WORKING PAPER

ACCEPTANCE OF CASHLESS PAYMENT INSTRUMENTS IN THE REPUBLIC OF SERBIA

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Acceptance of cashless payment instruments in the Republic of Serbia

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Abstract: Payment using cashless payment instruments, such as payment cards or instant payments, is a process familiar to all users of these payment instruments in Serbia. When making a payment, all the customer needs to do is to tap, insert, or swipe the card through a POS terminal, or display or scan an IPS QR code, and the transaction will be executed. On the other hand, the service of accepting these and similar payment instruments is not widely known to the public, at least not to the same extent as the statistical data related to cashless payments. Understanding the processes that occur in the background and the participants involved is of great importance for setting more efficient hypotheses and making better decisions regarding enabling the acceptance of cashless payment instruments. The explanation of the basic elements related to the acceptance of payment instruments in this paper aims to provide additional information based on which the wider and professional public can better understand the process of accepting cashless instruments, their possibilities, and characteristics. The information provided can help merchants and other market players in making adequate and optimal business decisions when it comes to the method of accepting and using cashless payments. The paper describes the infrastructure that a merchant can use when accepting cashless payments, the payment instruments most commonly used by consumers in Serbia, specific business models, the roles of payment service providers in the overall acceptance process, as well as the transaction flow initiated by different payment instruments. This way, all interested market participants, especially merchants, can take a broader view of the cashless payment acceptance system and independently draw comprehensive conclusions about the costs, type of instrument, and acceptance model they are considering.

Key words: payments, payment services, cards, mobile phones, IPS, acceptance, development, digitalisation, National Bank of Serbia, Serbia
[JEL Code]: E42, E64, D47, D61

Non-technical summary

Cashless payments are becoming increasingly common worldwide. Many papers note that a growing number of buyers have developed the habit of not using cash in their daily purchases. Even so, the use of cash and cash payments remain the most prevalent method of payment in a large number of economies around the world, although in almost all economies, systemic and individual efforts to increase cashless or digital payments can be observed. The main reasons cited for such activities are transparency, security, and simplicity of payments, as well as the fight against the grey economy. Additionally, the argument of reducing costs due to the acceptance of cashless payments is also mentioned.

Merchants are most interested in the costs of accepting cashless payment instruments, and the abovementioned topic of cost reduction is extremely complex. It should first be determined whether we are talking about the total cost at the level of the entire economy, individual costs for merchants using cashless payment instruments, or a specific type of cashless payment.

Some of the elements in the cashless payment process are payment instruments, technical-technological solutions for accepting payments, entities developing business models for acceptance, such as payment schemes, financial institutions..., technical service providers, merchants, consumers, and others.

All these elements play a role in the execution of cashless payments and develop interdependent relationships. The direction in which cashless payment will be developed is created in accordance with the already developed business models, habits, and culture. An extremely important segment of this is the service of accepting cashless payment instruments at points-of-sale. **Paradoxically, card payments are the most visible and well-known example of cashless payments, while the service of acceptance and related activities do not represent a very well-known topic even among professionals.** This service encompasses all the aforementioned elements of cashless payments and implies finding solutions in which all interested parties would want to operate and accept cashless payment instruments. Additionally, acceptance is very sensitive to the mentioned costs.

To understand this service and the costs it generates, which are essentially the final costs of executing a cashless payment at a checkout, we need to know the characteristics of payment instruments, the equipment used for acceptance, and the roles of payment service providers and payment schemes.

According to official statistics, there are over seven million payment card users[19] and 4.5 million mobile banking (m-banking) application users who can perform IPS payments in Serbia. This represents two large user bases that can make cashless payments to merchants. Merchants can use the competition among payment instruments in Serbia to negotiate relatively favourable terms from their payment service providers for accepting cashless payment instruments.

In negotiations with payment service providers, the size of the merchant, i.e. their bargaining power, the average transaction value, the merchant's turnover, the number of checkouts, and other factors play a significant role. Additionally, it is very important for merchants to understand that they have a choice in using different equipment for accepting payments, as well as the possibility to use devices they already own, such as mobile phones, computers, or fiscal cash registers implemented due to the eFiscalisation process. Modern payment instruments, such as IPS payments, allow merchants to use such devices (without special POS terminals) when accepting payments and force other payment instruments to follow this trend. Therefore, merchants in Serbia, with more options on the market, have the opportunity to negotiate more favourable terms for accepting payment instruments compared to markets where merchants have much fewer choices.

Increasing competition in the market enables the formation of new business models related to the acceptance of cashless payments, which significantly affects the expansion of the acceptance network in Serbia, i.e. the increase in the number of merchants accepting cashless payments. In addition to competition, the legal framework, which includes the Law on Payment Services and the Law on Interchange Fees and Special Operating Rules for Card-Based Payment Transactions, also influences

[19] Given that one user, for example, can take out a payment card at two commercial banks, which would result in him being counted as two users in these statistics, the actual number of payment card users is slightly lower than the number presented in the "Card issuance" category.

the acceptance network. The results of establishing an adequate legal framework and developing competition on the acceptance side in the previous period have reduced merchant costs for accepting payment instruments and subsequently increased the number of brick-and-mortar checkouts by 55% in 2024 compared to 2021, while the number of online merchants more than doubled in the same period. Further development of the acceptance service in the payment services market represents a key factor in increasing the number of cashless payment transactions executed at points of sale in Serbia.

Contents:

1 Introduction

The acceptance of cashless payment instruments implies cooperation between payment service providers and merchants to execute cashless payments at their points-of-sale by buyers.

Besides the fact that buyers have to use their cards when executing cashless card transactions, this also requires the use of equipment and procedures on the part of the merchant, i.e. the acquirer. In accordance with the law, the possibility for merchants to accept card payments at their points-of-sale is provided by payment service providers, called acquirers in practice. They are the link between the checkout and the payment system in which the transaction is executed.

Establishing the service of accepting a cashless payment instrument implies negotiating various terms and services with the merchant. In this process, an agreement is reached as to the amount of the fee that the merchant pays for using the acceptance service at their checkouts, the method of transaction reporting, the equipment that will be used for acceptance, etc. Accordingly, the offer of the acceptance service is a complex activity, and payment service providers make significant efforts to attract new clients (expand their acceptance network) in the market. A quality acceptance service positively affects the competitiveness of banks, which can use this service to attract various large clients engaged in retail. The revenue from turnover and the turnover of the bank's clients achieved through acceptance can be used multiple times in their operations.

