PAYMENTS 2030

The payments strategy objective of the MNB and the introduction of the Payments Development Indicator Set (PDIS)

Based on the results of the previous payments strategy, a new vision is required regarding electronic payments, summarised by the MNB's document called Payments 2030, which also provides a basis for specific measures to be defined in the future. In the following period, the MNB's main payments strategy objective is to significantly increase the ratio of electronic transactions by 2030, and in case of an extensive and general usage stimulation, the MNB aims to make 60 per cent of transactions electronic, and in case of further specific measures, two-thirds of them electronic by 2030. The payments strategy outlines the main areas and possible directions identified during the analysis and research activity carried out so far, where targeted economic policy intervention may take place in the future in order to achieve the main strategic objective. In order to evaluate the current situation of Hungarian payments, identify potential areas of intervention and possibilities for specific measures, define strategic objectives, evaluate the implementation of the necessary measures to reach the objectives, the MNB has established the Payments Development Indicator Set (PDIS).

The Payments 2030 document was prepared by the Directorate Financial Infrastructures and Payments of the Magyar Nemzeti Bank (the Central Bank of Hungary), and was discussed at the Monetary Council meeting on 9 May 2023.

Table of contents

Introduction

01

The effective and reliable operation of a modern electronic payments system plays a key role in the operation of the economy, therefore, the MNB handles it as a priority area as well. One of the fundamental duties of the Magyar Nemzeti Bank (MNB) is to ensure the reliable operation of Hungarian payments and continuously develop them. An advanced electronic payments system enables economic operators to carry out the financial settlement of their transactions efficiently and quickly. Electronic payment solutions already include the main features of the widely used cash payments as they are instant and permanently (24/7/365) available. In addition, they offer several advantages compared to cash usage since they enable transactions between remote parties as well, furthermore, related services can be developed for them in order to make the daily business of economic operators even easier. As a result, efficient and innovative electronic payments are inevitable for the "circulation" of the modern economy, therefore, the MNB also pays special attention to this area.

In order for Hungarian payments to keep pace with the current technological innovation and the development of other economic areas, the MNB has set detailed payments strategy objectives for the period up to 2030, as a continuation of its former two-pillar strategy. As part of its research and analysis work, the MNB continuously monitors Hungarian payments and identifies areas for their development. The previous payments strategy consisted of two main pillars: ensuring the possibility of electronic payments in all situations, namely, developing the infrastructure, and encouraging the use of electronic payments. In the last decade, significant improvements took place primarily in terms of infrastructure development, thus, it was required to renew the previous strategy. This document includes the payments strategy objectives of the central bank for the period up to 2030, which were mainly defined based on the common good, more interoperable payments and the enhancement of the competition. The MNB defined these strategic objectives in accordance with and as a continuation of its former two-pillar strategy, and developed a detailed set of objectives and in-

dicators that helped identify the objectives and define the areas to be developed as precisely as possible. The strategy particularly focuses on sub-areas where the analyses showed underdevelopment, and separate objectives were defined for these areas. It also means that this strategy does not aim to render the aspects of all market or state actors involved, who follow different objectives that are typical of that operator in their daily operations, or of private operators who follow profitability interests. At the same time, the publication of the central bank's strategic objectives enables market players to adapt their own development activities to them.

The payments strategy of the MNB covers all types of payment situations and electronic payments, and the entire range of end-users, both the consumers and the corporate clients. The framework of the strategy also defined indicators that help to follow the development of each (sub-)area significant for Hungarian payments. The indicators and the progress measured by them also provide a basis to develop new regulatory and public policy measures aimed at specific sub-areas.

In accordance with these, the next section provides an insight into the framework and theoretical background of the development of Hungarian payments, and a short description and evaluation of the payments strategy of the last 10 years. The study then follows to describe the strategic objectives of MNB for 2030, and it identifies the central bank's potential areas of intervention related to measures required to reach these objectives, and finally, it provides an explanation on the Payments Development Indicator Set, which quantifies the current level of development and the future improvements. It is a complex set of indicators that can be used to determine the interventions necessary to achieve the main strategic objective, as well as the areas affected by them, and to monitor the development of the affected areas and the changes that occur in them. The timeframe for the payments strategy is seven years, and the objectives were defined for 2030. However, the progress of reaching these objectives will be evaluated more often, on an annual basis by the MNB.

The former payments strategy of the MNB and the development of payments in Hungary in the last 10 years

02

The MNB's activity in the development of electronic payments is justified by several factors, such as increasing the efficiency of economic operations, reducing social costs, and curbing tax evasion. A wider range of the usage of electronic payments can contribute to greater economic growth (llyés-Varga 2016). Furthermore, several studies (see e.g. Schmiedel et al. 2012; Turján et al. 2012) concluded that significant cost reductions could be reached at the social level with the more frequent use of electronic payments, among others, due to the decrease of manual processes or physical presence (and its time requirement) related to cash. Deák et al. 2022 also showed that the social costs per transaction decreased significantly between 2009 and 2019, which was partly due to developments, and partly due to dynamically increasing turnover. Besides all these, it is also an important aspect that electronic payments provide greater transparency and better traceability in the financial relations of economic operators, which can greatly contribute to the prevention of tax evasion and grey economy.

In recent years, the ratio of electronic transactions has increased significantly in the total economy, however, cash still remained the most frequently used payment method. Between 2015 and 2021, the ratio of the number of electronic transactions increased by nearly 20 percentage points to 31 per cent, considering all payment situations, as well as transactions of the household, corporate and public sectors. The increase was resulted by the fact that the possibility to use electronic payments generally improved in each sector and payment situation, although at different extent, and thus, the changes in payment habits resulted in a more frequent usage. In addition to these factors, the coronavirus pandemic further accelerated this process in the last 3 years.

Chart 1: The ratio of the number of electronic transactions, and its annual change in terms of percentage points in the total economy

Per cent / Percentage point

■ The ratio of the number of electronic transactions (left axis)
— The ratio of the number of electronic transactions annual change in terms of percentage point (right axis)
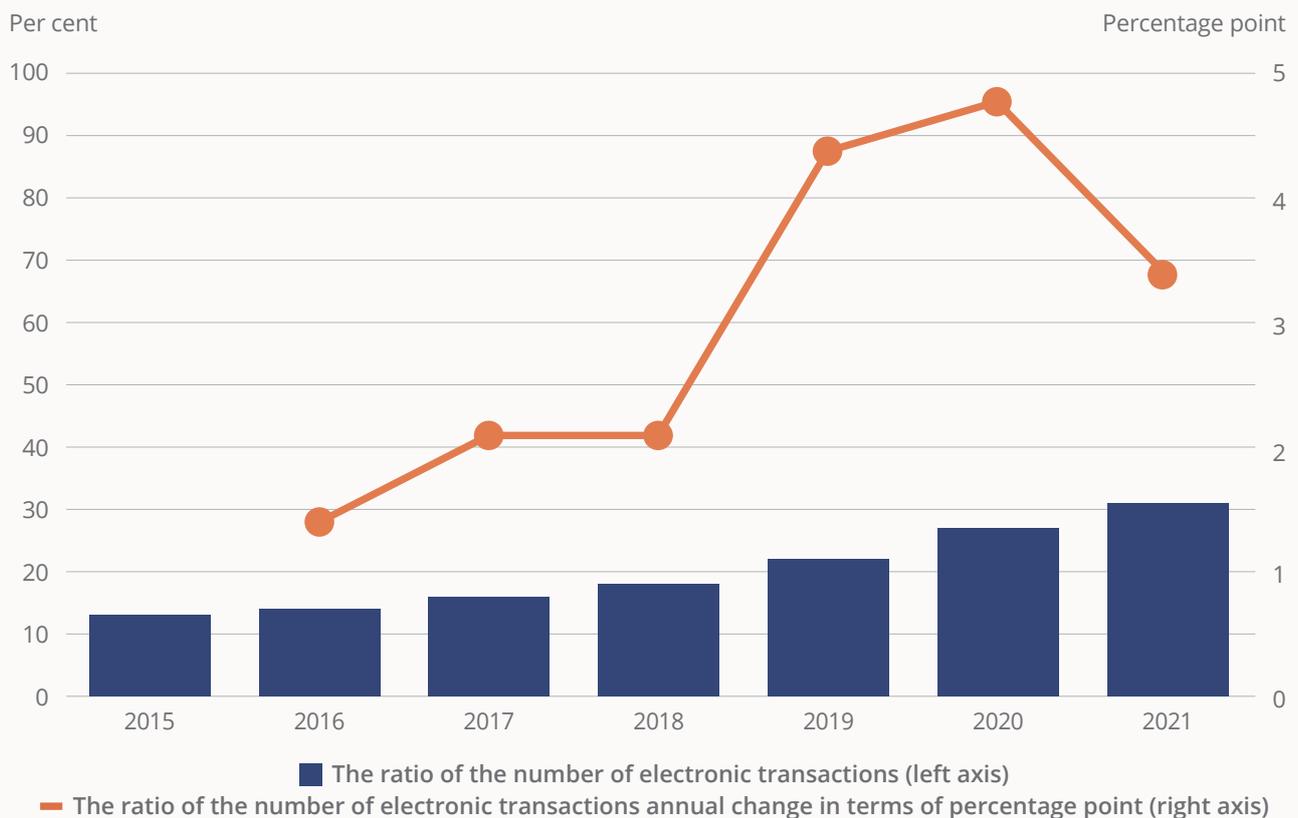
Source: MNB

So far, the MNB has regularly monitored the growth of the efficiency of Hungarian payments in three areas, covering a significant part of electronic payment situations: credit transfers, electronic payments of purchases and bill payments. The factors mentioned above, namely the promotion of economic growth, and the reduction of social costs and tax evasion, justify that the central bank shall continuously track the development of electronic payments, and if necessary, it should actively intervene for further development. The MNB has developed efficiency indicators for this purpose, which are published in the annual Payment Systems Report.

Chart 2: Indicators measuring the level of development of Hungarian payments

Credit transfers as a percentage of GDP

Annual value of credit transfers / GDP

Electronic payments of retail purchases

Total annual value of card purchase transactions / Annual household cunsumption
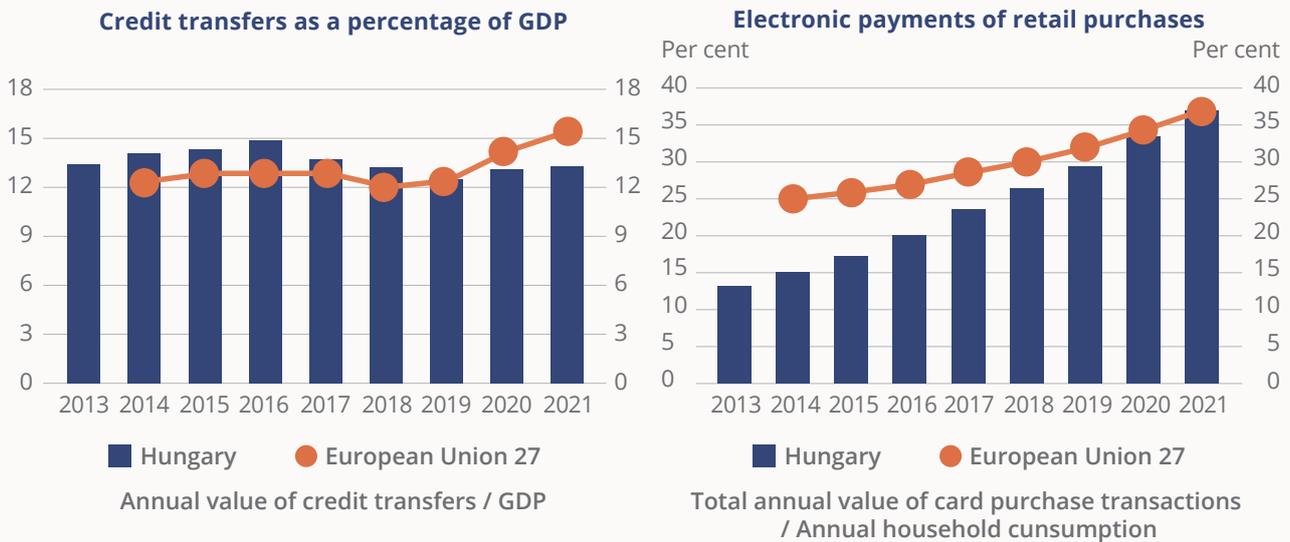
* European Union excluding United Kingdom from 2022
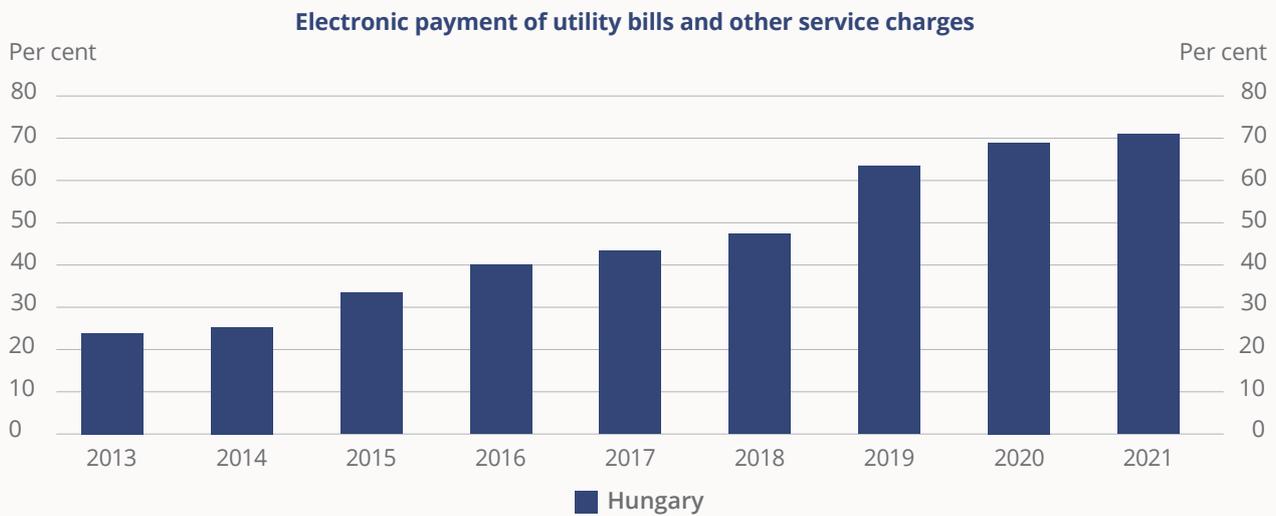
Electronic payment of utility bills and other service charges

Estimated annual number of electronic bill payments / Estimated annual numer of bill payments

The Hungarian bill payment data before 2019 do not include the bill payments initiated not through postal money orders or direct debits (e.g. online card payments or in the service provider's local office, credit transfer), while the continously increasing payments of postal money orders conducted with payment cards in the post offices have formed intagral part of this indicator all the time. No European bill payment data are available for the purpose of EU comparison

Source: MNB, HCSO, ECB, Eurostat

In the past few years, Hungarian electronic payments have improved continuously, which was greatly influenced by the activity of the central bank as well. Fundamentally, the MNB supports payments development with three tools: 1. Regulation, either directly by MNB decrees (e.g. instant payment), or indirectly by amendments initiated towards other regulators (e.g. initiatives to modify the regulatory background of interchange fees at the related ministry); 2. Ownership and development of infrastructure, of which very obvious examples were the takeover of GIRO Zrt. by MNB in 2014, and the subsequent infrastructural developments, such as making more frequent the cycles of intraday clearing, or introducing instant payments; 3. Initiation and coordination of market developments, for example, the instant payment ecosystem, development of services based on instant payments, and the establishment of the QR code standard in particular.

Chart 3: The most important steps of payments development in Hungary in the last decade
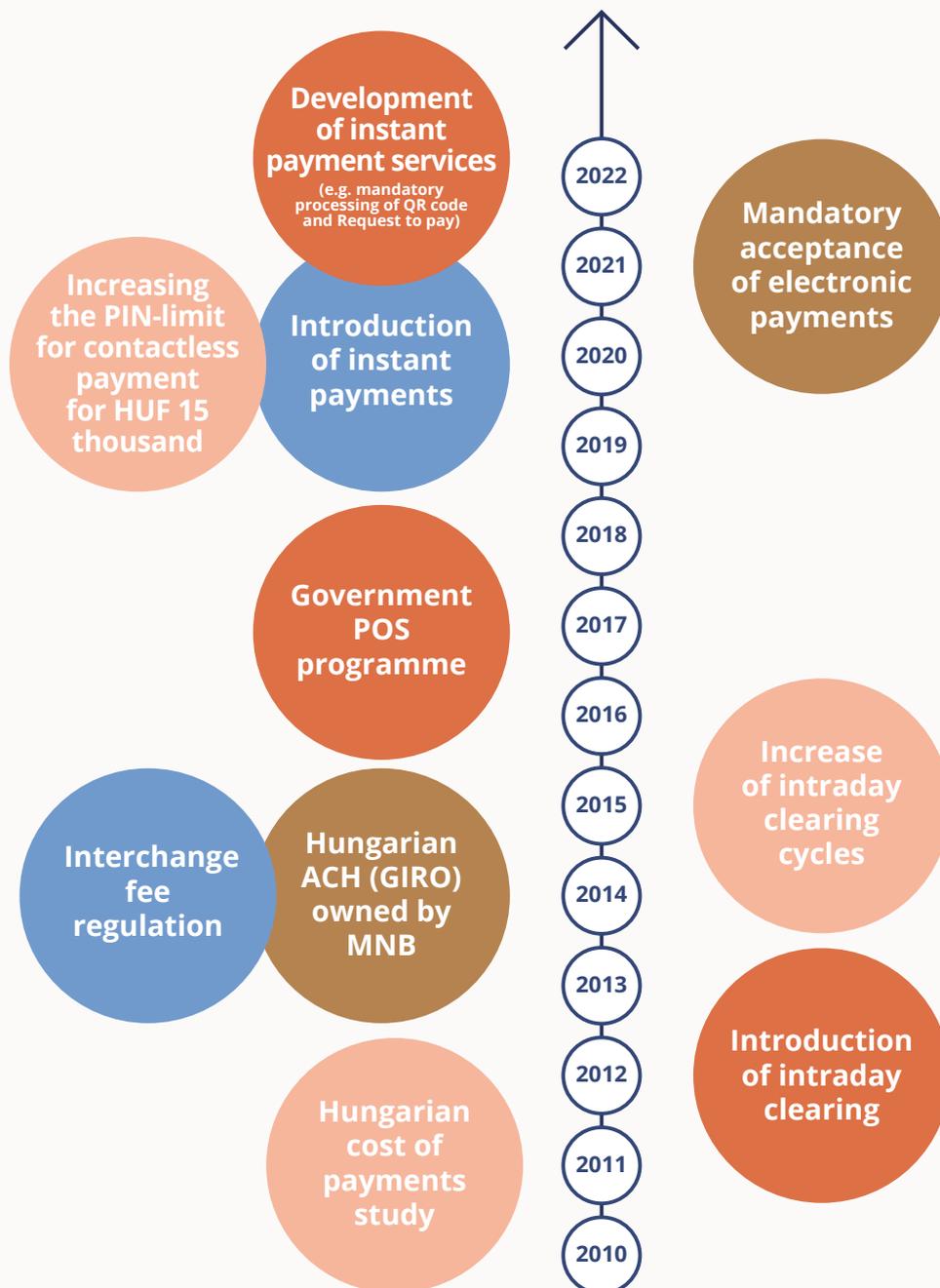
Source: MNB

In the past decade, the use of the triple central bank tool system was driven by two strategic objectives. In accordance with the two-pillar strategy established in 2010 by the MNB, one of the essential objectives was to provide options in as many payment situations as possible, so that electronic payments as an alternative shall be available besides cash payments (Kajdi-Varga 2015). Therefore, it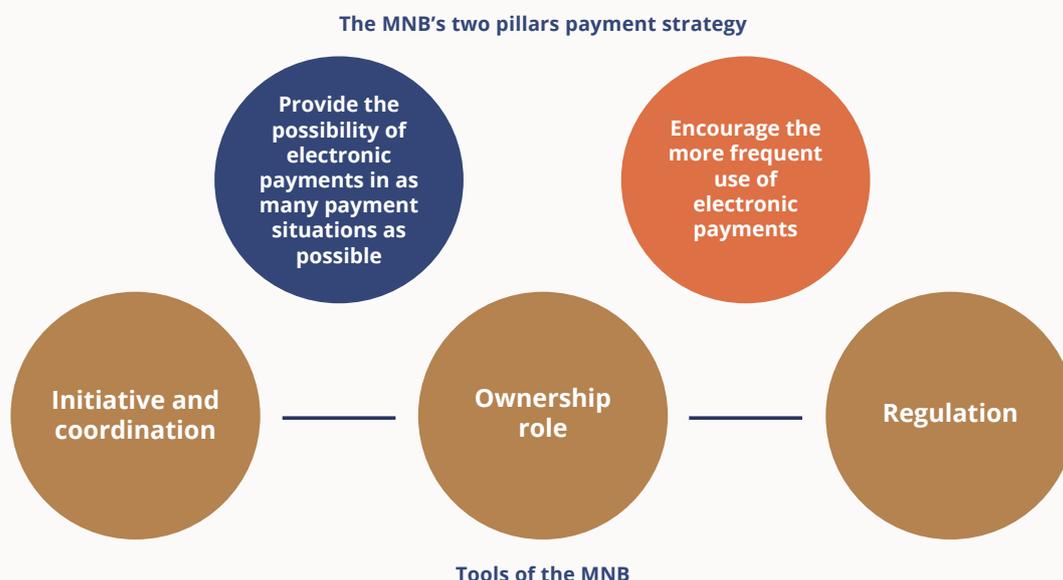 is important that consumers and companies shall not encounter technological-infrastructural obstacles when they would like to settle their financial obligations via electronic payments. The most obvious problems may occur in case of physical or online retail payments, however, it is also vital that modern electronic solutions shall be available for payments between persons (P2P) or businesses (B2B). On the other hand, due to the previously presented economic advantages, the MNB actively encouraged the more frequent use of electronic payments. Among other things, it was manifested in communications emphasising the need for more favourable pricing for consumers, but also in the fact that the fee structure of the MNB-owned GIRO Zrt. was restructured in a package-price system, which encourages payment service providers to handle higher turnover.

