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DECLINE OR DEVELOPMENT OF THE ATM SERVICES AND THEIR SOCIAL ACCEPTABILITY

Summary

The paper is focused on the still growing market of ATM devices and presents the growth of this market against the background of rapidly developing risks associated with electronic banking services. The paper also lists changes related to the progress in this particular channel of contact and presents alternative forms of communication between a bank and its clients. The paper also highlights the efforts undertaken by the banking sector towards reducing the presence of cash in the financial turnover and lowering the costs of cash transactions due to development of high-tech ATM devices. A growing number of available services, crucial for the ATM functionality and the level of ATMs social acceptability, however multiply the number of risks accompanying this process. Understanding various attack vectors and crimes is crucial to win the race with digital criminals and reduce the number of thefts. The paper quotes data obtained from the Polish National Bank, the Polish Banks Association and EAST.

Key words: ATM, e-banking, terminal banking, electronic money

Introduction

The style of communication between market participants has transformed significantly in recent years due to IT technologies growth, wide range of services promoted by e.g. banking sector and social acceptability of e-payment devices and services. The processes using convergence of teleinformation technologies and electronic media systems started to dominate and became significant attributes of the new economic reality.

ATM devices are a kind of showcase of modern electronic banking devices and growing number of banking services with a long history starting in the 1950s. Having still strong social impact that changed the

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way of life and allowed to reduce costs of payment, ATMs seem to be an integral part of modern banking. The paper concentrates on changes on the market of ATMs which are a vital channel of contact between a bank and its clients; it also discusses the situation on the Polish market and enumerates changes that have taken place due to the introduction of EMV standard. The author uses his own research as well as literature sources.

1. Services in electronic banking channel

The list of services offered by banks in the electronic (teleinformation) channel is a subject of constant development. The extension of the list is being powered by accessibility of new technologies and demands coming from the public. One of many divisions of the electronic services sector is, as follows:

- client sector (individual clients, business clients, corporate clients),
- degree of service complexity (operation of money transfer on linked accounts, presentation of information on accounts, bond and share trading, applying for loans and mortgages),
- functionality (creation and modification of standing orders; creation, modification and display of information on bank deposits; management of access to the account – automatic or Internet service).

Taking into account the range of services and degree of its integration with the electronic banking system, the e-services may be divided into:

- *passive services* – allowing the access to information related to accounts, deposits, loans and operations on the account,
- *limited active services* – allowing the access to information on passive level but with the possibility of making previously defined payments,
- *fully active services* – allowing the access to all functions of electronic banking.

Regardless of the way of e-service classification, the application of advanced ICT technologies offers a number of benefits:

- *time saving/money saving* – thanks to radical reduction of costs of a single transaction (hence lower charges) resulting from automation of processes and possibility to deliver quick service to a large number of customers without them having to actually visit the bank in person,

- *wider geographical range - borderless bank* – orders for transactions can be made from any place on the planet;
- *customizing the offer* – thanks to collecting information about clients' preferences, for example the kind and range of services they use, allows the bank to prepare tailor-made portfolio of services for each individual client,
- *increased surveillance and availability of services* – nowadays banks may conduct customer service activities 24 hours a day/ 7 days a week maintaining full control over the flow of money on customers' accounts.

In the past, the strength of a bank was determined by the number of branches, outlets or distance to existing or potential customers; but thanks to development of electronic banking, the bank entered the private space of its customers and one of the important channels of contact between a bank and customers has become an ATM.

2. ATMs still popular

The first Automatic Teller Machine (ATM) was introduced almost 50 years ago¹ and since that time it has evolved from a simple cash dispenser to a multifunctional device with inbuilt advanced functions of identity check. Now it is no longer treated as just a relief for bank personnel, it has become a flagship of a contemporary bank, a front desk facility for the customer, a source of income, a winner of competitive advantage.