Accordingly, acquirers constantly think about ways to broaden their offer and expand their acceptance network. Therefore, to understand the mechanisms of functioning and the offer of the acceptance service, the most important segments of this service are presented below. Understanding these segments and their mutual influence is particularly important for merchants because, with a comprehensive view of the cashless payment acceptance service, they can make the best decisions about the type of payment instrument and the method of its acceptance.

1.1 Payment instruments

The Law on Payment Services defines a payment instrument as any personalised means and/or set of procedures agreed between the payment services user and the payment service provider, which the user uses to issue a payment order.[1] For the purposes of this paper, a payment instrument can be more simply viewed as an object (payment card) or part of software (an application on a mobile phone) used to initiate the transfer of money between two or more parties. The most popular payment instrument in Serbia is payment cards. In addition to them, there are instant payments, electronic money, cheques,[2] transfer orders, etc.

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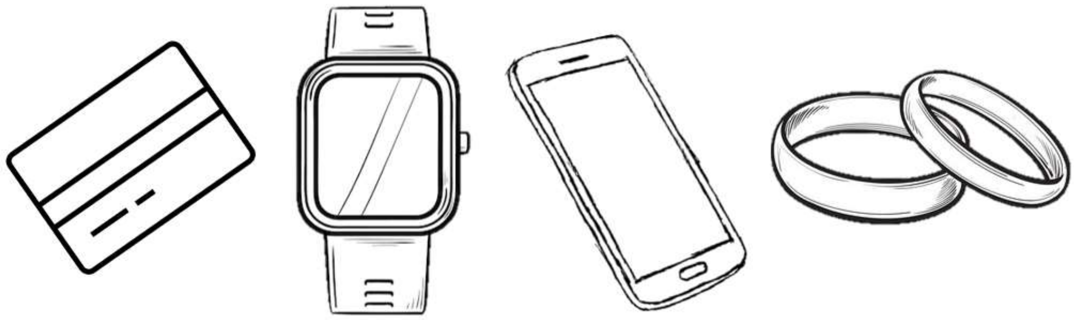
[1] Law on Payment Services (RS Official Gazette, Nos 139/2014 and 44/2018).

[2] By law, a cheque is is defined as a document, not a payment instrument, but it is included in this classification because of the manner and popularity of its use in our country.

Merchants at their points-of-sale, through a technical-technological solution (POS terminal, SoftPOS, cash register...), most often accept payment instruments such as payment cards, instant payments (hereinafter: IPS payments), and electronic money. To accept payment instruments, the merchant, in addition to the technical solution, must also have a signed framework agreement on the acceptance of the payment instrument with the payment service provider, e.g. a bank, payment institution, or an electronic money institution.

Payment cards cover a large number of different payment methods, for which, in addition to payment cards in physical form, other devices such as mobile phones, watches, etc., can also be used. Simplicity, speed, trends, and even fashion are important when creating the process of using payment instruments by buyers in 2025, which is why payments can be executed using various devices/objects. Accordingly, payments through, for example, GooglePay, ApplePay, and other digital wallets on mobile phones and devices (e.g. watches, rings, bracelets) are enabled by entering card data into the application, and all these payments fall under the same payment instrument – payment cards. Of course, the use of card infrastructure for executing transactions is not the only possibility for using these devices/objects. Many payment instruments can be used through various devices depending on how they function and which rules they follow. For example, instant payments in Serbia are used on mobile phones, in m-banking applications, unlike cards, which are primarily used through, for example, digital wallets mentioned above – i.e. applications on mobile phones.

Figure 1. **Objects for executing cashless payments**



In addition to the standard payment method, payment cards can enable the payment of goods in instalments. Buyers often use the service that allows instalment payments with debit cards. The merchant can agree with the acceptance service provider to offer this service for debit payment cards used by their customers. By providing deferred payment in their store, the merchant, in addition to the simplicity and speed of the service, offers their users an additional service that will increase their turnover and income.

The use of debit payment cards for instalment payments in Serbia largely represents the legacy of the use of cheques and their improvement. Namely, some banks in our country that allow their users to purchase in instalments with a debit card no longer offer the service of paying by cheque. Thus, one payment instrument is being replaced by a more modern and cost-effective one, primarily for financial institutions and other participants in the transaction.

The business model of instalment payments with debit cards is a model where the merchant offers the deferred payment service to the buyer for purchases in their store. Instalment payments with a debit card can only be made by a buyer who uses a debit card from a bank with which the merchant has signed an instalment sales agreement. In other words, in our country, instalment sales through debit cards occur only for on-us transactions – the buyer's bank (issuer) and the merchant's bank (acceptor) are the same bank. In accordance with this setup, the payment service provider guarantees the merchant that the instalments will be paid, because the payment is made by the buyer who is a user of the same payment service provider and for whom the payment service provider has assessed that they meet the conditions for instalment payments. Financial institutions use such instalment payments to expand their acceptance network (number of merchants) based on a large number of current account/card users (buyers), and vice versa.

From the buyer's perspective, using a card provides the possibility of payment by tapping, inserting, or swiping the card through a POS terminal, without the need to carry cash. However, the question arises as to whether this applies to every card or only certain ones.

In Serbia, consumers can obtain cards from four different card schemes operating in our country (DinaCard, Visa, MasterCard, AmericanExpress), and the merchant must have an agreement to accept each of the schemes whose cards they wish to accept. Given that the schemes differ, primarily in terms of merchant fees, they may decide to accept only certain brands in accordance with their business policy. At such points-of-sale, the buyer can only pay with cards of the card brands accepted by the merchant, which can be seen at the entrance to the merchant's point-of-sale.

Figure 2. **Logos of payment schemes operating in Serbia**

In addition to cards, IPS payments are also used at points-of-sale in Serbia. Buyers use IPS payments through their mobile phones, i.e. m-banking applications on them.

The merchant can accept IPS payments through the IPS Scan and/or IPS Show methods. Depending on which method the merchant chooses, the buyer will pay either by scanning the merchant's IPS QR code (IPS Scan) or by showing their IPS QR code, which the merchant scans (IPS Show) with their equipment (POS terminal, mobile phone with the SoftPOS application, 2D barcode reader connected to the cash register, ...).

By accepting IPS payments, the merchant enables buyers to pay at their point-of-sale without a wallet or cash, and given that these are instant payments, currently only in the NBS IPS system, after the goods or services are paid for, the money is immediately credited to the merchant's account.

