

The Economic Models for the ATM Network Implementation

Ranković, A., Marko; and Vasković, R., Vojkan

Abstract — *In order to create or expand the Automated Teller Machine (ATM) network infrastructure, the bank has two options: to create or expand the network by using its own resources or to outsource the network implementation and expansion to the banking processor. This paper describes the foundations of the shared ATM network and economic models for the banking ATM network establishing. Two models have been developed: the Economic model for the bank's ATM network outsourcing services and the Economic model for the shared ATM network services. The structure of the costs has been presented as well as comparative analysis of these two models. This paper is highlighting the need for rationalization of the invested funds in ATM infrastructure development. This is especially significant for rural and less developed regions, in the countries were lack of these services is obvious. Small number of users makes individual banks uninterested for the ATM network development, but shared networks are justifying the invested funds. Making closer these services to the users, digital divisions are decreasing.*

Index Terms— *ATM, shared network, economic model, costs, savings*

1. INTRODUCTION

When the banks and banking business facing the global market turmoil, they are not eager to invest into the business development and therefore they're not eager to invest into the ATM infrastructure neither. In order to expand their ATM networks, the banks need to invest significant amount of funds. The financial crisis shows that the banks, not only, are not ready to invest, but the banks have become financial institutions which need investments injections. However, despite the problems with which the financial institutions are facing, the banks need to have continuous presence on the market and to expand that presence further and to offer more convenient service to its clients. One of the important bank's links to the clients is the part of the bank' alternative distribution channels – the ATM network.

In order to gain benefits from the ATM network, the bank needs to build infrastructure of the ATM network continuously and to invest continuously into the ATM network management. The costs of the ATM network management are numerous and therefore very complex and they are presenting a significant investment to the bank, either if they are considered as one-time costs or monthly costs.

Networks of the ATM devices are deployed by the banks only or in cooperation with processing companies. Deployment of the ATM devices requires engagement of the significant resources from the bank side, both financial as well as human resources. Deployment and maintenance of such network is usually outsourced by the banks, in order to avoid huge computing centers and specialized experts needed for the network maintenance. Network maintenance is comprehensive job and it can be payable only if there is many ATM devices in the network, which is not the case while speaking about small banks. From the other side, processing companies have resources and equipment for deploying and maintenance of the ATM networks, bigger then those which are owned by the banks. All these elements created prerequisites for relationship established between banks and processing companies, with idea that each party should do what it do best. This relationship represented common ground for the shared ATM networks enterprise

2. SHARED ATM NETWORKS

Shared Networks of the ATM devices are deployed by the banks only or in cooperation with processing companies. Deployment of the ATM devices requires engagement of the significant resources from the bank side, both financial as well as human resources. Deployment and maintenance of such network is usually outsourced by the banks, in order to avoid, huge computing centers and specialized experts needed for the network maintenance. Network maintenance is comprehensive job and it can be payable only if there is many ATM devices in the network, which is not the case while speaking about small banks. From the other side, processing companies have resources and equipment for deploying and maintenance of the ATM networks, bigger then those which are

Manuscript received Decembar 4, 2008.
M. R. is with the EuroPlanet, company, Belgrade, Serbia
V: V. is with the Belgrade Business School, Belgrade, Serbia

owned by the banks. All these elements created prerequisites for relationship established between banks and processing companies, with idea that each party should do what it do best. This relationship represented common ground for the shared ATM networks enterprise.

The shared ATM network is based on the concept of spreading and expansion of these devices, by involving the third party- specialized companies (banking processors). The shared ATM network is not a substitute for the existing banking ATM network, but on the contrary, it represents the expansion of that network.

There are several reasons why the banks should invest in the infrastructure of the shared ATM network. The most important reasons are the following:

1. Reducing of the cost per transaction (transaction initiated in the ATM device are cheaper then those initiated at the banks premises, via teller)
2. Expanding bank's presence on the market
3. Increasing the client's satisfaction
4. Profit gain, based on the charges for initiation of transactions to the non-bank ATM users
5. Reducing time needed for the turnover of funds.
6. Expanding geographical presence of the bank in the regions where the bank is not usually present
7. Marketing advantages gained through expanded market presence.

The main reasons why processor should invest in the shared ATM network infrastructure are:

1. Expanding presence on the market of the ATM devices
2. Profit gain, based on the transactions fees initiated on ATMs devices of the shared ATM network.

