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PROFITABILITY ASPECTS OF ELECTRONIC BANKING APPLICATIONS FOR SMALL COMPANIES

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ABSTRACT

The main goal of the paper is the presentation of the evaluation methodology of electronic-banking systems from the point of view of small companies. First, e-banking offers of six selected banks for small companies are presented. Then, all potential selection criteria and methods of their hierarchization and validation are discussed. The next step is a comparison of the e-banking offers of six banks. Finally, the author tries to compare the profitability of traditional and electronic banking for small companies.

1. INTRODUCTION

This paper is a logical continuation of the work related to the comparison and evaluation of the IT systems implemented by different organisations, especially banking institutions. Last year, an attempt at formal methodology of IT system selection and practical application of its first implementation at a real bank was presented on the example of the systems VideoTEL Corporate Banking 5.0. and NetBank. [Chmielarz, 2000a, Chmielarz, 2000b]. So, this paper is a continuation of the previous papers describing the methods, techniques, procedures and assumptions of IT system evaluation and selection with regard to the specific needs of the organisation that will use them. In comparison with the other methods of the IT systems valuation (for example: [Hill, 1999; Saaty, 1977; Campbell, 1998]) presented method is very plain and intelligible for future users.

The discussion is organised along the following lines:

- First, the e-banking services for small companies offered by the selected banks operating in Poland, whose services were used by small companies the most frequently in 2000, are described,
- Subsequently, the comparison criteria of different e-banking systems are reviewed,
- In the next step, the scoring method used to evaluate all the criteria is described,
- E-banking services offered by six selected banks are compared with regard to the economic criteria (mainly costs) and functional criteria,
- The results of these comparisons are summarised,
- Finally, a tentative comparison of the profitability of traditional banking and e-banking services is performed using similar methods.

The analysis is focused on small companies [Karpiński, 1998]. The main classification criterion is the turnover (net sales income), which could not exceed US\$ 771 thousand in 1997.

E-banking is a modern „virtual” form of banking services, which does not require visits to a bank branch. E-banking services are provided through IT and telecommunication systems used to improve and accelerate the non-cash flow of money in traditional and modern interbank systems and between customers and banks. The part of e-banking based on the Internet is known as Internet banking. E-banking, which is a computerised form of providing traditional banking services, is divided into the following basic categories:

- Home banking – the system of providing services to individual customers at their place of residence. The customers can perform specified operations on their PC;
- Office banking – the system of providing services to corporate clients where banks and their corporate clients can exchange information and perform financial operations.

The division into retail and corporate banking is reflected in the amount of fees charged for different services. Corporate banking fees are several times higher than retail banking fees. Significant differences in the amounts of fees result primarily from the number of operations performed within a month by individual customers and institutions.

Further analysis will be limited to e-banking services provided to corporate clients.

This paper will only discuss office banking and Internet banking services for small companies. Phone banking services will not be taken into account due to a limited range of banking operations performed by telephone.

2. E-BANKING SERVICES EVALUATION CRITERIA

The key element of every evaluation is a definition of a set of evaluation criteria and their detailed elements. For the purposes of this paper, the following sets of criteria have been defined: technological, economic, psychological, organisational and functional.

Hardware and software requirements depend on the selected method of communication with the bank. Below these requirements are presented by type of service:

- office-banking, where the customer’s computer is connected directly through modem to the bank’s telephone number: a PC; minimum 8, 16 or 32 MB RAM (main memory); from 20 to 500 MB hard disc space; 1.44 MB disc drive; access to a direct telephone line; regular modem; operating system Windows 3.xx, Windows 95, 98, NT or Windows 2000
- internet banking, where the customer’s computer is connected to the bank through Internet, e.g. with the use of a WWW browser: a PC; Internet access (switching or fixed line); a browser: Netscape Navigator or Microsoft Internet Explorer.

High security level is also one of the technological criteria of e-banking systems. In practice, high security level has been achieved through the implementation of specific technological solutions for the purposes of user identification and coding of the transmitted data. On the basis of the information about the methods of system protection received from banks we may conclude that the security level of all systems is satisfactory.