1.2 Devices for accepting cashless payments

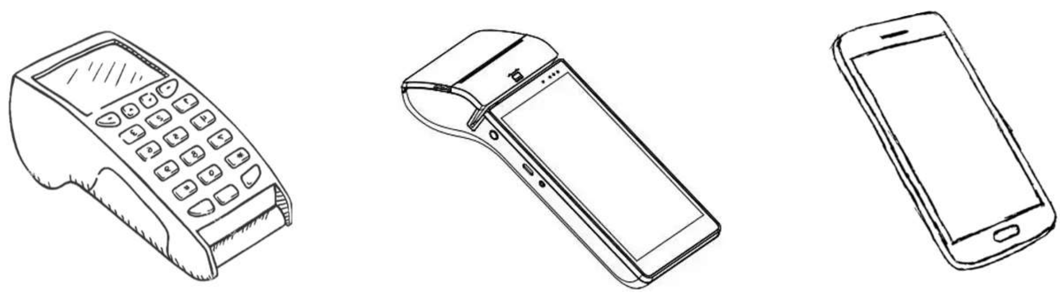
In addition to the payment instrument used to execute a transaction at a checkout, a device or software must also be in place allowing the use of the mentioned payment instrument at the checkout. A special device through which cashless payment instruments are accepted, which can be seen in many retail outlets, is the point-of-sale for cashless payment instruments, such as cards, and is called a POS terminal. In Serbia, at end-2023, the official statistics of the National Bank of Serbia recorded over 137,000 POS terminals in the market, while by the end of 2024, there were over 153,000 terminals. This means that around 110,000 points-of-sale in our country use these products to accept cashless payment instruments, such as cards or IPS payments.

These devices are a combination of hardware and software that together give merchants the technical ability to accept various cashless payment instruments. They are made in accordance with international standards in the payment industry, as well as security standards to protect the merchant and the buyer using the device.

Modern POS terminals are now also produced as Android POS terminals, meaning that, in addition to payment functions, merchants can use them for many other activities, given that various applications can be installed on the Android operating system of the terminal. The best example is eFiscalisation and fiscal cash register software, which are very often found on the same Android device on which some of the payment instruments in our country can be accepted – the Android POS terminal.

In accordance with the mentioned development of the application of modern technologies in payments, SoftPOS solutions have also appeared on the market in our country, allowing the acceptance of cashless payments using only a mobile phone. Essentially, SoftPOS is an application that the merchant can install on their phone and accept payments without a special physical device. In our market, the first applications that accepted cashless payments were intended for IPS payments, while in the following period, solutions for accepting buyers' payment cards along with IPS payments also appeared.

Figure 3 **Some devices used for accepting cashless payment instruments**



The POS terminal has long been the only technical solution for accepting payment instruments in a store, whereas now there is the possibility that these special devices are not used (e.g. a phone or the merchant's cash register can be used). Regardless of the infrastructure (phone, terminal, merchant's cash register...) established at the point-of-sale for accepting cashless payments, the process of cashless payments behind that point-of-sale (e.g. POS terminal) is essentially still the same.

The differences that merchants may notice are reflected in:

- the method of executing the transaction (tapping, inserting, or swiping the card, scanning the IPS QR code, or displaying it) – the user experience;

- the costs for accepting cashless payments;
- additional possibilities brought by different infrastructure.

To better understand all the options available to merchants, the important segments of the payment process that are carried out/used before/after initiating payment at the point-of-sale are explained below. The most important segment is the choice of an adequate partner in accepting cashless payments. Accordingly, it is necessary to explain the role of the payment service provider, especially when it comes to accepting cashless payments, given that many details as to the way acceptance will be carried depend on this.

2 The role of the payment card and IPS payment acceptance service provider

When a merchant decides that they want to accept cashless payment instruments, several activities need to be carried out to obtain the ability to do so. Using or activating the terminal is the last step in these activities, and before that, it is necessary to find an appropriate payment service provider and agree with them on the terms of accepting the desired payment instruments.

Payment card and IPS payment acceptance service providers in our country are most often banks, electronic money institutions (hereinafter: EMIs), and payment institutions (hereinafter: PIs).

Given that the payment service provider (e.g. a bank) is the link between the merchant and the payment scheme, the merchant must first establish cooperation with such an institution. As part of establishing cooperation, in addition to the mentioned agreement on the terms of using the equipment and/or application for accepting cashless payments, the bank agrees with the merchant on other terms of accepting cashless payments. In practice, the most important terms for accepting payment instruments from the merchant’s perspective are the following:

- The amount of the merchant fee – the fee that the merchant pays to their payment service provider for each cashless transaction executed at their point-of-sale. It can be expressed as an absolute amount (e.g. 7 dinars per transaction) or as a percentage (e.g. 1% of each transaction), although it is most often combined and contains a minimum that is an absolute amount and a percentage of the transaction for those transactions where the percentage is higher (e.g. the fee is 1%, with a minimum of 7 dinars). The amount of the merchant fee also depends on the brand and instrument that the merchant wants to accept at their point-of-sale, and in practice, for accepting national payment instruments such as the DinaCard and IPS, the merchant pays a lower merchant fee than, for example, international card schemes;
- The technical solution for accepting the payment instrument – on which part of the costs depend, as will be discussed further;
- The amount of turnover that needs to be realised in cashless payments and penalties for achieving lower turnover.

For large merchants or merchants with a high average transaction value at their point-of-sale, the conditions in the payment services market can be very favourable. Such merchants maintain current accounts with multiple banks and have the ability to establish cooperation with many. Consequently, they can effectively utilise the wide range of payment instruments available in our country and take advantage of the competitive benefits these payment instruments create among themselves.

As cashless payments are essentially the transfer of money from one account to another, the primary goal in negotiations with payment service providers is usually to reduce the costs associated with this activity. However, in addition to cost reduction, large merchants are also highly interested in the quality of service offered by the payment service provider. This quality is reflected in customer support, specialised reports for their accounting, and special services that can be provided, such as cash withdrawals during purchases, acceptance of instalment payments, and similar. In these areas, payment service providers compete and attempt to match each other in terms of fees, technical solutions, and business solutions.

On the other hand, small and micro-merchants typically have an account with only one bank and are tied to it due to, for example, loans they have taken for their business operations. If that bank does not offer acceptable conditions for accepting cashless payments or does not offer them at all, these merchants are forced to seek payment acceptance services elsewhere. Opening a current account with another bank and transferring part or all of their turnover can be an unacceptable option for the merchant, potentially leading to an inconvenient situation. It is precisely in such cases, as well as many others, that PIs and EMIs can provide an acceptable solution for the merchant. These payment service providers perform activities identical to those of a bank from the merchant's perspective, with the added benefit of being able to provide these services without the need to open a current account with any other bank. All funds collected from the merchant's point-of-sale can be deposited into the merchant's account at their bank, according to the agreed payment dynamics.