3. ATM SHARED NETWORK PARTICIPANTS

Classification based on the participation in the shared network is as following:

1. Owner of the shared ATM network – processor
2. Sponsor Bank
3. Member bank

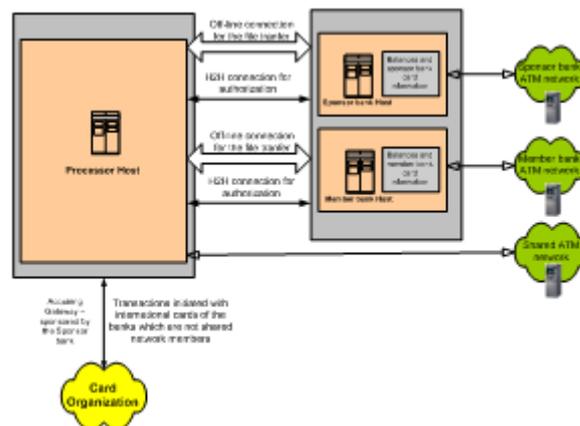


Figure 1. Architecture of the ATM network

It is important to highlight that the bank can be the owner of the ATM network and the member bank which is sharing the ATM network with other member banks at the same time.

4. MODEL I: THE ECONOMIC MODEL FOR THE BANK'S ATM NETWORK OUTSOURCING SERVICES

The Economic model for the bank's ATM network outsourcing services is describing the level of funds, on one-time and monthly basis, which need to be invested in the ATM network infrastructure, in order to expand the network. The starting presumption of this model is that the bank is the main and only investor to the expansion of the ATM network. This model describes the structure of the costs and the cost-related activities which need to be undertaken in order to create or expand the ATM network.

The costs in the Economic model for the bank's ATM network outsourcing services have been separated to the two levels: one-time costs and monthly costs.

One-time costs

One-time costs are the costs which are occurring once. In this model these costs are very significant, because they are including the purchase of the ATM, which is the largest investment needed for the expansion of the ATM network.

One-time costs and their structure are presented with the equations below:

$$C_{UK} = \sum_{i=1}^m \sum_{j=1}^n C_{OT} = C_S + C_{SS} + C_{PC} + C_I + C_{PIF}$$

$$; \quad C_I = [C_{SP} + C_{IPC} + C_{IC}]$$

i =1-n :- number of the ATMs on the corresponding locations

$j=1-m$:- number of the ATM locations
 $k=1-t$:- number of transactions

C_{uk} – overall one-time costs
 $C_{pif}=(C_p+C_{fc})/f$ - Crediting purchase finance model

C_{ot} - One-time infrastructure costs
 C_{pif} - ATM purchase and financing costs
 C_p - ATM purchase costs
 C_s - ATM storage costs
 C_{ss} - ATM site selection costs
 C_{pc} - ATM procurement costs (Procurement department related costs)
 C_i - ATM installation costs (C_{sp} - ATM site preparation costs + C_{ipc} - ATM site infrastructure preparation costs + C_{ic} - ATM installation costs)
 C_{fc} - ATM financing model costs
 f - financing period
Implication.

Monthly costs

Monthly costs are the costs which are occurring on the monthly basis. Individually, these costs are not too high, but since there are many types of the monthly costs, summarized they are representing significant costs.

The structure of the monthly costs is presented with the equation below:

$$C_{UM} = \sum_{i=1}^n T_{mt} = \sum_{i=1}^n T_{up} + \sum_{i=1}^n T_l + \sum_{i=1}^n T_s + \sum_{i=1}^n T_o$$

C_{mt} - Monthly costs
 C_{um} – Overall monthly costs
 T_{up} - Processing services costs
 T_l - ATM location costs
 T_s - Servicing related costs
 T_o - Insurance related costs

$$T_{up} = C_{of} + \sum_{k=1}^t C_{pc}$$

C_{of} - ATM outsourcing services monthly fee
 C_{pc} - ATM transaction processing fee

$$T_l = \sum_{j=1}^m C_{sr} + \sum_{j=1}^m C_{mm}$$

C_{sr} - ATM site renting fee
 C_{mm} - ATM site monthly maintenance fee

$$T_s = \sum_{i=1}^n C_{tc} + \sum_{i=1}^n C_{fc} + \sum_{i=1}^n C_{cc}$$

C_{tc} - ATM telecom connection cost
 C_{cc} - ATM consumables cost
 C_{fc} - ATM cash fill cost

$$T_o = \sum_{i=1}^n C_{ci} + \sum_{i=1}^n C_{ai}$$

C_{ci} - ATM cash insurance
 C_{ai} - ATM insurance

5. MODEL II: THE ECONOMIC MODEL FOR THE SHARED ATM NETWORK SERVICES

The shared ATM network is based on the concept of spreading and expansion of these devices, by involving the third party- specialized companies (banking processors). The shared ATM network is not a substitute for the existing banking ATM network, but on the contrary, it represents the expansion of that network

The Economic model for the shared ATM network services is describing the level of funds, on one-time and monthly basis, which need to be invested in the ATM network infrastructure, in order to expand the network. The starting presumption of this model is that the processor is the main investor to the expansion of the ATM network, as the owner of the ATM devices. This model describes the structure of the costs and the cost-related activities which need to be undertaken in order to create or expand the shared ATM network.