The most important economic criteria are the cost and time of service. Office banking services are associated with the following main costs:

- Installation fee – a single payment (upon signing of the contract), fixed or negotiable. The amounts vary from US\$ 7.23 to over US\$ 241.00. Some banks do not charge an installation fee.

- Cost of token – a single payment (with the purchase of the device), approx. US\$ 48.00 per one token. Some banks give the first one free.
- Training costs – depending on the bank, this fee may be negotiable or determined in advance per training or per hour of training. Sometimes the training fee is included in the installation fee.
- Account management fee – payable monthly, fixed. Depending on the bank, it may vary from US\$ 1.69 to US\$ 72.29 per month. It should be noted that this fee is significantly lower (up to 10 times) in the case of internet banking as compared with office banking.

Internet banking services are associated with the following fees:

- Fees for money transfer orders – a separate payment for every transfer order. The banks determine such fees as fixed amounts (between US\$ 0.28 and US\$ 0.88) or as a percentage (from 0.1 to 0.5% of the transaction),
- Cost of connection with the bank – a fee for Internet connection; depending on the type of connection, it amounts to:
 - US\$ 12.01 to US\$ 36.14 for Internet access (as part of the contract with the Internet provider) plus the cost of telephone connection at the rate determined by the operator (at TP S.A. a local connection costs US\$ 0.08 for 3 minutes);
 - Approx. US\$ 36 for the Fast Internet Access (SDI) service offered by TP S.A.,
 - Approx. US\$ 120-169 for access through a cable TV network (e.g. TwojaFirma@ACN package offered by Aster City).

With regard to the time needed to obtain service, the following aspects should be noted:

- e-banking is less time-consuming for customers: the time needed to reach a bank branch is eliminated completely and the time needed to order a specific service is reduced. Completing and sending by e-mail a transfer order (which has the same effect as submitting that order at a bank branch) does not take more than a few minutes.
- The processing of a transaction at the bank takes less time – sometimes processing of paper orders takes longer, because they must be entered manually into the system. Transfer orders submitted through office banking are posted automatically.

The main psychological problems related to e-banking arise from:

- A lack of confidence in the system – people do not feel safe using e-banking services, because they lack the necessary skills and because of the exaggerated press campaign undermining the reliability of such services.
- A lack of opportunity to obtain advice – in e-banking the possibilities of obtaining advice are limited (no direct contact with bank employees).

From the psychological point of view, the comfort of using e-banking services may be regarded as an advantage of this system. It is directly related to the place and time of performing the operations. When using e-banking services, a customer is not bound by the opening hours of the bank and the time needed to place an order for a transaction is much shorter. A customer performs all operations from his/her place of work at any time that suits him/her.

The organisational criteria are mainly related to the organisation of banks and their business hours. Theoretically, in e-banking the presence of bank employees is not needed during the performance of

most operations and the customer does not have to be present at the bank. In practice, however, none of the e-banking packages available provides all banking services through electronic channels, e.g. the customer must go the bank to sign an agreement for maintaining his e-banking account. As far as the availability of the services at different times of the day is concerned, the time of providing e-banking services is not restricted in any way (they should be provided 24 hours a day), however, in some banks certain services are available during the opening hours only.

The functional criteria concern the set of operations available within a given system. The bigger the number of operations available within the system, the higher its functionality.

Due to the variety of the criteria and the fact that they are divided into quantitative and qualitative ones, it is difficult to define a uniform method of their assessment, which would allow us to compare different bank systems not only with regard to the individual criteria but also from the point of view of the system as a whole. To ensure comparability of different criteria, the score method was used. Under this method, scores are granted to the individual functions / attributes of the specific criteria, e.g. using the following scale:

- 0 points - if a given function/ attribute is not present or is not as beneficial to the user as in a competitive system,
- 0.5 points – if a given function/ attribute is present only partly or the level of benefit to the user of the system cannot be clearly determined,
- 1 points – if a given function/ attribute is fully available or more beneficial to the user than in a competitive system.

The systems are evaluated by comparing the total number of points granted to each criterion and the combined number of points granted all the criteria of a given system.

