with other countries the Czech merchants pay higher fees for card payments and especially establishments with low turnover. The higher the turnover, the lower the percentage fee, which the trader pays the settlement bank. Therefore, small retailers prefer to purchase in cash before cashless payment and must consider whether accepting payment cards pays off. Either reduced revenues or fees reflected in the prices of goods and services. Still, traders are aware of the benefits of accepting credit cards. From the half of 2015 should merchants pay less for fees for card payments. This legislation passed the European Parliament. This limitation should do more to protect merchants.

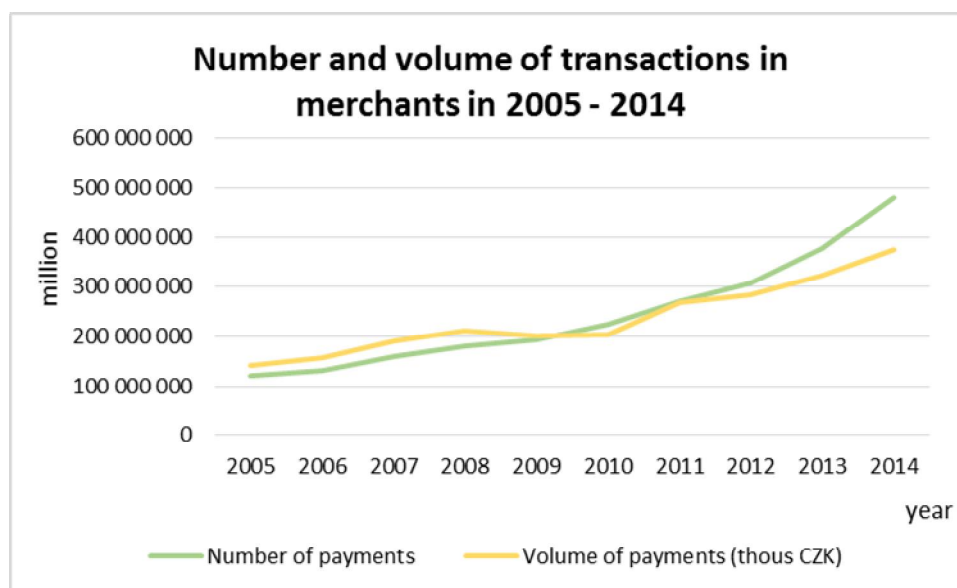
**Table 11. Overview of payments in merchants in the years 2005 – 2014**

	2005	2006	2007	2008	2009
<b>Number of payments</b>	120,342,199	132,082,580	159,110,446	181,228,776	194,231,582
<b>Volume of payments (thous CZK)</b>	142,735,769	157,066,320	190,019,145	210,374,705	200,924,496

	2010	2011	2012	2013	2014
<b>Number of payments</b>	224,409,915	270,008,563	308,186,163	377,920,819	479,675,371
<b>Volume of payments (thous CZK)</b>	203,591,149	269,077,694	283,834,301	321,826,663	374,752,411

Source: Own data processing; *Sdružení bankovních karet.* Available at: [http://www.bankovnikarty.cz/pages/czech/profil\\_statistiky.html](http://www.bankovnikarty.cz/pages/czech/profil_statistiky.html)

**Graph 7. Comparison of number and volume of transactions made in merchants in 2005 - 2014**



Source: Own data processing; *Sdružení bankovních karet.* Available at: [http://www.bankovnikarty.cz/pages/czech/profil\\_statistiky.html](http://www.bankovnikarty.cz/pages/czech/profil_statistiky.html)

#### 4.5.1. Using payment cards in practice

In connection with cashless payments they approached companies: Ikea, Billa, Lidl, Kaufland, OBI, Tesco, DM and Penny. For the purpose of this thesis were asked about the

percentage of payments that their customers performed using a payment cards in each year since the beginning of their activity on the Czech market until now. Five of these companies responded that it is an internal data of company and refuse to provide the information to public and two companies did not respond.

