

# KEY TYPES OF AUTOMATED INNOVATIVE PAYMENT SYSTEMS AND THEIR SIGNIFICANCE IN THE BANKING SECTOR \*

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**INESA NUSHIKYAN**

*Ameriabank CJSC, Executive Office,  
Documentation Flow Management Service, Specialist;  
Armenian State University of Economics, the Faculty of Finance,  
Chair of Banking and Insurance, Ph.D.Student  
Yerevan, the Republic of Armenia*

[inushikyan@gmail.com](mailto:inushikyan@gmail.com)

ORCID: 0009-0006-4880-3859

***The main purpose of the article is to study the main types of automated payment systems, their application, transactions and further development stages in the banking sector.***

***To achieve the goal, the following tasks were set: to study the process of implementing automated processes in the bank, to understand the main target groups and, based on that, to develop measures to expand the possibilities of using automated payment systems.***

***In order to investigate the primary types of automated payment systems and their roles within the banking sector, the study employed the following research methods: deductive method, inductive method, analysis method, graphical method.***

***The main conclusion of the research is that considering the complex external environment and strong competition, banks need to continuously track developments in the banking services sector and utilize automated tools. This approach can contribute to the effective and stable growth of the banking system. Over time, the stable development of automated payment systems could boost economic stability, enhance customers' media literacy, and improve their financial and economic skills. Such advancements could pave the way for updating banking resources and potentially attract additional financial investment.***

**Keywords:** *Automated solutions, innovations, banking sector, payment methods, card operations, ATMs, transactions.*

## Introduction

The economy today is built on a network of daily transactions, with payment systems and financial settlements between economic entities at its core. The article highlights that modern economic relations are fundamentally based on these settlements and payments, which enable the resolution of mutual obligations and demands. The development of a country's economic system is unimaginable without the efficient implementation of payment systems and contemporary payment methods.

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Based on current experience, it is evident that solving both short-term and long-term financing and lending challenges in the economy requires the development of diverse cashless payment methods and mechanisms. The article's analysis shows that commercial banks handle the majority of cashless transactions, carrying out key payment and settlement roles within the national payment system. The effectiveness of national economies across all countries is closely tied to the optimization of their payment systems.

To enhance the efficiency of collaboration between banks, their partners, and clients, specialized automated banking systems are designed and deployed. These systems function on the electronic platforms of the bank's internal or external networks.

There is a growing emphasis on the role and application of innovative technologies in the banking sector, driven by unprecedented global changes and the evolving demands of customers facing contemporary challenges. The evolution of automated payment systems is influenced by the increasing demands of both banks and customers. It is crucial to recognize that the level of societal advancement in a country is largely determined by its economic condition. Automated payment systems offer an effective solution for processing payments for goods and services securely and promptly. It is widely recognized that automation involves substituting human physical and cognitive work with technological tools that deliver the same or even higher levels of productivity and quality. Although this substitution is only partial, it helps conserve both time and various resources.

The importance of this topic is clear, given that the effectiveness of the banking sector's operations fundamentally depends on the successful implementation of automated payment systems.

Based on the types of ATMs discussed on the mentioned sites, here are some of the most commonly used ATMs around the world:

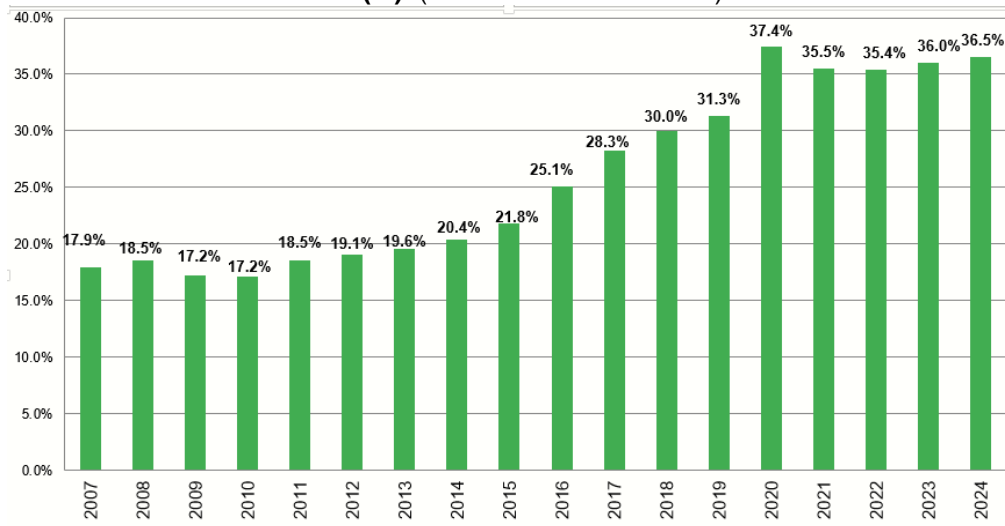
1. **Green Label ATMs:** Designed for agricultural-related transactions.
2. **Orange Label ATMs:** Used for handling stock transactions.
3. **Pink Label ATMs:** Catered specifically for women, aimed at reducing wait times.
4. **Yellow Label ATMs:** Intended for transactions related to electronic commerce.
5. **White Label ATMs:** These are alternatives to bank-owned ATMs and are typically deployed to expand ATM networks in regions where it is not economically viable for banks to place their own ATMs.