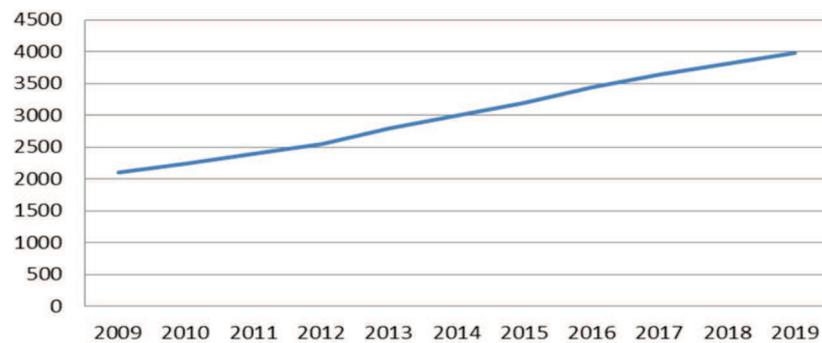
ATM is still one of the most popular intermediaries between the bank and customers (and there are more and more of them each year²). Among the leading providers of ATM market are inter alia: NCR, Diebold and Wincor Nixdorf. These three manufacturers supply almost two thirds of all devices in the world. The next group of players on the ATM market with a quarter of the world supplies are: Nautilus Hyosung and

¹ On 27 June 1967 the first ATM was installed in a Barclays Bank branch in London, it was made by John Shepherd-Barron.

² Retail Banking Research (RBR) study shows that only in 2013 the number of ATMs in the world increased by 205,000. It means that about 2.8 million cash points existed all over the world that year and 80% of new installations took place in Asia and Pacific.

GRGBanking, they operate mainly in Asia and Pacific³. The research conducted by RBR shows that by 2019 the number of ATM devices will have reached about 4 million, Image 1.

Image 1. Number of ATMs in the world, actual state and forecast (in thousands)



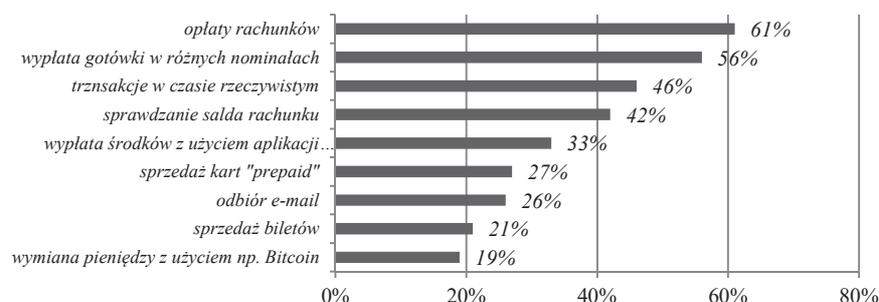
Source: own work based on⁴

ATM devices are still an indispensable element of modern banking sector despite dynamic development of electronic banking and growing number of cashless transactions. The pursuit of rationalizations of this contact channel means that more and more new functions are constantly being added to improve the distribution of services and to cut costs. The new functions include: customer account service, applying for a new service, deposit of banknotes, withdrawal of coins, videoconference service, integration with mobile devices. According to *ATM Marketplace* study on level of popularity of particular functionalities of ATM devices, the most frequently used function is payment processing (more than 61% of respondents confirms that), cash withdrawal (56%), making transactions in real time (46%). Interestingly, the respondents have not confirmed cash withdrawal with use of mobile applications as popular (only 33%), Image 2.

³ Global ATM Market - Size, Industry Analysis, Trends, Opportunities, Growth and Forecast, 2013-2020, Allied Market Research, 2015.

⁴ Ibid.

Image 2. Services available through ATMs



Source: own work based on⁵

The whole process is accelerated by dynamically developing market of mobile technologies and devices⁶. As the research conducted by *We are Social* shows, there are 3.42 billion of Internet users in the world, 3.79 billion users of mobile phones (which is about 51% of global population)⁷.