The model of accepting payment instruments contracted with a PI or EMI in this manner is called the aggregation model. Beside benefiting merchants who are unable to accept cashless payments through their bank, this model is very popular for e-commerce and for many small and micro-merchants. The reason for its popularity among small and micro-merchants is that entities like PIs and EMIs are significantly smaller than banks, and their business processes and goals are designed in line with the aggregation of small merchants. The business processes that must be completed with a merchant before starting to accept payments require a certain time dimension and staff engagement. Given that the result is relatively limited turnover for small merchants through the contracted service, PIs and EMIs have more motivation to contract the service than banks, whose business model is often based on higher turnovers.

In addition to the role that payment service providers play on the acquiring side of payment instruments, they also have a role on the issuing side. Payment service providers issue payment cards, m-banking applications and other payment instruments to their customers, thus enabling cashless payments. Besides issuing payment instruments, payment service providers carry out activities related to the promotion of payment instruments, their security and the technical maintenance of their systems, in order to ensure that payments are made without interruption. They carry out all these activities in cooperation with the payment schemes within which they issue/accept payment instruments.

Figure 4 **Elements of cashless payments**

3 How do I get a device for accepting cashless payments?

When a merchant decides to accept cashless payments and wants to purchase a device for this, they need to consider the needs of their point-of-sale. Accordingly, they should pay attention to the following:

- number of checkouts (e.g. cash registers) in the store and whether each one needs to provide a cashless payment method;
- types of payment instruments that will be accepted;
- having an Android device for fiscalisation that can also be used as a POS terminal (this should be checked with your fiscalisation software and hardware provider)
- turnover that the merchant expects to carry out in a cashless manner after installing the POS terminal (an important item when contracting a cashless payment acceptance service due to the conditions that the merchant can expect);
- average transaction value (an important item when contracting a cashless payment acceptance service due to the conditions that the merchant can expect);
- need for a special device (POS terminal), the ability to use a cash register (possible for IPS payments) or a mobile phone (SoftPOS);
- costs of purchasing and/or maintaining a POS terminal.

In accordance with its business needs, a merchant can look for the best technical solution for accepting cashless payments. This may include purchasing a separate physical device and its accompanying equipment or installing an appropriate application on the merchant's existing devices/equipment at the point-of-sale. The possibilities for a merchant in obtaining a technical solution are diverse and adaptable to many situations.

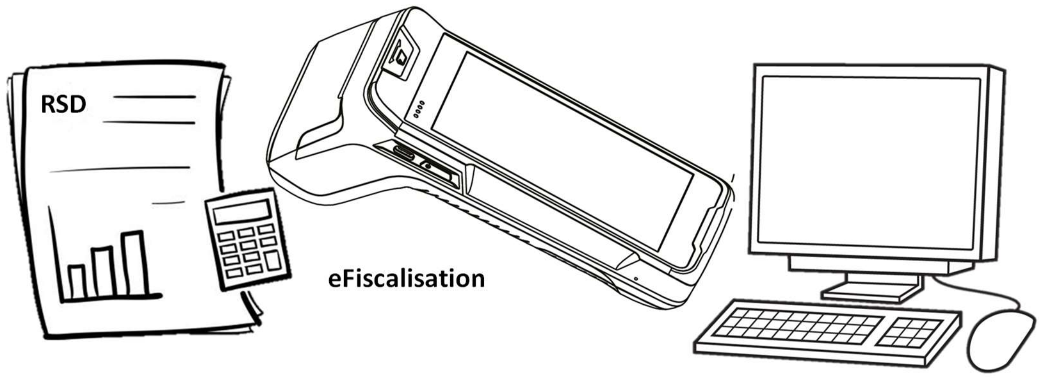
Technical and technological solutions can be purchased through a payment service provider that provides the merchant with the service of accepting payment instruments. It is common that when concluding a contract for accepting payment instruments, a POS terminal is also obtained from the payment service provider for use, similar to when a router is received from the network operator upon contracting internet service in a household. The important difference in the merchant's case is that a monthly lease is usually also agreed for the POS terminal, i.e. maintenance costs.

Often, the maintenance costs of a POS terminal are a reason to abandon its use, especially if the merchant does not expect many transactions and an increase in revenue due to the acceptance of cashless instruments. In that case, there is the already mentioned option of the SoftPOS application, which can be installed on a mobile phone, and which generates lower maintenance costs, while with some payment service providers it does not generate any costs.

In addition to the option of acquiring POS terminals from payment service providers, many merchants are already conducting procurements or may be planning to procure POS terminals from fiscalisation software providers. The most popular devices used for fiscalisation by merchants in our country are also POS terminals, which already have mechanisms in place for accepting cashless payment instruments and are waiting service activation by the merchant through the signing of an acceptance agreement with the payment service provider. Therefore, merchants who have acquired Android devices for fiscalisation purposes in recent years already have the infrastructure to accept cashless payments.

Beside this infrastructure, merchants using only software solutions for fiscalisation, such as those connected to their computerised cash registers provided by the service provider, can also utilise solutions for accepting IPS payments without any additional investment in equipment. Acceptance in this case would be carried out by displaying the IPS QR code on the computer screen, which the customer scans and executes the payment at the point-of-sale. For them, the computer would become what is, for others, a dedicated device such as a POS terminal.

Figure 5 **e-Fiscalisation**



In addition to these entities, there are also companies that are technical providers of services for accepting cashless payment instruments, with whom merchants can arrange to use their devices or applications at their points-of-sale – independently of the devices offered by banks or fiscalisation software providers. However, it should be noted that a larger number of devices complicates processes at the point-of-sale and increases costs for merchants. For this reason, the above methods of acquiring technical capabilities for accepting cashless payments are dominant in the market, especially for small and micro-merchants. These companies already work with payment service providers and others in the chain who offer their technical solutions for accepting cashless payments to merchants.

4 Acceptance of IPS payments

IPS payments are a cashless payment instrument in Serbia, widely used by both citizens and businesses, and are a very significant option for merchants. The use of IPS payments for payments at points-of-sale enhances competition in the payment services market at a key level, i.e. the level of payment schemes. With the introduction of IPS payments at points-of-sale, the number of four-party payment schemes[3] operating in Serbia increased by 33% – from three before 2020 to four since 2020 (IPS, DinaCard, Visa, Mastercard).