### **Transaction Analysis Performed by Automated Payment Systems**

In Armenia, automated payment systems encompass the various forms, methods, and frameworks for cashless transactions. This system operates based on the regulation of the monetary supply and its volume in circulation. The central bank's policies are designed to preserve the stability of the currency's purchasing power and to ensure the seamless functioning of monetary transactions.

Let's consider the relative weight of the volume of automated payments in the given chart. In 2019, automated operations in the territory of RA had an increase of 1.3% compared to the previous year. 2020 is seeing a big increase considering the situation caused by the covid 19 pandemic. During the mentioned year, automated operations made up 37.4%, registering an increase of 6.1% compared to the previous year.

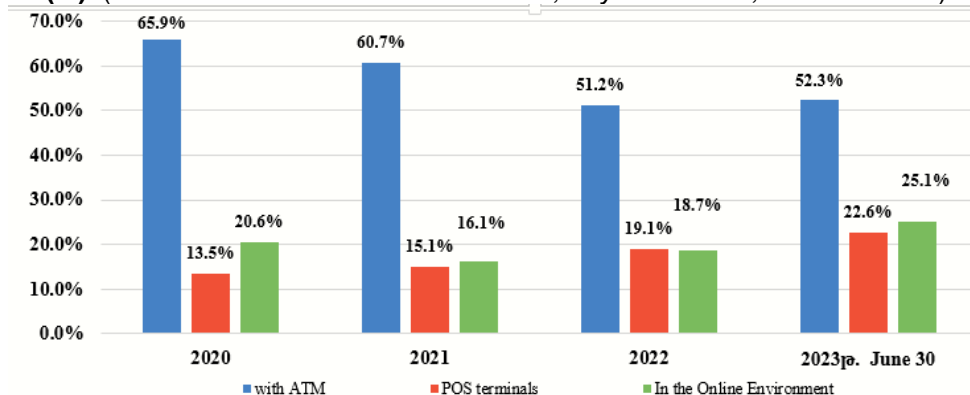
**Figure 1. The share of the volume of automated payments in the total, 2007-2024 (%). (Central bank of Armenia)**



In 2021, the indicator decreased by 1.9%, and in 2022, compared to the previous year, the change almost did not change - 35.4%. In 2023, the share of the volume of automated payments increased by 0.6% compared to the previous year, and in 2024 by 0.5%, making 36.5%.

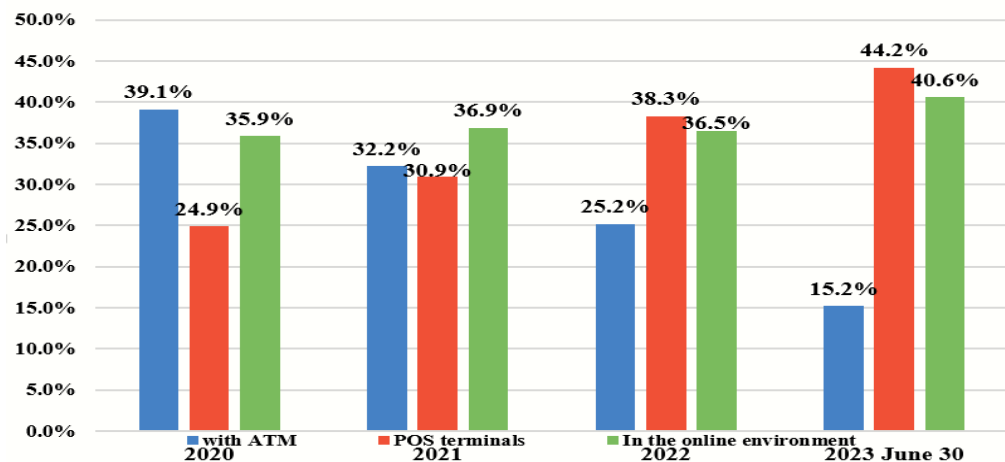
In the banking sector, cashless transactions are typically conducted via card accounts. The following analysis will focus on the volume of card transactions in Armenia, categorized by the different types of services provided.