Multifunctional ATMs are not a thing of the future, they are our present. A good example of a technologically advanced ATM is a device called Punt Groc, built by Spanish Caixa Bank. It is equipped with two screens and allows to make more than 200 transactions including withdrawal of money using proximity card. The device is able to customize information for particular customers based on their history of transactions. Equally interesting ATM is used by another Spanish bank BBVA, it operates NFC transactions by means of proximity cards. The ATMs found in the area of Asia and Pacific should also be mentioned here. Asian Citibank ATMs are referred to as *smart banking* because they accept loan applications, credit card applications, have in-built videoconference function and a function which integrates a mobile device with the bank account. Banks view such devices as a source of income from foreign transactions, an opportunity to lower their prime costs and win new customers thanks to appropriate quality standards and multiplicity of rendered services. ATMs also make it possible to transfer

⁵ ATM FutureTrends 2015. ATM Marketplace, Network Media Group, 2015.

⁶ Report, *Digital, Social & Mobile in 2015*. [Access 20 January 2015].

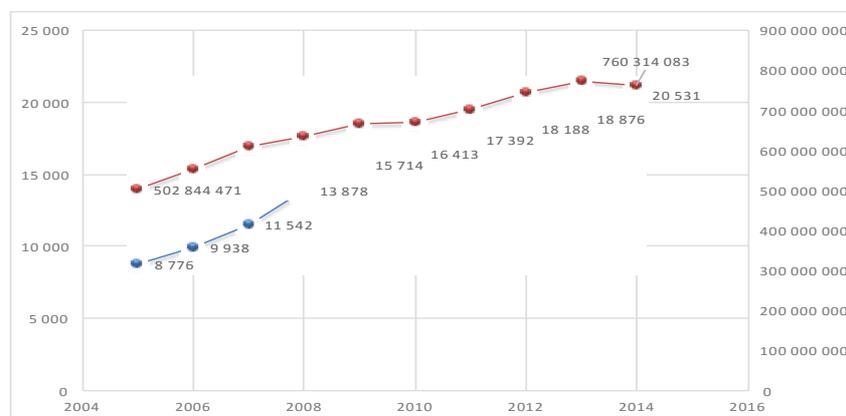
⁷ Report, *Digital in 2016 – We are Social's Compendium of global digital, social and mobile data, trends and statistics, 2016 Digital Yearbook*, We are Social, 2016.

customer service from counters manned by human staff to self-service zones.

Poland under communist rule was lagging behind western European countries with respect to developments in modern technologies and access to commercial bank services. Introduction of any novelty into what was then the Polish banking sector was very difficult. The milestone came in the 90s with the lifting of technological embargo and initiating deregulation and antitrust processes which enabled Poland to catch up with the better developed European countries. Nowadays the market of ATMs in Poland is growing with respect to the number of cash points and the number and value of transactions. Image 3.

Also technologically Poland has made a giant step forward and the Centre of Payment Technologies ITCARD S.A. is just one of many companies which have made a considerable contribution to the growth of the market ⁸.

Image 3. Number of ATMs in Poland in 2005-2015 (blue line – number of ATMs; red line – value of transactions)



