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The History Of Smart-Cards and Their Place In Modern Russia

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# Introduction

Russian smart-cards market is one of the fastest developing sectors of country’s financial market. The trial period which was over by 1995 allowed its participants to learn technologies and problems that can be hit upon while dealing with “cards” business. The fact that more then 500.000 international plastic cards were issued in Russia for several last years only approves of the topicality of such payment systems.

# What are plastic cards? What kinds of cards exist?

## Cards with magnetic line and memory-cards

Cashless payment systems based on traditional cards with magnetic line are dominating world wide. They achieved noticeable improvement in supplying card owners with many kinds of services. But the fact of internal limits in magnetic line cards leads to many new problems. These problems are: the increase of financial risks and losses, administration expenses, technical problems. This kind of cards has a lot of disadvantages that make their operation in Russia in same scale as in Europe impossible. The most serious disadvantage, in my opinion, is that such systems require on-line authorization in stores and, as a consequence, they need well branched high quality communication nets (e.g. telephone lines).Because of this fact magnetic line cards systems have a serious restriction for their operation in the countries with unsatisfactory state of telecommunication systems. I also have to notice a low security level of magnetic line cards and the entire technological chain of such systems. This often leads to great flow of unprovided false transactions. This aspect is a serious obstacle to developing magnetic card systems, especially in the countries with a high level of criminality.

Memory-cards belong to chip-cards equipped with memory chip. Payment systems based on memory cards have important advantages as compared with magnetic line cards. They have a higher security level and the option of off-line authorization in stores. Technical abilities of chip built in memory cards define restrictions to their operating in payment systems though. We have just the same problem here (as with magnetic line cards) – unsatisfactory security level of any single card and system in general. Taking criminal situation in Russia into consideration we have to admit that this kind of cards can hardly find the appropriate place in modern Russia. This aspect captures a special place when several banks are involved in one payment system, where special attention should be paid to accident prevention and authenticity of financial information, differentiation of responsibility for keeping a secret information with transaction members. Main areas for memory-cards are systems of limited access to accommodation and computer networks (identification cards); telephone networks (cellular telephone network GSM); payphone and metro cards, local payment systems (club cards). Certainly, memory-cards will find their place, but obviously they will not be ruling in future.

Thus, magnetic line is a medium in magnetic line cards which lowers reliability and makes multi recording impossible and requires on-line access.

The chip is a medium in memory-cards. Such cards can be used with off-line access, multi recording is available, but the procedure is still complex. Because of low security level running memory-cards is dangerous.

## Smart-cards: step forward

Magnetic line cards market is now formed in all developed countries. Giant infrastructure was created: processing centers, money access machine, trade terminals, hundreds million cards in use, international standards are formed and admitted. That is why magnetic line cards will be still in use for many years.

However, world leaders VISA, Europay, MasterCard have already declared about inevitable conversion to smart-card technology in future. All of them started developing future international standards for payment systems based on smart-cards. Even in Europe where magnetic line cards are traditionally popular smart-cards are winning one project after another.

The most successful introduction of smart-cards is supposed to take place in the countries where magnetic cards hold a weak position; in the countries without high quality well branched and reliable communication systems; in the countries with a high criminal level where the population have a low credit reliability.

These days many Russian banks issue traditional magnetic cards of international payment systems. However, such issues are definitely oriented on concrete social consumer group and regions of their use are quite limited.

Now lets say some words about a smart-card. The medium in smart-cards is a small processor chip. The identification area allows only one record while personalizing the card and later available for reading only. Access to other areas available only after the card holder entered the proper “key”. The smart-cards security level is much higher than the magnetic cards one. As to prices on smart-cards, they are higher, but they become lower and lower every year as their technology is being improved and production scale is being enlarged

The smart-cards are small computers is some way. Modern smart-card chips features can be compared with personal computers in early 80’s. Part of the data located on a smart-card can be used only in internal card’s operations. This fact together with high level cryptographic security makes smart-cards valuable asset for financial systems demanding additional security and reliability. Because of that smart-cards are now considered to be the most promising kind of plastic cards. They can be also considered to be the most promising for their features. Smart-cards counting abilities allow card holder to keep multi-currency wallet. As predicted by VISA and Europay/MasterCard, smart-cards will replace magnetic line cards within the 10 year period.