**Figure 2. Distribution of Card Transaction Volumes by Service Type, 2020-2023 (%). (Union of Banks of Armenia. Accounts, Payment Cards, and Transfers.)**



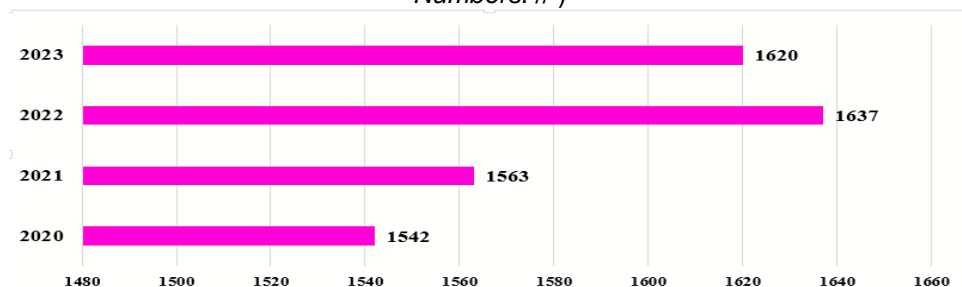
Based on the data from the Union of Banks of Armenia, it is clear that the volume of transactions conducted through ATMs decreased by 14.7% between 2020 and 2022. However, as of June 2023, there was a 1.1% increase in ATM transactions compared to the previous year. In contrast, transactions through terminals have seen a growth from 2020 to 2023. Additionally, online cashless transactions grew by 9% from 2021 to 2023. This growth trend is also evident in the number of such transactions.

**Figure 3. Percentage of card transactions by type of service, 2020-2023 (Central Bank of Armenia, Reports, 2018-2023)**



The line chart shows a 23.9 percentage point decline in ATM transactions from 2020 to 2023, while transactions via terminals grew by 19.3 percentage points. The expansion of ATMs within the Armenian banking sector is depicted in the following chart.

**Figure 4. Increase in the number of ATMs in the Armenian banking sector, 2020-2023 (units) (Union of Banks of Armenia, *The Banking System of Armenia in Numbers. II* )**



According to the line chart data, the number of ATMs showed notable fluctuations during the specified period. There was a 3.2% increase in 2022 compared to the previous year. However, in 2023, the number of ATMs fell by 17 due to technical difficulties. As information technology continues to advance, the range and development of automated service options are also evolving rapidly.

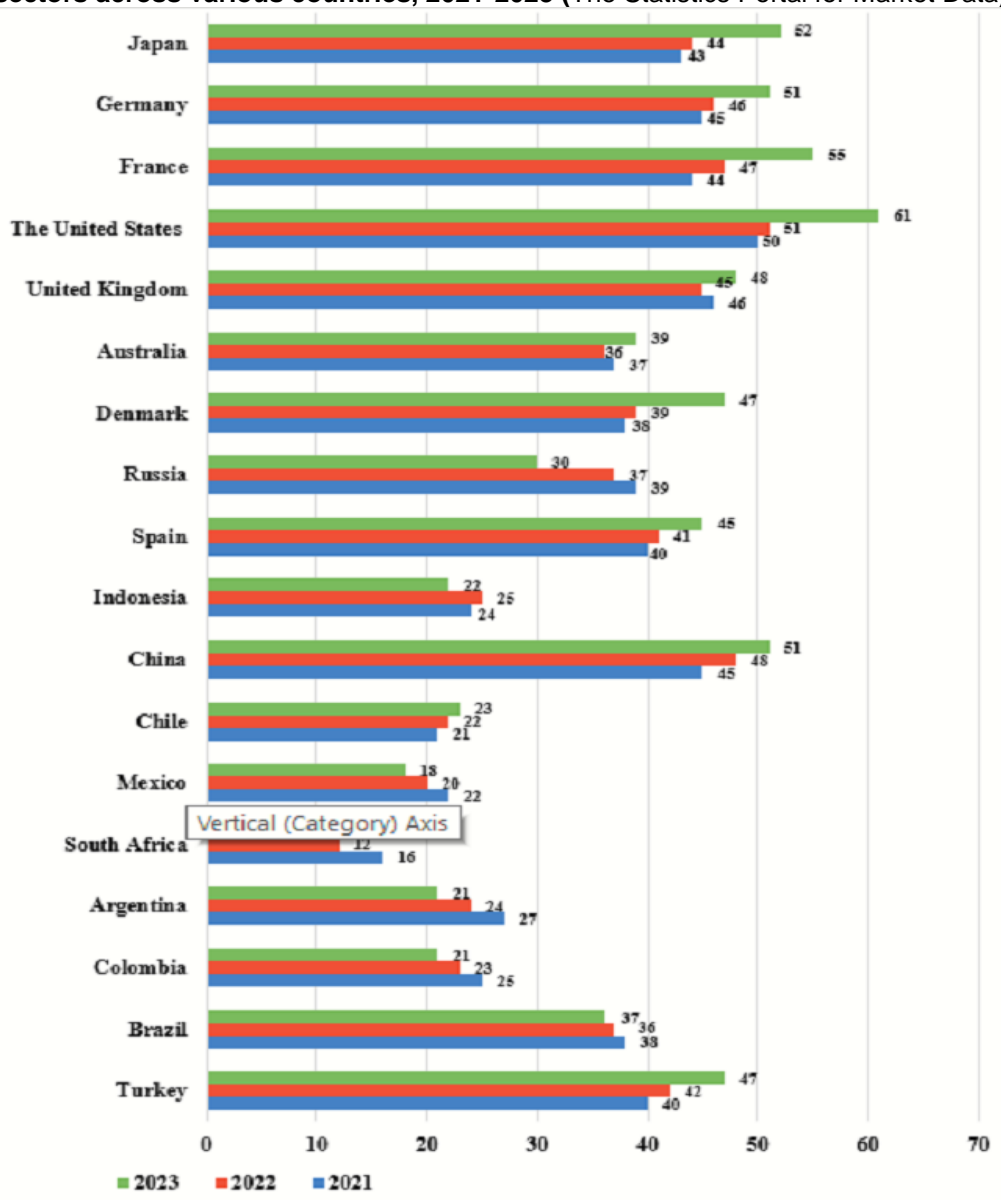
To conclude, automated financial transactions offer significant benefits. They streamline financial operations, making them more efficient and accessible at all times. Users can conduct payments securely, saving time and keeping track of receipts and payment history. This system effectively addresses the needs of today's users by enhancing the speed and convenience of payments.