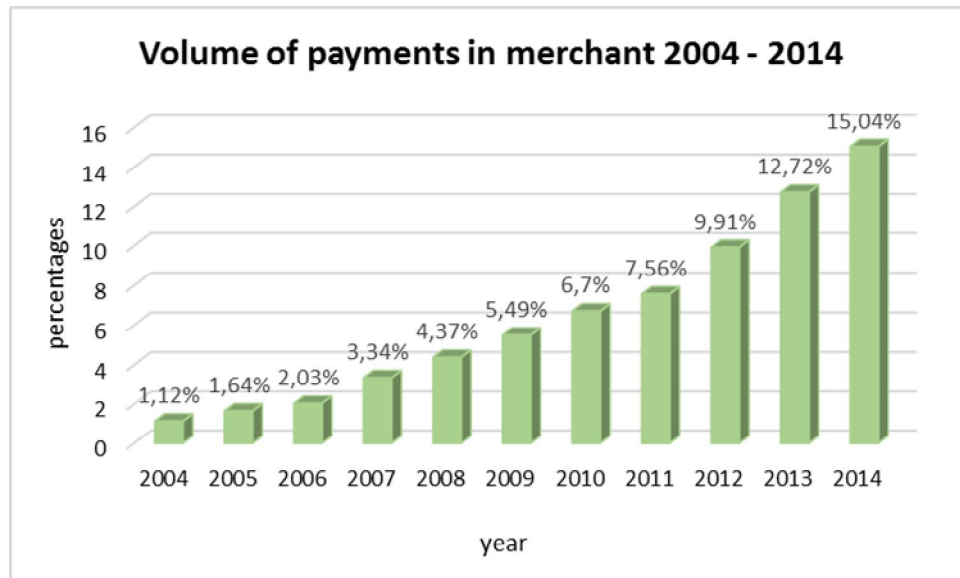
For the purposes of determining the use of payment cards was used data samples of retail store – drugstore, located on the main street in the center of the town, which has about 27,000 residents. Customers had the opportunity in this shop to pay cashless from June 2004. The non-cash payments were made in 1.12% of cases. In other cases, customers voted for the payment in cash. The following year was 1.65% of all cashless payments, and in 2006 it was 2.03%. For completeness, it should be noted that not every owner is willing to adopt cashless payment, because it is early days when customers had the opportunity to use a payment card payment for good have been difficult for merchant in several aspects.

As the owner of the shop said, the first three years of using the payment terminal, which was connected to a modem transmission over a telephone line to the bank, was associated with each payment fee for telephonic line of 2.50 CZK. No one in the store was allowed to use the phone while the payment was processed. At that time the bank also demanded merchants pay 2.5% of each payment transaction when the goods were paid by payment card. It is quite logical that especially in small volumes payments when customer pay for goods less than 100 CZK defended the merchant paying goods by payment card.

After deductin of taxes from the amount of 100 CZK;  $100 / 1.2 = 83.333$  and from this amount usually was 20% of the profit of merchant. From 83.333 is 20% around 16.66 CZK. After deducting phone fee for terminal connection with the bank, was deducted twice 2.5 CZK and a retailer profit was of about 11.66CZK per sold goods in the amount of 100 CZK. From this amount is then deduct monthly fee to the bank for payment terminal. Even so, profit is not complete because it must take into account the payment of rent for the premises, salaries, energy, etc. It is obvious that in these circumstances the payment terminal as a service for customers is disadvantageous because it greatly reduces the profits of merchants.

The situation improved after 2006. Merchant began to use a payment terminal connected to the network with internet access. Connection with bank in the payment transaction was considerably cheaper. The merchant just paid a monthly fee for Internet access. Also, the conditions have changed and the merchant signed with bank more profitable contract. Currently, the bank fee from each executed cashless payments made via payment card is charged 1.9% of the amount paid. In 2007, the number of payment card transactions increased to 3.34% of the total volume of payments. Evolution of payments shows a steady increase in cashless payments. The largest increase occurs in 2011, when it was 7.56% payments and in subsequent years rose steadily to the current 15.04% in 2014.

