

Features and development directions of non-cash transactions via electronic payment systems in information economy

Akif F. Musayev¹, Alovzat G. Aliyev², Elza H. Musayeva³

¹Doctor of Economics, Professor, Correspondent members of ANAS (Azerbaijan National Academy of Sciences)

²Head of department of the Institute of Information Technology of ANAS, Ph.D. in economics, as. professor

³Senior scientist of Institute of Information Technology of ANAS

¹ Azerbaijan National Academy of Sciences, Baku, Azerbaijan

^{2,3}Institute of Information Technology of ANAS, Baku, AZ1141, Azerbaijan

¹akif.musayev@gmail.com, ²alovzat_qaraca@mail.ru, ³depart8@iit.ab.az

Abstract: The paper substantiates the relevance of non-cash payments and transactions in the formation of the modern information economy. The main objective of the non-cash payments is explained and the impact of psychological factors is analyzed. Modern electronic payment systems are classified, and requirements to them are shown. The process of improving payment systems through POS terminals and the foreign experience in this process are analyzed. A number of proposals and recommendations are put forward basing on a real statistics as the result of the analysis of non-cash transactions in Azerbaijan.

[Akif F. Musayev, Alovzat G. Aliyev, Elza H. Musayeva. **Features and development directions of non-cash transactions via electronic payment systems in information economy.** *J Am Sci* 2014;10(11):49-54]. (ISSN: 1545-1003). <http://www.jofamericanscience.org>. 7

Keywords: electronic payment systems, non-cash payments, non-cash transactions, POS terminals, ATM, payment cards, Internet banking.

1. Introduction

In accordance with the development trends of emerging knowledge-based economy in the world, the modern and dynamical development strategy of the economy of Azerbaijan is based on the national development model determined by the national leader Heydar Aliyev. The source of this strategy is based on socio-economic policy of new content, which is implemented by the follower of the political and statehood legacy of the great leader, the President Ilham Aliyev. This policy has recently led to the division of the economy, to the rapid growth rate of the non-oil sector on its structure, to the development of high-tech industries, to the enhancing of international ratings of the national economy, and ultimately, to the inclusion of the country into the group of countries with middle-income.

Knowledge and information is a source of the development of ICT at the present stage, while an important component of economic strategy is monetary and fiscal policy, main directions of which is aimed at ensuring macroeconomic stability, stability in the banking sector, and deepening financial intermediation. To achieve these goals, monetary policy and banking supervision is improved continuously, as well as the further development of the coordination of macroeconomic policy is supported, and most importantly, comprehensive measures are taken to increase the circulation of non-cash money [1].

As a result of the recent globalization of the national economy and the development of ICT, the volume of non-cash payments has increased significantly, which are carried out in domestic and international financial transactions through various types of plastic cards, the Internet and other electronic payment systems. Despite extensive reforms and achievements in the context of the formation of information society and information economy, a number of problems still remain in an efficient and absolute use of infrastructure opportunities and the capacity, technological integration of the related organizations into electronic payment systems, as well as providing access to electronic financial services in the regions.

The analysis the money circulation in the country shows, that the number of cash transactions is significantly higher than of non-cash transactions. An increase in the share of non-cash amount in general amount, on one hand, is substantiated with the urgency of new management of the economy and its monitoring, on the other hand, with the expansion of transparency in taxing and economic relations.

2. The foremost function of non-cash payments

The foremost functions of the activities carried out in connection with the expansion of non-cash payments in the country, include the transition of the economy to the new stage of quality, achieving transparency within the entities of the economic system, restricting the volume of the “shadow economy”, which can not be observed, minimizing the

tax evasion. At present, non-controlled economic transactions, on one hand, lead to the reduction in tax revenues in the state budget, on the other hand, to the reduction of effectiveness of the economic regulation methods by the state through economic mechanisms [2].

3. Psychological factors of non-cash payments

The world economical history proves that the economic theories based on human psychology have been long-lasting and have led to effective results. Human is both producer, and a consumer of the economy. It is this dualism, i.e. a dual approach has been widely applied recently. It is the basic paradigm of the human development concept [3].