Banking sectors and the services they provide vary widely from country to country, shaped by social, economic, and cultural factors. It is clear that developed nations generally exhibit a higher level of innovation in banking compared to developing countries. These disparities are driven by several key factors, such as awareness, age,

education level, and proficiency with computers and the internet. (In Skolkovo, the most innovative banks in Russia for 2022 were announced 2023).

The next chart shows the share of automated payment systems across different countries banking sectors.

**Figure 5. Percentage of automated payment systems utilization in banking sectors across various countries, 2021-2023** (The Statistics Portal for Market Data)



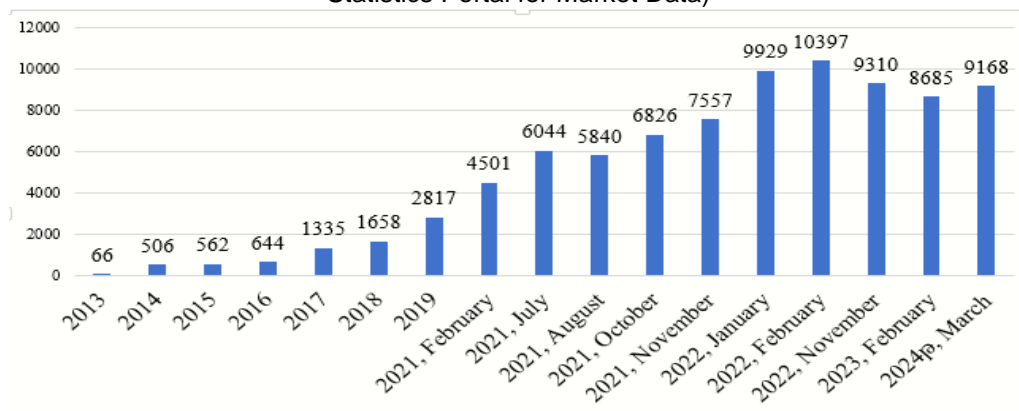
Based on the data, the United States is the leader in the adoption of automated payment systems, with rates of 51% in 2022 and 61% in 2023. China comes next, with 48% in 2022 and 51% in 2023. The lowest usage of automated payment systems is in

South Africa. Despite Argentina and South Africa having the lowest percentages, they have shown the most significant relative growth.