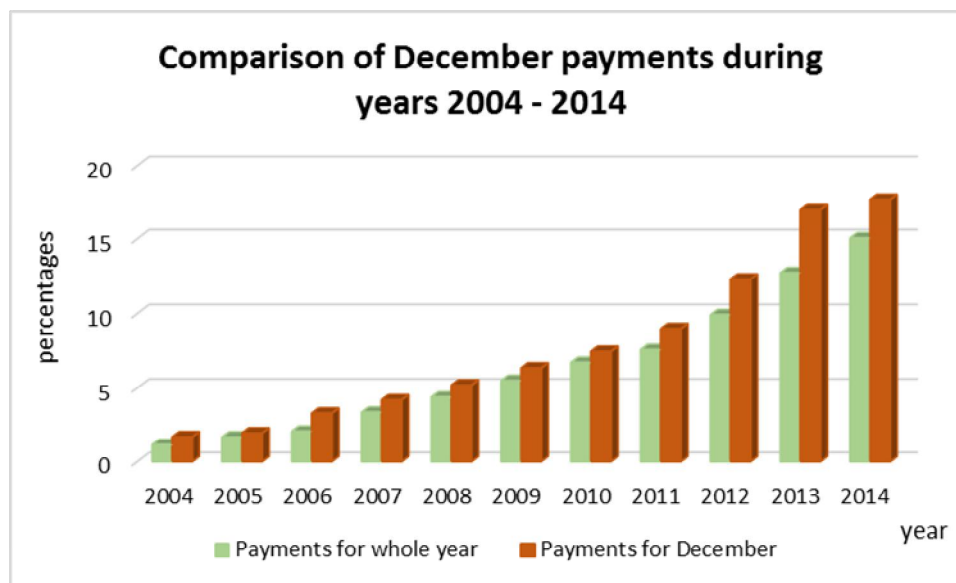
**Graph 8. Volume of payments in merchant in years 2004 - 2014**



Source: Own data processing; Internal material of drugstore.

An interesting comparison is displayed in Graph 9. which shows (coloured by green) cashless payments in percent for the year and with red color are payments in December in each year. In December, when there are large purchases because of the Christmas holiday, there is also a slight increase in the use of payment cards. For comparison, in 2011 – 7.56% average cashless payments for the year and 8.97% average for the month of December. The average cashless payments for year 2012 was 9.91% and 1.29% average for the month of December. And at the end of year 2014 the average cashless payments was 15.04% and the average for the month of December came to 17.65%.

**Graph 9. Comparison of December payments during years 2004 – 2014**



Source: Own data processing; Internal material of drugstore.

#### **4.6. Regulation relating to the payment system in the Czech Republic**

The Czech environment in connection with cashless payment system is determining by the Payment Systems Act no. 284/2009 Coll., on transfers of funds, electronic payment instruments and payment systems, which is designed in accordance with European regulation contained in European Parliament and Council 2009/110/EC from 16th September 2009 on the taking up, pursuit and prudential supervision of the business of electronic money institutions. European directors enforce others to determine the terms of payment in the Czech Republic. For example, the Directive of the European Parliament and the Council no. 924/2009 from 16th September 2009 about on cross-border payments in the Community and also the highly awaited directive on interchange fees for card-based payment transactions no. 2015/751 from 29th April 2015.

An important part of building the single market of the European Union's integration in the area of payments. The introduction of a common currency brought about the unification of payments by cashless payments. The basis here was the creation of the so-called SEPA - Single Euro Payments Area. SEPA has ensured for euro payments to

eliminate differences between national and cross-border payment. For citizens of the Czech Republic, both of these types of payments are to become domestic, so that the client did not distinguish whether it is a payment to another country or neighboring town. The euro payment system may suffice single account anywhere in SEPA. The benefit for clients will be more comfort and convenience, and in particular the increased competition of the services offered, which has led to cost savings and accelerated the development of innovative solutions.