The role of psychological factors in the increased volume of non-cash transactions in an interaction between cash and non-cash circulation is very important in many cases. Observations and analysis show that the limitation of cash transactions by the influence of psychological and mentality factors and increase of the volume of non-cash transactions is more effective than other means (administrative penalties, rough restrictions, etc.).

Growth rate of income of the people differs from the growth rate of expenditures. Household economies are raising their own consumption with the growth of incomes; however they do not increase an income volume adequately, but with an increase tendency of savings.

Economic and psychological situation that occurs in the community, seems to increase their own consumption with the growth of the revenues, nevertheless the volume of this increase differs [4]. The more income is rising, the more people tend to reduce personal consumption level, although the shares of obvious and non-obvious deposits are increased. But at the same time, it should be noted, that an economic growth and consequently, the growth of people's income, satisfaction of requirements (food and non-food) which play a key role emerged some psychological stereotypes. Families tend to compare their income with the income (higher income) of other ones. However, the amount of cash money of the population comes into the circulation in partly better cases. In worst cases, it gets out of circulation becoming a reserve. For example, as of July 1, 2013, the balance of bank deposits amounted to 5922.2 million AZN, and increased by 35.4 percent compared to the same period of the previous year. 3583.8 million AZN or 60.5 percent of deposits was invested in national currency, and 2338.4 million AZN in foreign, and they were by 23.6 percent and 44.5 percent respectively compared to the previous year. Such rapid growth of deposits of population is due to the rising living standards. On the other hand, the people

do not take the risk of directing these deposits to other investment projects. One of the reasons to this is associated with lagging the securities market from the requirements of financial market, and high interest rate of the deposits.

4. Classification and requirements of modern electronic payment systems

According to defined rules the payment system includes financial institutions realizing financial transactions between economic entities using a full set of methods and tools (bank and telecommunication transfer systems, technical equipment, payment tools, etc.). All of the elements of financial institutions are participating in the payment system. These institutions has certain organizational and management mechanisms ensuring stability and further development of the economic and social system.

The payment systems is a set of internal and external regulations, technical component elements, payment methods, technology, organization, and the rules, which enable all participants to realize financial operations and transactions with each other (Figure 1).

Electronic technology-based payment systems must comply with the following requirements:

- confidentiality. Only legally relevant and allowed persons are informed about financial information;
- ensuring the integrity of information;
- authentication – confirmation of identity of the system user;
- authorization - confirmation of the transaction availability;
- security;
- supporting a wide range of payment tools;
- reducing transaction costs and expenditures;
- verification and confirmation of the information accuracy about the payments to the participants of external arbitration and audit process during any conflict, etc [5].

Payment mechanisms are divided into three main groups depending on payment systems: 1)Internet payments; 2)mobile payments; 3)e-money payments.

Classification of payment systems. Modern methods of electronic payment are divided into traditional and innovative methods. Traditional payment methods include traditional payment tools (credit cards, credit transfers, etc.) that contribute to the payment exchange through traditional means of payment (deposit money) for the transfer of payment information in electronic form. Innovative methods use the following payment means [6]: 1)new payment tools (payment portal service, cell phones, etc.) that contribute to the payment exchange through traditional means of payment (deposit money) for the transfer of payment information in electronic form. 2) new means of payment (e-money). The first group of

the innovative payment method is based on bank deposits. The main common innovation of these methods is the use of web-sites and e-mail for the communication between payment providers and consumers.

The second group of innovative payment methods is based on new means of payment, i.e. electronic money. Electronic money represents the value of the money presented in accordance with the relevant requirements, stored in the specific device in electronic form, and used for the payment to the third party. Deposit money, that is transaction or cash stored in current accounts of credit institutions act both in traditional, and new means of payment methods. However, the use of e-money as a new means of payment is the most important recent innovation.