Within the framework of the topic, in the article we also touched on cryptocurrencies. As automated payment systems, cryptocurrencies provide a decentralized and secure way to exchange value. They eliminate middlemen, enabling fast and cheap transactions on a global basis. The use of smart contracts allows you to automate processes, which opens up new business opportunities. However, it is important to be aware of the risks associated with volatility and legal aspects. Cryptomarkets are decentralized financial platforms where cryptocurrencies and other digital assets are exchanged. Operating outside of traditional financial institutions, these marketplaces provide users with anonymous and fast transactions, making them attractive to investors and traders. Cryptocurrencies such as Bitcoin, Ethereum and many others are traded on crypto exchange platforms where participants can buy, sell and trade their assets. Today, crypto markets continue to evolve and their influence on the global economy is growing. As the financial landscape changes rapidly, it is important to be aware of both the opportunities and risks associated with this new and rapidly evolving industry.

The given chart shows the daily growing dynamics of cryptocurrencies in the world.

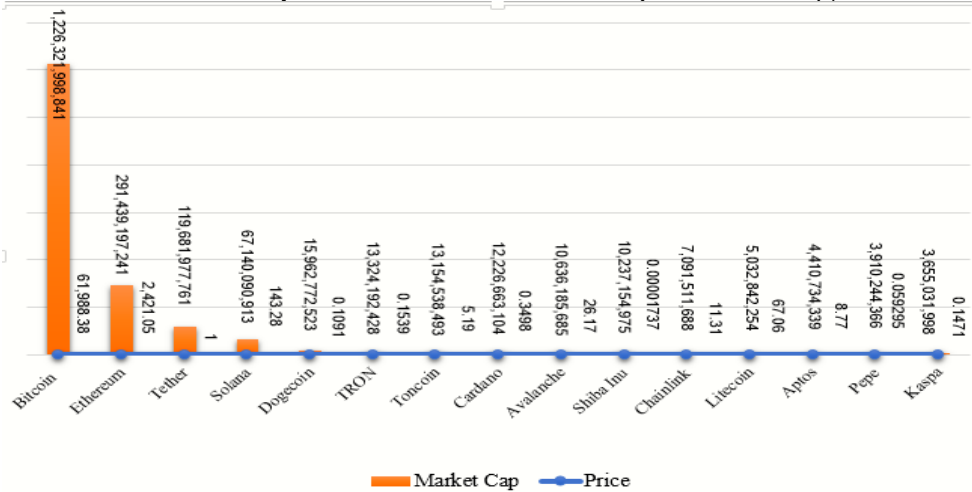
**Figure 6. Number of cryptocurrencies in the world from 2013 to March 2024 (The Statistics Portal for Market Data)**



The graph shows that from 2013 to 2017, cryptocurrencies showed slow growth, but they did grow. In 2018-2021, they increased by about 3000 per month, after which the number was 6044 in July, in August 2021, compared to July of the same year, the number decreased by 204, after which it increased from October to January 2022. In recent years, however, there has been a decrease in the number of cryptocurrencies.

The other chart shows several assets in the crypto market that are leading the way in terms of market capitalization, popularity, and usage. Bitcoin remains the largest and most popular cryptocurrency. Its wide acceptance among investors and the growing number of companies accepting it as a payment method contribute to its popularity.

**Figure 7. Cryptocurrencies with the largest market capitalization and their market prices in 2024 on October 7 (CoinMarketCap)**

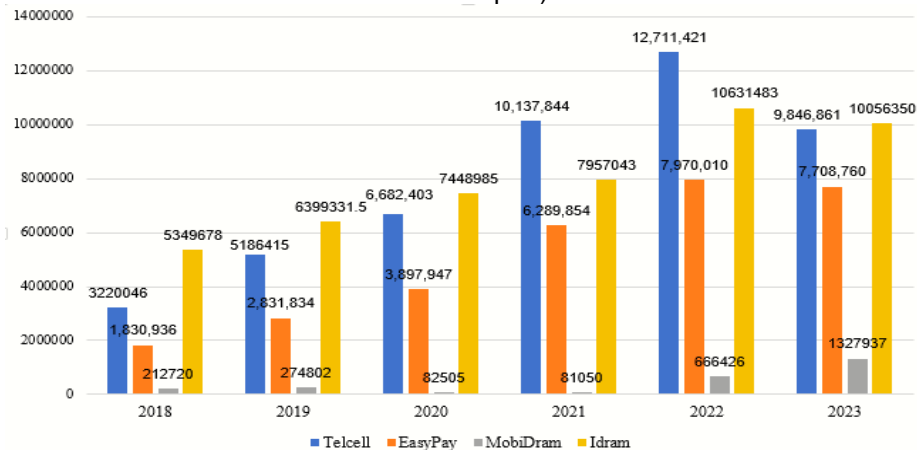


Payment wallets play an important role in the modern financial world, especially in the context of digital and cryptocurrencies. These tools allow users to securely store, send and receive money, providing convenience and accessibility.