Chart 4: The MNB's former two-pillar strategy

The MNB's two pillars payment strategy

Provide the possibility of electronic payments in as many payment situations as possible

Encourage the more frequent use of electronic payments

Initiative and coordination

Ownership role

Regulation

Tools of the MNB

Source: MNB

In the past few years, a significant development has taken place both in terms of payments infrastructure and the use of electronic payments, which was jointly resulted by several factors, of these is fundamental the population's bank account coverage. The MNB regularly conducts household surveys on payment habits, which show that in general there is no significant problem regarding financial inclusion, at least 90 per cent of Hungarian households have minimum 1 bank account or bank card (Deák et al. 2021a). Instead, further room for improvement can be seen in some groups, such as elderly people. Looking at certain payment methods, several changes took place regarding the two most commonly used electronic solutions, bank cards and credit transfers, both in terms of their infrastructure and usage.

In the case of retail payments, bank cards have long been the exclusive and currently the most important alternative to cash, the acceptance network of which has expanded significantly in recent years. Bank cards have been the only electronic payment methods in physical retail stores until the introduction of instant payments in March 2020. Among others, the infrastructural expansion of bank cards can be attributed to the regulation on the reduction of interchange fees initiated by the MNB, which

preceded a European regulation of similar content by one year (Kajdi-Kiss 2021). Furthermore, POS installation programs initiated by the MNB and launched by the Ministry of Finance and card companies played a key role in the expansion of the acceptance network as well. On top of all these, as a proposal of the central bank, an amendment of the Act on Trade was entered into force in 2021, pursuant to which the retailers obliged to use online cash registers have to provide the possibility of electronic payment, which was fulfilled by most of the retailers by means of introducing card acceptance. The previous introduction of online cash registers and the obligation to use them in wider ranges presumably stimulated the willingness to introduce electronic payments for those retailers as well, who formerly preferred cash payments for less transparency.

Chart 5: Change in the number of POS terminals (left chart) and online acceptance points (right chart)

Number of POS terminals

Number of online acceptance points
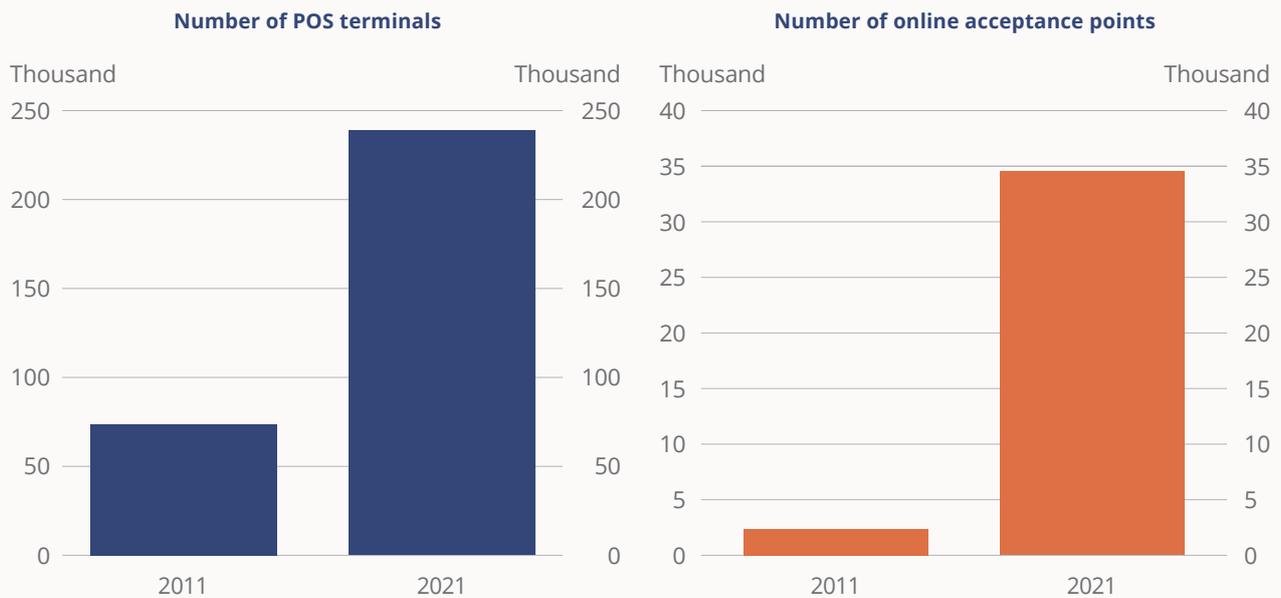
Source: MNB

With regard to technology, the introduction of contactless payments based on NFC data transmission has been a breakthrough in the past few years. This provides an extremely simple, fast and comfortable user experience, so card payment has become a suitable electronic alternative for those who previously chose cash due to their lower digital skills. As a result of significant developments, 93 per cent of the issued cards and 99 per cent of POS terminals supported contactless payments by the end of 2021. Besides that, in an international comparison, card payments are considered outstandingly safe in Hungary, which is further supported by rules protecting consumers. Despite all their advantages, card payments are not suitable to provide a cashless option in every payment situation, therefore, the MNB actively supported the development of credit transfers as well.

Chart 6: Evolution of the domestic card acceptance network, 2010–2021

Number of card acceptance points

Contactless POS ratio (%)

- ■ Number of acceptance points at physical merchants
- ■ Number of online acceptance points
- — Contactless POS ratio
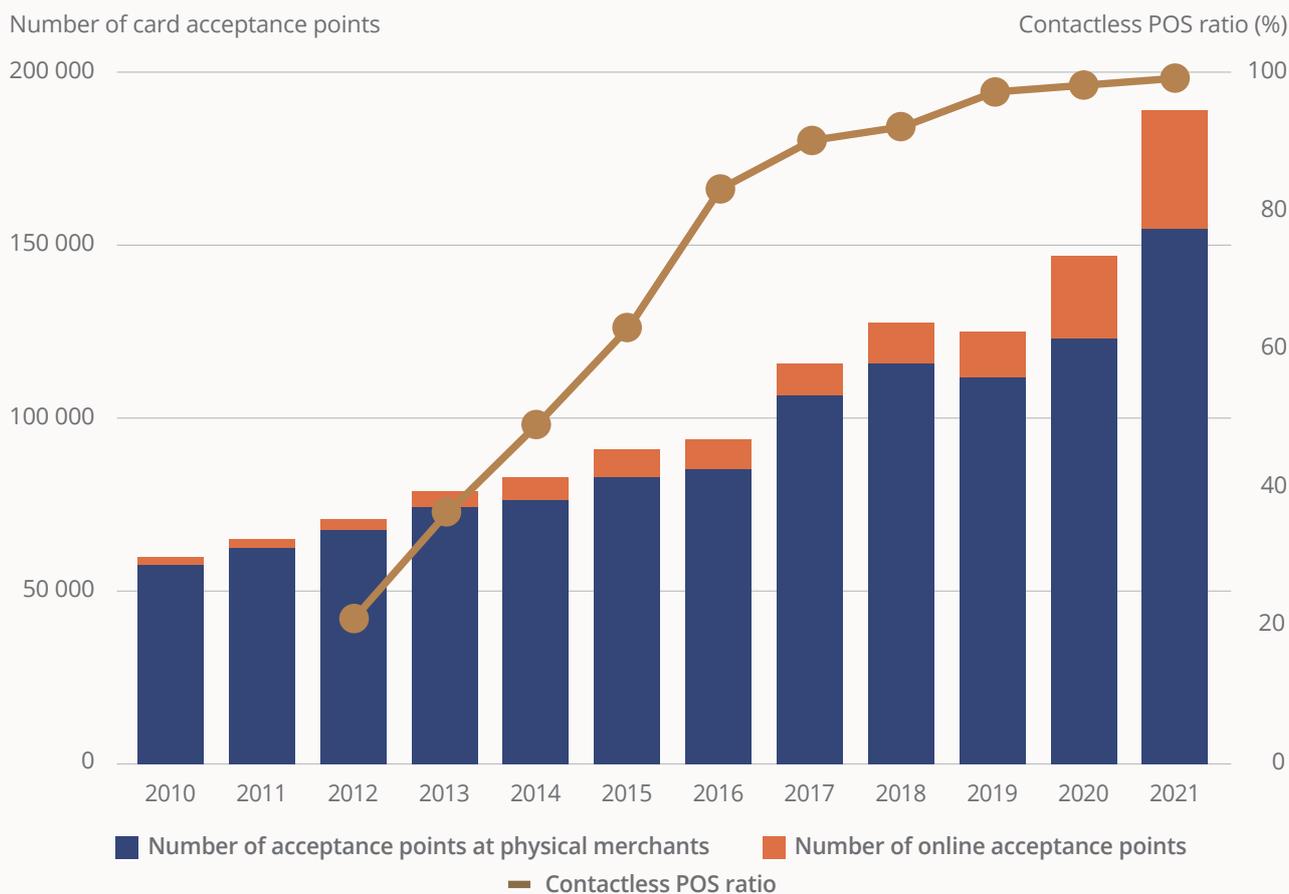
Note: Data are as at 31 December.
Source: MNB

The introduction of instant payments has been a milestone in the development of Hungarian electronic payments, which can completely transform future payments. Regarding credit transfers, the first significant step was the introduction of intraday clearing in 2012. Subsequently, the GIRO clearing house, which became the property of the MNB in 2015, doubled the number of intraday clearing cycles, so credit transfers could be processed even faster than before, typically in one hour. On the other hand, the introduction of instant payments in 2020 was a more prominent improvement, which provided a completely new basis for credit transfers as payment methods. Card payments have been the driving force behind the development of Hungarian electronic payments in the last decade, however, this payment method also has its limitations as it cannot be used in all payment situations. This is the reason why the demand for another payment method was formulated, the

parameters of which provide at least as favourable properties for consumers as cash. Accordingly, in the case of instant payments, continuous (24/7/365) availability and real-time transaction processing in a few seconds are ensured, which technically enables credit transfers to be used in any payment situation. In addition to this, beyond the payments market, a large-scale digitalisation took place in all areas of the economy, and as a result, the clients and consumers both require these kinds of solutions. All of the above mentioned facts contributed to the principles of instant payments to be established in compliance with the latest digital challenges. However, in order for the clients to use instant payments conveniently, more service level developments are needed, and the MNB has a key role in their initiation and coordination. These include the elaboration of the QR code standard, or the introduction and promotion of the request-to-pay service, which is based on instant payments. On

the other hand, the current inappropriate pricing structure of credit transfers meant a problem, which was necessary to be resolved so that customers can indeed frequently use the new solutions based on instant payments. It is supported by the fact that payment service providers cannot charge fees to retail customers for instant credit transfers initiated by a standardised data entry solution from 2023 (e.g. QR code, NFC, deeplink) or a request-to-pay.

Chart 7: Market trends realised by the basic requirements of instant payments

Source: MNB

The MNB's main payments strategy objective for 2030

The MNB's main payments strategy objective in the next period is to increase the ratio of electronic transactions significantly by 2030, and in case of an extensive and general usage stimulation, the MNB aims to make 60 per cent of transactions electronic, and in case of further targeted measures, two-thirds of them by 2030. The excessive spread of card infrastructure and contactless technology in the past decade, the statutory obligation to provide electronic payment options in the large majority of retail payment situations, and the introduction of instant payments in Hungary have resulted that the first element of the MNB's former two-pillar payments strategy is essentially being accomplished. Namely, in almost every payment situation, consumers and businesses already have certain cashless alternatives, and in some cases several solutions. Therefore, the time has come for the MNB to focus on the other former strategic objective, increasing the usage of electronic payment methods. Based on the previous analyses of the MNB (Ilyés – Varga 2016; Kajdi – Varga 2015), it can be expected that the unit costs of electronic transactions will drop below the unit cost level of cash payments if the ratio of the former accounts for at least half of all transactions. In line with this, and looking at the recent development trend, the development of the areas outlined in this strategy could make it a realistic objective to make 60 per cent or even two-thirds of transactions electronic by 2030. It is important to emphasise that the MNB's strategy related to the development of electronic payments is in line with its strategy aiming at the safety of cash supply, and these do not include conflicting objectives.

In order to reach a further dynamic development of the Hungarian economy, catch up with the European Union's development level, and achieve widespread digitalisation, it is essential to increase the use of electronic payments, which can be fulfilled through a general and targeted promotion of usage based on a wide range of payment solutions. The widespread use of electronic payments may greatly contribute to the economic growth and the effective operation of the financial sector and the total economy. With the continuation of the current development trend, the target value of 60 per cent can be reached by 2030 with general promotion of usage like the previous ones. In this case, it is necessary to implement measures that target a wide range of customers or payment situations, similar to usage stimulation programmes implemented so far. For further targeted measures, the objective is to make at least two-thirds of transactions electronic. In this case, additional usage promotion activities are required that have a targeted effect on certain sub-areas of payments, targeting certain smaller customer groups or certain separately defined payment situations. In the past few years, the surge of card payments has intensified the expansion of electronic payments, however, its growth rate is expected to slow down, partially due to the limitations of card payments, especially the usage limitations of acquiring services in retail situations. The MNB expects that in the medium term, instant payments introduced in 2020 will contribute effectively to the development of the Hungarian payments market, offering a cashless alternative practically for all payment situations. The solutions based on instant payment and the card together can result in an efficient electronic payment option being available to everyone. It is also supported by statutory provisions, for example, credit transfers being exempt from financial transaction tax under 20,000 HUF, and instant payments being free of charge if initiated by QR codes or a request-to-pay.

With regard to payment situations, among online payments, bill payments and payments conducted on online cash registers, which mainly happen in physical stores, the majority of transactions consists of payments requiring personal presence, which is the last category. In case of non-electronic transactions, it is even more true that this payment situation has the largest share of them, more than 90 per cent, so in order to increase the proportion of electronic payments, this payment situation has the highest number of payments that can potentially be diverted. There are no exact data on person-to-person (P2P) payments, however, according to house-

hold surveys, the majority of transactions happen in cash in this segment as well, which also leaves room for the expansion of electronic payments. In addition, online payments are expected to increase the number of transactions due to the latest services.

Chart 8: Number of transactions broken down by payment situation, 2021

Legend: ■ Number of transactions ■ Number of non-electronic transactions
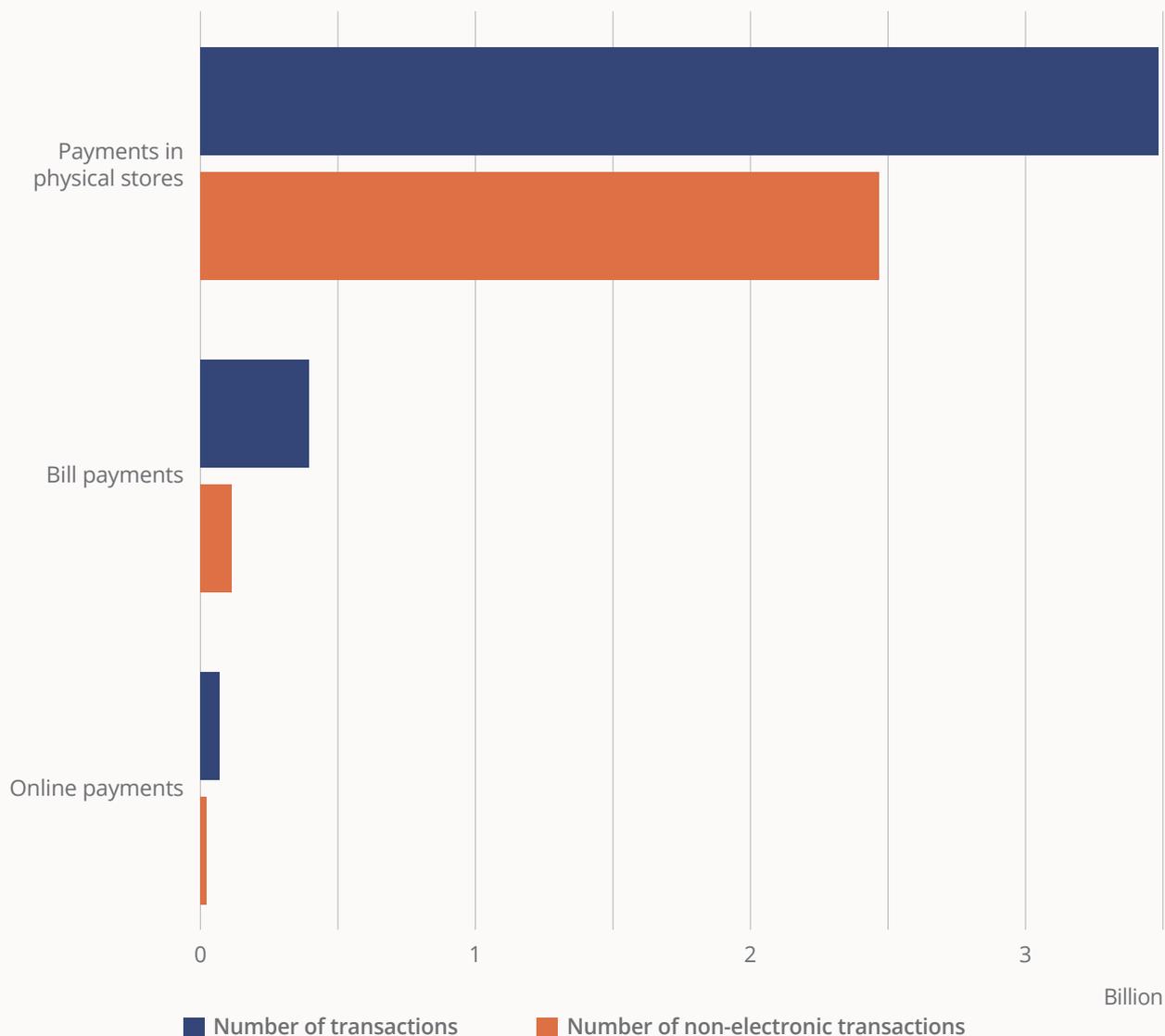
The international comparison shows that the rate of cash usage is typically low in several European states that are considered to be the most developed in terms of electronic payments. According to the SPACE data collection of ECB of 2019 (ECB 2020), in the Scandinavian and Benelux countries, together with Estonia, the rate of cash payments only accounts for around one-third of the transactions. These data are significant as the group involves several countries that can serve as role models for Hungary for further development in payments and digitalisation.