Source: own work based on www.nbp.pl

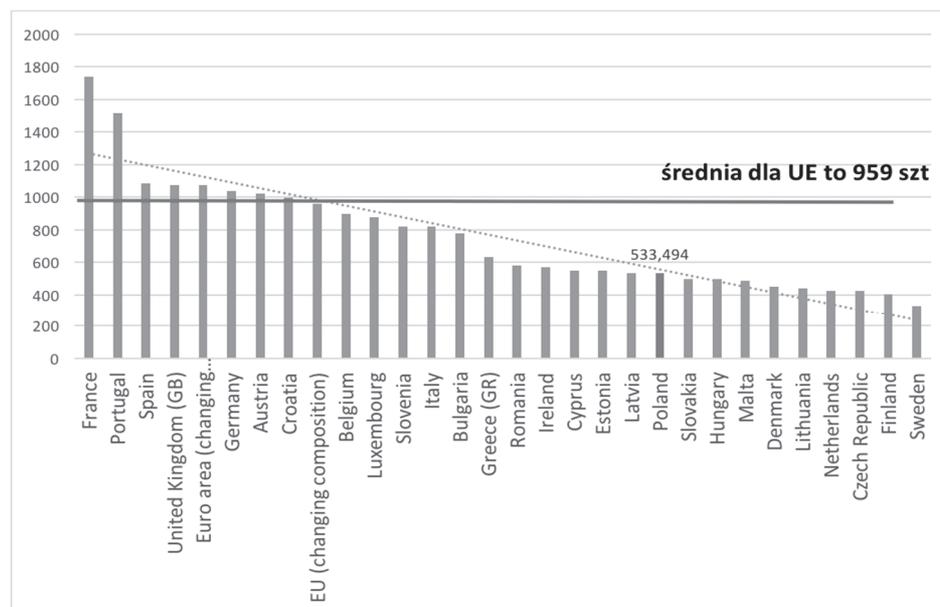
Despite such positive tendencies, the backwardness of Poland as regards the number of ATMs per million citizens is still visible, it stands

⁸ ITCARD – second biggest ATM service and processing centre in Poland whose basic activities are: service of ATMs and POS termini, authorization of payment transactions, service of VISA and Master Card payment cards. The company owns the Polish ATM chain Planet Cash, terminal chain Planet Pay and Internet gallery Planet Plus.

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at 534 units per million versus the average 959 per million for the European Union (not to mention the leaders: France 1700, Portugal 1500, Germany 1000)⁹, Image 4. The reason why the indicator is so high for France and Portugal is the multifunctional character of ATMs there. Additional functions of French and Portuguese ATMs include: money transfer service, mobile phone top-up vouchers sales and road tolls payments. Low rate of the indicator in the Scandinavian countries where electronic banking is developing rapidly, points to the existence of alternative contact channels such as POS termini which allow to make various cashless transactions.

Image 4. Number of ATMs in Poland versus other European countries



Source: Own work based on¹⁰

There is a certain number of reasons for 45% lower value of the number of ATMs per million ratio in Poland versus EU and 50% lower than in the Eurozone. One of these reasons may be high costs of ATM

⁹ Population of Poland, according to the Central Statistical Office for 2015, amounts to 38,478,602.

¹⁰ Statistical Data Warehouse, <http://sdw.ecb.europa.eu>, 2015.

devices (about 17,000 EUR per unit), long-term period of return from the investment or relatively small number of current accounts¹¹. In case of the first and second reason mentioned above, the banks either commission external businesses to develop ATM networks for them (Polish Bank BZ WBK ordered their ATMs from Galposter), or enter into agreements with rival banks who own their own ATM networks or use services of independent operators (Euronet, Cash4You or eCard), Table 4.

Table 4. Number of ATMs which belong to banks or are rented by distributors

Bank/group	number	share in %
Euronet Polska Sp. z o.o.	6503	31,0%
PKO Bank Polski SA	3163	15,1%
Bank Polskiej Spółdzielczości SA	2311	11,0%
Bank Pekao SA	1828	8,7%
Bank Zachodni WBK SA	1438	6,9%
Planet Cash Sp. z o.o.	1382	6,6%
Spółdzielcza Grupa Bankowa (SGB Bank SA)	1185	5,6%
ING Bank Śląski SA	969	4,6%
SKOK 24 (Towarzystwo Finansowe SKOK SA)	513	2,4%
Bank Millennium SA	486	2,3%
Raiffeisen Polbank (Raiffeisen Bank Polska SA)	277	1,3%
Bank BGŻ BNP Paribas SA	220	1,0%
eCard SA	203	1,0%
Euro Bank SA	179	0,9%
Citi Handlowy (Bank Handlowy w Warszawie SA)	87	0,4%
Global Cash (Towarzystwo Finansowe SKOK SA)	87	0,4%
Krakowski Bank Spółdzielczy	80	0,4%
Cash Zone (Cardtronics Polska)	70	0,3%
	20981	

Source: own work based on¹²

¹¹ The highest proportion of ATMs in Poland belongs to three biggest Polish banks: PKO BP, Pekao SA, BZ WBK and Euronet -the provider of electronic payment and transaction processing.