This means that with IPS payments, users are not only using a new mobile payment application that results in a transaction passing through the same network/payment scheme as others, but the transaction is executed through a separate infrastructure. This leads to more realistic opportunities for reducing the costs of accepting cashless payment instruments in the economy and to new opportunities for the development of cashless payments and business models.

IPS payments are particularly significant for e-commerce in our country. They have improved user experiences and the perception of security for online customers. The reason is the method of implementing IPS payment acceptance online and, consequently, the payment method. Merchants cannot store any sensitive payment instrument data when executing instant payments, as they do not have access to these data. The customer at the online point-of-sale clicks on a link or scans the IPS QR code, based on which the m-banking application receives all the necessary data to execute the transaction, and the customer confirms their intention to make the desired payment. The transaction then passes through three levels of verification (at the issuer, the IPS NBS system, and the acquirer), and if it successfully passes all checks, it is executed. In this way, customers do not leave any sensitive payment instrument information online, as everything related to the transaction is handled within their bank's m-banking application.

In addition to online points-of-sale, IPS payments at brick-and-mortar points-of sale-offer a cost-effective option for accepting cashless payments, as well as more opportunities for designing the user experience during payment. This depends on the technical and technological solutions the merchant uses to accept IPS payments. Therefore, to accept IPS payments in their store, the merchant, in addition to having a signed agreement with the payment acceptance service provider, must also have adequate equipment. This can be provided by the payment service provider, the technical service provider, or the merchant.

[3] A four-party payment scheme is a payment scheme that involves four key actors in the payment execution process – the issuer, acquirer, payer, and payee. The fifth entity in this arrangement is the payment scheme. Four-party payment schemes are typically card systems (though not all) and are among the most recognisable payment brands – UnionPay, Visa, Mastercard, etc.

To accept IPS payments at the point-of-sale, the merchant does not need to invest in special equipment but can use their existing fiscal cash register, mobile phone, or other internet-connected devices. All they need to do is install one of the many applications for accepting IPS payments on these devices, which they receive and activate in cooperation with their payment service provider (bank, PI or EMI). In the application, the merchant receives the selected IPS payment method for which they have agreed on the acceptance service with the payment service provider.

The payment methods that can be used for IPS payments at the point-of-sale are IPS Scan and IPS Show. These two methods differ only in the way the transaction is initiated by the customer. For the IPS Show method, the customer generates the IPS QR code in their m-banking application and displays it to the merchant for payment. After the merchant scans the generated code, the transaction is executed. The IPS Scan method is used when the customer scans the IPS QR code generated by the merchant on their IPS payment acceptance device using their m-banking application.

By accepting IPS payments at the point-of-sale, merchants can achieve savings, as the fees for accepting these transactions are lower than, for example, card transactions, and because they do not need to invest in or use a dedicated payment acceptance device, such as a POS terminal for card transactions. For merchants who already accept cards at their points-of-sale, IPS payments are also significant as an independent (separate) payment infrastructure. This means that in the event of technical challenges related to cards for users, merchants, or banks, the merchant can use the IPS Show or IPS Scan methods to accept cashless payments at the given moment. Given that these are instant payments, the merchant will receive the funds from these transactions in their account within seconds.

5 Transaction flow

Depending on the type of payment instrument used at the point-of-sale, the flow of information exchanged to execute the transaction (transaction flow) differs. The transaction flow is influenced by many elements, and the basic types and elements of the transaction will be explained below to provide a better understanding of the instrument and the opportunities it offers.

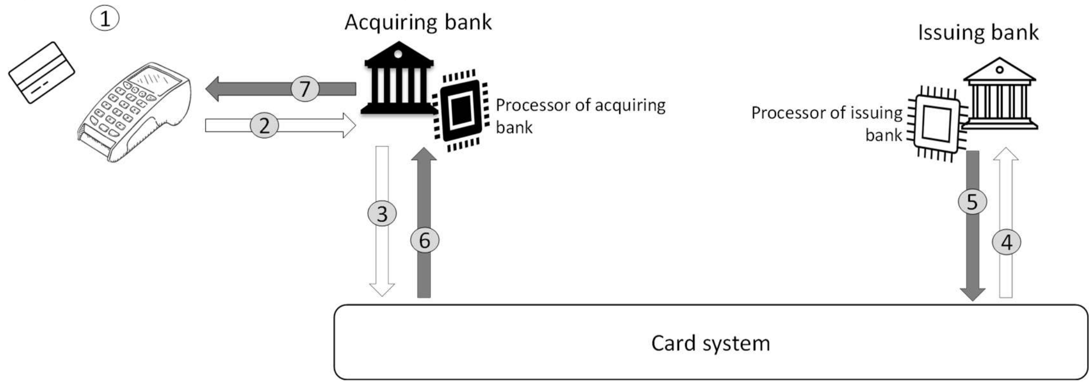
Understanding the transaction flow will help gain a better insight into the payment instrument, the infrastructure for its acceptance, and the cost structure involved.

5.1 Payment card

To explain the transaction flow of card payments, we will use the example of a standard four-party card scheme transaction, such as DinaCard, Visa, or Mastercard. In the transaction flow, in addition to the customer and the merchant, entities such as the card-issuing bank (the customer's bank), its processor, the acquiring bank (the merchant's bank), its processor, and the card scheme are involved. It should be noted that in rare cases, some banks process cards independently and do not use processor services.

During each standard (online) card payment, information passes through the mentioned participants as follows:

Diagram 1 **Transaction flow in the card system**



1. The customer uses a card at the point-of-sale, and the merchant uses a POS terminal to accept the payment.
2. When the card is tapped, inserted, or swiped through the terminal, it sends the necessary information via a secure connection to the acquiring bank (or the bank's processor if the bank uses that business model).
3. The bank (processor) processes the received information and sends it to the card scheme within which the card was issued, e.g. DinaCard.
4. The card scheme forwards the information to the card-issuing bank – the customer's bank (or the bank's processor if the bank uses that business model).
5. The issuing bank approves or declines the transaction and returns this information to the card scheme.
6. The card scheme forwards this information to the acquiring bank.
7. The acquiring bank forwards the transaction status information to the POS terminal. After this, the merchant issues the goods to the customer, and the funds used in the transaction are reserved in the customer's account with their bank (the issuing bank).

After receiving confirmation that the transaction has been approved, the merchant has a guarantee from the bank that the funds will be credited to their account. From the moment the transaction is approved until the funds are received, the merchant typically waits one day, although it may be longer (e.g. if the payment is made on a Friday or over the weekend, the funds will be in the merchant's account on Monday). The merchant receives the funds in their account after the clearing and settlement process.