## The developing of smart technology

First smart-cards appeared in France in the middle 70’s. The main advantages as compared to magnetic line cards are higher reliability, security and multifunctionality. The main disadvantage that it is still difficult to get over is high prime cost.

Nevertheless, in early 90’s rapid growth of smart-cards market took place. Thus, at the last smart-technology forum (SmartCard Forum), hosted in the USA, statistical reports showed that the majority of magnetic line cards owner would use smart-cards as electronic wallet if their bank issued such cards.

But financial institutes that working with smart-cards have a lot of questions at the moment. Many of these questions still do not have answers. Here are the most popular ones:

* How high is the level of smart-cards security?
* What schemes should be used for transactions: open or secured?
* How available and reasonable is the complete replacement of cash with electronic money?
* What authorization mode is better: on-line or off-line?

The fact of existence of these questions demonstrates that there is a high interest in smart-cards connected with an ability to transform little sum payments into cashless payments. Visa researches show that annually more then 1,8 trillion dollars happen to less then 10 dollars transaction. Obviously operation of these payment through electronic cards is more than attractive. But the organization of such transformation hits upon serious problems even in well developed countries. In this case solving this problem with a help of electronic wallets seems to be the most effective. According to Jean Jacques Debone, the president of European branch of Visa International “the development of smart-cards, allowing the client to make less then 8 dollar payments, will treble bank’s cards profit”

# Smart-cards appear in Russia

## Smart-cards as bank’s cards

BGS Smartcard Systems AG is the official dealer and distributor of Visa International smart-technologies is Russian and the former USSR market. It was founded in 1997 and holds right for software and technologies of cashless payments based on U.E.P.S standards. U.E.P.S. – universal electronic payment system is a system based on smart-card technology. The main technological feature of U.E.P.S. is that all transaction operations are done in off-line mode trough direct contact of two smart-cards. BGS introduced several large projects for Sberbank of Russia, Promstroybank, Inkombank and some other banks and bank’ unions in Russia, the leading banks of Uzbekistan, Ukraine and Kazakhstan. In September 1996 BGS signed the agreement with Visa International on developing and migration of smart-card product COPAC including U.E.P.S. as a basis. The matter for greater interest is joint project with Sberbank on creating the united smart-card system (SberCard cards). Taking scale of spreading and recent issue date into consideration we can say that SberCard is on of the most promising card in Russia.

On Sep 13 1996 during annual meeting of banks-members of international payment system VISA International announced a new product – a new plastic card with microprocessor Chip Off-line Preauthorized Card. This product has no special brand name yet, abbreviation COPAC was taken as a working version of a brand name.

Since 1992 BGS company has exclusive right for distribution U.E.P.S technology in the former USSR, Western Europe and Austria.

VISA International declared in the second quarter of 1997 of the new pilot project with Sberbank of the Russian Federation and Inkombank (Union Card) on introducing COPAC technology. After this the pilot project was over new COPAC specification became

available world wide.

## Smart-cards as corporate cards

The greatest company offering corporate integrates smart-cards systems in Russia is IT company. Founded in 1990 today Information Technologies Co. (I.T. Co.) ranks among the top three Systems Integrators in Russia, according to the Dator marketing agency and Russian Computer Union opinion poll statistics. Reporting annual revenues in excess of $27 Million, I.T. Co. has deployed over 500 projects in Russia and the CIS for industrial enterprises, trade companies, government, and financial institutions. In 1996, Computer Press magazine granted I.T. Co. an award “For Outstanding Results in Developing the Russian Computer Market”, and was included into the State Registry of Quality Systems. Having extensive experience in the development of information and computing systems, I.T. Co. has created a broad product line of private-branded high-tech software and hardware solutions for the local and international market. Since 1990, I.T.Co. has focused on meeting the demands of what is now today's competitive global marketplace. As businesses, large and small, progressively long for ways to interface with all of their suppliers using one system -- a complete information management system that is specifically designed with the customers' needs in mind, and just as importantly, a system friendly to the bottom line -- I.T.Co. remains on the forefront of technology, delivering a quality product on time, and on budget