3. COMPARISON OF E-BANKING SERVICE PACKAGES OFFERED BY SELECTED BANKS

A comparative analysis of the e-banking packages has been performed for six selected banks. Their offers are compared with regard to two sets of criteria:

- The economic criteria (costs),
- The functional criteria.

The remaining criteria (technological, economic (time), psychological and organisational) were not taken into account due to a lack of material differences between the attributes/ functions of different e-banking offers. As part of the analysis of the costs, each fee was granted a score: 1; 0.5 or 0 points. Finally, the e-banking offers of six selected banks were compared by comparing the total scores obtained by each bank (the total of the scores granted to all the criteria). The amounts of fees and the scores granted to each economic criterion are presented in the Table 1.

Scores for the cost of connection were given on the basis of the following assumptions:

- In internet banking, the cost of a connection comprises the fee for Internet access payable to the Internet provider and the cost of telephone connection at the rate determined by the operator;
- In office banking, the connection cost comprises the cost of telephone connection at the rate determined by the operator only,
- With regard to the costs, the selected e-banking offers obtained scores from 2.5 to 4. As many as two out of six banks obtained scores of 3.5 or higher. The results show that the costs of the

respective e-banking offers are comparable, so the probability that a customer will choose any of the offers is equal.

Tab. 1. A comparison of the amounts of fees for e-banking services of six selected banks and the scores granted for those fees

Bank	Installation fee	Cost of token	Cost of training	Account management	Fee for money transfer to another bank	Total
PKO BP	0 (approx. US\$ 289.00)	1 (free)	1 (Included in the installation fee)	0 (US\$ 48.00 a month)	0 (US\$ 0.87)	2
PKO SA	1 (free of charge)	0.5 (first token – US\$ 0; next – US\$ 48.00)	1 (free of charge)	1 (US\$ 1.69 a month)	0.5 (US\$ 0.60)	4
BŚ	0.5 (US\$ 7.23 + US\$ 48.19)	1 (free)	1 (free of charge)	1 (US\$ 3.61 a month)	0 (0.1-0.5% of the transaction value payable by the debtor, min. US\$ 4.82 a month)	3.5
WBK	0.5 (US\$ 7.23)	0 (US\$ 43.37)	1 (free of charge)	0.5 (US\$ 7.23 a month)	0.5 (US\$ 0.48)	2.5
BGŻ	0.5 (US\$ 72.29)	1 (free)	0 (6 hours free)	0 (US\$ 48.19 a month)	1 (US\$ 0.36)	2.5
PBK	1 free of charge	0 (free)	1 (free of charge)	0 (US\$ 48.19 a month)	1 (US\$ 0.36)	3

Tab.2. A comparison of the e-banking packages offered by selected banks with regard to the functional criteria

Functional criteria	PKO BP	PKO SA	BŚ	WBK	BGŻ	PBK
Bank orders /Domestic transfers						
To be executed immediately	1	1	1	1	1	1
To be executed in future	1	0	1	1	1	1
Foreign transfers	0	0	0	0	0	0
Social security (ZUS) contribution payments	1	1	1	1	1	1
Making/ terminating deposits	0	1	0	1	0	1
Requests for bank cards/ cheques	0	0	0	0	0.5	0.5
Blocking bank cards/ cheques	0	0	0	0	0.5	0.5
Information about:						
Account balance and ongoing operations	1	1	1	1	1	1
Account balance and historical operations	1	1	1	1	1	1
Foreign exchange rates	1	1	1	1	1	1
Co-operation with external applications						
Import of data	1	0	1	0	1	1
Export of data	1	0	1	0	1	1
Other						
Bank correspondence	1	1	1	1	1	1
Defining the list of recipients	1	1	1	1	1	1
Submitting applications for access through network	0	1	0	0	0	0
Demo version	0	0	0	1	0	1
TOTAL	10	9	10	10	11	13

Six e-banking systems were compared with regard to the functional criteria on the basis of the scope of services offered.

The total number of points obtained by each bank was used in the evaluation. All scores obtained by the individual banks for the functional criteria fall within the range from 9 to 13 points. The differences in the total scores show that the number of banking services available to a customer

depends on the e-banking system selected. Naturally, the customer will select the offer that includes as many services as possible. Therefore, continuous extension of the scope of operations available through the e-banking system is a simple way for a bank to attract more customers.