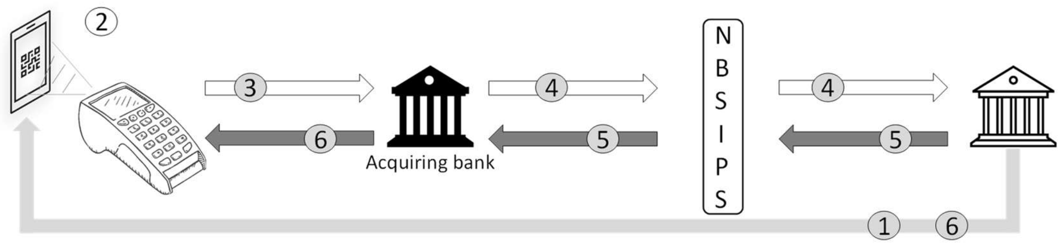
5.2 IPS

The transaction flow of IPS payments can be presented in a simpler way than that of card payments. In such payments, in addition to the customer and the merchant, the issuing bank (the customer's bank), the acquiring bank (the merchant's bank), and the IPS system are involved. Accordingly, and owing to other characteristics of the system and the created business model, the merchant fee for IPS payments can be significantly lower than that charged for card payments.

IPS payments can be executed at the point-of-sale using two methods – IPS Show and IPS Scan, which have different transaction flows. The merchant can use the same equipment for acceptance regardless of the model they choose. Also, using either IPS payment method, funds are transferred from the customer's account to the merchant's account in real time, and the transaction status information is received. This is a significant difference compared to, for instance, card transactions.

During each payment executed using the IPS Show method, information is exchanged as follows:

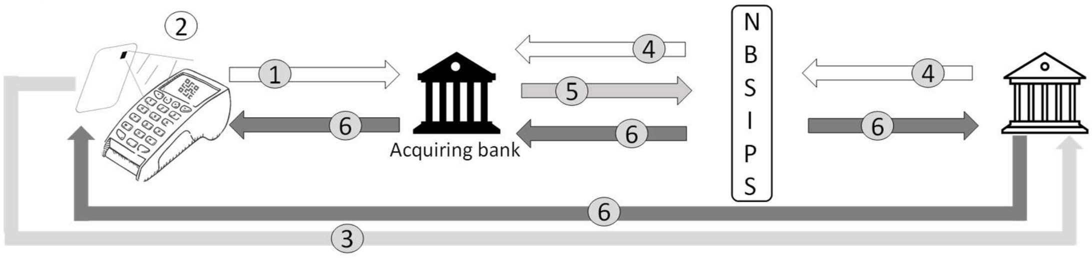
Diagram 2 **Transaction flow in the IPS Show method**



1. The customer generates the IPS QR code on their m-banking application, with data verified and generated by their bank.
2. The merchant scans the customer's generated IPS QR code. They can use a mobile phone, POS terminal, scanner at the cash register, or any other acceptable solution.
3. The merchant's cash register device forwards the scanned data to the acquiring bank.
4. The acquiring bank forwards the information through the IPS NBS system to the issuing bank (the customer's bank).
5. After appropriate checks, the issuing bank (the customer's bank) will confirm the execution of the transaction by making the payment to the acquiring bank (the merchant's bank) through the IPS NBS system.
6. After the payment is executed and the funds are received, the acquiring bank notifies its merchant that the transaction has been completed by delivering this information to their device or software used for acceptance, and the issuing bank does the same for its customer in the m-banking application.

During each payment executed using the IPS Scan method, information is exchanged as follows:

Diagram 3 **Transaction flow in IPS Scan method**



1. The merchant generates the IPS QR code on their device, with the code information automatically forwarded to their bank.
2. The customer activates the camera in their m-banking application by clicking on IPS Scan and scans the displayed IPS QR code.
3. The information from the IPS QR code is delivered to their bank via the application.
4. The bank sends the information to the IPS NBS system to execute the payment, and the system forwards this information to the merchant's bank.
5. The merchant's bank performs the necessary checks and confirms the execution of the transaction in the IPS NBS system.
6. Based on this confirmation, the IPS NBS system sends information about the execution of the transaction to both banks, and they forward this information to their clients – the customer in the m-banking application (issuing bank) and the merchant on their device or software used for acceptance (acquiring bank).

6 Acceptance of cashless payments in numbers

In addition to analysing the opportunities and methods of use that payment instruments and the associated infrastructure can offer to the economy, we also need to analyse the statistical results achieved so far to obtain a comprehensive picture of cashless payment acceptance.

In 2022, the paper "Trends in digital payments – Serbia's Digital Payments Index" was published, defining the Digital Payments Index as a unit of measurement which indicates the development of digital payment usage in Serbia over time, calculated for a one-year period.[4] It is composed of data related to the ability to execute digital payments, the issuing side, the acceptance side, and payment performance. The Index shows a trend of digital payment development in all the mentioned areas.

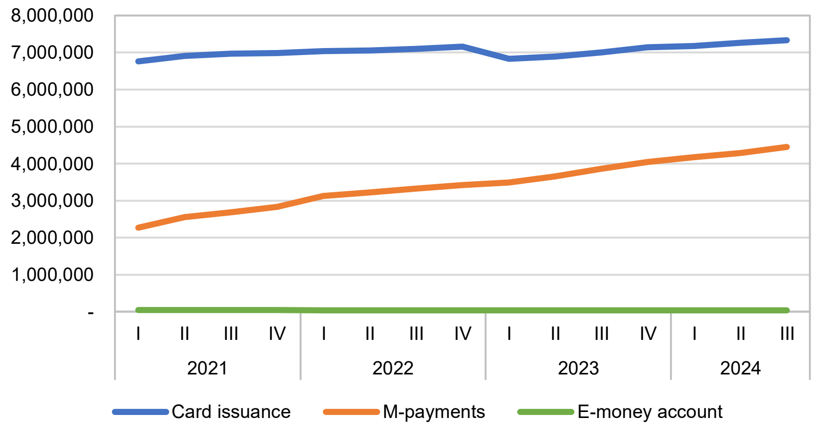
The analysis was carried out based on data related to the acceptance of payment instruments in Serbia. To track cashless payment acceptance in more detail, key indicators influencing acceptance and showing its status are highlighted here (more detailed data can be found in Appendix 2):

- payment instruments;
- acceptance network;
- number of transactions.

Payment instruments have already been described in the previous part of the paper and are very important for the acceptance service, as they enable customers to make cashless payments. As stated, the most popular payment instruments for cashless payments at points of sale in Serbia are cards and IPS payments, and their usage in our country is shown in Chart 1.