There are several types of payment wallets: traditional bank wallets, mobile apps, online wallets, and cryptocurrency wallets. Traditional wallets are linked to bank accounts and can be used for regular transactions. Mobile apps like Apple Pay or Google Wallet offer the ability to pay with a smartphone, making it convenient for users on the go.

Online wallets like PayPal provide the ability to send and receive money online. They are often used for online shopping and offer buyer protection. Cryptocurrency wallets, in turn, are designed to work with digital currencies. They come in hot (online) and cold (offline) varieties and provide different levels of security.

**Figure 8. The income received for the services of payment settlement organizations in RA, 2018-2023, ( AMD) (TelCell, EasyPay, MobiDram, Idram annual report)**



In the chart, we can see that in 2018-2022, the leader in terms of revenue is Tell-Cell, followed by Idram, and in 2023, Idram's revenue was 10 billion 56 million 350,000 drams, which is 2.1% more than Tell-Cell's revenue compared to the previous year. who

One of the main advantages of payment wallets is their ability to simplify the payment process. Many wallets allow you to save card data, which makes transactions faster and more convenient. However, it is important to remember about safety. Choosing a secure wallet and taking precautions like two-factor authentication can greatly reduce the risk of fraud.

As a result, payment wallets are becoming an integral part of our financial lives, offering convenience, security and access to modern financial technology.

Now let's talk about electronic banking. E-banking or online banking has become an integral part of the modern financial system, providing users with the convenience of accessing banking services through the Internet. This allows customers to manage their finances anytime, anywhere, using computers or mobile devices.

The essence of electronic banking is the ability to carry out various financial transactions without the need to visit a bank branch. Users can check balances, transfer money, pay bills, order statements and even apply for loans, all in real time. These features greatly simplify financial management and save time.

One of the main advantages of electronic banking is convenience. Customers can transact 24/7, which is especially important for people with busy schedules. In addition, online banking often offers lower fees compared to traditional banking services.

Security is also a key aspect of e-banking. Banks use various technologies such as encryption and two-factor authentication to protect customer data. However, users should be vigilant and ensure the security of their accounts by avoiding suspicious links and protecting their passwords.

However, electronic banking also has its drawbacks. For example, the lack of face-to-face contact with a bank employee may be uncomfortable for some customers, especially with complex financial issues. There are also risks associated with cyber threats that can affect the security of funds.

In general, electronic banking is a modern and convenient solution for financial management that opens up new opportunities for users, but it also requires care and caution.

Within the framework of the topic of automated payment systems, we also referred to the concept of "Direct debit" in the article. Direct debit is a convenient financial tool that allows you to automate the regular payment process. It is especially popular for utilities, rent, loans, and subscriptions to various services. A direct debit payer allows his bank to withdraw a certain amount from his account within a certain period of time.

The advantages of direct debit are that it is convenient and secure. The customer does not need to worry about paying the bills on time as the debiting happens automatically. This helps avoid delays and penalties. Additionally, users can easily manage their payments by setting or changing debit amounts and dates.

Another important aspect of direct debit is security. Banks offer customer protection, allowing them to easily cancel transactions or charges in the event of a mistake. This creates an additional level of trust for users.

However, despite its many advantages, Direct debit has both advantages and disadvantages. Customers should monitor their balance to avoid situations where the



account does not have sufficient funds for a debit. It is also important to carefully review the terms of contracts with service providers to avoid unexpected charges.

Direct debit is becoming especially relevant in the modern world, where automation and simplification of financial processes play an important role. It makes life easier for many, allowing them to focus on more important matters, leaving the worries of making regular payments to the bank.

In conclusion, Direct debit is an effective and convenient tool for managing regular expenses, which offers many advantages to customers, but requires caution and attention.

### **Conclusions**

Thus, summarizing, it can be concluded that there is no legal regulation of the organization and management of automated circulation systems in RA, which makes the development prospects of the sector quite targetable. In particular, the development of the IT sector, the variety of types and services of automated payment systems need the development of universal security mechanisms of operations, which will significantly reduce possible risks, excluding the development of virtual crimes. The lack of law actually leads to an increase in the shadow economy as well. Automation of banking processes implies a large amount of investment, which is not always affordable for RA banks. In the banking sector, large banks can acquire and use modern technology, while for smaller companies this is a serious challenge. It turns out that over time, big banks can become more competitive, pushing smaller players out of the market.

One of the problems in the sector is that the transition to automated processes in the bank complicates the access to financial services for less advanced customers and the elderly. This issue is also a serious challenge in terms of attracting new customers. The situation is similar when using automated banking. Currently, the use of most of the technologies is more difficult for the consumer to access than the actual ATM software, for this reason, banks should program their online services using the simplest technologies, making the service available to customers. Basically, the use of automated payment systems should be of most interest to the elderly due to mobility and other difficulties, but this target group has not yet fully adapted to using technological services and in some cases lacks confidence.