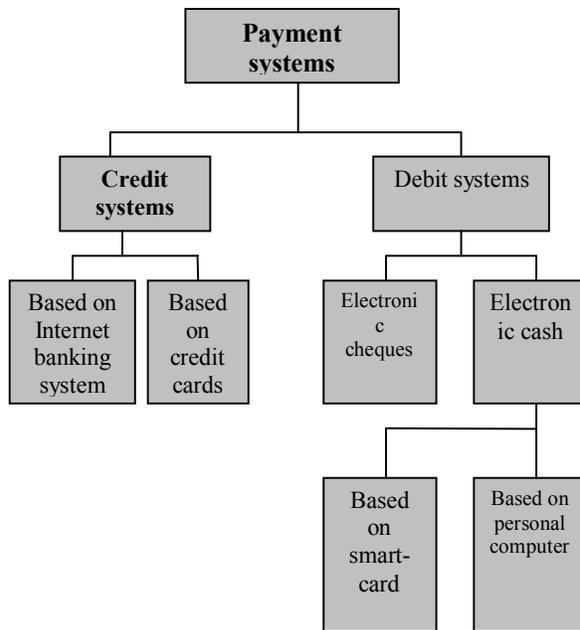


Fig.1. Elements of payment systems

The most important factors for the development of new payment methods include functional abilities such as security, reliability, low transaction costs, anonymity, and so on. An extensive and intensive use of these methods is significantly dependent on these factors.

5. Improving modern electronic payment services through POS-terminals

The development of financial market, extended opportunities of investment in the economy, formation of unite e-payment space and improvement of modern e-payment services in regard with limited cash circulation, non-cash payment stimulation and so on are of great importance [8]. These measures contribute to strengthening financial discipline in enterprises,

improvement of transparency in the corporate sector, including the elimination of tax evasion.

Development of national payment system has led to the formation of a new service area. Thus, application of POS-terminals is the source of additional revenue of banking institutions. Banks receive appropriate service fees from enterprises for the use of POS-terminal and for the operations carried out through POS-terminals. This service is called acquiring in the international sphere. Thus, the entities are charged monthly fixed fee for the transactions carried out via POS-terminals, the monthly volume of which is 1,000 AZN per month averagely. The monthly service fee is about 50 AZN. The monthly transaction service fee of the entities of more than 1,000 AZN is 1-3 percent. Purchase and installation of POS-terminals, as well as communication services for equipments are covered by the bank service.

Note that the highest rate of tariffs reduces direct use of POS-terminals. Consequently, sellers do not tend to influence consumers to take advantage from plastic card payment, and ultimately it leads to the application of cash payment. The high rate of service tariffs can be regarded as one of the main factors preventing the expansion of non-cash payments [7].

6. International practices on the use of POS-terminals

In Russia, acquiring amount required from the entity for the bank card payment via the same bank POS-terminal is 1-1.5 percent, acquiring amount for the card payment via other bank POS-terminal is 2 percent. These service fees are 0,5-2 and 1.5-3 percent accordingly in Kazakhstan. In Moldova, the service fee for POS-terminal transactions carried out by local banks is 1.8 percent, but by the foreign banks is 2.8 percent.

For comparison, note that in Ukraine acquiring amount required from the entity for the bank card payment via the same bank POS-terminal is 1-2 percent, acquiring amount for the card payment via other bank POS-terminal is 2-2,8 percent.

In Turkey, the situation is slightly different. Low tariffs are applied relatively for business entities in this country. So, this service fee 1,25-1,4 percent for the transaction conducted by the bank card, which installed POS-terminals, 1,7-1,85 percent for the transaction conducted by the other local bank cards, 1-1,7 percent for foreign cards. In Bulgaria, the citizens of the country are charged 0.7 percent for the card payment through POS-terminal, but juridical persons pay relatively more (1.7 percent).

Obviously, comparing to CIS member states, the rate of tariffs for POS-terminal transactions is low in other countries (Turkey, Bulgaria), which provides reduction of the bank costs of economic entities and increases their financial capacity.

7. Analysis of non-cash transactions in Azerbaijan

So far, the number of plastic cards used in electronic systems of Azerbaijan reached 5301 thousand by June 2013. 4665 thousand out of them are debit cards, while 636 thousand are credit cards [9]. Many transactions are carried out through these cards.

To analyze the characteristics of cash and non-cash payments, first of all, the structure and properties of plastic cards in circulation are of great interest (Table 1). (The Central Bank data are referred in this and subsequent tables).