Tab.3. Summary of the comparisons of the e-banking systems of selected banks.

Criteria	PKO BP	PKO SA	BŚ	WBK	BGŻ	PBK
Economic criteria: costs	2.0	4.0	3.5	2.5	2.5	3.0
Functional criteria	10.0	9.0	10.0	10.0	11.0	13.0
TOTAL	12.0	13.0	13.5	12.5	13.5	16.0

Table 3 presents the final comparison of six selected e-banking systems. The systems were compared by adding up the total scores for the economic and functional criteria obtained by the individual banks, assuming that all the criteria have the same weight. All totals thus obtained fall within the range from 12 to 16 points. PBK obtained the highest score and PKO BP – the lowest.

Of course, we may assume that in fact all the criteria are not equally interesting for users. For example, the World Bank [Poniatowska-Mańczak'97] recommends that these years the economic criteria should be assigned 33% weight in relation to the remaining criteria. We should suppose that in Poland the economic criteria still have 50-66% weight, especially in the non-bank sphere. If the calculations are adjusted adequately, the relations between the systems will change materially. The relevant calculations for all previously analysed systems are presented in Table 4.

Tab.4. Comparison of the systems taking into account different weights of the economic criteria

Criteria	PKO BP			PKO SA			BŚ			WBK			BGŻ			BPK			
	33%	50%	66%	33%	50%	66%	33%	50%	66%	33%	50%	66%	33%	50%	66%	33%	50%	66%	
% weight of the economic criteria																			
economic criteria	0,66	1,00	1,32	1,32	2,00	2,64	1,16	1,75	2,32	0,83	1,25	1,66	0,83	1,25	1,66	1,00	1,50	2,00	
functional criteria	6,60	5,00	3,30	5,94	4,50	2,97	6,60	5,00	3,30	6,00	5,00	3,30	7,26	5,50	3,63	8,58	6,50	4,29	
TOTAL	7,26	6,00	4,62	7,26	6,50	5,61	7,76	6,75	5,62	7,43	6,25	4,96	8,09	6,75	5,29	9,58	8,00	6,29	

If we take into account the customers' preferences as to the importance of the individual criteria, the differences in the evaluation of the e-banking systems of the selected banks will become even deeper.

The differences in general scores obtained by different banks confirm that the e-banking offers of different banks are not the same. The range of e-banking services available and the cost of those services depend on the specific e-banking offer selected by a small company. Therefore it is very important to understand thoroughly the possibilities offered by the chosen system. However, the banks constantly increase the scope of e-banking services offered and the rating presented here may change with time. On the other hand, it would be interesting to compare the e-banking services offered by banks operating in Poland with the traditional banking services. Such an analysis has been performed as the next stage of this study.

4. AN ATTEMPT AT COMPARING THE PROFITABILITY OF E-BANKING SOLUTIONS WITH TRADITIONAL BANKING FOR SMALL COMPANIES

The offers are compared with regard to the following criteria:

- economic,
- psychological,
- organisational,
- functional.

Tab. 5. A comparison of traditional banking services with e-banking services with regard to the economic criteria

Economic criteria	Traditional banking	E-banking
Costs		
- installation fee / opening of an account	1	0
- training cost	1	0
- account management fee	1	0
- money transfer fee	0	1
- connection cost	1	0
Total	4	1
Time		
- time spent by a customer to use a service	0	1
- processing time at the bank	0.5	1
Total	0.5	2
GRAND TOTAL	4.5	3

The other economic criterion was time. The time needed for both types of services was compared with regard to the following aspects:

- traditional banking: travel time, waiting time (queue), time spent at the counter,
- e-banking: connecting time, time needed to make the order.

E-banking operations are much less time-consuming, so e-banking scored 1 point. In the case of some banking services the processing time is different for orders submitted through traditional and electronic channels. There is also a group of services whose processing time is identical, such as e.g. requests to issue a bank card. In view of this, the following scores have been granted: 0.5 points for traditional banking and 1 point for e-banking.