The processor is creating or expanding the shared ATM network, by purchasing, installing and maintaining the network infrastructure and renting these ATMs to the interested parties (banks) as a model of expansion of the ATM network

The costs in the Economic model for the shared ATM network services have been separated to the two types of costs: one-time costs and monthly costs.

part can be broken in as many sections and subsections as needed.

One-time costs

One-time costs are the costs which are occurring once. In this model this costs not complex and are not high, because they are including only investment for acquiring gateway opening at the International Card Organization (ICO).

One-time costs are presented with the equations below:

$$C_{ot}=C_{ico}$$

C_{ot} - One-time costs
 C_{ico} - ICO Acquiring Gateway opening costs

Monthly costs

Monthly costs are the costs which are occurring on the monthly basis. Individually, these costs for this model are not too high, and there are not many types of the monthly costs, which are included within overall monthly costs, summarized they are not representing significant costs for the bank.

The structure of the monthly costs is presented with the equation below:

$$C_{mt} = C_{of} + C_{tc}$$

C_{mt}- Monthly costs

C_{of}- ATM outsourcing services monthly fee

C_{tc}- ATM transaction fee

Overall monthly costs

$$C_{um} = \sum_{i=1}^n C_{mt} = \sum_{i=1}^n T_{up}$$

C_{um} – Overall monthly costs

T_{up}- Processing services costs

$$T_{up} = C_{of} + \sum_{k=1}^t C_{pc}$$

C_{of}- ATM outsourcing services monthly fee

C_{pc}- ATM transaction processing fee

t- number of transactions

6. ANALYSIS OF THE SIMULATION RESULTS

During the cost-simulation analysis different scenarios were used, in order to determine cost-flow trend and economic models appliance in a different market situations.

Scenario I – Savings

The main presumptions of the first scenario are that the number of the ATM is variable, which is having growth trend of 20.37% per month and a constant number of transactions per month. If we analyze the levels of monthly costs of Model I and Model II, we can see significantly lower costs when the Model II is applied, especially when observed long-term. Savings on the monthly level, compared to the level of costs were presented on the Diagram 1.

Same as for the monthly savings, accumulated savings for the observed period are increasing. Trend of growth of the accumulated savings, when compared to the monthly costs of the Model I and Model II is presented on the Diagram 2.

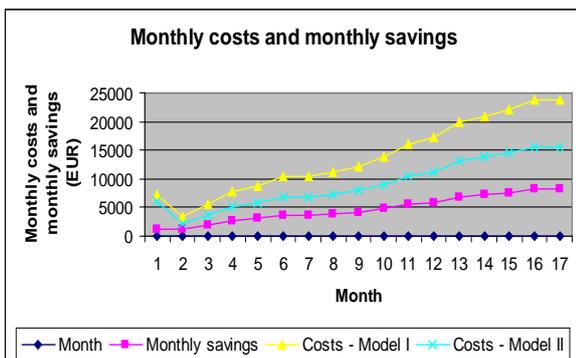


Diagram 1. Monthly savings

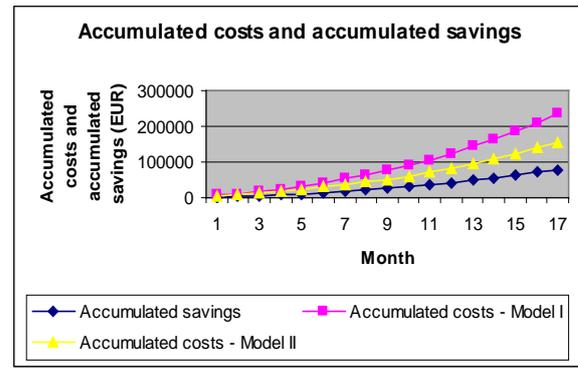


Diagram 2. Accumulated costs and savings

Scenario II – Savings

The simulation costs analysis for Model I and Model II, with variable number of the ATMs, which is having growth trend of 20.37% per month and variable number of transactions per month, which is having growth trend of 5% per month has shown that the period when the incomes per ATM are higher than the costs, e.g. when the bank starts to earn money from the ATM network, is twice shorter when the Model II is applied. The costs and savings on the monthly level and their' comparative overview is shown on the Diagram 3.

The level of the accumulated savings has been shown on the Diagram 4.