Chart 9: The ratio of cash transactions in euro area countries regarding retail and person-to-person payments, 2019

Ratio of cash payments (number)
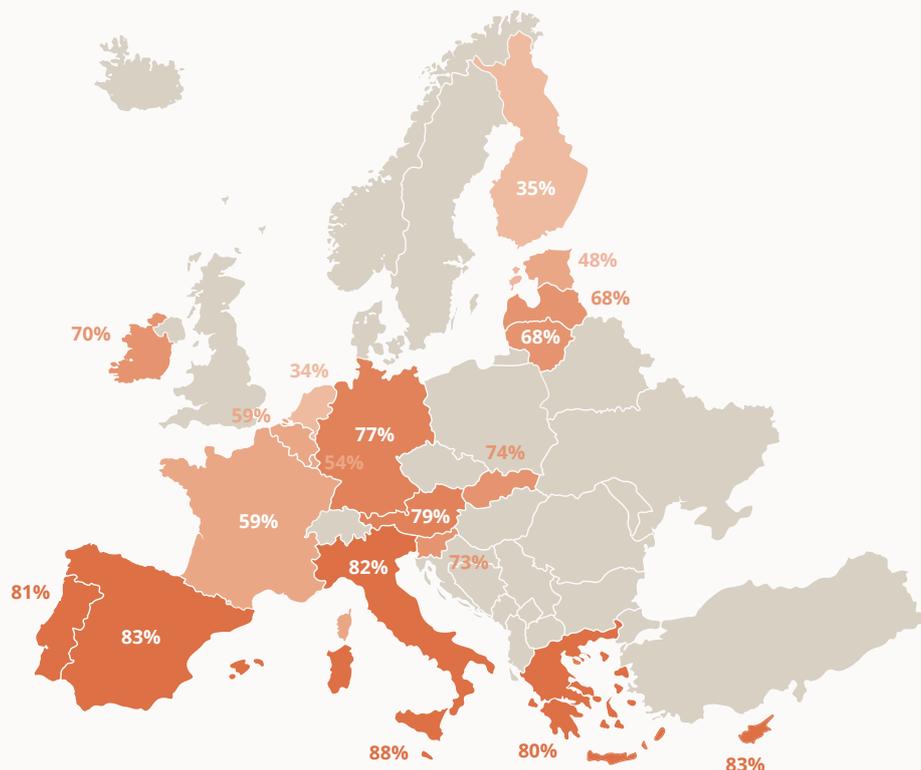
Ratio of cash payments (value)
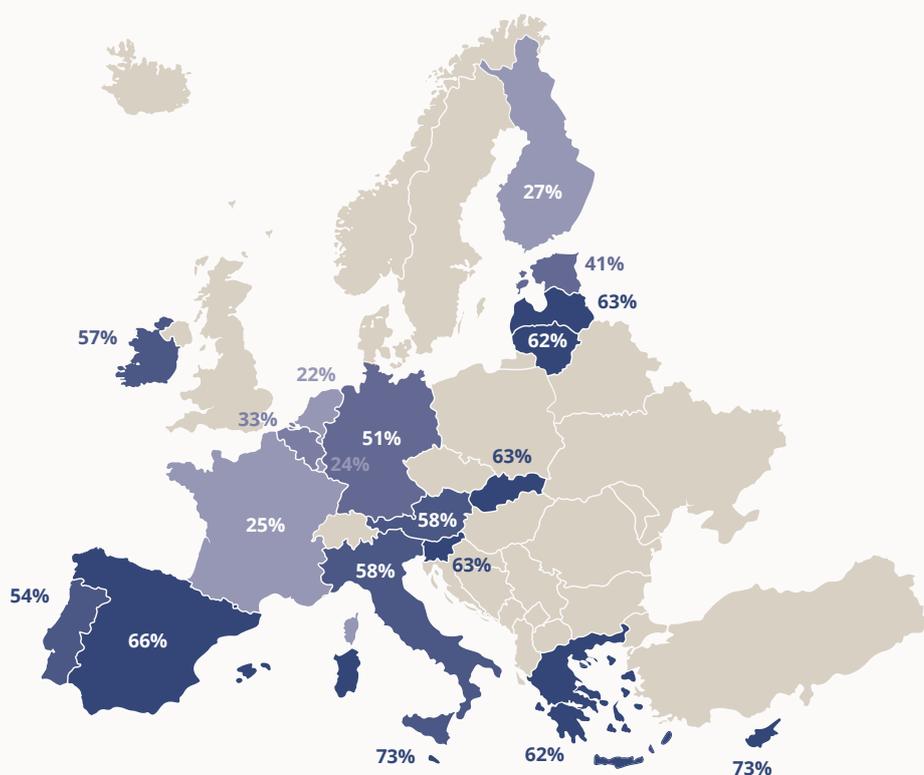
Source: ECB 2020, Figure 1, p. 20

Areas of intervention identified to achieve the main payments strategy objective

04

The MNB has identified the areas and directions for which specific action plans can be developed in the future. The MNB's main payments strategy objective is to make the majority of all payment transactions electronic. This section outlines the main areas and possible directions identified during the analysis and research activity carried out so far, where targeted economic policy intervention may take place in the future in order to achieve the main strategic objective. Based on this, and in accordance with its analyses and research activity on payments, the MNB will determine how to intervene in certain areas by means of targeted public policy actions in order to ensure the proper development of the electronic payments market in Hungary. During this, the MNB will develop action plans, each lasting for a few years, based on the strategy, which contain the detailed descriptions of the necessary measures in each field and their planned implementation.

These areas of intervention are not completely separate from each other. Some segments of payments interact with each other, so progress achieved in one field can support further progress elsewhere. It is important to keep this in mind in order to be able to interpret the progress achieved in each field and the impact of future changes. The identified areas of intervention 4basically cover three main themes: the use of electronic payments, which include issues of pricing or the spread of innovative payment solutions; the development of the supply side, which essentially focuses on the activity and costs of the retailers' acceptance network; and financial awareness, or whether consumers know electronic payments, and how they relate to them. The increasing use of electronic payments and the development of the supply side both contribute to the growth of electronic payments formulated as the main objective. Furthermore, all three themes can be positively influenced by the development of financial awareness, while electronic payments and the supply (retailers') side can fundamentally support each other: in case of growing consumer expectations, retailers are also more willing to improve their electronic payment options, whereas customers use electronic payment solutions more frequently when they are widely available, i.e. there are viable payments solutions, or acceptance network.

Chart 10: Relationships between the themes affected by the main strategic objective
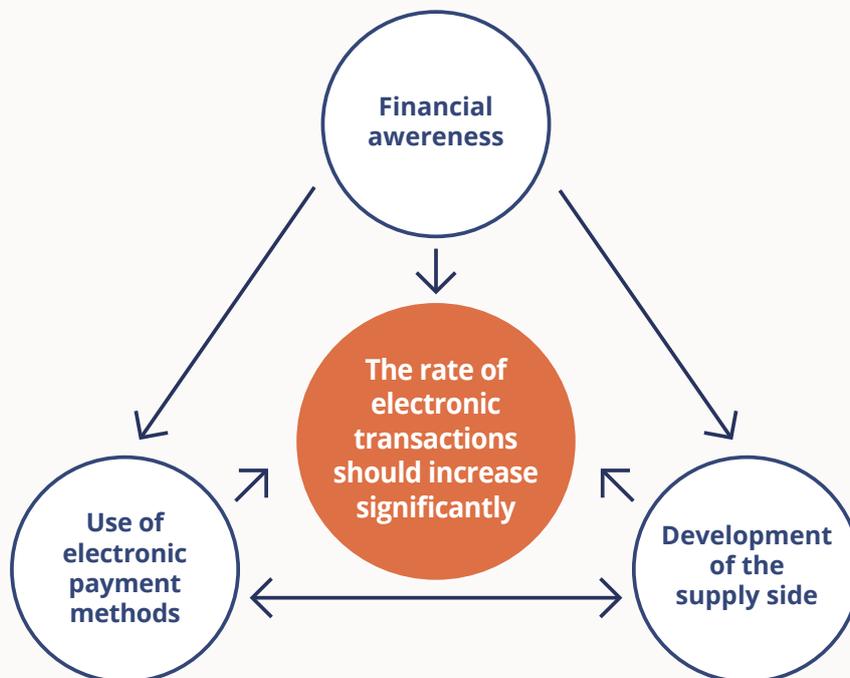
Source: MNB

If we have a deeper look at the level of certain areas of intervention, we can distinguish areas based on public policies or development directions which can directly or indirectly contribute to the development. The identification of these development areas may help to define the expected impact and the approximate direction of the concrete steps, which are planned in line with the strategic objective. Thus, it becomes visible development in which areas can be supported by the progress reached by the impact of the concrete public policy measures that are to be designed, and how it can contribute to the achievement of the main payments strategy objective.

In order to achieve the strategic objective, it is necessary that the expansion of the use of electronic payments exceeds the increase in payments resulting from economic growth. The progress in the areas to be developed, which are presented below, may cause Hungarian payments to expand not only because of the economic growth, but also result in an additional, higher rate of increase. All of this means that it will be realistic to achieve the objectives set for 2030.

Chart 11: Areas that support the achievement of strategic objectives
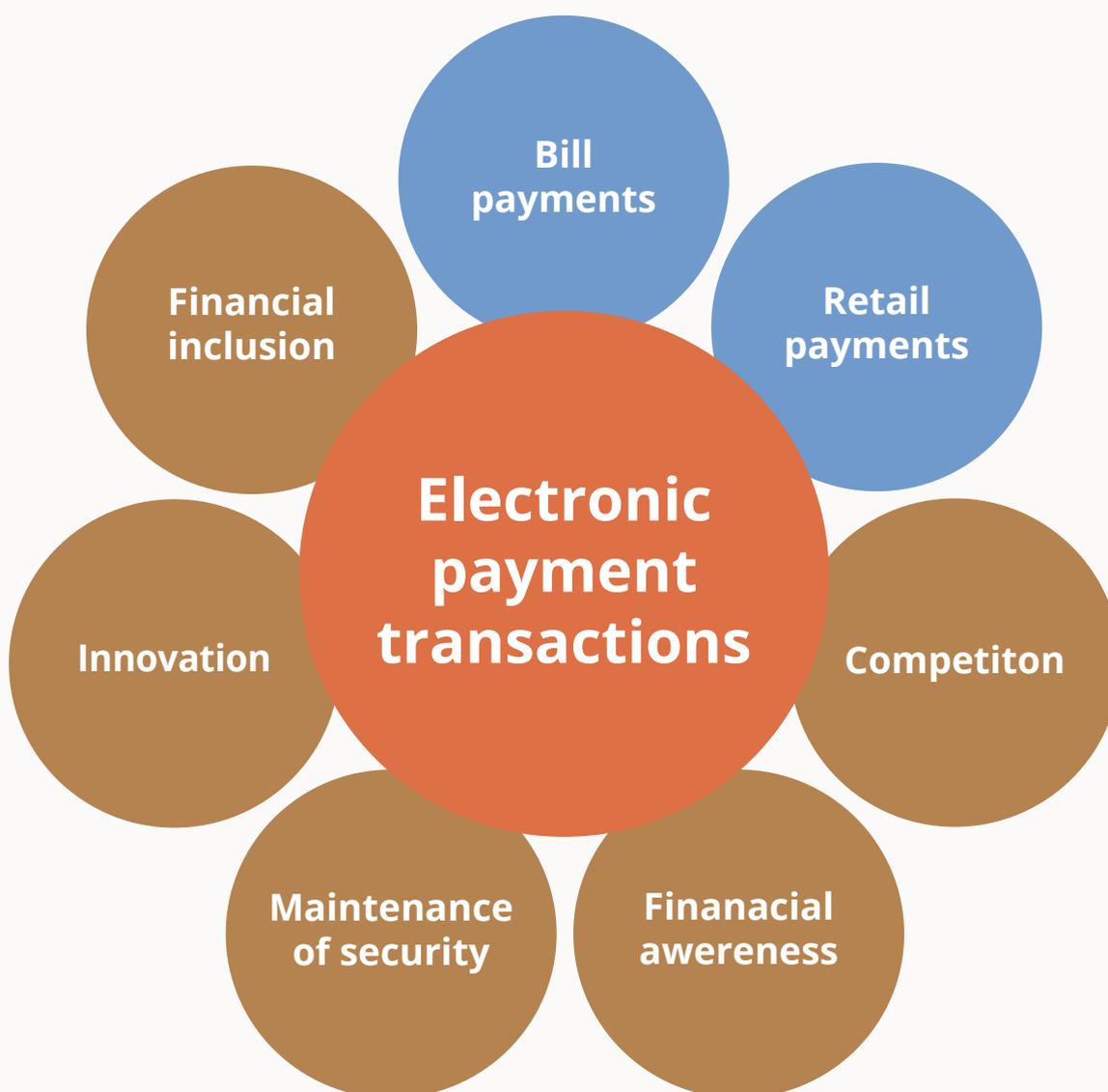
Source: MNB

4.1. Areas indirectly contributing to the achievement of the strategic objective

Those areas where interventions contribute indirectly to the achievement of the objective tend to promote the widespread use of electronic payment methods more slowly, in the medium term, and their impact is broad and may affect several areas.

- **Financial inclusion:** This can help increase the range of potential users of electronic payments and the activeness of those who already have access to them. A basic requirement for the use of electronic payments is that the consumers need to have a payment account and use it actively. At the moment, the inclusion cannot be considered to be complete, therefore, it should be separately promoted for certain groups. Within this topic, two main areas are worth highlighting:

  - Increasing bank account coverage over the age of 60: In case the number of retired people who receive their state benefit via credit transfer increases, an opportunity occurs for new consumer groups to be included in electronic payments, which can further increase the ratio of the use of electronic payments. There are several ways of increasing electronic pension payments, for example, one of them can be if pensioners receive transfers electronically by default; nonetheless, it is important to highlight that cash payment options need to be ensured for those who wish to receive their pension this way. Looking at the usual payment method currently used for benefits (pension, other benefits), 61 per cent of them are paid electronically according to the data in 2021, which accounts for an increase of 6 percentage points since 2017.

  - Group of people with lower incomes and less digitally educated: In this segment, bank fees can be fundamental obstacles in terms of financial inclusion. The previous analyses of the MNB showed that the Hungarian payments fees are high in an international comparison, which imposes a heavy burden especially on people with lower income. For this reason, special attention must be paid to the pricing of payment service providers. Furthermore, it is important to achieve that more and more people should receive their income in an electronic form, as cash income is rather typical among people with lower income and lower education level. Another possible way to handle the situation is to establish free social basic accounts or to introduce further regulation on incomes.

- **Strengthening innovation in payments:** The promotion of innovative payment methods is essential because these improvements can provide a basis for market service providers to develop other payment services in the future. Along with the extremely dynamically expanding card-based mobile wallet turnover, solutions based on instant payments are also expected to start spreading. QR code payments are expected to further develop due to the amendments of the regulatory background, which made QR code reading capability compulsory in mobile banking applications, and introduced a central authentication procedure in order to prevent QR code frauds. Furthermore, additional data entry methods (e.g. NFC, deeplink) are also possible, the range of secondary account identifiers that can be registered may be broadened, or common guidelines can be defined for the optimal customer experience in mobile applications. The advancement of the request-to-pay service can also be greatly supported by the fact that all payment service providers will be obliged to ensure the acceptance of requests for consumers. Both cards and instant payments may be affected by efforts to make SCA more convenient to use, for example. the use of an increasingly wide range of biometric identifiers. These factors altogether may not only result in those who already use mainly electronic transactions making more transactions, but even those who have used electronic payments less frequently may become more involved due to the convenient customer experience.

- **Strengthening competition:** Innovation can be supported by strong market competition, i.e. the stronger the competition is, the more payment service providers are forced to introduce new services besides providing low fees. If market concentration is reduced, large players can be prevented from defining the development of the market and establishing a market structure of duopoly as in the case of payment cards, for example. That is why instant payment was designed in such a way, and this is what the MNB also keeps in perspective, that it should lower the barrier to entry, and allow even non-bank actors to enter the market as well. An example of this could be the possibility for non payment service providers (PSPs) to submit requests-to-pay to GIRO, which operates the central system, but also the possibility that the mandatory QR code positive feedback required by the amendment of the legal framework could also help non-PSPs to enter the acceptance market. The spread of TPP services can similarly have a beneficial effect on competition, which can even help increase the number of account changes through account information (AISP) services. Moreover, the payment initiation (PISP) services may also receive an increasing role in retail acceptance services. In case of TPPs, it is essential that the API connections of the account provider PSPs shall work according to the legislation, and the need for further standardisation needs to be examined as well. Strong competition may also affect pricing, which can contribute to the more frequent use of electronic payments. Favourable pricing is a basic requirement for the frequent use of electronic payments. Such instances can be payment solutions without transaction fees as it may make people perceive instant payments to be free of charge, similar to cash and card payments, and so they would use them more often. On the other hand, retailers should also be provided the most favourable acquiring prices possible in order to expand the acceptance network. This mostly affects the smallest retailers, who are forced to pay significantly higher fees compared to their larger competitors.

- **Improving financial awareness:** Without improving the financial awareness of consumers, it is impossible for consumers to change for the right account package or service, or even use electronic payments more consciously and frequently. As a minimum requirement, it is important that they know cashless payment solutions, but even more importantly, they should willingly use them, and if possible, prefer to use these solutions instead of cash. For this reason, the MNB is planning to communicate actively by launching information campaigns, and already supports this objective with the amendments to the legal framework. Among others, payment service providers are obliged to inform their customers about the success of their transactions or their available balance, to make the use of these payments become more obvious and transparent. Financial awareness may have an impact on the pricing of payment service providers as well, which means if consumers actively look for more favourable account packages, market players will have to provide more advantageous conditions. Currently, several banks offer package-priced accounts, however, the number of customers for these products is still fairly low, which makes it even more vital to encourage customers to change for a more suitable account package or service, and provide more information on the features and prices of the services available. Later on, it is possible that further information similar to the statement of fees will be mandatory to be provided, and switching between account packages may become simpler.

- **Maintenance of security:** Safe electronic payments are basic requirements in every country's payments. If fraud is widespread, or if because of cyber attacks customers are afraid of keeping their money and data at payment service providers, it can discourage the use of electronic payments as well. For all these reasons, it is crucial to guarantee the security of electronic payments. At the moment, in an international comparison, Hungarian payments are considered to be extremely safe, however, it is important to maintain this status. Although the MNB in its supervisory role regularly examines the reliable and safe

operation of Hungarian banks and financial infrastructures, it is also important to increase the awareness of consumers in this field. The latter will also be measured as part of the continuous monitoring of financial awareness.

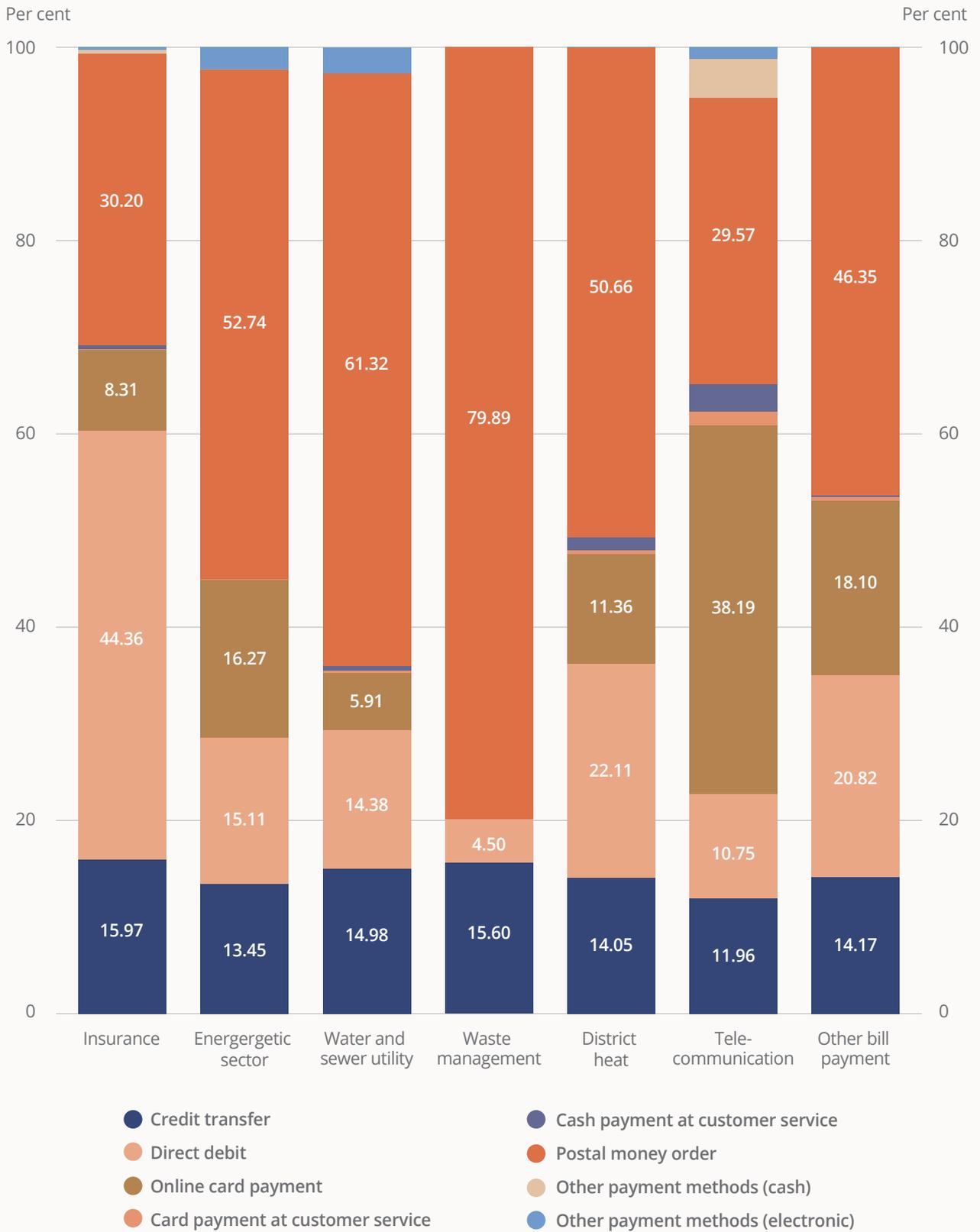## 4.2. Areas directly contributing to the achievement of the strategic objective

In addition to the areas presented above, there are certain segments of public policy that can affect the target indicator, the ratio of electronic payments directly and in a short time. They also refer to such sub-sectors of payments, which may need separate intervention in order to stimulate the use of electronic transactions according to the MNB, and inherently affect the digitalisation of the total of Hungarian payments in a favourable way.