I.T. company has developed their own conception of smart-card systems CmartCity. Besides SmartCity technology department proceeds developing and promotion of new systems of controlling and managing banking accounts through Internet. This project is based on the client-server software on personal finance managing DEKART, a new solution in electronic commerce area.

SmartCity is a “card” product of I.T. The company together with its suppliers created several large-scaled projects based on this system.

I would like to stress three projects of this company in Russia.

One. Cashless payment system “Meta Card” based on SmartCity technology for Metkombank, Cherepovetz. System projected “power” is 50.000 cards, with 300 trade terminals. This number covers 75% of town’s stores and trade points and services. The card holder can use his card not even in Cherepovetz but in Metkombank affiliates in Vologda too.

Two. Cashless payment system for gas filling station “LICard” also SmartCity product. This system was created for oil company Lukoil and Imperial Bank in Volgograd, Perm, Vologda, Cheliabinsk and Baku for 100.000 cards. Further developing of the project provides organization of cashless payment for Lukoil gas station on entire territory on Russia with 300.000 cards issued by 2003.

Three. Cashless payment system for Purneftegas in Gubkinsky in Tumen region. This project provides 31.000 cards. More then 100 terminals were installed to deal with smart-cards in food, bakery stores, airline booking offices. All in all in 50 trading and servicing places in Gubkinsky.

Lets take a proper look at “LICard” project. In my opinion, it is the most promising one.

Lukoil corporation has big and constantly growing number of filling stations in all regions of Russia and many countries of the former USSR. The company plans not only further grown of number of gas stations but also widening the specter of provided services including cashless payments by plastic cards.

While creating corporate electronic payment system on company’s filling stations and terminals the following aims were pointed out:

* Increase of financial arrivals to Lukoil;
* Creating of information database for making managing decisions;
* Exploring new sales markets.

Lukoil fuel cards are used in several regions (Volgograd, Chelyabinsk, Perm and others) for years. In every separate region cards functionate well. But the problem of unite system was not solved yet. The card holder cannot use his card in another region but only where he has bought his card. That’s why the question of unification of the system of electronic payments appeared where cards could be acceptable at every filling station.

The main criterion while choosing the technology for organizing cashless payments was the low level of telecommunication systems in Russia, which makes on-line transaction almost impossible. Thus, it was decided to use smart-cards to operate the special processing center instead of on-line transactions (off-line). The second argument for smart-cards was high security level of recorded on smart-card information. Besides, smart-cards are available for many kinds of application which was also important for this project.

It was decided to use smart-cards produced by GemPlus company in SmartCity technology for creating corporate electronic payment system for Lukoil filling station. Every person or company can become a card owner.

Before going somewhere a car driver put his money on his smart-card or money can be transferred by an organization. And now our driver travels with a plastic card instead or a huge wallet full of money for his trip. When filling at Lukoil gas station corresponding sum of money is written off from his smart-card. If using smart-card driver gets 3-7% discount.

By the end of 1997 LICard system has been in action in greater part of Russia. Noticeable growth of personal LICard owners was hit upon for the recent year.

LICard has three levels the scale of ranks as to its organization:

1. Low level. Regional agencies and service offices, and filling stations Lukoil;
2. Middle level. Regional processing centers and regional representative offices of LICard;
3. High level. Application center and interregional processing center LICard.

Transfers between regional centers are carried out through the interregional processing center. This action allows any filling station to receive money even if no money was put on the card.

This project can real working example of applying smart-cards for corporate needs. But I would like to notice that not all features were used in this project. Using some additional wallets project owner could have more effective and profitable system.