Based on these issues, we have developed several recommendations. thus, because some groups of the RA population are difficult to adapt to the latest technologies, therefore, it negatively affects the process of rapid use of these technologies, as a result of which payments are actually less. Taking these considerations into account, we suggest that banks regularly carry out monitoring to identify two target segments of the population: the first is the segment that is actively able to use automated payment systems, for that target we suggest that banks use promotional tools to develop the ability to use automated payment systems. The second is the segment that finds it difficult to adapt to the latest services, cannot apply technological means, so it is necessary to regularly organize practical courses for that segment, thus ensuring a high level of awareness. We think that in this context, awareness is an important factor and can attract new customers, so coordinated measures should be taken in this direction, both in the form of state programs and in the form of social videos, flyers, and informative announcements initiated by private banks.

In order to combat fraud in automated innovative payment systems in Armenia, we suggest using an integrated approach. First, it is necessary to improve security

technologies by using modern methods of data encryption and introducing multi-factor authentication. This will provide an additional level of protection for users' personal data.

Modern data encryption and multi-factor authentication methods play a key role in ensuring information security and protecting users of the digital platform. Encryption is the process of converting information into an unreadable form using special algorithms, thereby protecting data privacy and preventing unauthorized access.

Data encryption protects information such as financial transactions and personal information, making it inaccessible to attackers.

Multi-factor authentication is a user authentication method that requires providing multiple forms of authentication before granting access to a system or data. This can include something the user knows, such as the password, as well as something they have, such as a mobile device, to receive a one-time code. Biometric devices such as fingerprints or facial recognition may also be used. Multi-factor authentication greatly improves security because even if an attacker has access to the password, they still have to go through additional layers of verification.

Transaction monitoring and analysis also play an important role. We propose to create special departments in universities related to machine learning systems, where students will learn mastery of security systems and detection of anomalous transactions in real time, analysis of big data, identification of fraud patterns. We also propose to conduct similar courses within the framework of bank employees and train special specialists.

We suggest banks to cooperate closely with law enforcement agencies. This cooperation will contribute to the effective fight against counterfeiting. Sharing information between financial institutions and law enforcement agencies, as well as participating in joint investigations, will help identify and arrest fraudsters more quickly.

We suggest to RA banks and organizations using automated payment systems (I-Dram, Tell-Cell, etc.) to introduce blockchain technologies, which will allow to assess the level of protection and ensure compliance with the established requirements. In addition, the implementation of blockchain technologies will increase the transparency of transactions and reduce the risks of fraud.

First, the integration of blockchain technologies will significantly improve the security of transactions. By decentralizing data storage, blockchain reduces the risks of fraud and unauthorized access. This will create an additional level of trust for users.

Second, blockchain allows for transparency of all operations. Every transaction is recorded on the blockchain, making it verifiable and eliminating the possibility of data manipulation. This is particularly important to ensure compliance with regulatory requirements.

The technology also helps reduce transaction processing times, especially international ones, by eliminating the need for middlemen. This not only speeds up processes, but also reduces transaction costs, which is an important factor for banks and their customers.

Banks should invest in employee training and infrastructure development for blockchain integration, and consider partnering with fintech companies that already have expertise in this technology. This will speed up the implementation process and maximize the benefits of blockchain.

We propose to create ecosystems in this area. An ecosystem, in the context of business and technology, is a network of interconnected participants working together to achieve a common goal. In the field of financial technology and automated payment systems, it includes various elements such as service providers, users, developers, regulators and partners. Service providers, including banks and clearinghouses,

communicate with both natural and legal entity users who use payment systems for their transactions. Developers create applications and technologies that integrate with these systems, while regulators set rules and standards that protect users and ensure secure transactions. Ecosystem partners such as e-commerce platforms drive the adoption and use of payment technologies.

Creating an effective ecosystem in Armenia will improve interaction between all participants, promote innovation and ensure sustainable development. It will also help Armenia's financial institutions adapt to market changes and respond to challenges such as counterfeiting and changing consumer preferences. The formation of such an ecosystem in Armenia may include the development of local standards, user training, support for fintech startups, and active cooperation with international players to share experience and technology.

The joint implementation of all these measures will significantly increase the level of user protection and reduce the likelihood of fraudulent operations in payment systems.