Table 1. The structure and statistics of payment cards in turnover

Year	The total number of payment cards	In comparison with the total number of payment cards (in %)				Transactions via debit and credit cards	
		Debit cards			Credit cards	Quantity, thousand transactions	Volume mln. AZN
		Social cards	Salary cards	Others			
2010	49304	58,10%	29,62%	9,18%	3,10%	46502	6056
2011	52933	56,18%	29,56%	10,86%	3,39%	50953	7230
2012	57905	52,88%	28,07%	12,85%	5,68%	57169	8826
2013 (10 months)	52634	47,67%	26,24%	14,15%	11,94%	54604	8224

According to the Table 1, most of plastic card payments are carried out by social and salary cards. Thus, these transactions amount 70% of all transactions. Another result obtained from the table is the increased number of transactions carried out via debit cards and credit cards. Thus, credit card transactions were equal to 3 %, to 5.6% in 2012, and more than 11% in 2013. This rapid growth in early

2013 occurred as the result of the closure of credit services in the retail trade points, and due to mass distribution of small amount of cards.

Another point is the form of transactions with payment cards. In other words, the purpose of the user is either cash withdrawal or non-cash payments. It is determined by the indicators presented in Table 2:

Table 2 Structure of common Card Payment transactions

Year	The share of the domestic transactions in total transactions (in %)								The share of the total transactions abroad in the total transactions		
	Cash withdrawal				Non-cash payments						
	Via ATM		Via POS-terminal		Via ATM		Via POS-terminal		Volume	Quantity	Volume
	Quantity	Volume	Quantity	Volume	Quantity	Volume	Quantity	Volume			
2010	91,97%	87,24%	0,95%	4,21%	2,02%	1,17%	1,21%	1,29%	3,84%	6,09%	
2011	89,12%	86,63%	0,64%	3,90%	2,19%	1,73%	2,96%	1,45%	5,08%	6,29%	
2012	84,17%	84,50%	0,61%	4,78%	1,19%	1,94%	7,56%	2,02%	6,47%	6,76%	
2013 (10 months)	76,01%	81,54%	0,49%	5,67%	0,94%	1,91%	15,27%	3,64%	7,30%	7,25%	
Year	The share of debit card transactions in the total transactions (in%):				The share of the total transactions in domestic transactions with debit cards (in%)						
	Via ATM		Via POS-terminal		Via ATM		Via POS-terminal		Quantity	Volume	
	Quantity	Volume	Quantity	Volume	Quantity	Volume	Quantity	Volume			
2010	95,09%	89,66%	96,73%	94,53%	1,82%	0,44%					
2011	94,52%	89,31%	94,42%	94,38%	3,04%	0,46%					
2012	92,67%	87,93%	89,37%	92,90%	7,16%	0,71%					
2013 (6 months)	85,44%	83,60%	78,22%	91,14%	10,85%	0,94%					

According to the indicators of domestic card payment over the past few years, we can conclude, that though the share of cash withdrawal payment cards in all transactions declined, it still dominates. Thus, cash withdrawal was 93% in 2010, and 76.5 % in 2013. At the same time, the share of non-cash transactions declined in all ATM transactions. This is due to the increase of Internet payment via credit cards. Overall, the share of non-cash transactions in the total number of transactions increased from 1 % to 15%, while its volume increased from 1.2 % to 3.6%.

Indicators of the use of debit payment cards in the country are shown in Table 3:

Table 3: Indicators of debit cards transactions

Abovementioned information shows, that the vast majority of non-cash payment transactions carried out both in the country, and abroad is performed through debit cards.

According to the indicators of the past four years, the total number of non-cash transactions with debit cards and ATMs in the country declined, however the average monthly percentage of the transactions carried out via POS-terminals across the country in the past two years in number and volume respectively: increased from 3.04 % to 10.85 % and from 0.46 % to 0.94 %.

In recent years, the rapid development of the banking sector, and facilitating conditions of the

loans, and other factors increased the use of credit cards [10,11]. However, it can not be considered the best result. Thus, the least part of the credit card

transactions are carried out through payment cards in the country (Table 4).