[4] Ilija Etinski, Bogdan Stanišić, Aleksandar Aleksić, Ivan Radanović (2022), *Trends in digital payments – Serbia's Digital Payments Index*. Working Papers Bulletin of the National Bank of Serbia, III.

Chart 1 **Payment instrument users in Serbia**



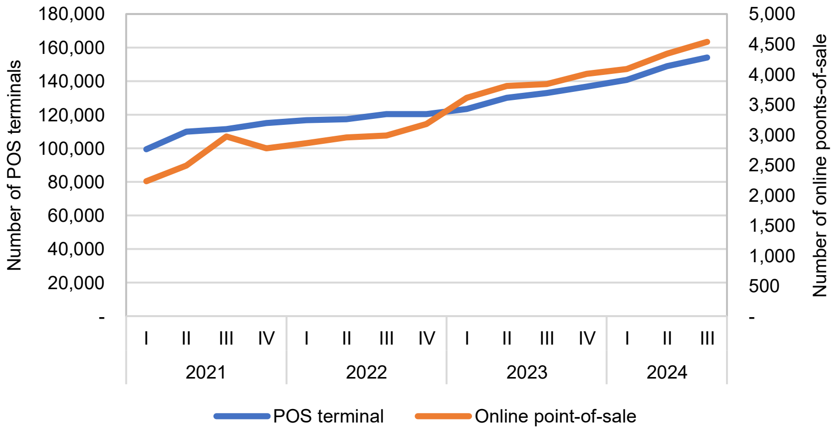
Source: NBS.

According to the National Bank of Serbia's official statistics, the "Card issuance" category indicates the number of payment service users to whom a payment service provider has issued a card – there were 7,336,461 users in the third quarter. Given that one user can, for instance, take a payment card from two business banks, which would count them as two users in this statistic, the actual number of payment card users is somewhat lower than the number presented in the "Card issuance" category. Nevertheless, based on the presented number and its relation to the population in the country, we can conclude that there is a large base of card users in Serbia. The same can be concluded for users of m-banking applications, i.e. users shown in the "Mobile payments" category in the Chart. In the third quarter of 2024, there were 4,451,471 of these users, i.e. a large number of citizens, through m-banking applications, form the base of IPS payment users. The growth in the number of m-banking users from 2.2 mn in 2021 to 4.4 mn in 2024 indicates greater digitisation of payments in the economy, as well as recognition of the potential and opportunities that IPS payments offer to their users through the application. Finally, the stagnation of e-money accounts during the observed period was recorded, indicating a lack of development of this instrument in the Serbian economy. Still, payment service users have many payment instruments at their disposal to make cashless payments.

The results on the issuing side materialise on the acceptance network, through which the efficiency of established business models and technical solutions in the market and the utilisation of market potential can be observed. In payments, acceptance is a key activity. If the above statistics for payment instruments were to double at this point, it would not have such a drastic impact on the number of executed cashless transactions, as a larger number of clients can still only purchase from the same merchants and cannot make cashless transactions with merchants not accepting such payments. Therefore, acceptance is the most important activity when it comes to increasing the number of cashless transactions at points of sale.

The National Bank of Serbia collects information on the acceptance network, with the most important data shown in Chart 2.

Chart 2 **Acceptance network in Serbia**



Source: NBS.

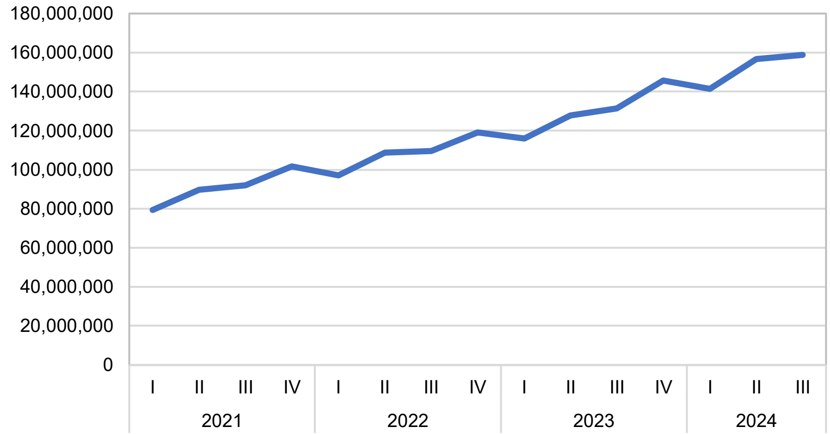
Based on the information published by the National Bank of Serbia on a quarterly basis, the acceptance network has been recording an almost constant upward trend over the past four years. The "POS terminals" category in the Chart shows the number of checkouts for all acquirers in the country. This means that the 153,938 checkouts recorded in the third quarter of 2024 are not actually that many checkouts in the real economy. This is because some merchants have arranged acceptance services with multiple payment service providers at their checkouts to obtain lower costs, offer different services to their customers, etc., with each payment service provider separately reporting on its checkouts in the official statistics based on cooperation with the merchant. Virtual points-of-sale in the Chart indicate what is better known as online points-of-sale, and they rarely, if ever, face the challenge of statistical representation as is the case with physical checkouts (the "POS terminals" category). Despite this nature of the collected data, the acceptance network is expanding.

The introduction of e-fiscalisation and the way it was implemented in Serbia opened room for further development of the acceptance network, as it enabled the market to adopt new technical and technological solutions for accepting cashless payments and created opportunities for the development of new business models. It is now up to the market players to find adequate business models that will maintain or underpin the current growth trend.

Finally, the upward trend in the acceptance network and the large number of payment instruments, i.e. options that the customer can use to make payments, also leads to a constant increase in the number of transactions executed in the acceptance network in Serbia.

Chart 3 shows data on money transfer payment transactions executed at checkouts in Serbia using cards issued by payment service providers from Serbia. In the last observed quarter, the number of transactions was the highest compared to the previous four-year period and amounted to 158,822,205. This number doubled compared to the first quarter of 2021, which is an extremely positive result, testifying to the development of the cashless payment acceptance network.

Chart 3 **Number of card transactions at POS in the acceptance network in Serbia**



Source: NBS.

7 Conclusion

In Serbia, there are currently over 153,000 checkouts accepting at least one of the above payment instruments. Merchants, in the described manner, enable their users to make fast and simple payments without the need for cash at the point-of-sale, while they themselves benefit from better money protection, more transparent operations, increased revenue, and more satisfied consumers.