- **Development of retail payments:** One of the most important areas is still retail payments, which still has considerable room for improvement based on the online cash register database. Consumers usually make purchases several times a day both physically and online, therefore, the financial leg of these means an outstanding number of transactions. For physical merchants, the amendment of the Act on Trade and the obligation to provide electronic payments to those who are obliged to use online cash registers meant an extremely significant development. In the future, it may be worth expanding this scope further, for example to include the service sector, public institutions or entertainment facilities (cinemas, theatres, museums, etc.). Electronic payments over the internet are already growing dynamically, but there are still many who pay cash on delivery for goods ordered. This may be due to the lack of consumer trust, which can be addressed by informing

consumers (card refunds) and by improving services, such as the refund system for instant payments. On the other hand, there may still be cases where the courier delivering the product is not able to provide electronic payment, so it may be worth considering regulatory options in this segment, such as making electronic payment mandatory for online commerce and couriers. It is also important in this sector to provide users with a wide range of information on the services available, their usage options and pricing, to ensure that they can use the services that best meet their needs on the retail side.

- **Strengthening electronic bill payments:** The other area that may achieve significant developments is bill payment, which involves the payment of mainly utility bills and other regular services. Since these transactions occur in every household, stimulating the use of electronic payments in this segment may improve financial awareness, and can encourage consumers to actively use cashless solutions in other areas as well. The proportion of electronic bill payments can already be considered high, however, progress could be made in some sub-areas. Based on the MNB's surveys, the ratio of cashless bill payments in some utility services is significantly lower than the most advanced insurance and telecommunications sectors, so further progress could be achieved with focused measures. In this matter, innovative payments, which have been mentioned previously, especially the widespread use of request-to-pay services may bring about a change as they provide consumers with a convenient electronic payment solution, while it gives them the freedom to choose the date of their payment. The latter may be an important aspect primarily for consumers with lower incomes. Furthermore, encouraging the wider spread of electronic invoicing can also promote the further spread of electronic bill payment and the reduction of costs for service providers.

Chart 12: Breakdown of bill payments by sector in 2021

Per cent

	Insurance	Energergetic sector	Water and sewer utility	Waste management	District heat	Tele-communication	Other bill payment
Postal money order	30.20	52.74	61.32	79.89	50.66	29.57	46.35
Online card payment	8.31	16.27	5.91		11.36	38.19	18.10
Direct debit	44.36	15.11	14.38	4.50	22.11	10.75	20.82
Credit transfer	15.97	13.45	14.98	15.60	14.05	11.96	14.17

Legend:
- Credit transfer
- Direct debit
- Online card payment
- Card payment at customer service
- Cash payment at customer service
- Postal money order
- Other payment methods (cash)
- Other payment methods (electronic)

Source: MNB

4.3. Other areas that can influence the achievement of the strategic objective

In addition to the factors presented above, several international trends can also be identified in payments, which are continuously followed by the MNB as well. Similar to the MNB, the European Central Bank (ECB 2021) and the European Commission (EC 2020) treat the promotion of instant payment as a significant objective, though due to the nature of institutions, they also emphasize cross-border payments, which is currently of low priority in the Hungarian market. Some of the new actors and innovative payment solutions, stablecoins and crypto assets, are currently not mature enough on the market to be taken into account in this strategy, and it is questionable to what extent they are able to function as money and to what extent they can be considered more as investment instruments. Other innovative solutions came from fintech and bigtech actors, which indirectly appear in the development of payments, for instance, through the spread of third-party providers (TPP) or mobile wallets. In addition to TPPs, another im-

portant area of the second European Payment Services Directive (PSD2) was the widespread introduction of strong customer authentications, which had a traceable indirect effect on the strategy. Another interesting trend of the future can be the introduction of a potential central bank digital currency, which is researched in many countries, and which has important aspects in terms of payments as well. Since the MNB has not decided about its potential introduction yet, no related payments indicator has been defined in the current strategy either. Finally, it is absolutely necessary to mention the effects of the coronavirus pandemic on payments, which was also analysed by the MNB (Deák et al. 2021b, Végső – Bódi-Schubert 2020, Deák et al. 2020). As a result of the pandemic, the use of electronic payment methods has increased, largely due to factors such as increasing the limit for purchases without a PIN code for card payments to HUF 15,000, which has facilitated the possibility of paying without a physical contact. The rise in online purchases was also significant during this period. Future studies will have to determine to what extent these effects have persisted in the consumers' payment habits.

Payments Development Indicator Set (PDIS)

In order to evaluate the current situation of payments in Hungary, identify potential areas of intervention and options for targeted measures, as well as assess the achievement of the strategic objective and the realisation of the measures supporting it, the MNB has established the Payments Development Indicator Set (PDIS). Based on the dynamic development of electronic payments in the last decade, the main strategic objective, i.e. the achievement of a 60 percent electronic payment ratio in the case of further broad, general promotion of usage, and two-thirds in the case of targeted measures by 2030 is an ambitious, but realistic objective. On the other hand, as we have already referred to, we also need to take into consideration that the current main electronic payment alternative, the payment card, has its own limitations, and this is why the current tendency of electronic turnover growth rate is expected to become more moderate. At the same time, in order to achieve the main strategic objective, the current rate of development must be maintained. Therefore, certain sub-areas also need targeted measures besides general payments developments.

Apart from general types of indicators, the PDIS includes such indicators as well which rather cover some relevant sub-areas. The indicators of certain sub-areas in certain cases could be broken down along other dimensions (e.g. social or socio-demographic), however, the indicators presented only show breakdowns with the best suitable depth suited to the related strategic objective. During the planning of the measures to be realised for the achievement of the strategic objectives, it can be reasonable to examine the data based on further breakdowns. Territorial breakdown may be justified in some cases (e.g. inf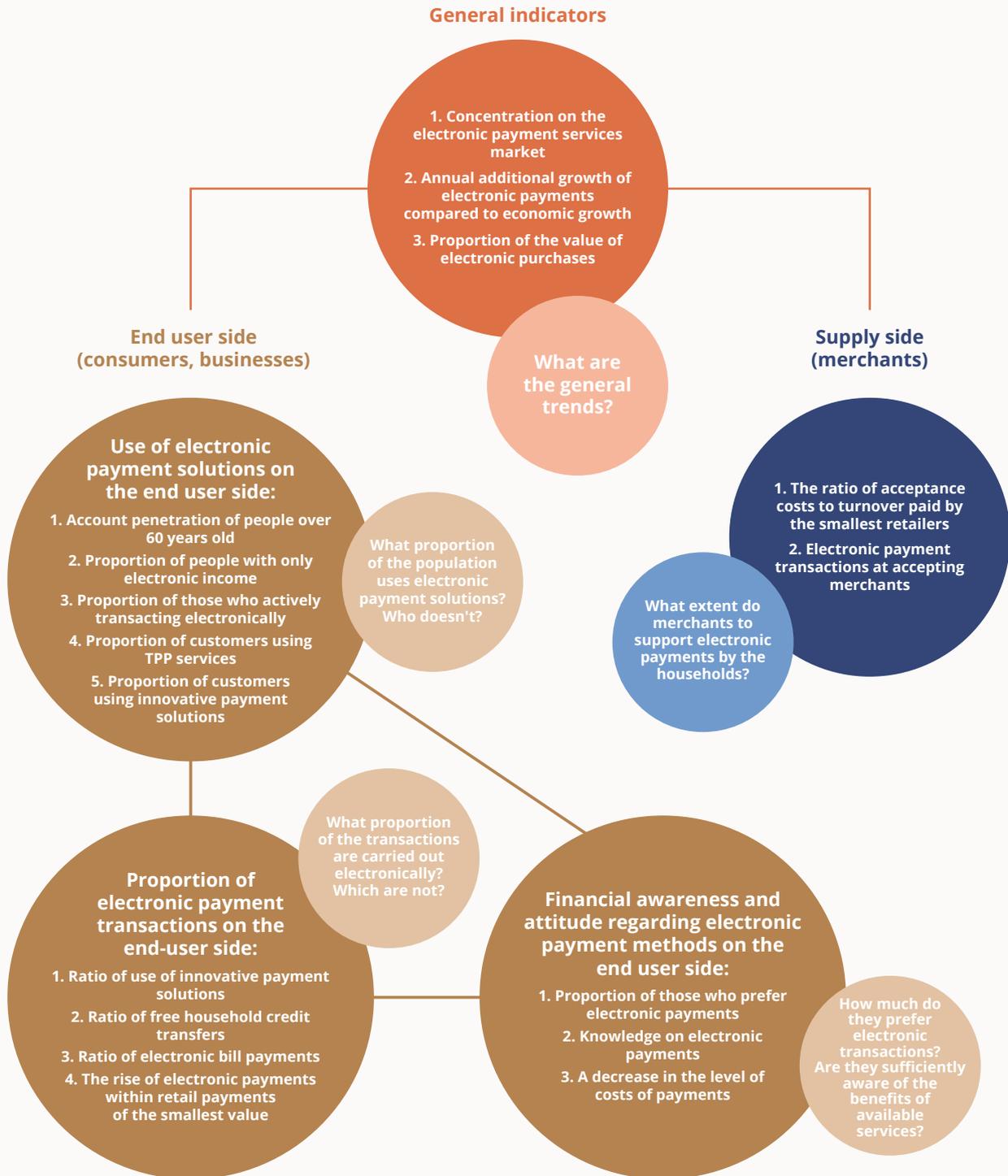rastructure), but for population indicators, looking at the issue along socio-demographic dimensions rather than territorial breakdown may provide a more accurate picture and better support the design of targeted measures.

On the other hand, areas currently considered to be highly developed, or that do not seem to require the central bank's or any other central intervention based on the data currently available, were not included in the indicators and the areas to be developed. Such areas can be, for example, card payments, which have an extensive acceptance network, an almost full coverage of retail card holders, and continuously expanding turnover, so no additional measure appears to be generally necessary in this area.

The indicators can be classified into three major groups. The selected indicators can be applied to track the development of the demand side of the payments market, i.e. the changes in the expansion and usage frequency of payment services available to the end-users (consumers, companies), and the changes in the end-users' financial awareness. On the other hand, separate indicators show the development of the supply side of the payments market, i.e. how the utilisation and costs of the acceptance network develop on the side of the beneficiary (primarily the accepting retailer). As a result of the previous payments strategy, the acceptance network has developed to such an extent that electronic payments are available in most cases, therefore, the indicator system does not include indicators that specifically measure the size of the acceptance network and the availability of payment options on the beneficiary side. In addition to the sub-indicators of the two sides, more general indicators have also been developed that measure the current and future development of the total market.

The main payment strategy goal:
the majority of transactions will be electronic by 2030

General indicators

1. Concentration on the electronic payment services market
2. Annual additional growth of electronic payments compared to economic growth
3. Proportion of the value of electronic purchases

What are the general trends?

End user side (consumers, businesses)

Supply side (merchants)

Use of electronic payment solutions on the end user side:

1. Account penetration of people over 60 years old
2. Proportion of people with only electronic income
3. Proportion of those who actively transacting electronically
4. Proportion of customers using TPP services
5. Proportion of customers using innovative payment solutions

What proportion of the population uses electronic payment solutions? Who doesn't?

1. The ratio of acceptance costs to turnover paid by the smallest retailers
2. Electronic payment transactions at accepting merchants

What extent do merchants to support electronic payments by the households?

Proportion of electronic payment transactions on the end-user side:

1. Ratio of use of innovative payment solutions
2. Ratio of free household credit transfers
3. Ratio of electronic bill payments
4. The rise of electronic payments within retail payments of the smallest value

What proportion of the transactions are carried out electronically? Which are not?

Financial awareness and attitude regarding electronic payment methods on the end user side:

1. Proportion of those who prefer electronic payments
2. Knowledge on electronic payments
3. A decrease in the level of costs of payments

How much do they prefer electronic transactions? Are they sufficiently aware of the benefits of available services?

Source: MNB

In order to calculate the value of the indicators, we apply comprehensive databases available to the MNB, complied on the basis of legislation, cooperation and representative questionnaire surveys, such as regular (quarterly) reports from payment service providers, data submitted by payment service providers on the basis of statements of fees, data from the online cash register database[1] (hereinafter: OCR database) received from the National Tax and Customs Administration of Hungary, data collected from the household payment habits surveys and other publicly available data. Upon calculating the values of the indicators, the data of Hungarian service providers (which have Hungarian headquarters or branches) were taken into account, the indicators do not contain the data of the services of foreign service providers providing cross border services.

The development of certain indicators or sub-areas may not fall into the scope of the MNB, the MNB only affects them indirectly, for instance, by establishing an efficient and inexpensive Hungarian electronic payment infrastructure, but the efficient intervention of other governmental or market players may be necessary as well. We also tried to take these factors into account when defining certain target values.

Chart 14: Impact of possible measures
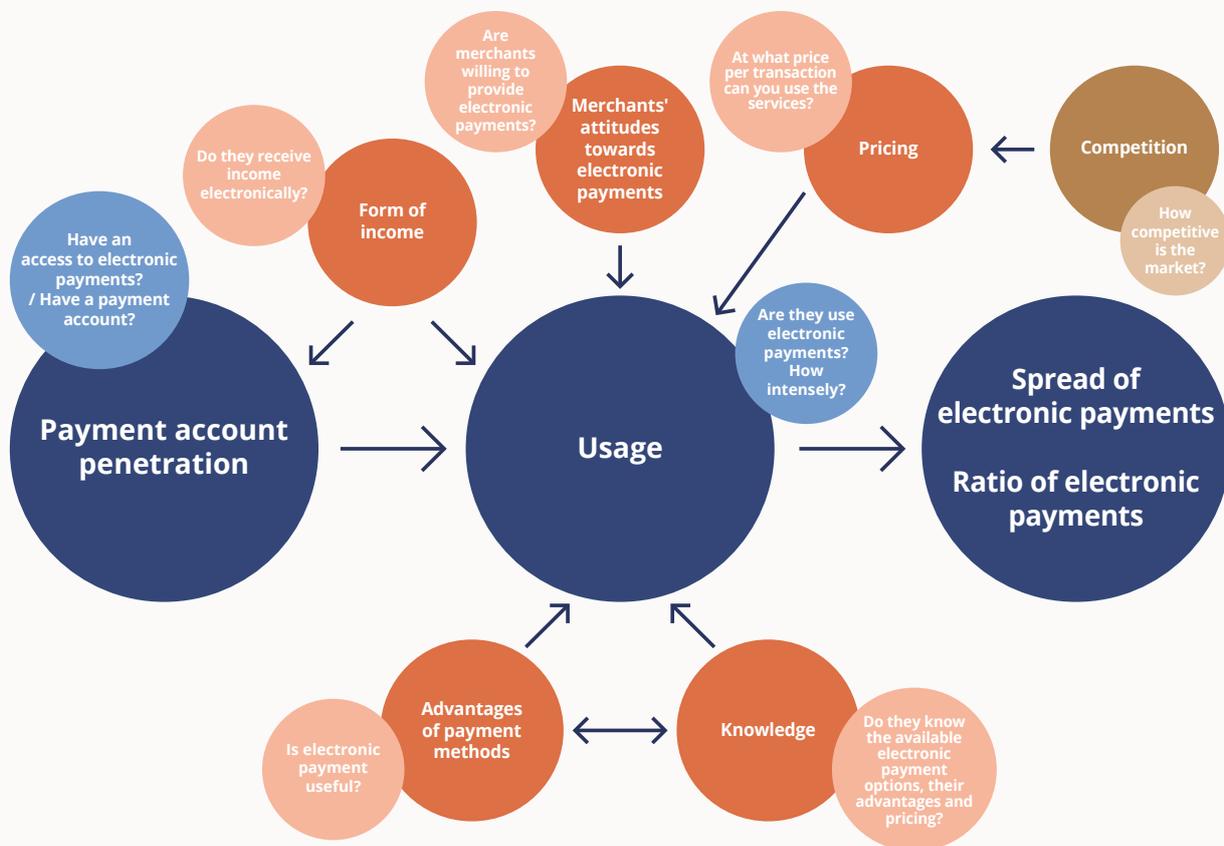
• Electronic income -> have a payment account, more likely to use electronic payments (also for pensioners?)

• Services that provide electronic payment options as user-friendly as possible -> more users, more transactions

• Knowledge of electronic payment options -> more users, more transactions

• Free transactions (lowest possible pricing with no per-transaction fee) -> more users, more transactions

• Greater competition -> higher quality services, better pricing

• Lower costs associated with providing electronic payments for merchants -> less negative electronic payment discrimination towards consumers -> more transactions

Source: MNB

---

[1] Taxpayers can only fulfill their obligation of giving receipt with online cash register for certain activities.

In the following section, in addition to the content and calculation method of the PDIS indicators, we will present why measuring the rate of progress in the given area can be important from a public policy point of view, what the current situation is, and what the target value is to achieve the payments strategy objective of the MNB by 2030. In other words, in order to define the target value of certain indicators, it was a primary aspect that regarding the main strategic objective, not only the target ratio of the widespread, general usage stimulation should be obtainable, i.e. 60 per cent of payments should be electronic, but the target ratio in case of targeted measures as well, i.e. at least two-thirds of the transactions should become electronic by 2030. Nonetheless, it is important to see that not all areas of development or indicators need to reach the target value: the main strategic objective of the MNB can be achieved even if these targets are not realised for all indicators.

5.1. General indicators

Besides the specific areas of payments development, it is important that the indicators should keep track of the general tendencies as well. This includes comparing the development of payments with the economic growth, or the concentration of the payments market (i.e. indirectly, the strength of competition).

5.1.1. The ratio of the number of electronic transactions

Calculation method:

$$\text{The ratio of the number of electronic transactions} = \frac{\text{The number of electronic transactions}}{\text{The number of cash + electronic transactions}}$$

Electronic transactions: purchases at physical and online acceptance points (typically card purchases and credit transfers), electronic bill payments (card payments and credit transfers are also possible here, in addition, payments can also be performed by direct debit or paying postal money orders by card), electronic transactions within and between different sectors (e.g. households, corporates, government) (mostly credit transfers).

Cash transactions: purchases at physical and online acceptance points, bill payments (payment of postal money orders by cash), cash payments within and between different sectors (e.g. households, corporates, government).

Among payment transactions, savings, investment, and lending transactions only appear to the extent that the financial flow affects at least one payment account.

Value of indicator:

- 2021: 31%
- Target value:
    - 60 per cent of transactions in case of extensive, general stimulation of usage
    - two-thirds of transactions in case of further targeted measures

Content: The indicator shows how the ratio of the number of electronic transactions changes in general, thereby helping economic growth and reducing social costs and tax evasion. This main indicator shows the basic payments strategy objective of the MNB to increase the use of more socially efficient electronic payments.