# The place of smart-cards in modern Russia

In this chapter I mean smart-cards under “plastic cards” term. Because magnetic line cards and memory cards have little chance for success in Russia.

Our plastic cards market is rather a collage picture. Before 90’s plastic cards was so badly known that they even were not shown in Soviet films that showed disadvantages of Western style of living. Meanwhile, plastic cards are so deeply integrated in American and Western style of living that person who has rather big sum of money is cash almost immediately gains the reputation of a criminal.

Plastic cards are not so wide spread in Russia as in Europe and of course in the United States. Obviously, the reason is in the lack of necessity of everyday cashless payments We also have to take average income in our country into consideration which, unfortunately does not let many citizens to have enough free money to place then on a card. There are still many obstacles in operating plastic cards in Russia: from simple tradition to call pieces of paper in a pocket money to elementary distrust, fear to become a victim of another “MMM” speculation project.

Hence placing plastic card into operation in further 3-5 year would not bring a satisfactory result to any bank, no matter how reliable it is. The success can be reached only by uniting all existing systems into one national payment system. But this perspective is now very attractive to the majority of banks as they are afraid to depend on bigger and stronger banking groups. Beside that the present level of telecommunication systems and banking equipment will not let such project to be realized. And great investments are needed for many banks to proceed the convertion from magnetic line cards to smart-cards. That’s why I consider putting smart-cards into operation in Russia rather disappointing in the nearest years.

I think the solution of this problem is in replacing existing systems of cashless payments with smart-cards technology. Lets take transport fuel coupons as an example. Obviously, introducing plastic cards in this sphere will meet the lowest resistance of citizens who got accustomed to other kinds of cashless payment for fuel. Such systems are good for both: people and oil companies. People are glad to carry one small card instead of a bunch of coupons and to be sure that nobody else would use their fuel credit even if their card is stolen. Oil companies gets valuable assets with such systems as they ensure themselves from serious losses connected with coupon falsification. And if we mention speeding up money return, it becomes absolutely clear that such systems will soon appear in our life. After fuel smart cards are introduced, additional wallets can be added to the same cards. For example, on one and the same card fuel credits can be recorded (in litres), some technical service for cliens car (in working hours), dinners in filling station cafe (in number of dinners). It that situation our driver can travel with a little sum in cash and his smart-card.

Besides, using plastic cards instead of coupons territory depending problem can be easily solved, as direct and strong “coupon” connections already exists through oil companies.

Thus, in my opinion, the process of introduction plastic cards should start not from banking but from trading sphere. The ideal case could be the combination of corporate, banking and international cards into one.

## Plastic card payments in Internet

Another stimulus for developing smart-cards is active growth of selling trough international computer network Internet. Unfortunately it has not received enough development in Russia. Although there are companies selling goods through Internet (music CD, books, computer) payments are still processed after an old manner: client pays the money after he gets the good at the post office. Hence there are some noticeable losses because of payment delays.

The situation in Europe and the United States is quite different. Companies sell almost everything from pens to cars and cottages through Internet and such activities give real profit. For example, on 10 May 1999 Apple virtual computer store sold equipment on more than 1.9 million dollars – a record during short history on Internet selling.

In trading part of the Internet the decision to converse from magnetic line cards to smart-cards has been discussed for more then 3 years. As e-companies incur constant losses because of low security level of magnetic line cards If such decision is made we will have the right to say that it will be a final victory of smart-cards over their out of date congeners.

# Conclusion

The above analysis of operating smart-cards as modern international payment tools allows me to make the following conclusions:

1. Impressing results are reached in realization of smart-technology and applying different kinds of plastic cards payment systems in international markets.
2. The process of developing plastic cards as universal payment systems is in a phase of rapid growth in Russia
3. There is a clear tendency of intellectualization of plastic cards, based on modern technology chip equipment and electronic communications.
4. Year 2000 will define tendencies of plastic cards developing once and for all.
5. The most promising way of introducing smart-cards in big Russian cities is in creating local systems of small sum cashless payments with their further unification into one national cashless payment system.

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