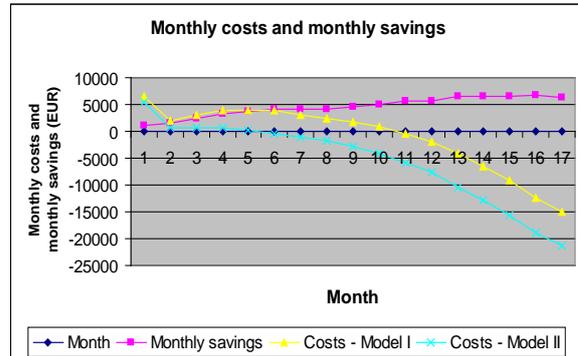


Diagram 3. Monthly savings

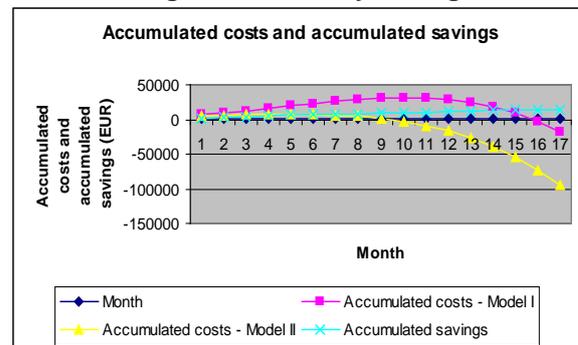


Diagram 4. Accumulated costs and savings

7. CONCLUSION

Based on the simulation costs analysis, when Scenario 1 is applied and the number of the ATMs is changing, as per the monthly growth rate of 20.37% and constant number of transactions, it can be concluded that the appliance of the Model II: Economic model for the shared ATM network services is much more cost-effective for the bank than Model I. The main reason why the Model II monthly costs are lower is that the bank has only ATM renting costs and transaction processing costs. As a result of the lower monthly costs, the Model II accumulated costs are also lower. Appliance of the Model II can bring significant savings both on monthly and accumulated basis. As much as period of simulation is longer, the level of monthly and accumulated savings is higher.

The main reason of the constant, almost linear, growth of the costs, in both models, is the continuous investment into the network, with the constant level of transactions. Since the ATM transaction number is constant, incomes per ATM are constant too. In the Scenario 1 of the cost simulation, the average number of the ATM transactions per month projected on the global level has been used.

If the bank, based on the market researches, determines that the number of transactions for the projected period will be constant, within the average number of transactions, it should use Model II as a model for the ATM network development and expansion.

Based on the simulation costs analysis, when Scenario 2 is applied, when the number of the ATMs is changing, as per the monthly growth rate of 20.37% and number of transactions has monthly growth rate of 5%, it can be concluded that the appliance of the Model II: Economic model for the shared ATM network services is much more cost-effective for the bank than Model I. If the bank, based on the market researches, determines that the number of transactions in the

projected period will grow 5% per month, choice of both Model I and Model II is acceptable for the bank, since the level of accumulated savings is relatively low. Advantage of the Model II, is because the investment will be returned sooner than if Model I is applied, because of high initial investments.

It is important to emphasize that usage of the shared ATM networks is having wider social-usability justification. Usage of the shared networks, the same communication channels are used and installed devices are used by more-than-one banking institutions and therefore overall business costs are decreasing and climate of the social responsibility has been produced against the common funds. Individual deployment of the ATM devices by the banks is causing insufficient usage of the invested funds. This is especially relevant to the rural areas and undeveloped parts of the regions, where we can make close services to all users by implementing the concept of the shared networks. The main characteristic of these regions is that the banks don't have interest to develop the ATM networks independently, because the number of users is small. This means that the only way to cover these regions with self-service services on the ATM devices is development and deployment of the shared networks, where sum of the overall users of all banks, members of the shared networks is potentially enough to make the business cost-effective and justified.

REFERENCES

- [12] Vasković V., "Sistemi plaćanja u elektronskom poslovanju", FON, Beograd, 2007.
- [13] http://buy.cuna.org/download/diebold_fraudpaper.pdf
- [14] <http://www.24x7.com>
- [15] <http://www.nbs.yu>
- [16] <http://www.visabscemea.com>
- [17] <http://www.euronetworldwide.com>
- [18] <http://www.mastercard.com/us/personal/en/cardholder-services/securecode/index.html>
- [19] <http://www.mastercard.com/us/company/en/corporate/>
- [20] "The Nilson Report, Februar 2007", Issue 874 <http://www.atmwarehouse.com/ATMstatistics.htm>
- [21] http://www.greensheet.com/gs_online.php?story_id=196
- [22] <http://www.prleap.com/pr/83773/>