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**ԱՎՏՈՄԱՏԱԶՎԱԾ ՆՈՐԱՐԱՐԱԿԱՆ ՎՃԱՐԱՅԻՆ ՀԱՄԱԿԱՐԳԵՐԻ  
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**ԻՆԵՍԱ ՆՈՒՇԻԿՅԱՆ**

*Հայաստանի պետական տնտեսագիտական համալսարանի  
ֆինանսական ֆակուլտետի բանկային գործի և  
ապահովագրության ամբիոնի հայցորդ,  
«Ամերիաբանկ» ՓԲԸ-ի գործադիր տնօրինության գրասենյակի  
փաստաթղթաշրջանառության կառավարման մասնագետ,  
ք.Երևան, Հայաստանի Հանրապետություն*

Հոդվածի հիմնական նպատակն է ուսումնասիրել ավտոմատացված վճարային համակարգերի հիմնական տեսակները, դրանց կիրառումը, կատարվող գործարքները և հետագա զարգացման փուլերը բանկային հատվածում:

Նպատակին հասնելու համար մեր առջև դրվեցին հետևյալ խնդիրները՝ ուսումնասիրել բանկում ավտոմատացված գործընթացների իրականացման գործընթացը, հասկանալ հիմնական թիրախային խմբերը և դրանք հաշվի առնելով՝ մշակել միջոցներ ավտոմատացված վճարային համակարգերի օգտագործման հնարավորություններն ընդլայնելու համար:

Ավտոմատացված վճարային համակարգերի հիմնական տեսակների և բանկային համակարգում դրանց դերի ուսումնասիրության համար կիրառվել են ներքոբերյալ ուսումնասիրության մեթոդները՝ դեդուկցիա, ինդուկցիա, վերլուծություն և գրաֆիկական:

Հետազոտության հիմնական եզրահանգումն այն է, որ հիմք ընդունելով արտաքին միջավայրի բազմաբևեռ բնույթն ու բարձր մրցակցությունը՝ կարծում ենք՝ բանկերը պետք է մշտադիտարկեն բանկային ծառայությունների ոլորտում փոփոխությունները, օգտագործեն ավտոմատացված գործիքները, ինչը կարող է իր նպաստը բերել բանկային համակարգի արդյունավետ ու կայուն զարգացմանը: Ավտոմատացված վճարային համակարգերի կայուն զարգացումը ժամանակի ընթացքում կարող է նպաստել տնտեսական կայունությանը, բարձրացնել հաճախորդների մեղիագրագիտությունն ու ֆինանսատնտեսական կարողունակության մակարդակը: Այս կերպ հեռանկարներ են ուրվագծվում բանկային ռեսուրսի արդիականացման համար, ինչը կարող է հավելյալ ֆինանսական միջոցների ներգրավման համար հիմք դառնալ:

**Հիմնաբառեր՝** ավտոմատացում, նորարարություն, բանկային համակարգ, վճարային համակարգ, քարտային գործարքներ, բանկումատ, գործարք:

## **ОСНОВНЫЕ ВИДЫ АВТОМАТИЗИРОВАННЫХ ИННОВАЦИОННЫХ ПЛАТЕЖНЫХ СИСТЕМ И ИХ РОЛЬ В БАНКОВСКОЙ СИСТЕМЕ**

**ИНЕСА НУШИКЯН**

*соискатель кафедры банковского дела и страхования  
финансового факультета  
Армянского Государственного экономического университета,  
специалист службы управления документооборотом  
Исполнительного офиса ЗАО «Америабанк»,  
г. Ереван, Республика Армения*

Основная цель статьи – исследование основных типов автоматизированных платежных систем, их применения, операций и дальнейших этапов развития в банковской сфере.

Для достижения цели перед нами были поставлены следующие задачи: изучить процесс внедрения автоматизированных процессов в банке, выделить основные целевые группы и на основе этого разработать меры по расширению возможностей использования автоматизированных платежных систем.

Для изучения основных типов автоматизированных платежных систем и их роли в банковской системе были использованы следующие методы исследования: метод дедукции, метод индукции, метод анализа и литературный метод.

Основной вывод исследования заключается в том, что, исходя из многополярности внешней среды и высокой конкуренции, мы считаем, что банки должны постоянно отслеживать изменения в сфере банковских услуг, использовать автоматизированные инструменты, которые могут способствовать эффективному и устойчивому развитию экономики. Устойчивое развитие автоматизированных платежных систем с течением времени может способствовать экономической стабильности, повышению медиаграмотности клиентов и уровня их финансовых и экономических возможностей. Таким образом, намечаются перспективы модернизации банковских ресурсов, которые могут послужить основой для привлечения дополнительных финансовых ресурсов.

**Ключевые слова:** *автоматизация, инновации, банковская система, платежная система, карточные операции, банкомат, транзакция.*