Chart 15: The ratio of the number of electronic transactions within the total payments
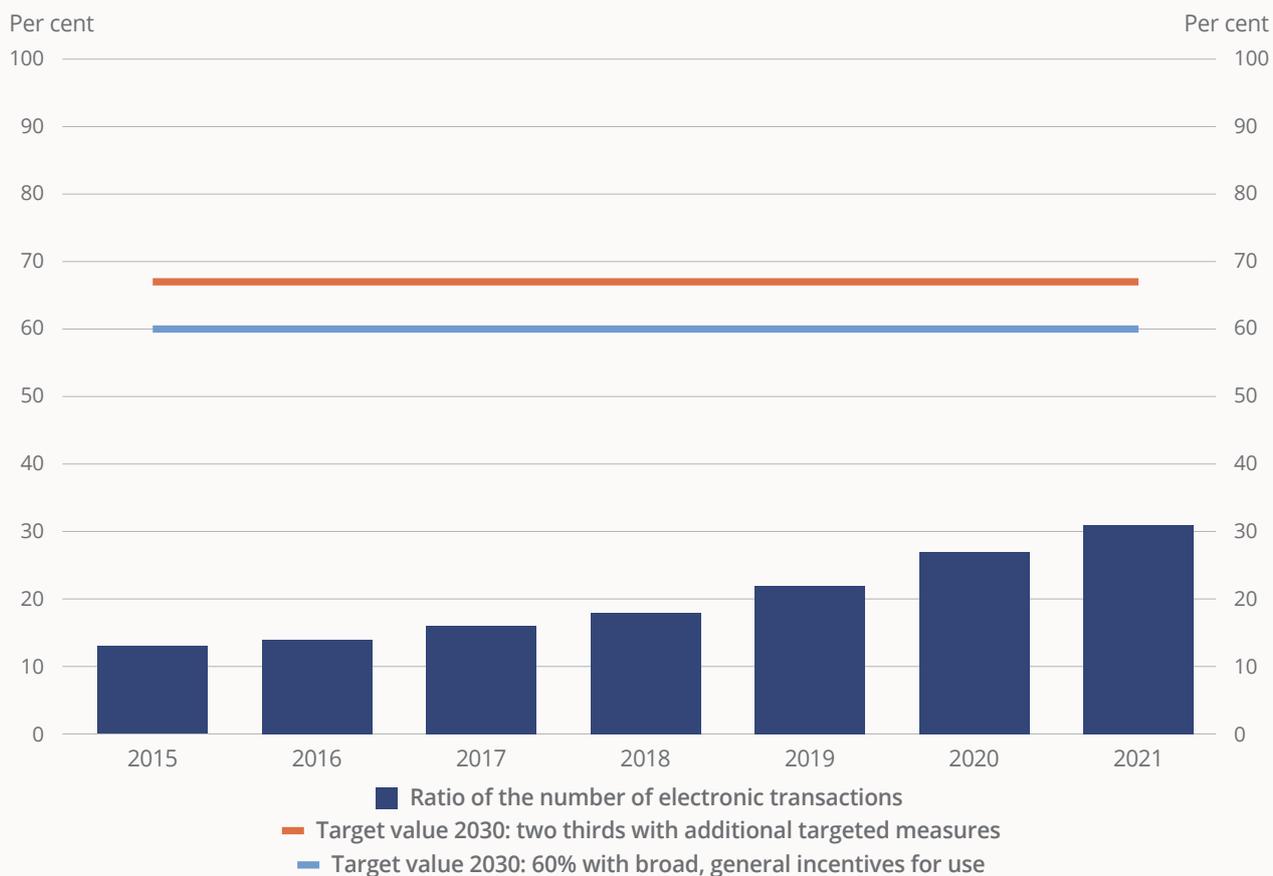
Source: MNB estimate based on the online cash register database of the National Tax and Customs Administration of Hungary, regular bank data collections and questionnaire surveys

5.1.2. Concentration on the electronic payment services market

Calculation method: Herfindahl–Hirschman index (HHI), market share in relation to the ratio of transactions initiated.

$$HHI = s_1^2 + s_2^2 + \ldots + s_n^2$$

where

- s: the market share of the given payment service provider from the total of the electronic transactions. Among the electronic transactions, transactions initiated by cards issued in Hungary, and in case of credit transfers and direct debits, the debit side (data from the payer's side) were taken into account.
- n: the number of actors in the payment service sector

Value of indicator:
- 2021: 2,199
- Target value: Maximum 2,000

Content: In the case of a lower degree of market concentration, the market competition is assumed to be stronger. It may provide cheaper and better quality service to the customers of payment service providers, greater innovation, therefore, it is also desirable from the point of view of the development of the payment market. This is especially true considering that the payments industry is based on economies of scale, where oligopolistic market structures are more frequent particularly for this reason. In order to avoid them, the MNB deems it necessary to monitor market concentration, therefore, we used the HHI index to monitor changes in the market share of financial institutions by examining the initiated transactions. Market concentration could be measured in several sub-markets (e.g. based on the number of

transactions initiated or received, the number of accounts or electronic payment instruments), among which it is important to highlight the indicator measuring the most important area to be developed for the achievement of the main strategic objective, and set a separate target for that. Based on the previous strategy, the acceptance network of electronic payments is fairly developed, the majority of retail customers have access to a bank account, so further development in these areas cannot be reached by means of measures related to market concentration. On the other hand, in terms of encouraging and simplifying use, more intervention options for payment initiation can be taken into account, which can be supported by a more intensive market competition (e.g. the development of services, the reduction of their fees), therefore, the MNB examines the changes of the intensity of the market competition from the aspect of transaction initiation. There are several scales for interpreting the values of the index, but the market concentration is typically considered medium or low under 2,000, and the lower the value of the index is, the lower the market concentration becomes. Currently, an increasing trend, which means an increasing market concentration can be observed, so the goal in this area is to reverse this trend and reach the value of 2,000, which indicates moderate concentration.

Chart 16: The value of the Herfindahl–Hirschman index (HHI) on the market of electronic payment services

Source: MNB

5.1.3. Annual additional growth of electronic payments compared to economic growth

Calculation method:

$$\text{Annual additional growth of electronic payments compared to economic growth} = \frac{\text{Annual growth of electronic payments}}{\text{Annual growth of GDP}}$$

Regarding electronic payment transactions, credit transfers (HUF individual and batch credit transfers, foreign currency, domestic and cross border as well), direct debits, and transactions made with payment cards issued in Hungary were taken into consideration. The percentage change in their total annual value was divided by the annual percentage change in GDP.

Value of indicator:
- 2021: 1.1
- Target: Every year above 1

Content: The economic growth (e.g. the growth in consumption) typically involves increasing the value of electronic transactions as well, i.e. if people consume more, companies will satisfy the additional consumption by producing and delivering more, which results in a higher value of electronic payments. However, this relationship is not necessarily deterministic, of course, so economic growth does not automatically mean the increase of electronic payments. Regarding the development of the payments market, it is important to see the rate of increase in the value of electronic transactions apart from the "natural" expansion resulting from the economic growth.

In other words, in case of the development of electronic payments, it is worth separating the rate primarily related to the economic growth, and the rate rather due to the development of payments (e.g. the introduction of new payments, transactions increased due to the wider availability of electronic payments etc.). With the help of the indicator, we want to monitor the rate of the increase in efficiency in the payments market in addition to economic growth. Accordingly, the indicator value above 1 shows that the development of electronic payments is not only due to the economic growth, but also to the increase in efficiency in the field of electronic payments.

Chart 17: Annual additional growth of electronic payments in Hungary compared to economic growth
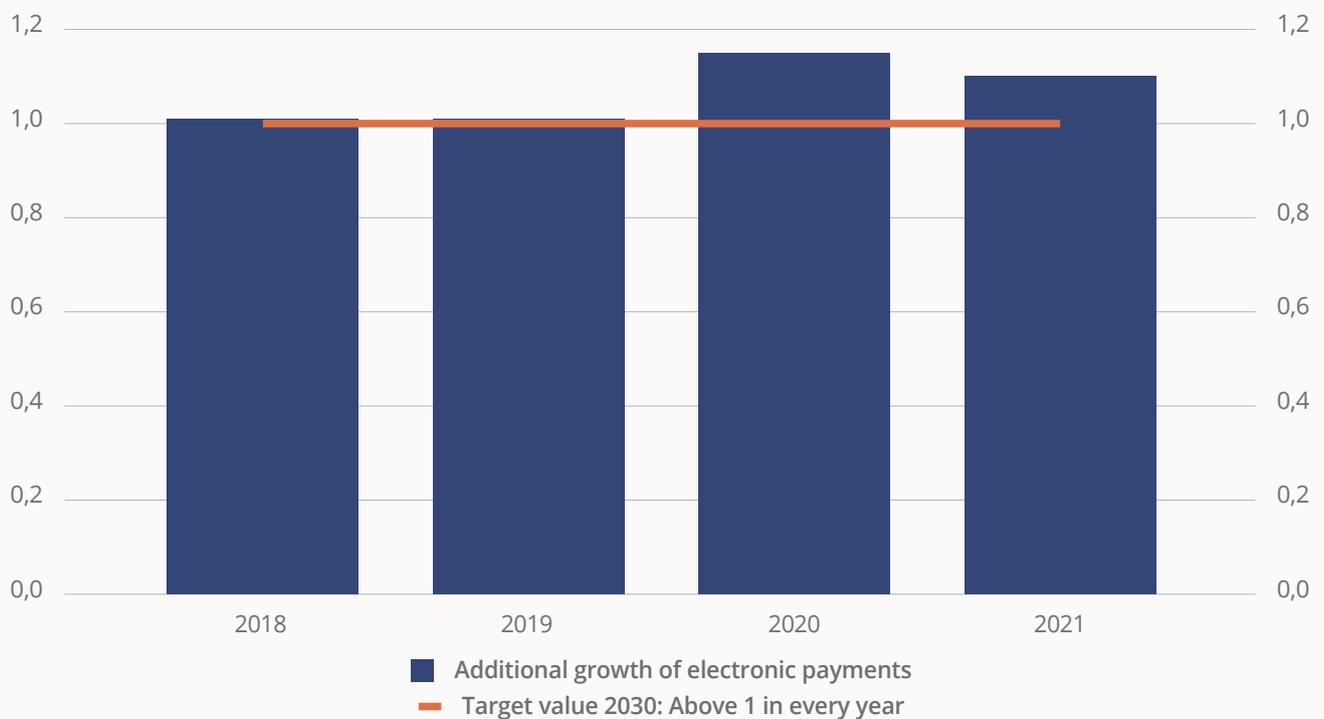
Source: MNB

5.1.4. Proportion of the value of electronic purchases

Calculation method:

$$\text{Proportion of the value of electronic purchases} = \frac{\text{Total annual value of electronic purchase transactions}}{\text{Annual household consumption}}$$

Electronic purchase transactions: Currently, the numerator of the indicator shows the data of card payments among electronic payment methods as it is the most common alternative to cash payments. Later, for example, with the expansion of the acceptance network of instant payments, the data of other electronic payments may also be included in the data applied for the indicator's calculation.

The denominator includes the annual consumption of households.

Value of indicator:
- 2021: 37%
- Target value: 62%

Content: The indicator of the ratio of the electronic payments can be easily compared at an international level. The indicator shows the total annual value of electronic purchases in the total household consumption. A higher value of the indicator refers to a more intensive use of electronic payments among consumers, meaning an increasing proportion of purchases are made without the use of cash, so it also shows the development of the electronic payments market in Hungary. Based on international examples, the most developed countries should be taken into account in this indicator, so the aim is to approach their value. The average value of the ten countries with the highest value in this indicator was 62 per cent in 2021, so it would be a significant improvement to reach this ratio in Hungary by 2030.

Chart 18: Proportion of the value of electronic purchases
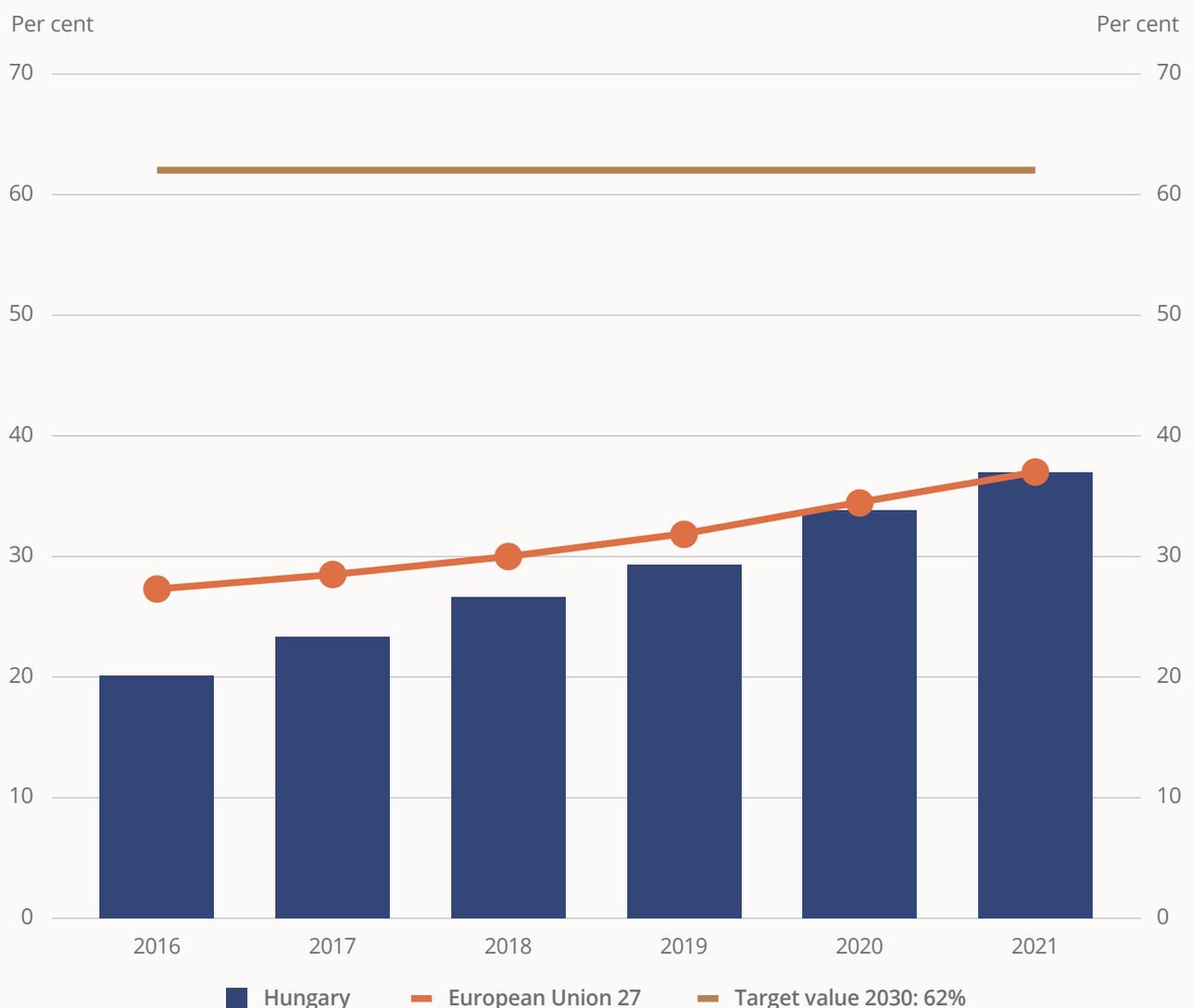
Source: MNB

5.2. The use of electronic payment solutions on the end-user side

In order to implement targeted measures to achieve the main objective, the spread of electronic payments, on the end-user side, it is worth tracking the ratio of population having access to electronic payment services or receiving their income electronically; the use of electronic payments among account holders, and their activity; the distribution of certain electronic payment methods and solutions related to the total turnover.

5.2.1. Account penetration of people over 60 years old

Calculation method:

$$\text{Account penetration of people over 60 years old} = \frac{\text{The number of inhabitants over 60 years old with bank account}}{\text{The number of inhabitants over 60 years old}}$$
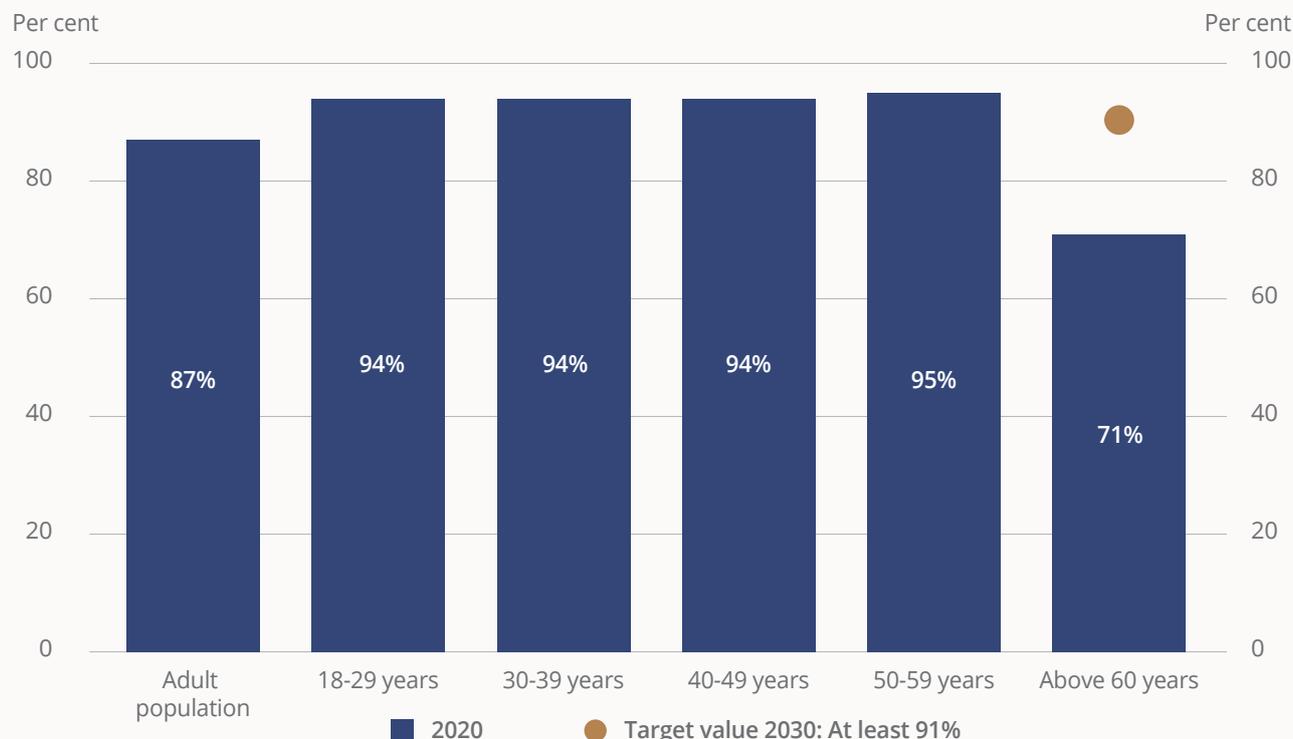
The value of this indicator is calculated on the basis of a household questionnaire survey, therefore, unlike the other indicators, it also includes accounts with foreign service providers.

Value of indicator:
- 2020: 71%
- Target value: 91%

Content: A basic requirement to the use of electronic payments is to have access to these solutions, which can be mainly measured based on the account ownership. The proportion of account holders was 76 per cent in 2014 and 87 per cent in 2020, so for the total population no further measures need to be introduced in this field.

Chart 19: The ratio of the population's access to bank accounts by age group

Per cent

Age group	2020
Adult population	87%
18-29 years	94%
30-39 years	94%
40-49 years	94%
50-59 years	95%
Above 60 years	71%

2020   Target value 2030: At least 91%

Source: MNB

Based on the distribution by age group, it is visible that while at least 94 per cent of the group under 60 years old have bank accounts, this ratio is much lower, only 71 per cent in the group above 60 years old. The MNB has not investigated the coverage of the youngest age group, under 18, in its research so far, however, the low number of self-employed individuals in this group and thus the number of self-initiated transactions may contribute to the achievement of the strategic objectives to a small extent, while in the age group over 18 the coverage rate of account access is already sufficiently high. In other words, while there is no infrastructural reason for not using electronic payments in the young and middle-aged groups, there is still room for improvement in the case of the older age group. For them, it is necessary to reach to open bank accounts that they can use for credit transfers, or they can order payment cards for. The target value of 91 per cent shows that in the case of older age groups, it is also required to reach the generally good account coverage, currently characteristic of the Hungarian population. By reaching the target value, it can be ensured that the measures encouraging the use of electronic payment solutions can be carried out effectively in this segment as well, as account coverage will be almost complete here too.