The final evaluation of the economic criteria should take into account the symmetry between the total score for the costs and the total score for the time. As shown in the above table, the total score granted to the costs of traditional banking is four times higher than the total score granted to the costs of e-banking. It means that a customer using e-banking services pays four times more. If we compare the time-related criteria, the proportion is reverse.

Tab.6. A comparison of traditional banking with e-banking with regard to the psychological criteria

Psychological criteria	Traditional banking	E-banking
Confidence in the system	1	0.5
Comfort	0	1
Possibility to obtain advice	1	0.5
TOTAL	2	2

Evaluation of the psychological criteria may be much more controversial than evaluation of the economic criteria, because the latter can be assigned numerical values. The first criterion presented above takes into account the fact that an e-banking operation cannot be verified. As far as the second criterion is concerned, e-banking solutions have an advantage. Therefore, e-banking obtained a higher score for comfort, while traditional banking was evaluated higher with regard to the confidence in the system. Among other things, it is a result of the fact that the speed of work, which increases comfort, at the same time is associated with a lower level of safety arising, among others, from the fact that an operation cannot be reversed. The third detailed criterion is related to the availability of advice: traditional banking scored 1 point, because a customer being served at the bank can obtain advice on the spot.

The total scores for the psychological criteria are identical, which leads to the conclusion that the probability of selection is identical for both systems. A customer will choose either traditional or electronic banking depending on what is more important for him/her: safety or comfort.

Tab. 7. A comparison of traditional banking with e-banking with regard to the organisational criteria

Organisational criteria	Traditional banking	E-banking
A bank employee must be involved	0	0.5
The customer must be present at the bank	0	0.5
The services are available 24 hours a day	0.5	1
TOTAL	0.5	2

In traditional banking, the bank staff must be involved in all operations. However, some e-banking services also require involvement of bank employees (e.g. opening an account), so the score is 0.5 points. The same is true about the customer's presence at the bank. In e-banking such presence is not required for money transfer orders, but a customer must visit the bank to sign a contract for opening a bank account. As far as the availability of the services round the clock is concerned, e-banking obtains 1 point for the possibility to use the system without any time limits. The final comparison of the organisational scores shows that e-banking has a clear advantage in this area. It is understandable in view of the fact that e-banking solutions have been designed to reduce employment at banks and extend the business hours.

Tab. 8. A comparison of traditional banking with e-banking with regard to the functional criteria

Functional criteria	Traditional banking	E-banking
Bank accounts		
-submitting requests to open a bank account	1	0.5
-submitting a specimen signature	1	0
-information on the account balance and ongoing operations	1	1
-terminating a bank account contract	1	0
Bank payments		
-issuing a transfer order	1	1
-issuing direct debit orders	1	1
-obtaining a confirmation of transfer	1	1
Loans		
-obtaining information about available loans	1	1
-submitting a loan application	1	0
-signing a loan contract	1	0
Bank guarantees		
-ordering a bank guarantee	1	0
Cheques and bills of exchange		
-submitting a request for cheques or a cheque book	1	0.5
-writing cheques or bills of exchange	1	0
-confirmation of a cheque/ bill	1	0
Card services		
-submitting a request for bank card	1	1
-blocking bank cards	1	0.5
Safe deposits boxes		
-renting a safe deposit box	1	0
International payments		
-receipt of necessary forms (e.g. order to open a letter of credit)	1	0
-submitting the required forms (orders)	1	0
-conformation of order execution	1	0
-obtaining information on foreign exchange rates	1	1
Deposits		
- completing an application to open a deposit	1	0.5
- extending the term of deposit	1	0.5
- terminating a deposit	1	0.5
Financial advice		
-obtaining advice	1	1
Banking fees		
-obtaining information about fees and commissions for banking services	1	1
Other		
- a possibility to negotiate contract terms	1	0
TOTAL	27	12

The services offered as part of e-banking are essentially the same services as offered in the traditional systems, because the range of e-banking services is based on the traditional banking services. Half a point was granted for the possibility of using a given service in the system depending on the selected bank.