¹² <http://www.karty.pl/bankomaty.php?statystyka=bank>

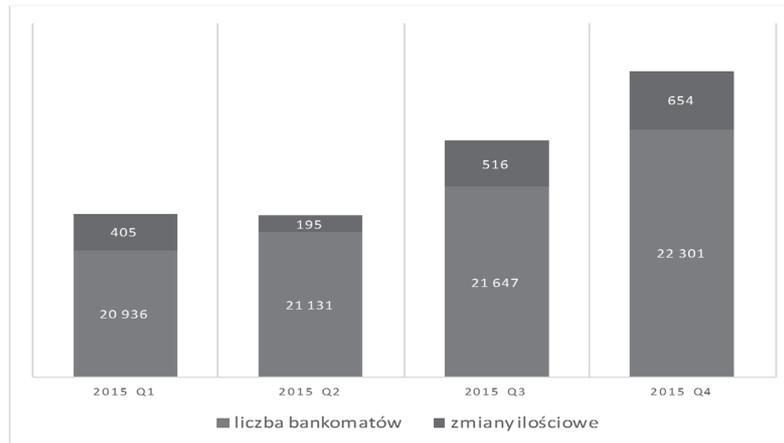
Euronet Polska Sp. z o.o., PKO Bank Polski SA, Bank Polskiej Spółdzielczości SA are the leaders with their joint share on the ATMs market in Poland exceeding 10%. However, there is a constraint; the banks and Euronet do not allow cash withdrawals free of charge any more. Euronet and Bank PKO SA introduced charges for using their ATMs as of 2016. The third reason behind relatively small number of ATMs in Poland i.e. small number of current accounts per person, is a vital factor of development of cashless turnover. Being in possession of a bank account gives citizens grounds to use a wide portfolio of cashless instruments including cash points. In Poland this factor is gradually improving, which is supported by data obtained from the Polish National Bank. The number of current accounts in Polish currency in banks, credit institutions and cooperative bank SKOK for private persons was 52,216,000 in 2016 (increase of about 2 million y/y)¹³. Dynamic increase of statistical number of bank accounts is, however, insufficient yardstick of the level of cashless turnover, which ought to be paired with active behaviour of account owners who would use a vast spectrum of bank services. Unfortunately, when it comes to the aforementioned active behaviour of account holders, Poland still remains at the very end among European Union countries.

Relatively negative ratio of Polish market saturation with ATM devices should however be juxtaposed to the dynamics of changes occurring on this market in Poland, the EU and the Eurozone,

Whereas in Poland in the period 2004 - 2009 there was a positive change of the ATM ratio (y/y), in the Eurozone the trend was opposite; in 2014 it amounted to -2,5% y/y (excluding the period 2007 – 2008 when a short-term increase of the ratio was observed). In Poland the negative trend started 2009, but value of ATM ratio for 2014 is still higher than in the EU and Eurozone for the same period. It was in 2014 when the ratio started to improve again y/y for Poland (about 8.66% y/y), European Union (about 12.2% y/y) and Eurozone (about 15,7% y/y). In the fourth quarter of 2015 the number of ATMs in Poland increased by 654 units q/q (about 3% q/q); in the last 12 months the growth amounted to 8,62%,

¹³ Comparison of selected elements of Polish payment system with systems of other EU countries for 2013, 12.2014.