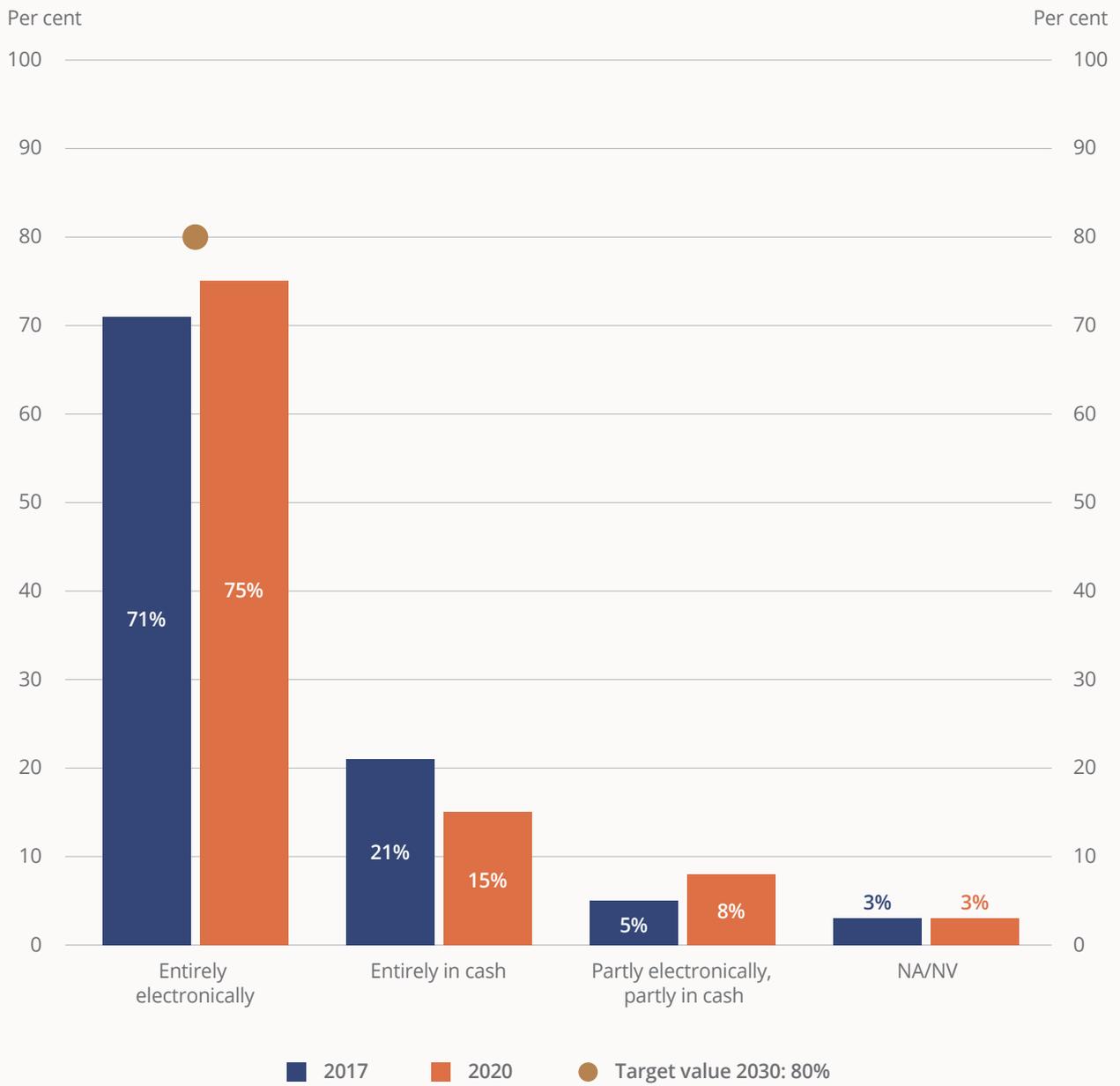### 5.2.2. Proportion of people with only electronic income

Calculation method:

$$\text{Ratio of people with only electronic income} = \frac{\text{Adults receiving all their incomes electronically}}{\text{Number of adults}}$$

Value of indicator:

- 2020: 75%
- Target value: 80%

Content: Inhabitants receiving their income in cash can be helped/motivated for the use of electronic payments by targeted measures, therefore, it is important to assess the proportion of this group within the total population. The ones receiving their incomes in cash can be supported to deposit the income to their account (if they have accounts). In addition, employers can be encouraged to pay wages electronically, if possible. Another important consideration is that one of the barriers to the use of electronic payments is the informal economy, and one of the easiest ways to measure it is perhaps the proportion of income received in cash. All of this does not mean that cash wages should be banned, but as electronic incomes become more widespread, the proportion of people who do not use modern cashless payments because they are forced to use cash for transactions in their daily lives will decrease. The proportion of inhabitants receiving all their income in cash has fallen over the years, from 21% to 15% in 3 years, based on 2017 and 2020 data. This has led to an increase in the share of people receiving income partly in cash and partly electronically to 8% by 2020, and to 75% for those receiving only electronic income. By 2030, the target is to further increase the latter ratio to 80 per cent.

Chart 20: Form of regular income

Per cent / Per cent

- 2017
- 2020
- Target value 2030: 80%

Category	2017	2020
Entirely electronically	71%	75%
Entirely in cash	21%	15%
Partly electronically, partly in cash	5%	8%
NA/NV	3%	3%

Source: MNB

5.2.3. Proportion of those who actively transacting electronically

Calculation method:

$$\text{Proportion of those who actively use electronic payments} = \frac{\text{Retail customers making minimum 15 electronic transactions per month}}{\text{Number of retail customers}}$$

Retail customer: a person who has a bank account or bank card.

The monthly average of electronic transactions per customer includes credit transfers (domestic within and outside the bank, cross border credit transfers, regular credit transfers, foreign currency transfers), direct debits, domestic and foreign card purchases.

Value of indicator:
- 2021: 39%
- Target value: 50%

Content: Regarding retail end-users, it is important to see the distribution of electronic transactions. As we have already mentioned above, in case of bank account penetration, only cer-

tain subgroups encounter problems, but on the whole, the households have bank accounts in a significant proportion, and they can be used for electronic transactions. On the other hand, it is still a question how many people with bank accounts use electronic solutions, and if they use them, what the ratio of those who transact moderately or intensively.

Based on the MNB's 2020 retail surveys, it can be seen that 80 per cent of the adult population uses at least one type of electronic payment solution. Looking at payment situations separately, this proportion is 68 per cent for bill payments, 31 per cent of the population shop online, and 92 per cent use an electronic payment solution when shopping online. Further steps to improve payments should first target the group of using electronic payments partially, by identifying the underlying reasons why they do not always pay electronically. The use of electronic payment methods can be influenced by several factors, such as pricing or whether cashless payment is available at all. For bill payments and online shopping, this is ensured in most cases, but there are still many situations where consumers are unable to pay electronically because of reasons beyond their control (e.g. purchases on the market).

**Chart 21: Ratio of inhabitants using electronic payments**
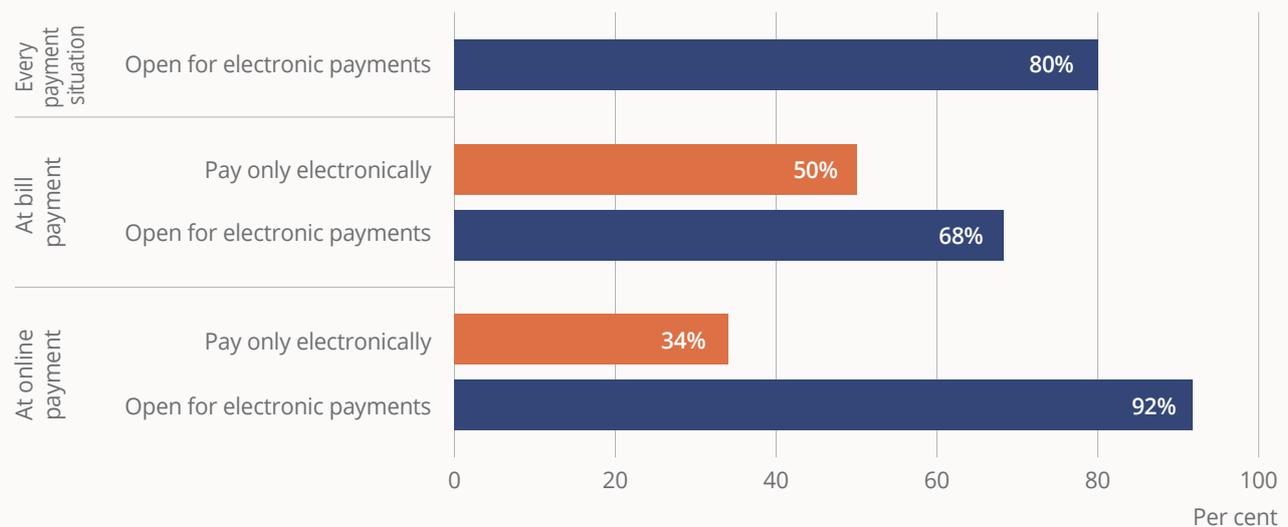
Note: this chart includes ratios of the group of adults, and ratios of adults using electronic payments for bill payments and online purchases.

Source: MNB

According to the data available to the MNB, 13 per cent of account holders do not use electronic transactions at all, 48 per cent make only a low number of them (1-15 transactions per month on average), and 39 per cent of them make transactions frequently (more than 15 electronic transactions per month on average). Looking at the total number of electronic transactions, 16 per cent are carried out by the group of those conducting few electronic transactions, and the remaining 84 per cent can be attributed to those conducting a lot of electronic transactions. The MNB's strategic objective is to reduce the proportion of people who have an account but do not use it for electronic payments, or only use it to a small extent, i.e. as many people should start using electronic payment solutions as possible on a daily basis among those who otherwise have no infrastructural obstacles to do it. It is directly related to the objective for the main indicator of the payments strategy, the significant increase of electronic transactions: increasing the ratio of customers that more frequently use electronic transactions to 50 per cent enables the majority of transactions to be conducted electronically in 2030.

Chart 22: Distribution of the ratio of retail customers and electronic transactions between the groups defined according to the use of electronic payments
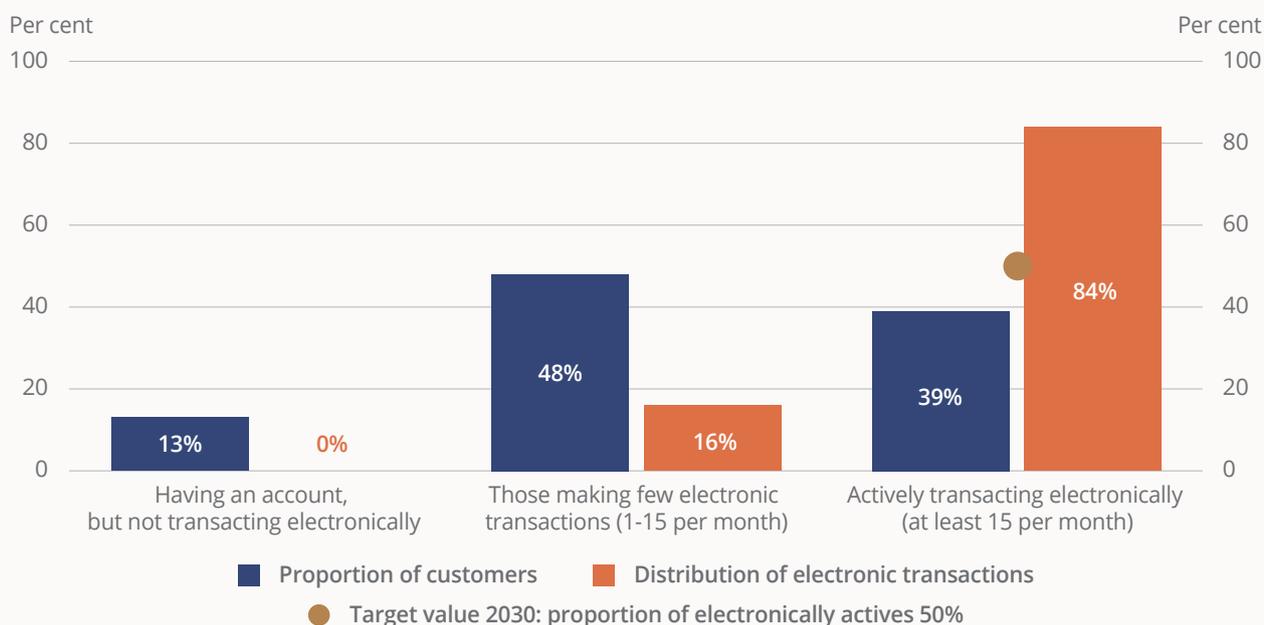
Source: MNB

After categorising retail customers according to their payment habits, incomes and age group, significant differences can be seen between them. Currently, a significant number of groups use electronic payments occasionally. Since the average age and income are the lowest in this group, it can be concluded that the group consists of a large number of students and young workers. In the medium term, there is significant potential for growth in the number of transactions associated with this group, because its members have already occasionally used electronic payment solutions, so they know how these services work and are willing to use them, and with the expected increase in their income, they will have the opportunity to carry out more transactions.

Table 1: Groups of the adult population with electronic income by transaction habits and other sociodemographic characteristics in 2020

Group	Number of elements	Average number of card payments per month	Average number of credit transfers per month	Average number of cash withdrawals per month	Average income per capita per month (HUF)	Average age (year)
Rare electronic payers	435	5.8	0.34	1.27	143,108	64.1
Occasional electronic payers	439	9.1	0.95	1.25	133,142	38.9
Frequent electronic payers	230	22.7	3.9	1.9	213,412	46.1

Source: MNB

5.2.4. Proportion of customers using third-party provider (TPP) services

Calculation method: The ratio of customers using third-party (TPP) services is analysed based on several elements compiled:

- $$\text{The ratio of TPP service users} = \frac{\text{Number of accounts subscribing for PISP or AISP services}}{\text{Total number of payment accounts}}$$

  Value in 2021: 0.4%

- $$\text{The use of payment initiation (PISP) services} = \frac{\text{Number of accounts from which credit transfer was initiated by means of PISP}}{\text{Total number of payment accounts}}$$

  Value in 2021: 0.001%

- $$\text{The use of account information services (AISP)} = \frac{\text{Number of accounts from which requesting information by means of AISP}}{\text{Total number of payment accounts}}$$

  Value in 2021: 0.4%

When determining the value of the indicator, we take into account the largest subcategory value, i.e. the case when customers use services belonging to at least one subcategory.

Value of indicator:
- 2021: 0.4%
- Target: continuously increasing the ratio of customers using TPP services until 2030

Content: The second European Payment Services Directive (PSD2) enabled the regulated market entry of the third-party providers (TPP), and obliged the account provider payment service providers to support the activity of TPPs in a specified manner. The directive distinguishes between two types of TPPs: payment initiation service providers (PISP), which allow the initiation of credit transfers, and the account information service providers (AISP), which support users to make better financial decisions by querying and displaying account information (transaction data). The appearance of TPPs can strengthen competition in the payments market, as well as support the improvement of financial awareness, as it can contribute to switching to account packages that provide more favourable conditions among others. For all these reasons, it is beneficial for Hungarian payments if more users can familiarise themselves with these ser-

vice providers and take advantage of their services. As the target value of the main strategic indicator can be achieved in multiple ways, not only by the extensive promotion of TPP services, there is no specific target value set for this indicator, the only expectation is the continuous development of the Hungarian TPP service market.

5.2.5. Proportion of customers using innovative payment solutions

Calculation method: Composite indicator of the following elements:

- $$\text{The proportion of cards registered in mobile wallets} = \frac{\text{Number of cards registered in mobile wallets}}{\text{Number of cards}}$$

Value in 2021: 13%

- $$\text{Ratio of accounts registered with a secondary account identifier} = \frac{\text{Number of accounts registered with a secondary account identifier}}{\text{Number of accounts}}$$

Value in 2021: 1%

In order to define the value of the indicator, the higher value of two indicators was taken into consideration, assuming that there is significant overlap between the users of the two types of services. In the following years, with the development of innovative payment services, the range of sub-indicators may be expanded.

Value of indicator:
- 2021: 13%
- Target value: 58%

Content: The dynamic growth in the use of mobile payment solutions is expected to continue in the coming years. With the widespread use of mobile internet and smartphones, the infrastructural conditions for the use of these solutions have been facilitated, offering a number of advantages, including: the possibility to use different data entry methods (e.g. QR code, NFC); the possibility to tokenise payment

data, thus making payments more secure; and the possibility for the payer to immediately check the completion of the transaction or the balance of the account with the smartphone. People who use modern, innovative payment solutions tend to pay more frequently by some form of electronic payment on a daily basis, so increasing the ratio of these consumers in the total population could also increase the use of electronic payments.

There is also significant potential in the use of instant payments to make cash payments electronic. Instant payments, which were introduced in 2020, are already accompanied by a number of available services to make the use of the new payment service easier. By means of secondary account identifiers, beneficiaries can receive money more easily as the payer only needs to know the payee's phone number, email address or tax number to send the money, instead of their bank account, which is difficult to memorise. Data entry methods, such as request-to-pay messages or QR code-based data transfer, can also greatly facilitate the initiation of transactions. On the one hand, the indicator shows the extent of usage of these services by consumers and, on the other hand, it may indirectly indicate the extent of the appearance of additional services based on instant payments in the Hungarian payments market.

Similar to other sub-areas, this indicator does not always relate directly to the achievement of the electronic transaction target value, but it can make a significant contribution to it. As a result, it is essential to consider it a sub-area in need of continuous monitoring and development. The target value was determined based on the adoption rate of contactless cards and smartphones, among the innovative digital services that have become widespread over the past decade.

5.3. Ratio of electronic transactions on the end-user side

In this section, we are going to examine the ratio of the number of electronic transactions from various points of view, in order to see where and how this value can be increased.

5.3.1. Ratio of use of innovative payment solutions

Calculation method: Composite indicator of the following elements:

- $$\text{Ratio of mobile payment transactions among electronic payments} = \frac{\text{Number of card based mobile wallet transactions and instant payments initiated with QR code, contactless (NFC) or deeplink}}{\text{Number of all card and instant payment transactions}}$$

- $$\text{Use of request-to-pay service} = \frac{\text{Number of credit transfers initiated in response to a payment request}}{\text{Total number of instant payments if the initiation channel was online banking, mobile banking or TPP (PISP)}}$$

- $$\text{Use of secondary account identifier service} = \frac{\text{Number of credit transfers initiated to a secondary account identifier, which were not initiated as a response to a request-to-pay}}{\text{Total number of instant payments if the initiation channel was online banking, mobile banking or TPP (PISP)}}$$

$$\text{Indicator value} = \frac{\text{Total innovative card and instant payment transactions}}{\text{Total card purchase and instant payment transactions}}$$

Value of indicator:
- 2021: 9%
- Target value: 54%

Content: Regarding innovative payments, it is not sufficient to examine the ratio of consumers using them, it is also vital to see the frequency of usage, i.e. their ratio from the total electronic payments in Hungary. The use of mobile payment solutions and payment initiation service providers, instant payments based on requests-to-pay or secondary identifiers all represent a new opportunity for consumers to initiate electronic transactions more conveniently and faster than before. If payments initiated in these ways account for a significant proportion of the total transactions, it means that not only a small part of the population, who are more inclined to technical innovation, use it, but they have become widespread and available. When determining the target value, the expansion rate of contactless card usage was taken into account, and it was modified according to the additional usage features of payment solutions shown in the indicator.

5.3.2. Ratio of free household credit transfers

Calculation method:

$$\text{Ratio of free household credit transfers} = \frac{\text{Number of free individual household credit transfers}}{\text{Total number of individual household credit transfers}}$$

Free household credit transfers: the number of transfers where no fee per transaction is charged.