The results show that over half of the services provided by banks through traditional channels are not available through electronic channels yet. All information services are provided through electronic channels, but not all operations can be performed on a computer. At present all banks offer domestic transfers and the payment of social security (ZUS) contributions in the e-banking system. However, such operations as international transfers, requests for bank cards, cheques or cheque books and opening term deposits are not always available through electronic channels (it depends on a bank). The fact that less than two-thirds of all banking services are available in e-banking systems may decide about the selection of a banking system (electronic or traditional) by small companies.

Tab. 9. Final comparison of e-banking and traditional banking

Criteria	Traditional banking	E-banking
Economic criteria:		
- costs	4	1
- time	0.5	2
Organisational criteria	0.5	2
Psychological criteria	2	2
Economic, organisational and psychological criteria combined	7	7
Functional criteria	27	12
TOTAL	34	19

As shown in the table, both banking systems obtained the same score for the economic, organisational and psychological criteria combined. It means that the probability of selection of one or the other system is identical. If the owner of a small company values his time and comfort higher than the costs, he will choose e-banking and vice versa. However, the result of the comparison of the functional criteria is much less favourable for e-banking. The number of functions that can be performed by traditional methods is almost twice as big as the number of functions available through electronic channels. Therefore, if only this criterion is considered, the customer most probably will select traditional banking. The functional criterion is thus the most important evaluation criterion of banking services. If increasing the number of e-banking customers is a bank's objective, the only way to achieve it is through continuous extension of the range of services available through electronic channels.

Tab. 10. Standardisation of the criteria of comparison of e-banking with traditional banking (equivalence of the criteria)

Criteria	Traditional banking	E-banking
Economic criteria:		
- costs	1	0
- time	0	1
Organisational criteria	0	1
Psychological criteria	1	1
Economic, organisational and psychological criteria combined	2	3
Functional criteria	1	0
TOTAL	3	3

If the results were standardised with regard to the individual criteria, we would arrive at different conclusions. E-banking obtained a higher score than traditional banking, i.e. was regarded as more profitable from the customers' point of view, with regard to two criteria out of five, namely time (one of the economic criteria) and the organisational criteria. Traditional banking obtained a higher score than e-banking also in two cases out of five: the functional criteria and costs (the other economic

criterion). The psychological criteria do not actively affect the customers' choice of one or the other system. Such calculations indicate that the same number of customers should opt for each of the two systems, which at present seems a great oversimplification.

Tab. 11. A comparison of traditional banking with e-banking taking into account the relative preferences for the economic, organisational and psychological criteria

Criteria	Traditional banking			E-banking		
	33%	50%	66%	33%	50%	66%
Economic criteria:						
- costs	1.32	2.00	2.64	0.33	0.50	0.66
- time	0.17	0.25	0.33	0.66	1.00	1.32
Organisational criteria	0.17	0.25	0.33	0.66	1.00	1.32
Psychological criteria	0.66	1.00	1.32	0.66	1.00	1.32
Economic, organisational and psychological criteria combined	2.32	3.50	4.64	2.31	3.50	4.62
Functional criteria	18.09	13.50	9.18	8.04	6.00	4.08
T O T A L	20.41	17.00	13.82	10.35	9.50	8.07

As expected, if the previously presented scores are adjusted to account for sample user preferences, at 66% weight attached to the economic, organisational and psychological criteria, the difference between these criteria and the group of functional criteria is reduced, as a result of which the advantage of traditional banking over e-banking decreases from over two times to less than 1.5 times. Of course, the values presented above are examples only. In real life situations, the managements of small companies should select the ratios that reflect their real preferences.

5. CONCLUSIONS AND FUTURE DEVELOPMENT

First of all the method of selecting optimal electronic bank for Polish small firms should be simple and clear for owners of SMEs. This work discussed implications of application of the method adapted from regular implementation strategy. Using this concept depends on the size of company and preferences of users. The main purpose of the article was the indication of differences between various models of comparing points method. According to each model several assumptions were made. Then the assumptions were discussed in the sense of selecting the best method for optimal choice of banks from the point of view of small firms. Next, comparison of traditional and e-banking services for small companies was made. Results, under assumed circumstances, were profitable for traditional economy. It shows that there is a long way before Polish banks are to have a reasonable and comparative proposal for small companies.

Further research will be done in generalizing some previous assumptions so to make the general model for making decisions which strategy will be chosen for small firms.

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