Image 5. Number of ATMs in Poland in 2015 quarter by quarter



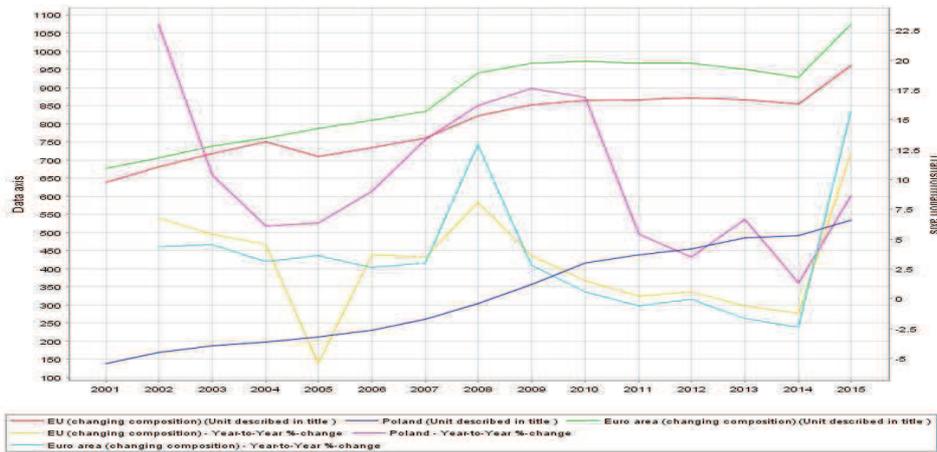
Source: own work based on National Polish Bank data¹⁴.

It does not alter the fact that Poland has a relatively low ratio of saturation with both ATMs (number of units per one million people) and devices processing electronic payment instruments (10 346 508 for Poland and 19 693 926 for EU in 2014)¹⁵. It puts Poland on one of the last positions among EU Member States. Although the invention conceived by Shepherd-Barron or Wetzel has been immensely successful, which is confirmed by 2.8 million ATMs currently in operation all over the world, Poland is still in the initial phase of growth of this particular channel of a bank's contact with its environment.

¹⁴ http://www.nbp.pl/home.aspx?f=/systemplatniczy/karty_platnicze.html

¹⁵ Statistical Data Warehouse, <http://sdw.ecb.europa.eu>, 2015.

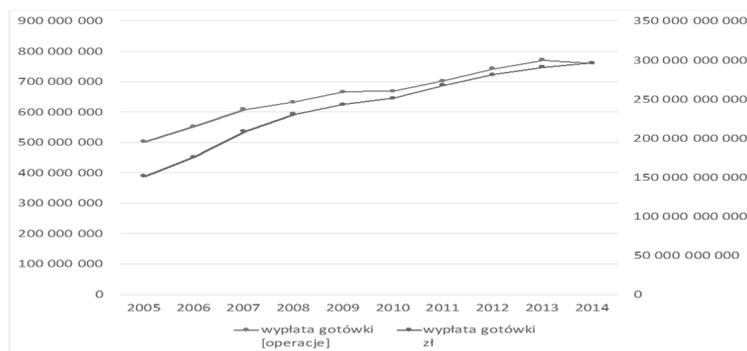
Image 6. ATMs in Poland versus EU and the Eurozone: (a) number of ATMs (b) percentage of change in the number of ATMs



Source: own work based on¹⁶

The work still to be done by Poland refers to the number of terminal devices and to the number and value of transactions processed by these devices (Image 7). Since 2010 the general trend towards the increase in the number and value of transactions has been positive with a slight fall in 2013 and 2014 (3,94% y/y and 1,47% y/y for the number of transactions and 3,53% y/y and 1,91% y/y for the value of transactions respectively).

Image 7. Number and value of ATM operations



Source: own work based on¹⁷

¹⁶ National Central Banks in the European Union, 2015.