Value of indicator:
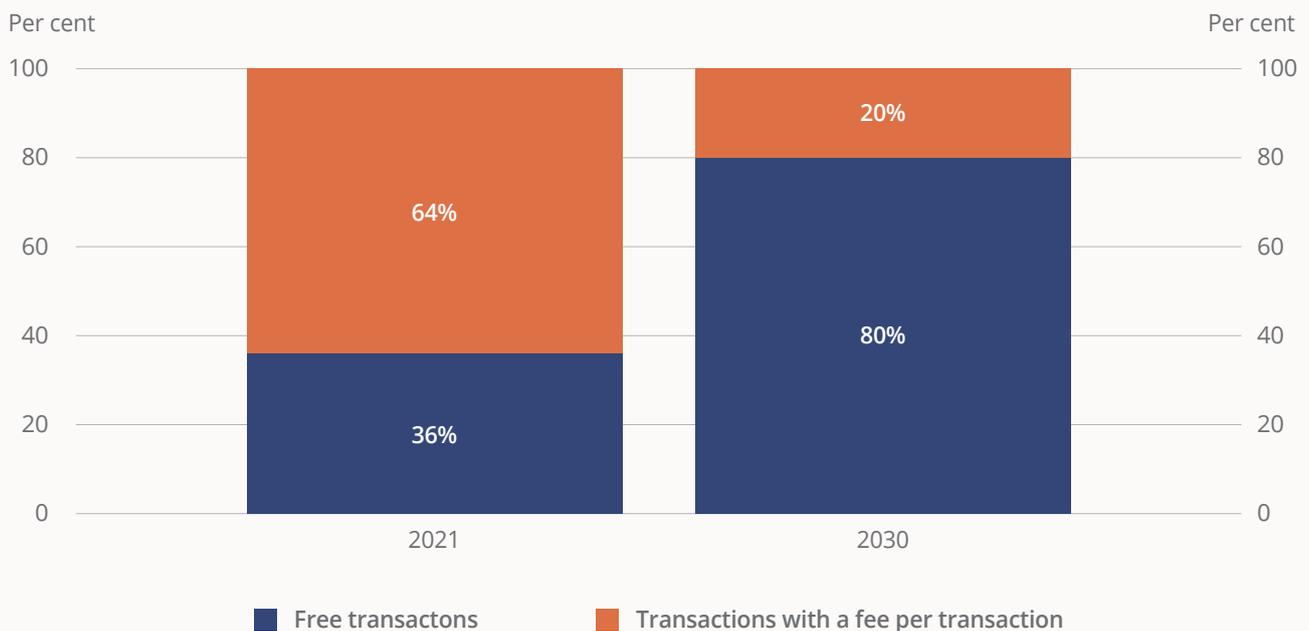- 2021: 36%
- Target value: 80%

Content: Pricing is an important aspect when using electronic payments. The ideal pricing is the internationally common package pricing, where there are no costs per transaction. In this indicator, we examine the ratio of free transfers. The optimal ratio is 100 per cent, as upon having free credit transfers, there is no deterrent factor for custom-

ers to use them. It has already been achieved for card payments, so it is a realistic objective for credit transfers as well to make the majority of them free of charge in the middle term, as banks cannot charge transaction fees for credit transfers initiated by standardised data entry solution or request-to-pay from 2023. It is also important to see that this indicator must be interpreted together with other indicators on the use of instant payments, i.e. it is not appropriate if transactions become free in the case of the current, relatively low number of credit transfers per customer, but the proportion of free transactions must improve in parallel with the increase in turnover. Consequently, in order to achieve the target value, it is necessary to provide payment solutions in a wider range than now that can be used easily in every payment situation, based on credit transfers, and as a result, a significant number of new transactions can appear at this payment method.

Chart 23: Ratio of free household credit transfer transactions

Per cent | | Per cent
Free transactons ■ Transactions with a fee per transaction ■

2021: Free transactions 36%, Transactions with a fee per transaction 64%
2030: Free transactions 80%, Transactions with a fee per transaction 20%

Source: MNB

5.3.3. Ratio of electronic bill payments

Calculation method:

$$\text{Ratio of electronic bill payments} = \frac{\text{Estimated annual number of electronic bill payments}}{\text{Estimated annual number of bill payments}}$$

Electronic bill payments: The bill payment data before 2019 do not include the bill payments made not through postal money orders or direct debits (e.g. card payment online or in the service provider's local office, credit transfer), while the continuously increasing payments of postal money orders conducted with payment cards in the post offices have formed part of this indicator all the time.

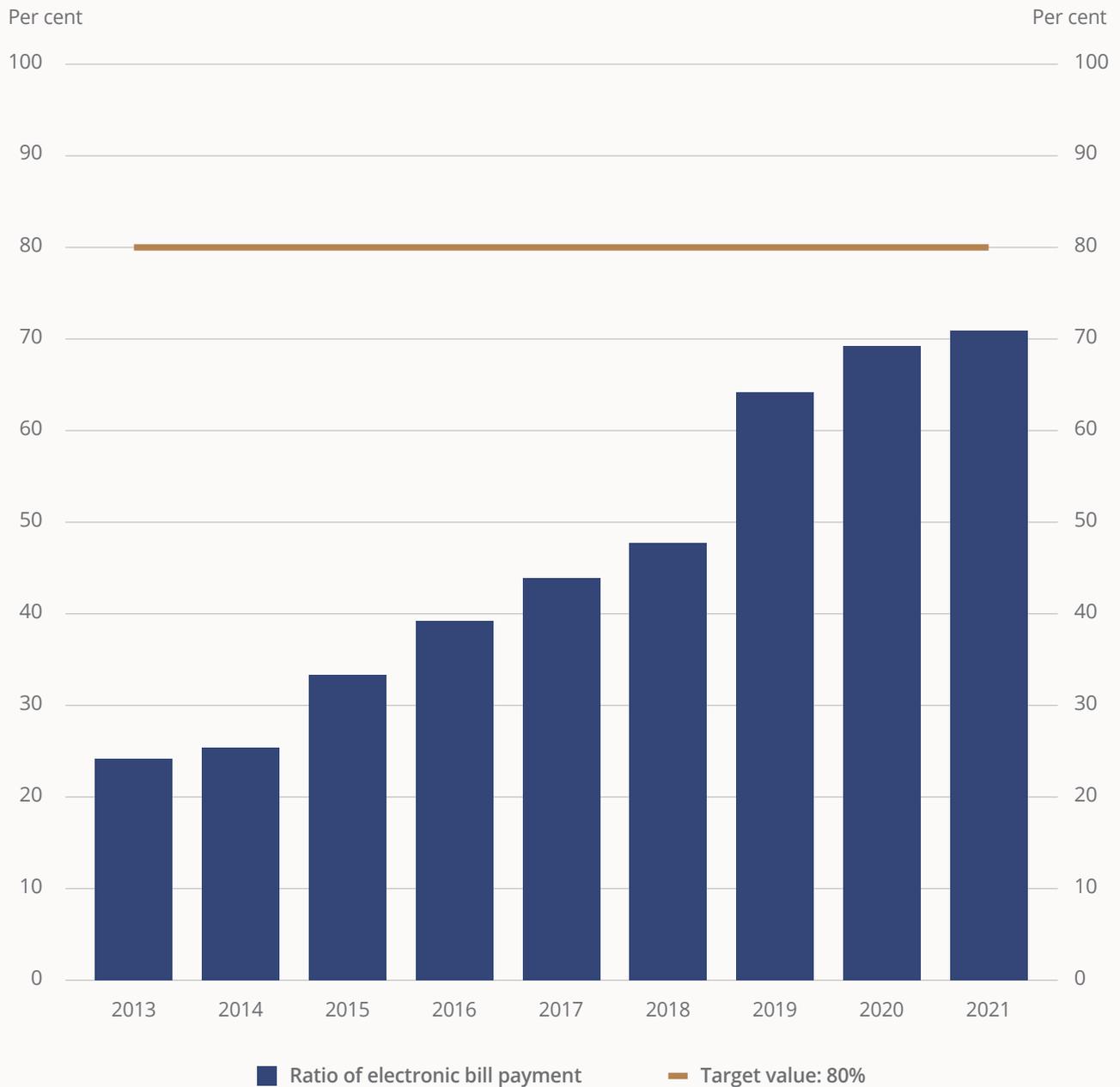**Value of indicator:**
- 2021: 71%
- Target value: 80%

Content: It is also worth looking at household transactions by transaction situation (online purchases, bill payments, purchases at physical locations), this indicator shows the ratio of

electronic transactions within bill payments. In 2021, the ratio of electronic transactions in bill payments was 71 per cent, which means an increase of nearly 47 percentage points since 2013. According to the MNB's calculations, the target of 80 per cent, with a moderate growth in bill payments, will adequately support the achievement of the main strategic objective.

Chart 24: Electronic payment of utility bills and other service charges

Per cent   Per cent

Year	Ratio of electronic bill payment
2013	24
2014	25
2015	33
2016	39
2017	44
2018	48
2019	64
2020	69
2021	71

■ Ratio of electronic bill payment   ▬ Target value: 80%

Source: MNB

5.3.4. The rise of electronic payments within retail payments of the smallest value

Calculation method:

$$\text{Indicator value} = \frac{\text{Median value of electronic payments}}{\text{Median value of cash payments}}$$

Electronic and cash payments: electronic and cash transactions mostly conducted in physical payment situations according to the online cash register database.

Value of indicator:
- 2021: 2.4

The median of electronic payments is 2.4 times the median of cash payments.
- Target value: 1.4

Content: Currently, the ratio of electronic payments is higher in case of higher-value purchases, i.e. consumers typically pay cash for low-value transactions. This is also evident from the data in the online cash register database, where most transactions were conducted in physical payment situations, and more than 80 per cent of these

transactions are below HUF 5,000. Regarding

non-electronic transactions, the share of transactions below HUF 5,000 is more than 85 per cent, so the share of electronic payments could be increased significantly by redirecting purchases of this value.

Since we need a multi-annual indicator to get a realistic view of changes over time, we compare the median of electronic payments to the median of cash payments, taking the ratio of the two as the value of the indicator. The optimal value is 1, because in this case the median of electronic payments and cash payments would be the same, so there would be no difference between payment methods depending on the value of the transaction, as is currently the case. However, this is not expected to be achieved in the foreseeable future. In 2021, the indicator was 2.4, a significant improvement over recent years, as in 2015 the median value of electronic payments was 3.9 times that of cash. Therefore, the target value for this indicator, taking into account the decreasing trend between 2015 and 2021, is to reduce the indicator to 1.4 by 2030, i.e. the median value of electronic payments should be less than one and a half times the median value of cash payments.

Chart 25: Top quartiles of cash and electronic transactions in 2021 and median ratio of electronic and cash payments from 2015 to 2021
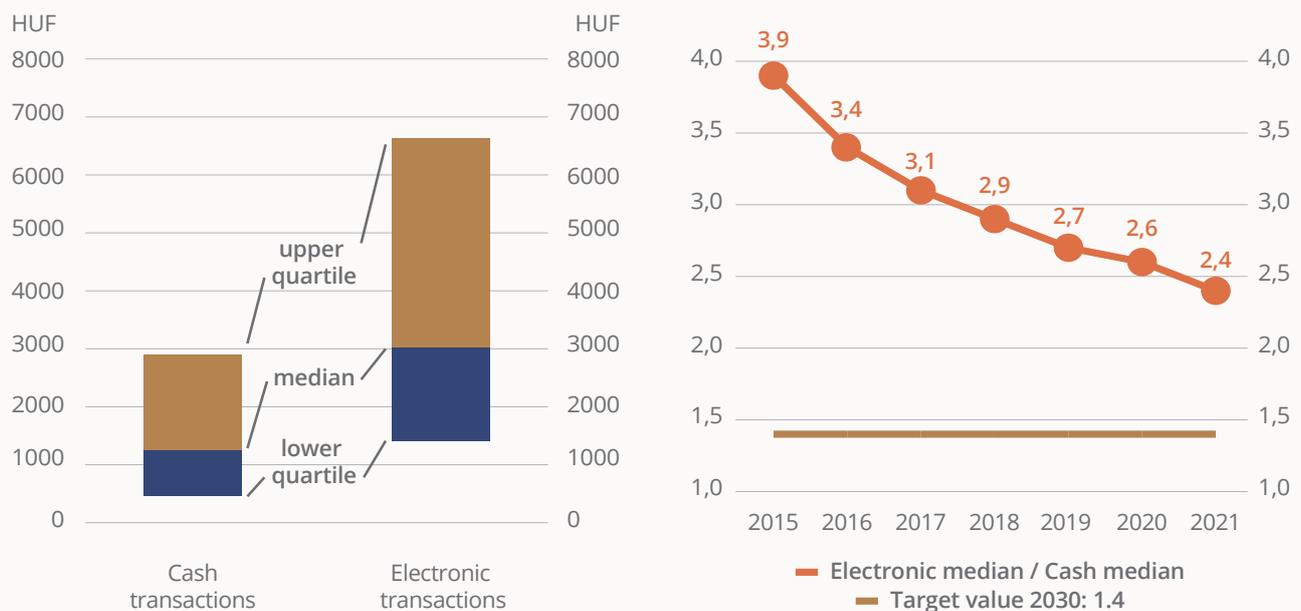
Source: NTCA, MNB calculations

5.4. Financial awareness and attitude related to electronic payments on the end-user side

In addition to the ratio of electronic payment users and the ratio of electronic transactions, it is also important to examine how the population generally relates to electronic payment solutions, whether they like using them/would like to use them, and whether they are sufficiently aware of their advantages.

5.4.1. Proportion of those who prefer electronic payments

Calculation method:

Indicator value $=$ $\dfrac{\text{Number of adults who prefer electronic payments}}{\text{Total number of adults}}$

Ratio of customers preferring electronic payments: At least one of the following statements is true:

- If I had the chance, I would be happy to use cashless solutions everywhere.
- I primarily use a bank card or credit transfer because I consider it safer.
- I primarily use a bank card or credit transfer because I consider it more convenient.

Value of indicator:
- 2020: 48%
- Target: increase continuously

Content: As we have presented above, due to the significant developments of infrastructure and the changes of the legal framework, cashless alternatives are available in most payment situations. As a result, the more people prefer to use electronic payments, the more electronic transactions can be expected. Exploring the underlying motivations can also be interesting, for example, as to why someone prefers electronic payments, since those who do not currently use these payment solutions might change their habits if they knew their advantages. In 2020, 48 per cent of the adult population preferred electronic payments, 29 per cent would pay cashless everywhere, 33 per cent prefer them because of security, and 39 per cent because of convenience.

Chart 26: Ratio of customers who prefer electronic payments
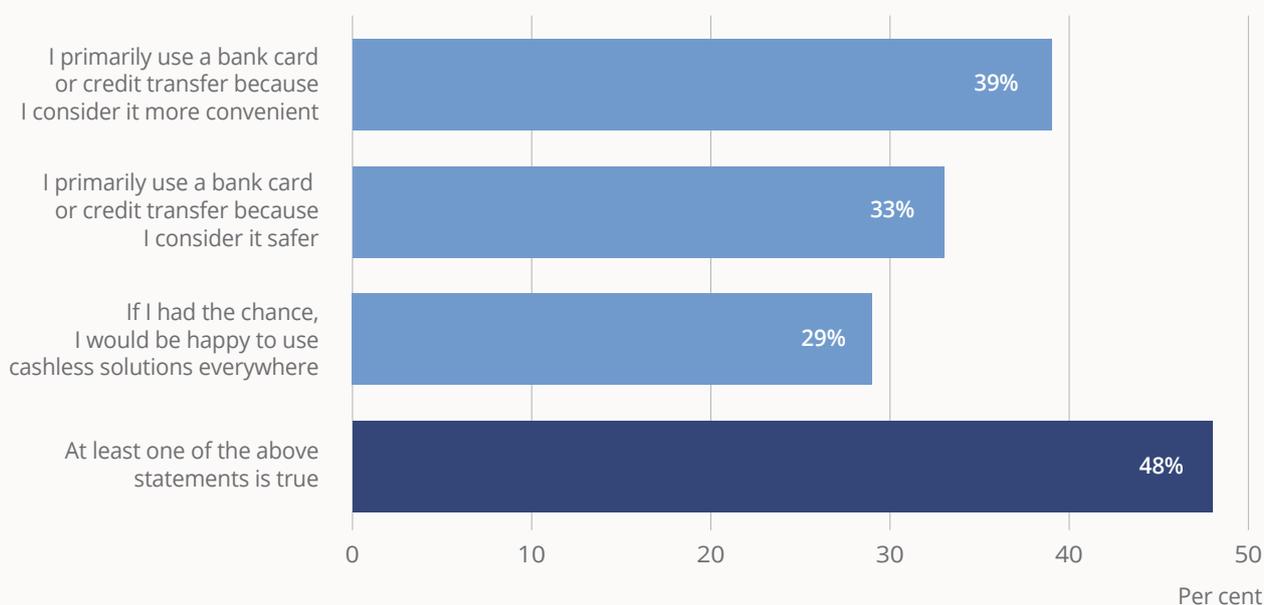
Source: MNB

5.4.2. Knowledge on electronic payments

Calculation method: Evaluation of the answers given to various questions about current knowledge on electronic payments.

Current knowledge:
- knowledge of instant payments
- knowledge of secondary account identifiers

Over the years, the topics covered are constantly being expanded with questions assessing different knowledge.

Value of indicator:
- 2020: as this field always assesses knowledge on current topics and innovative services, and thus the questions are constantly changing, it is not possible to set an aggregate indicator value and target, but progress can be assessed individually within each topic, currently the indicator includes the knowledge values assessed in 2020
- Target value: the values of different types of knowledge should increase continuously over the years

Content: In order to use electronic payments, people need to know about their existence, operation, pricing, terms and possibilities of use, as well as the benefits they can take advantage of, for instance, convenience and security. Accordingly, it is recommended to assess their knowledge on electronic payment services. The current questions are related to instant payments, and later on, the scope of questions may place more emphasis on the most relevant questions of financial awareness. So the primary focus of questions will centre around the areas of payments to be developed. We assess the value of the knowledge respectively for each question, and the aim is to increase the values of the given knowledge assessed throughout several years. Accordingly, we do not assign a specific aggregate value or a specific target value to this indicator, but rather monitor the progress achieved in certain questions. When designing targeted actions to improve knowledge, it is also useful to consider the evolution of knowledge of other digital services, not necessarily financial, which may also influence the effective implementation and efficiency of the measures.

Table 2: Surveying the knowledge of the adult population on instant payments in 2020

	Yes
Instant payments were launched on 2nd March, so payees are able to receive credit transfers within 5 seconds at any time of the day. Have you heard about this?	75%
Did you know that you can register your phone number, email address or tax number as a secondary account identifier, so people can address credit transfers to these identifiers to transfer money to you?	31%

Source: MNB

5.4.3. A decrease in the level of costs of payments

Calculation method:

$$\text{Indicator value} = \frac{\substack{\text{Number of customer}\\\text{categories per}\\\text{electronic transaction}\\\text{numbers where the}\\\text{MNB's cost reduction}\\\text{expectations were met}}}{\substack{\text{Total number of}\\\text{customer categories}\\\text{per electronic}\\\text{transaction numbers}}}$$

The MNB's expectations for cost reduction:

- Cost differences between customers should be reduced:

  - the standard deviation of the real value of the average monthly costs of the current year within the categories per electronic transaction numbers should not be higher than the standard deviation measured in 2021.

- Average cost levels should decrease:

  - in the current year, the real value of the average costs within the categories per electronic transaction numbers should be lower than the median value of the real costs and
 - the median value of real costs should not exceed the median value of 2021.

Our important assumption is that the cheap or free services provided by fintech companies and the innovative instant payments being free from 2023 will make it possible for the minimum values in all categories not to increase significantly. If this is not met, a new methodology is needed to evaluate the fulfilment of the MNB's expectations regarding cost reduction.

Value of indicator:

- 2021: 2021 is the base year, against which the value of the indicator is calculated in subsequent years
- Target value: 100% (i.e. reduce the differences between customers in each customer category per electronic transaction numbers, and make customers pay less on average)

Content: It is very typical that many consumers are not using the bank account package most suitable for them, and based on their payment habits, a cheaper account package would be available to them, or they use services that could be replaced by free of cheaper alternatives (e.g. text message services, which can be quite costly in certain cases, and which could be replaced by mobile bank notifications as a free alternative). Examining the groups according to the average monthly electronic transactions, it appears that in each group there is a customer who pays significantly more than another customer with similar transaction habits. It also means that presumably, there is a significant proportion of consumers who could take advantage of more favourable, cheaper account packages or services instead of the current ones, but they do not change their account packages due to the (supposedly) difficult process of switching, or the difficulty in comparing account conditions. It is important that customers use the account package and services that best suit their payment habits, as on the one hand, the relatively high costs directly restrict the more intensive use of electronic payment services since multiple services or the higher number of transactions would directly increase the costs, on the other hand, they can indirectly affect the customers' opinion on these services. If customers deem these services are usable only occasionally or in the absence of cash payment options due to the high costs, it can hinder the more intensive use in these groups of customers in the long term.