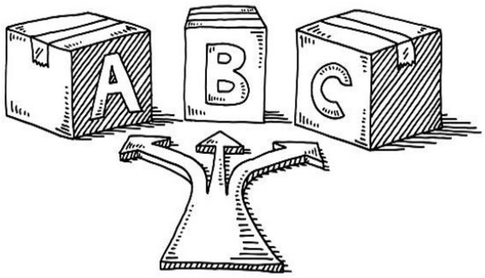
In line with the above, the number of checkouts where one of the mentioned payment instruments can be used is continuously growing. The reason are not only the benefits that cashless payments bring to merchants and customers but also many other activities, such as the implementation of the Law on Multilateral Interchange Fees and Special Operating Rules for Card-Based Payment Transactions. This Law limited the interchange fee that the acquiring bank pays to the issuing bank for each executed transaction to 0.2% of the transaction amount, or 0.3% for credit cards.[5] This measure has significantly influenced the reduction in merchant fees in our country, the effects of which are still reflected in the growing number of checkouts. The Law also introduced a measure that has influenced the transparency of merchant fees, further assisting merchants in making decisions regarding the selection of the best acceptance service. In accordance with the Law, in the payment service agreement concluded with the merchant, the acquirer is obliged to separately display information on the amount of all fees (merchant fee, interbank fee, and payment card system fee), and this applies to all payment brands and types of payment cards.

The level of merchant fees is also greatly influenced by market competition, which increased significantly in 2020, when the provision of IPS payment services at points-of-sale began in our country. The impact of IPS payments on competition is significant, as they represent a new payment instrument with a separate infrastructure that offers an adequate

[5] Law on Multilateral Interchange Fees and Special Operating Rules for Card-Based Payment Transactions (RS Official Gazette, No 44/2018).

alternative to the currently most popular form of payment – card payments. Although offered by the same payment service providers as card payments, IPS payment acceptance can be carried out without a dedicated device and can also be enabled within the merchant's cash register. In this way, IPS payment acceptance can be more cost-effective for merchants, and due to the described transaction flows for these payments, the merchant fee charged is significantly lower than for other mentioned payment instruments. Such competition with other models of payment instrument acceptance promotes the creation of even more accessible conditions in the market and innovations with which competition is responding to modern payment solutions.

Figure 6 **Selection**



It is upon merchants to continue monitoring developments and changes in the field of payment services in order to make quality choices in their business operations when considering the acceptance of cashless payments. It is also noteworthy that the Law gives merchants the right not to accept a specific payment instrument or type of payment card for which they incur higher costs. Such information, as well as information about the processes and participants involved in a payment system used by the merchant, help manage this very important segment of business operations, with merchants being able to choose the most acceptable payment instrument or method of accepting payment instruments at their points of sale.

Appendix 1

Glossary

POS terminal – a device used to accept payment instruments

Payment instrument – a personalised means and/or set of procedures agreed between the payment service user and the payment service provider, which the user employs to issue a payment order

Android POS – a device used to accept payment instruments, which uses the Android operating system

SoftPOS – an application that enables the acceptance of payment instruments on the device on which it is installed, e.g. a mobile phone

IPS QR – a QR code used to execute IPS payments at points of sale, which can be generated in the customer's m-banking application or on the merchant's equipment, depending on the payment method initiated

Card payment – payment at a point-of-sale using a payment card or an instrument based on a payment card

Card scheme – a set of processes and technical solutions that enable the exchange of information for the execution of card payments initiated by a card issued within the card scheme

IPS payment – payment initiated at a point-of-sale using the IPS Scan or IPS Show options in the m-banking application

IPS NBS system – a set of processes and technical solutions that enable the exchange of information for the execution of payments and the transfer of funds from account to account in real time

IPS Scan – a method of IPS payment at a point-of-sale where the customer scans the IPS QR code displayed on the merchant's equipment

IPS Show – a method of IPS payment at a point-of-sale where the merchant scans the IPS QR code displayed in the customer's m-banking application

Checkout – a location where goods or services are paid for (e.g. cash register, POS terminal)

Point-of-sale – a location where goods or services are sold (e.g. supermarket); one point-of-sale may have multiple checkouts

Merchant fee – a fee per transaction that the merchant pays for accepting the payment instrument used in the transaction

Issuer – an entity that issues a payment instrument to the customer (usually a bank or e-money institution)

Acquirer – an entity that enables the service of accepting payment instruments at a point-of-sale (usually a bank or an e-money institution)

Interchange fee – a fee that the acquiring bank pays to the bank issuing the payment instrument after a payment is executed at a point-of-sale

Processor – an entity that processes data related to card payments for the bank

Appendix 2

Statistical data

Data used in the charts:

Table 1 – **Number of payment instrument users**

Year	Quarter	Card issuance	M-payments	E-money account
2021	I	6,766,165	2,275,814	45,890
	II	6,917,384	2,556,111	46,468
	III	6,976,681	2,692,552	46,069
	IV	6,987,775	2,840,518	45,448
2022	I	7,042,690	3,129,600	44,589
	II	7,064,823	3,224,993	43,803
	III	7,103,107	3,332,306	42,655
	IV	7,168,166	3,425,213	40,675
2023	I	6,834,602	3,494,654	38,991
	II	6,894,517	3,657,691	38,949
	III	7,004,879	3,866,868	38,366
	IV	7,144,754	4,044,375	38,145
2024	I	7,181,003	4,180,152	38,539
	II	7,269,131	4,289,222	37,617
	III	7,336,461	4,451,471	44,141

Table 2 – **Acceptance network**

Year	Quarter	POS	Virtual POS
2021	I	99,301	2,231
	II	109,787	2,492
	III	111,444	2,970
	IV	114,984	2,774
2022	I	116,613	2,858
	II	117,315	2,956
	III	120,232	2,985
	IV	120,224	3,178
2023	I	123,308	3,610
	II	129,980	3,809
	III	132,799	3,840
	IV	136,662	4,010
2024	I	140,630	4,086
	II	148,923	4,340
	III	153,938	4,535

Table 3 – **Number of card transfer transactions at checkouts**

Year	Quarter	Number of card transfer transactions at checkouts
2021	I	79,323,655
	II	89,710,736
	III	92,027,607
	IV	101,661,580
2022	I	97,061,081
	II	108,777,425
	III	109,440,248
	IV	119,230,947
2023	I	116,112,950
	II	127,784,309
	III	131,441,111
	IV	145,748,188
2024	I	141,508,529
	II	156,664,657
	III	158,822,205

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