Table 4. Indicators of credit card transactions

Year	The share of credit card transactions in the total transactions (in%):		The share of domestic transactions with debit cards in the total transactions (in%)			
	Quantity	Volume	Via ATM		Via POS-terminal	
			Quantity	Volume	Quantity	Volume
2010	4,92%	10,34%	40,90%	34,98%	8,97%	21,88%
2011	5,54%	10,69%	37,25%	38,03%	12,64%	22,12%
2012	7,33%	12,09%	34,61%	39,46%	20,94%	20,90%
2013 (6 months)	14,56%	16,40%	31,62%	44,26%	44,56%	24,02%

Table 4 presents the overall operations with payment cards, as well as the indicators of the use of credit cards for domestic transactions. In the background of the total transactions with payment cards, as opposed to debit card transactions, the rising rate of credit card transactions are observed. This growth appears especially in domestic POS-terminal operations more clearly. However, it should be noted that though sharp increase in the number of transactions carried out through POS-terminals is observed, but in terms of volume, this growth is not high compared to previous years. Let's compare, the number of domestic operations carried out with credit

cards through POS-terminals amounts 8.97 % of total payment card transactions in 2010, and 44.26 % in 2013. Although these figures show the growth rate, the indicators on the volume of transactions are 21.88 % and 24.02 % respectively, do not show this growth to be effective. In other words, the number of transactions increased, although there is a decline in the amount of the payments [12,13,14].

Various electronic payment systems (ATM, POS-terminal) which became requirements of the modern era, are to key factors that accelerate and facilitate the implementation of non-cash payments. Table 5 shows an effective use of the systems.

Table 5. Indicators of ATM and POS-terminal use

Year	Average monthly indicator of transactions per ATM a year		Average monthly volume of transactions per ATM a year (in AZN)	Average monthly indicator of transactions per POS a year		Average monthly volume of transactions per POS a year (in AZN) (POS in commerce and service)
	Quantity, transaction	Volume, AZN		Quantity, transaction (POS in commerce and service)	Volume, AZN POS in commerce and service)	
2010	2 029	248 293	122	6	802	134
2011	1 941	266 079	137	13	949	72
2012	1 843	288 121	156	13	536	42
2013	1 784	290 600	163	24	854	35

The table shows that there is an inconsistency between the number and the volume of operations carried out via ATMs and POS-terminals. Thus, the average monthly indicators of ATM usage have declined over the years, in contrast to the increased volume of transactions [15-19]. Though, the average monthly rate of POS-terminals' usage increased, it almost do not affected the volume of transactions. Obviously, the number and partial volume of POS-terminal payments increased; however, generally it is still lower than the volume and number of ATM transactions. It characterizes the break of the multiplier chain at a certain stage.

8. Conclusions and Recommendations

Increasing the volume of domestic non-cash payment, developing card payment market, widening the scope of card payments for purchase transactions are of great importance for the country. Increasing the role of Azerbaijan in the modern globalized world, ranking 39th among 148 countries at many

international ratings, including the Global Competitiveness Index, Azerbaijan raised its image in the international world. Restricting cash payments and stimulating non-cash transactions may cause further progress of Azerbaijan in this area, strengthening its position in the international economic relations.

The government takes the necessary measures to improve the citizens' access to electronic payment systems, to ensure efficient use of electronic payment systems, to expand institutional framework significantly. Taking into account socio-economic factors, the following implementations shall be carried out to increase the efficiency of these measures:

- The proposals for the stimulation of non-cash transactions and restriction of cash transactions will cause tangible results;
- Lowering card payment tariffs by the banks will increase the volume of non-cash transactions via POS-terminals conducted by the economic entities;

- Taking informative and awareness measures on the role of society in non-cash transactions will increase an interest in this field;

- In the context of the emerging Information Society and Economy, an expansion of E-commerce application, emergence of new non-traditional area, i.e. e-economy, an increase of purchase of electronic products in overall consumer market will expand the base for non-cash payments;

- Expanding POS-terminals and ATM use and coverage will improve non-cash payment opportunities, and cause savings of financial resources and transparency.

Lowering the tariffs will lead to an increase in the volume of non-cash transactions, and consequently, it will create favorable conditions for the banks to receive additional funds. Due to addition financial resources and bringing down the tariffs, the banks will not only compensate the loss of funds, but also be able to obtain the additional revenue generated from loan funds. When implementing these measures, the national mentality should be taken into account, and the psychological factors in this field should be studied. Instructions on the use and significance of POS-terminals, advantages of non-cash payments with plastic cards, negative cases that may arise from cash payment, the role of citizens in non-cash payments and other issues should be delivered to the public regularly. No doubt, these measures will lead to qualitatively new results.