## 5 Conclusion

The development of means of payment is a visible indication of the efforts to reduce the need for cash payments. The reduction is being caused by an increase in the use of payment cards. From cash payments to paying by payment cards becomes increasingly larger percentage of people. The advantage for cardholders is mainly time and cost savings. It is no longer necessary to withdraw cash from an ATM before a purchase. The use of developers aims to further digitize money. Some people even see one possible fate of digitization of cash. The justification is that money for millennia drift towards ever higher levels of abstraction, therefore becoming a purely symbolic expression isolated from material value.

Even if paying cash is on the decline, it will not be as rapid as we thought. As a supporter of modern electronic technology I have to admit that cash were and still is an important payment instrument and cash will exist in future. Development and rise of contactless payment and online payments is large and the Czech Republic belong in this direction for the fastest growing market in Europe. When Greece closed their banks, did not have cash on hand, was completely without financial resources. Cash is generally accepted means of payment which ensure acceptability in most countries laws. The recipient of cash can ensure that a payment of cash was made and the issuer can be sure the date and amount of the sale without the threat of additional charges and the uncertainties of the future settlement of the transaction. Other means of payment such strong certainty do not provide, because they are usually the commitment of private companies. The cash payment system represents resources that provide a very good control over personal spending and anonymity. Moreover, the use of electronic payment leads to more debts, unlike the use of cash. The importance of the role of cash is explicit and plays a vital role in the national economy as well as stores a value. Finally, cash plays a very important role in the criminality.

When using a payment card, it is necessary to divide cards into two groups – debit and credit cards. As cited above, usage of credit cards decline, people become afraid of



debts and usage of debit cards increases. The future trend will be growth because Czech people are more and more educated in the problematic nature of payment cards.

Although the issuer of banknotes and coins controls the circulation of money, payments of financial institutions, security and development, means of payment are mostly in the hands of central bank. The future is in the hands of users, namely us. It depends on free elections and our preferences in the use of most of them.

Technological advances are changing how we use and view money. Electronic forms of payment have become a routine part of spending. Their use have due to the development and technological innovation still growing trend. Every year there is an increase in the number and volume of transactions that take place through payment cards in the several tens of percent. The number of places where you can pay by payment has more than doubled in the past 6 years. This thereby increases the utilization of payment cards and due to the fact that there is sufficient space for growth of cashless transactions at the expense of cash payments, it is likely that this trend will continue in the future.

As a future trend in the use of new technologies, it is possible to introduce Pay by touch. This method uses biometric payment authentication in the form of fingerprinting. It is one of the safest technologies. It used mostly in the USA but slowly expanding to other countries. The absolute novelty for 2015 available on Czech market will payment using technology HCE (host emulation card). It is a possible to use contactless payment on contactless payment terminals without owning a SIM card of a particular operator.

Regarding the latest technologies such as mobile and contactless payments, it is difficult to predict with certainty their development in the coming years. There is no doubt that it will become standard in some segments, for example, public transport. Thanks to a growing number of eshops and places where people can shopping comfortably will lead associations and companies engaged in developing payment technology to the need for finding new systems to facilitate purchases for the buyer and for the seller. It can be expected that in time they will actually develop these technologies as a major means in certain markets. In looking to the future, contactless payments and mobile payments have

strong potential and will be one of the many trends in the payment industry. These trends estimate mainly from the perspective of the market in the Czech Republic. In the last few years, the trend of cashless payments and extensive development of cashless technology is growing. Still, it is true that the Czechs are conservative people and the introduction of a modern means of payments will take awhile to develop the market.

The shifting boundaries of the market will be at the end of 2016, when the applicable European Union regulations regulate the fees from card transactions and POS terminals will be accessible to whole new segments of traders who work with minimal margins.

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