3. Data and transaction security – selected issues

It may be hard to believe nowadays but first ATMs had black and white screens, very limited number of functions, were really slow and they broke down ever so often. The ATMs of today supplied by NCR, Wincor Nixdorf, Diebold or Olivetti are complex, state-of-the-art devices operating under advanced operation systems and equipped with ultra fast processors. John Shepherd-Barron's and Wetzel's inventions introduced a new added value in shortening the bank-customer distance. The ATM ceased to be a machine working offline and processing only very simple operations, it has evolved into highly specialized, multifunctional device built upon advanced technological solutions and offering an efficient channel of communication. Moreover, now it is also an important Public Relations weapon.

However, constantly expanding number of functionalities of present ATMs and wide access to these devices, created a range of threats related to possible unauthorized access to customer accounts, Identity Thefts, Logical Thefts of Valuable Media or Physical Thefts of Valuable Media. One of the above mentioned thefts - the unauthorized access - is possible by e.g modifying original ATM settings or substituting real ATMs with fake ones. The most frequently occurring threats relating to usage of ATMs are:

- Personal Identity Number theft – placing fake keyboards on original ones and reading PIN numbers with a micro-camera; placing fake ATMs and recording PIN numbers during authorization attempt,
- copying magnetic strips from payment cards (skimming¹⁸) through inserting a copying device into the ATM card slot.

Understanding the various attack vectors and crimes, although it is a complex problem, is a key one in improving the level of security guaranteed. Its importance is due to the dynamic race between the defenders and the attackers focused on creating effective strategies reducing the thefts influence in this battle.

Taking 2008 as a reference point, an increase in ATM related crimes can be observed. Just in a two-year-period of 2014 – 2015 the number of

¹⁷ http://www.nbp.pl/home.aspx?f=/systemplatniczy/karty_platnicze.html

¹⁸ Skimming – illegal copying of magnetic strip from flat and embossed cards. It does not apply to the microprocessor cards.

ATM related frauds increased from 15,700 incidents to 18,700 incidents (a growth by 19%¹⁹). An infamous role in this statistics play the so called TRF crimes (Transaction Reversal Fraud) whose number rose from 160 to 5,100 incidents as well as crimes related to card trapping attacks (increase from 5,300 to 6,300). Also the sums of money lost due to skimming related offences went up (according to data obtained from EAST²⁰ the losses from skimming rose from 280 million euro in 2014 to 327 million euro in 2015) although the actual number of skimming incidents fell by 27% in the analyzed period y/y. It must be noted, however, that vast majority of skimming cases took place in the USA and in Asia and Pacific region where the EMV technology is still in early phases of implementation (losses from skimming activities in the analyzed period for the above mentioned regions amount to 19% i.e.44 million euro). The number of physical attacks on ATMs is also on the rise by 34% in 2015 y/y (from 1980 attacks reported in 2014 to 2657 attacks in 2015). The number of attacks with use of explosives and gases increased by 9% (in 2015 alone 673 incidents with these substances were recorded). The losses which were incurred as a consequence of physical attacks on ATMs reached the value of 49 million euro in 2015, which means an increase by 81 % as compared to 2014, (Image 8).

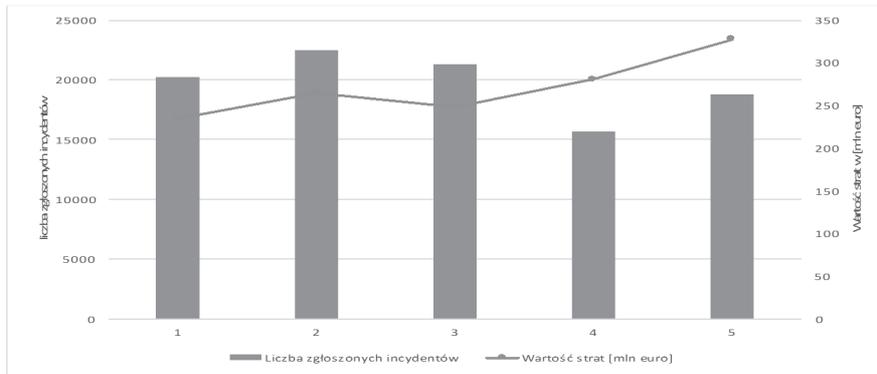
In such conditions many companies undertake activities towards improvement of customer authorization systems. The game played by the creators of customer protection and security solutions against hackers has become even more fierce. There are even voices claiming the need for establishing one formal body for the whole banking sector which would take care of cyber protection of banks.