In general, the status of the field of non-cash payments dose not coincide with the rate of economic development of the country, large-scale reforms, the goals and objectives of the development concept adopted by the president “Azerbaijan 2020: Vision to the Future”. In the globalized world economy, where non-cash transactions are dominating, the high rate of cash transactions in Azerbaijan proves to take imperative steps in this direction. The complex measures should be taken as soon as possible, in order to achieve transparency in the economic system, and the reduction of the “shadow” economy, and the strengthening of the financial system, as well.

Corresponding Author:

Ph.D. in economics, as. professor

Alovsat G. Aliyev

Institute of Information Technology ANAS, Baku, AZ1141, Azerbaijan

E-mail: alovsat_qaraca@mail.ru

References

1. “Azerbaijan – 2020: A Look to the future” The Concept of Development. Baku, Dec. 29, 2012. <http://www.president.az>.

2. Alan Greenspan. The Age of Turbulence. Problems and prospects of the global financial system. 3rd edition, Moscow. Publisher Skolkovo 2010, 518 pp.
3. Sharma, G.; Dept. of CSE, Inst. of Tech. & Manage., Gwalior, India; Mathur, M.; Mathur, K. Physical Security Aspects of E-Cash. Published in: Communication Systems and Network Technologies (CSNT), 2014 Fourth International Conference. 7-9 April 2014. Page(s):772 – 775.
4. Central Bank of the Republic of Azerbaijan. <http://www.cbar.az>.
5. A.G.Aliyev. Problems of information society and economy. Baku, "Elm", 2003, 460 p.
6. David Romer. Advanced Macroeconomics Second Edition. 2001. 651 pp.
7. Zhang Hui-min; Coll. of Manage., Henan Univ. of Technol., Zhengzhou, China. The study on the influential factors of electronic payment system adoption. Published in: Management Science and Engineering, 2009. ICMSE 2009. International Conference. 14-16 Sept. 2009. Page(s):106–111.
8. Dr. Tanai Khiaonarong, Dr. Jonathan Liebenau. The Diffusion of Payment Innovations Banking on Innovation. Contributions to Economics 2009, pp 101-116. 18 Apr 2009.
9. R.M.Algulyev, A.G.Aliyev. Analysis of ICT-oriented innovative processes in transition to knowledge-based economy. ANAS News. Science and Innovation Series. 2010, № 1 p.13-20.
10. R.M.Algulyev, A.G.Aliyev. E-commerce systems - as one of the main tools of the new economy based on high technology. NASA News. "Economic Science" series. Baku, 2010.
11. V.Myashin. Azerbaijan's banking sector: the growth rate of capitalization. J. "Place", №3 (133) '2008. www.plusworld.ru.
12. D.A. Kochergin. Metody payment on the Internet: Classification and economic features. J. Problems of the modern economy, №1(13), 2005.
13. A.G. Aliev. Theoretical and applied aspects of information humanitarian sectors. Baku, "Elm", 2006.
14. N.V. Baydukova. Organization of payment systems from the perspective of institutional. J. Problems of the modern economy, №1 (13), 2005.
15. G.A. Nabiullina, A.G. Komarov. The main issues and trends of development of electronic payment systems. J. Problems of the modern economy, № 3 (19), 2006, <http://www.m-economy.ru>.
16. I.S. Sirotin. Electronic money as a factor of economic development. J. Problems with modern economics. Number 3 (19), 2006.
17. V.Yu. Kopytin. New trends in the development of retail payment services. J. Calculations and operational work in a commercial bank. №1 (95), 2010. <http://www.gradient-alpha.ru>.
18. Dr.Tanai. Khiaonarong, Dr.Jonathan. Liebenau. Strategic Approaches to Payment Efficiency and Innovation. Banking on Innovation. Contributions to Economics 2009, pp 29-53.
19. Qidong Wang, Jun Zhu. Study on the Electronic Payment Technology in E-Commerce. Proceedings of the 2nd International Conference on Green Communications and Networks 2012 (GCN 2012): Volume 4 Lecture Notes in Electrical Engineering Volume 226, 2013, pp 95-100.

10/15/2014