Chart 27: Monthly costs related to payments of household customers based on the groups by the average number of electronic transactions per month

Average number of electronical transactions per month
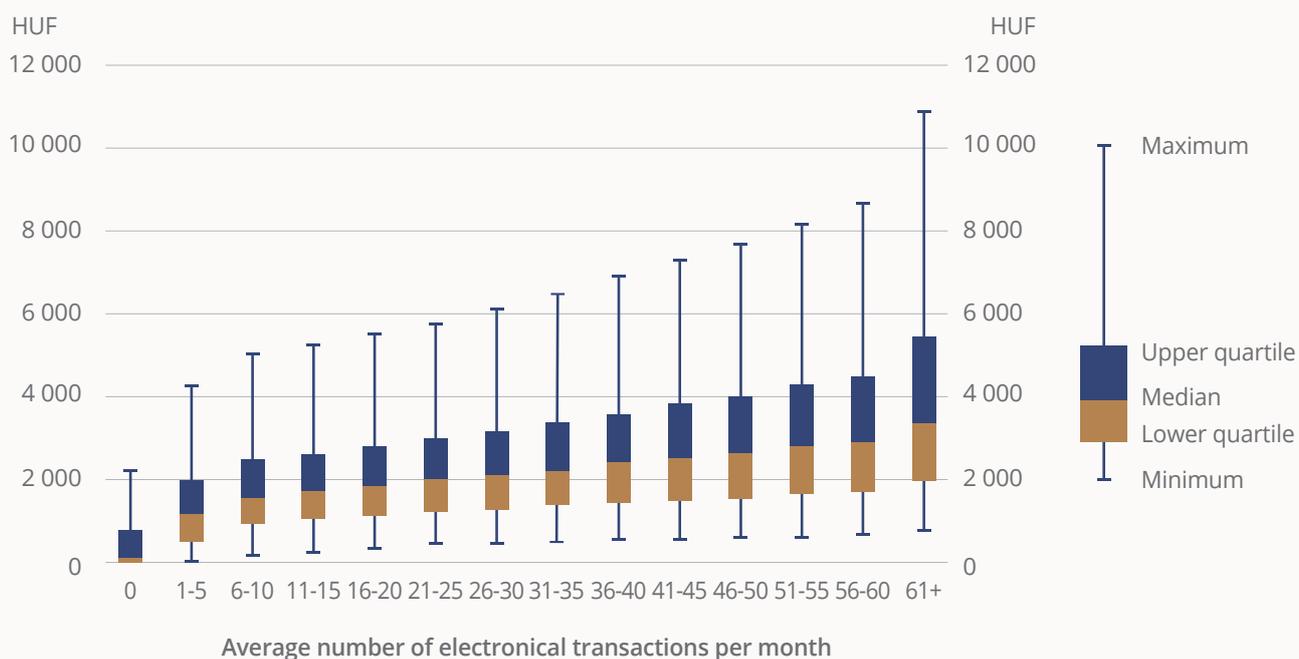
Source: MNB

Table 2: Standard deviation, average and median per number of electronic transactions in 2021 (HUF)

	Average number of electronic transactions per month													
	0	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61+
standard deviation	1,150	1,929	2,276	2,498	2,337	2,450	2,514	2,576	2,771	2,832	2,995	3,381	3,281	5,068
average	574	1,542	1,995	2,162	2,302	2,454	2,594	2,737	2,914	3,069	3,254	3,444	3,599	4,415
median	111	1,167	1,583	1,736	1,867	2,002	2,132	2,251	2,391	2,517	2,661	2,798	2,906	3,395

Source: MNB

Furthermore, it is important that customers are provided detailed information and an easy and proper comparison of the parameters of different account packages. It can be supported with extensive information on and easy access to the statement of fees, and by the MNB's bank account selector programme. In addition, even account information (AISP) and personal financial services can provide information in the future, which can offer new, more favourable account packages by taking the customer's transactions and financial situation into account, and monitoring the opportunities available on the market. It is also important that customers take advantage of this opportunity and switch to a more appropriate account package or service available to them. In this area, the current situation can be improved primarily by educating consumers. For these reasons, it is reasonable to monitor changes in the pricing of account packages and services in the strategy. In order to reach the target value by the end of 2030, the cost difference between customers in the different groups of electronic transaction numbers and the average fees paid will have to be reduced.

5.5. Development of payments on the supply side

For a long time, the main objective in case of retailers has been to ensure card acceptance, and in line with this, the focus has been on monitoring the acceptance rate and examining the underlying reasons for non-acceptance. With the introduction of instant payments in March 2020 and the mandatory provision of electronic payments by retailers obliged to use an online cash register from 1 January 2021, electronic payments are now available in almost all payment situations, so the focus is on encouraging the use of electronic payments, which can best be monitored by looking at the fees charged to retailers and the proportion of electronic payments per stores.

5.5.1. The ratio of acceptance costs to turnover paid by the smallest retailers

Calculation method:

$$\text{Indicator value} = \frac{\text{Acceptance costs of the smallest retailers}}{\text{Their electronic turnover}}$$

The smallest retailers: Retailers with a quarterly electronic payment turnover of HUF 0 and HUF 1 million.
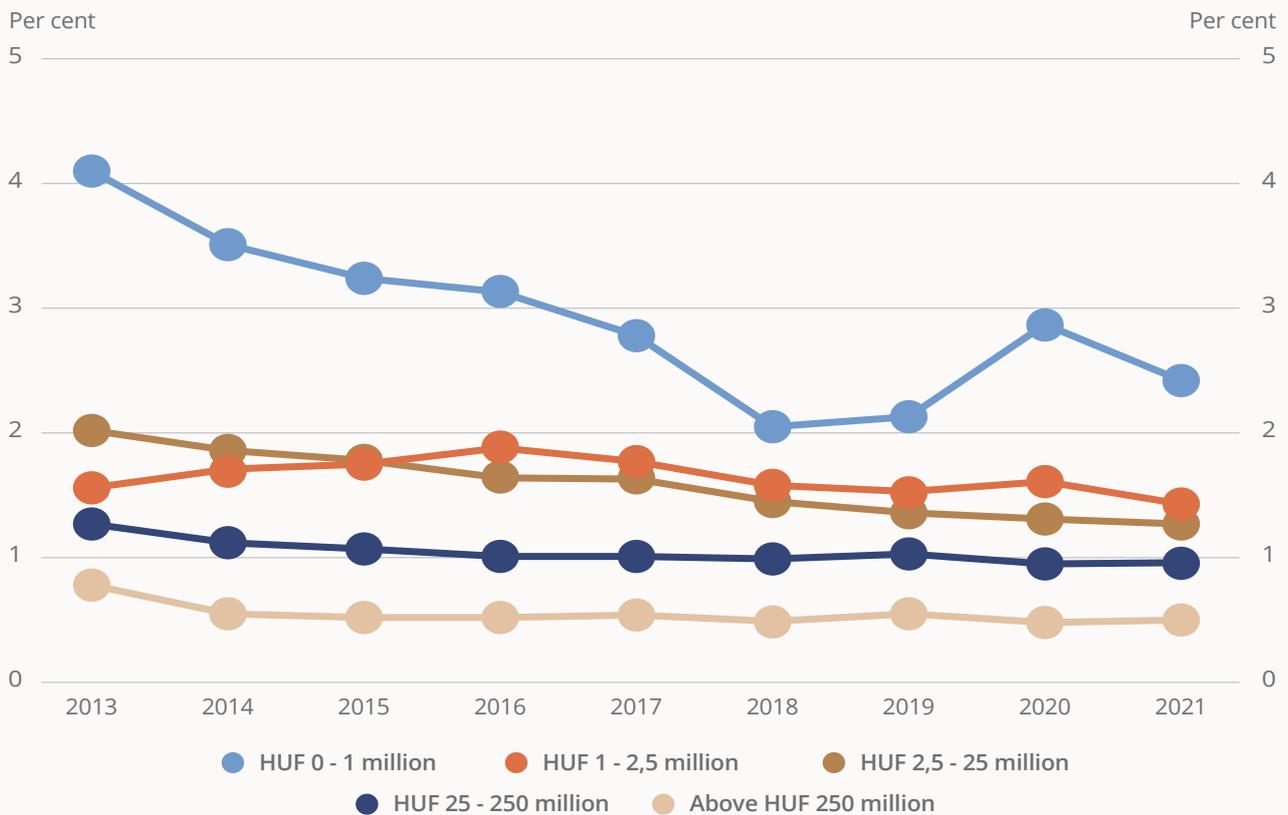
Electronic turnover: we are currently examining card turnover, later on, it will be supplemented with instant payments as well.

Value of indicator:
- 2021: 2.4%
- Target value: 1.5%

Content: Smaller retailers still face significantly higher acquiring fees as a proportion of turnover. In the case of the smallest retailers with a quarterly card turnover of less than HUF 1 million, the share of payment service providers' revenues from retailers in relation to the card payment turnover of the retailers in question is 2.4%. While this is an improvement compared to the value in 2020, it is still very high, especially when compared to retailers with higher turnover. Accordingly, the aim in this area is to reduce the current high acceptance fees for the smallest retailers to at least the current level of acceptance fees for other retailer categories. This is important because, in many cases, retailers can effectively influence shoppers' choice of payment method at the point of sale, but this requires that retailers do not incur high additional costs by using electronic payment solutions more intensively.

Chart 28: Ratio of acceptance costs to payment card purchase turnover by merchant categories according to quarterly payment card turnover (2013–2020)

Per cent

- HUF 0 - 1 million
- HUF 1 - 2,5 million
- HUF 2,5 - 25 million
- HUF 25 - 250 million
- Above HUF 250 million

Source: MNB

5.5.2. Electronic payment transactions at the accepting merchants

Calculation method:

$$\text{Indicator value} = \frac{\text{Number of stores, where the ratio of electronic transactions is more than 50 per cent}}{\text{Number of stores}}$$

Stores: retail units of taxpayers with the same activity by district in the online cash register database, which mainly covers transactions requiring personal presence.
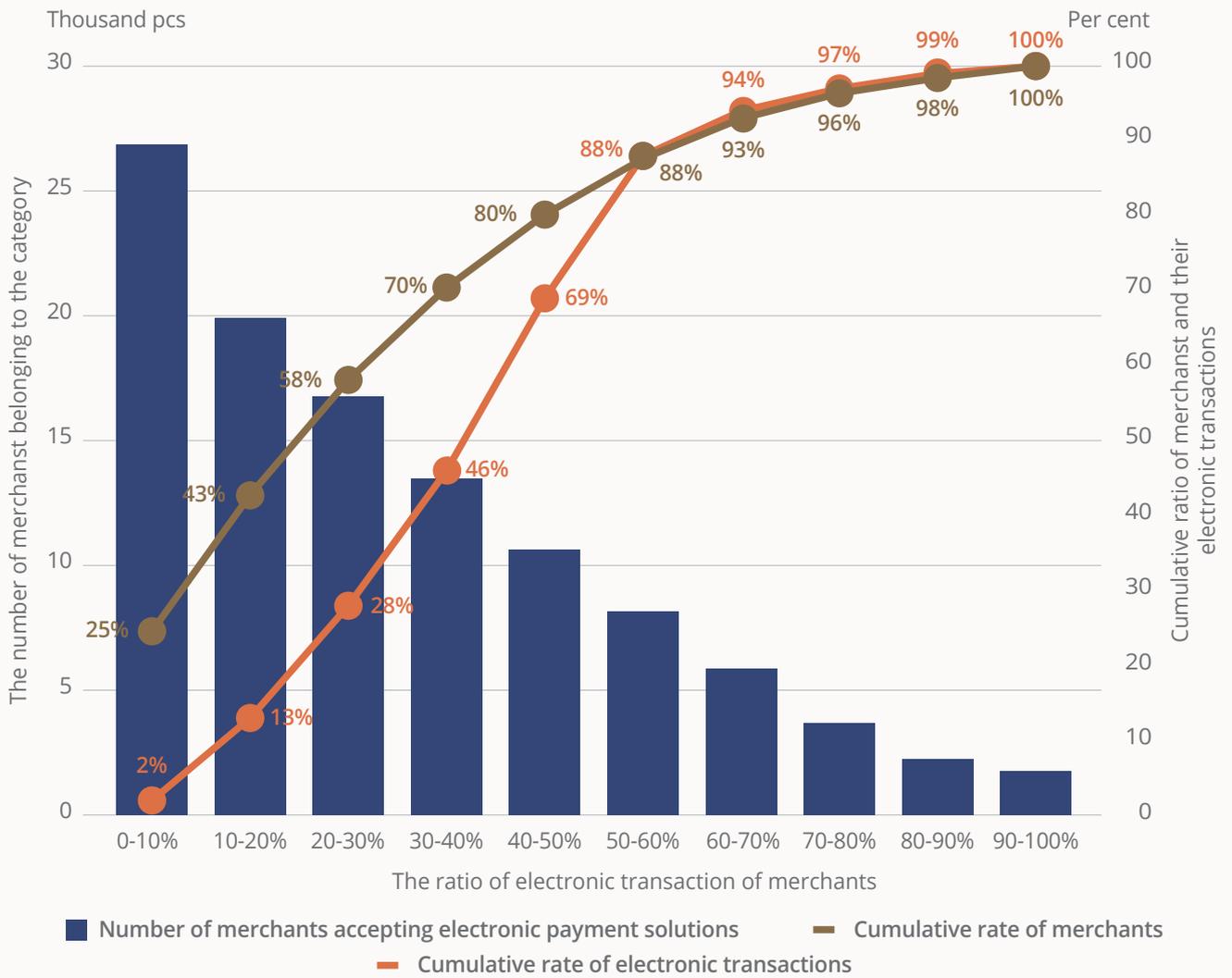
Value of indicator:
- 2021: 20%
- Target value: 40%

Content: As of 1st January 2021, retailers obliged to use online cash registers have to provide electronic payments, therefore, instead of analysing the rate of providing acceptance, it is better to analyse the ratio of electronic transactions per store in future studies. At least 50 per cent of transactions are settled electronically in around 20 per cent of the stores, and 31 per cent of all electronic transactions recorded in online cash registers appear in these stores. At the same time, the rate of electronic transactions is only between 0-10 per cent in a quarter of the stores, which suggests there is still considerable room for improvement. The growing trend in the use of electronic payments and the obligation of retailers required to use online cash registers to provide electronic payments anticipate a positive future for the growth of electronic transactions. By 2030, it is considered to be an appropriate and realistic objective that electronic transactions shall be in majority in 40 per cent of retailers, i.e. the ratio of electronic transactions shall be 50 per cent or above.

Chart 29: The ratio of electronic payments at Hungarian retailers

Source: NTCA, MNB calculations

5.6. Summary of the indicators and main values of the Payments Development Indicator Set

Category	Description	Value in 2021	Target for 2030
Key indicators	The ratio of the number of electronic transactions	31%	Minimum 60 per cent of transactions in case of extensive, general stimulation of usage Minimum two-thirds of transactions in case of further targeted measures
	Concentration on the electronic payment services market	2199	Maximum 2,000
	Annual additional growth of electronic payments compared to economic growth	1.1	Every year above 1
	Proportion of the value of electronic purchases	37%	Minimum 62%
Use of electronic payment solutions on the end-user side	Account penetration of people over 60 years old	71% (2020)	Minimum 91%
	Proportion of people with only electronic income	75% (2020)	Minimum 80%
	Proportion of those who actively transacting electronically	39%	Minimum 50%
	Proportion of customers using third-party provider (TPP) services	0.4%	Shall increase continuously
	Proportion of customers using innovative payment solutions	13%	Minimum 58%
Ratio of electronic transactions on the end-user side	Ratio of use of innovative payment solutions	9%	Minimum 54%
	Ratio of free household credit transfers	36%	Minimum 80%
	Ratio of electronic bill payments	71%	Minimum 80%
	The rise of electronic payments within retail payments of the smallest value	2.4	Maximum 1.4
Financial awareness and attitude related to electronic payments on the end-user side	Proportion of those who prefer electronic payments	48% (2020)	Shall increase continuously
	Knowledge on electronic payments	The values of the constantly changing sub-indicators are included in the publications that monitor the fulfilment of the strategy	
	A decrease in the level of costs of payments	2021 is the base year, against which the value of the indicator is calculated in subsequent years	100%
Development of payments on the supply side	The ratio of acceptance costs to turnover paid by the smallest retailers	2.4%	Maximum 1.5
	Electronic payment transactions at accepting merchants	20%	Minimum 40%

References

Deák, V. – Takács, K. – Varga, L. (2020): The impact of the coronavirus pandemic on changes in electronic payments during January–June 2020. The impact of the coronavirus pandemic on Hungarian payment habits – Part 2. Special article (szakmai cikk), Magyar Nemzeti Bank. https://www.mnb.hu/letoltes/the-impact-of-the-covid-19-pandemic-on-changes-in-electronic-payments-during-january-june-2020-in-hungary.pdf

Deák, V. – Nemecskó, I. – Végső, T. (2021a): Payment Habits of the Hungarian Households in 2020. Occasional Papers 143, Magyar Nemzeti Bank. https://www.mnb.hu/letoltes/mnb-op-143-final.pdf

Deák, V. – Nemecskó, I. – Végső, T. – Bódi-Schubert, A. (2021b): Impact of the coronavirus pandemic on Hungary's payment turnover in 2020. Special article (szakmai cikk), Magyar Nemzeti Bank. https://www.mnb.hu/letoltes/impact-of-the-coronavirus-pandemic-on-hungary-s-payment-turnover-in-2020.pdf

Deák, V. – Kajdi, L. – Nemecskó, I. (2021c): Analysis of Retailer and Corporate Payment Habits in Hungary. Financial and Economic Review, 20(2): 33–59. https://doi.org/10.33893/FER.20.2.3359

Deák, V. – Kajdi, L. – Nemecskó, I. – Végső, T. (2022): Time is Money: A Survey of the Social Cost of Payment Instruments. Financial and Economic Review, 21(2): 5-36. https://doi.org/10.33893/FER.21.2.5

EC (2020): Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on a Retail Payments Strategy for the EU. European Commission. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0592&rid=2

ECB (2020): Study on the payment attitudes of consumers in the euro area (SPACE). European Central Bank. https://www.ecb.europa.eu/pub/pdf/other/ecb.spacereport202012~bb2038bbb6.en.pdf

ECB (2021): The Eurosystem's retail payments strategy. European Central Bank. https://www.ecb.europa.eu/pub/pdf/other/ecb.eurosystemretailpaymentsstrategy~5a74eb9ac1.en.pdf

Ilyés, T. – Varga, L. (2016): Macroeconomic effects of the increase of electronic retail payments – A general equilibrium approach using Hungarian data. Financial and Economic Review, 15(2): 129–152. https://en-hitelintezetiszemle.mnb.hu/letoltes/tamas-ilyes-lorant-varga-en.pdf

Kajdi, L. – Kiss, M. (2021): The impact of policy effects on the Hungarian payments card market. Journal of Banking Regulation, 23(2): 107–119. https://doi.org/10.1057/s41261- 021-00152-6

Kajdi, L. – Varga, L. (2015): Készpénzmentes társadalom – Álom vagy valóság? (Cashless society - Dream or reality?) MNB, 2015. https://www.mnb.hu/letoltes/kajdi-laszlo-varga-lorant-keszpenzmentes-tarsadalom-2-resz.pdf

MNB (2022): Payment Systems Report. Magyar Nemzeti Bank https://www.mnb.hu/letoltes/mnb-payment-systems-report-2022-final.pdf

Schmiedel, H. – Kostova, G. – Ruttenberg, W. (2012): The Social and Private Costs of Retail Payment Instruments: A European Perspective. ECB Occasional Paper Series No. 137. https://doi.org/10.2139/ssrn.2145439

Turján, A. – Divéki, É. – Keszy-Harmath, É. – Kóczán, G. – Takács, K. (2011): Nothing is free: A survey of the social cost of the main payment instruments in Hungary. Occasional Papers 93, Magyar Nemzeti Bank. https://www.mnb.hu/letoltes/op93-fmtk.pdf

Végső, T. – Bódi-Schubert, A. (2020): Impact of the coronavirus pandemic on changes in cash holdings between January and August 2020. Impact of the coronavirus pandemic on Hungarian payment habits – Part 1. Special article (szakmai cikk), Magyar Nemzeti Bank. https://www.mnb.hu/letoltes/a-koronavirus-jarvany-hatasa-a-keszpenzallomany-valtozasara-2020-januar-augusztus-folyaman.pdf