There is already a range of protecting devices used to secure identity of customers. Biometric ATMs can be a good example, (Image 9). Verification of the account owner may take a form of e.g. PIN number, finger prints, finger veins, palm veins.

¹⁹ In Europe, surging costs from ATM skimming, physical attacks, atmmarketplace.com, [access 14 April 2016].

²⁰ EAST – an organisation consisting of: EAST National Membership – represents countries affiliated within Single Euro Payments Area and other countries affiliated under a separate agreement, the membership is limited to just one organisation from a given country and this organization serves as an ATM contact point; the other constituent is EAST Associate Membership – affiliating banks, law enforcing institutions and approved ATM organizations.

Image 8. Number of attacks on ATMs and the incurred losses



Source: own work based on report²¹

High efficiency of solutions based on recognition of blood vessels results from the usage of living organs for identity check. Banks additionally increase the level of security through introduction of supplementary forms of verification such as payment cards or PIN codes. However, perfectly tight security methods do not exist, even in case of biometrics, fraud attempts do occur.

Image 9. Biometric ATM in Tokyo



Source²²

²¹ Card skimming losses continue to rise outside Europe, European ATM Crime Report, April 2016.

²² Gazeta Wyborcza. 2010, <http://wyborcza.pl/51,75478,7427483.html?i=0>

Although the benefits of biometrics seem to be obvious, this method is still not commonly used in case of ATMs. Research carried out by RBR showed that at the end of 2012 there were only 7% of ATMs in the world equipped with biometric solutions; which constitutes a number of just 180,000 installations to be found mainly in the Asia-Pacific region (more than 60% of units)²³. The Western Europe hosts mere 3% of such devices. Unquestioned leader on the market of biometric ATMs is Japan with a 56% ratio of devices equipped with biometric readers²⁴. The question that arises here is why a solution with extremely high level of efficiency in identity authorisation is still so underused. The answer is to be found in the mentality of users of bank services who are sensitive towards the possibility of personal data leakage or abuse. Another reason is, certainly, the high costs of biometric technologies, especially when compared to equally effective and already widely widespread EMV standard. Moreover, the necessity to collect and store biometric data of customers is currently being eliminated. Despite numerous arguments for and against, the increase in use of biometric solutions can be easily noticed thanks to publications of statistics confirming their efficiency in reducing the number of frauds, as compared to other methods.

Conclusions

The market of ATM devices is constantly evolving despite the advances in elimination of cash money in favour of electronic money. It stems from the fact that the original function of an ATM being nothing more than just a cash dispenser was enriched by a portfolio of other electronic services. The issue of providing security for the operations made by use of ATMs is also a vital engine for introducing changes. And the switch from magnetic strip cards towards EMV solutions may be a good example here. The American card market is the leader in the dynamics of progress occurring in the field of instruments of cashless turnover. In the light of the figures quoted throughout the paper the assumption that the ATM market is constantly developing is given credibility. This development goes in two directions; firstly, the costs of

²³ In Japan alone out of 150,000 ATMs every third has in-built biometric authorization technology.

²⁴Automatyka Bankowa. <http://www.automatykabankowa.pl/biometria-w-bankomatach-coraz-bardziej-popularna-na-swiecie-ale-2/>, 2015.

cashless turnover are reduced; secondly, the levels of functionality and security of using ATM devices increase.

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