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COMPARATIVE ANALYSIS OF E-BANKING SERVICES FOR INDIVIDUAL CLIENTS IN POLAND

Abstract: The main goal of the paper is the analysis of the use of Internet banking services by individual clients in Poland at the beginning of 2007. First, the market of electronic services in Poland is described. Next, offers of Internet banking services of four banks: mBank, Inteligo, VW Bank and Toyota Bank are compared according to various methodologies. Finally, the author draws conclusions from this comparison concerning methodological correctness of the conducted research.

1. Introduction

This article is a continuation of previous papers related to the comparison and evaluation of IT systems implemented in organizations, especially banking institutions. In previous years an attempt at formal methodology of IT system selection for a commercial bank, the evaluation of electronic banking systems from the point of view of small and medium enterprises as well as comparative evaluation of electronic banking for individual and institutional clients were presented¹. Therefore, this study is a consequence of a series of previous papers concerning methods, techniques, procedures as well as evaluation premises and the selection of IT systems with regard to characteristics of organization where they are to be implemented.

The logic of the research reflected in this study, taking into consideration multi-criteria score evaluation of electronic banking services, is as follows:

- gathering of experts team consisting of bank clients, companies using banking services, bank websites producers and bank employees,
- collaborative establishing of detailed evaluation criteria of electronic services in selected banks, possibly sets of criteria and general criteria as well as their hierarchy and dependencies between evaluation factors,

¹ W. Chmielarz: *Systemy elektronicznej bankowości (Electronic Banking Systems)*, Difin, Warsaw, 2005.

- defining scoring principles of each criterion (e.g. standardized scale: 0; 0,25; 05; 0,75; 1), especially the transformation of economic criteria into scoring scale,
- collecting basic data for each of selected banks,
- experts' collaborative assigning relevant points to categories of sets of criteria on the basis of applied principles,
- presenting findings as a combined table,
- findings analysis and summarizing results.

Unfortunately, this method has certain disadvantages quoted by its opponents:

- unitary and equal treatment of all criteria, which e.g. in the case of a large number of functional criteria grants them absolute advantage over others – a solution in this case may be applying preference ratios from the point of view of a user, standardization, grouping of criteria, etc.,
- evaluation subjectivity – a solution might be the selection of experts panel and e.g. individual assessment (in place of a collective one), and subsequent averaging of scores, or using their dominants, you could also try using alternative methods,
- depending on the division of criteria we arrive at varying evaluation scores – in such a case appropriate interpretation depends solely on intuition and experience of a project manager.

However, the basic advantage of this group of methods is a possibility of presenting the final score as one value for each bank, which is comparable to the score depicting other banks and enables such a comparison. This method can provide an unequivocal answer to the question which of selected banks is the best for a specified category of a client, not going into speculations concerning ranking of particular banking services. Also, it does not enforce – for the sake of comparisons – creating an average banking services package which clients perceive as illusory and approach with certain reservations.

Electronic banking, which is a modern, 'non-contact' form of providing banking services without the necessity to visit a bank branch, is becoming a very important branch of individual and institutional customer service.

Further in this chapter, the paper will only present and analyse internet banking services in virtual banks offered to individual clients in the Polish market. In the analysis, the author examines an offer of four banks: mBank, Inteligo, Volkswagen Bank and Toyota Bank, the banks which on the Polish market can be considered virtual organisations².

² Despite certain reservations: Since the takeover of Inteligo by PKO BP SA, bank Inteligo is an electronic division of PKO BP SA, mBank has always been associated with BreBank, and mKiosks serve as minibranches; the remaining banks are much smaller and they started their operations as car insurance companies – as their names suggest.

2. Evaluation criteria of electronic banking services

For the evaluation of electronic banking we can differentiate the following criteria: technological, economic, psychological, organisational and functional ones. Numerous studies and expert opinions conclude that at present psychological criteria and, to a large extent, organisational criteria for electronic services for individual clients are shaped in a very similar way. Therefore, mainly economic and functional factors were taken into consideration, providing, similarly to internet services analyses, basic technological criteria and website range. In order to evaluate economic criteria we should analyse costs and profits of using electronic banking services and at times – the time of delivering a service. Within the costs related to using electronic banking services we can differentiate among others: a monthly fee for maintaining and account, fixed charge for using access channels, costs connected with payments/withdrawals of money into/from an account and transfers, costs of issuing and using charge cards. Functional criteria concern a set of operations which are available within a given system of electronic banking, and the functionality of the system depends mainly on the number of operations available within this system. Because here as well occurs a considerable homogenization and assimilation of basic services, the differences focus on additional and supplementary services, access channels, and less and less frequently on the methods of providing security.

Finally, a set of nineteen basic criteria has been established for the final evaluation of individual internet banking service. These are limited to: economic (minimum interest rate, fees for opening an account, fees for maintaining an account, obligatory minimum monthly payments, fees for a transfer to a parent bank, fees for a transfer to another bank, standing order to another bank, payment order, issuing a debit card, monthly fee for a card, commission or lack of commission for cash withdrawal in selected ATMs), functional (due to an extremely wide, largely similar, and partly incomparable offer, the following factors were taken into consideration: the range of general functionality as well as the range of additional services: insurance, investment funds, cross-border transfer, card for payments in the Internet/digital card, foreign currency account; access channels: SMS, WAP, bank branches, the Internet, call centre, helpline; security: ID and password, token, SSL protocol, a list of single-use passwords and a list of single-use codes), technological (visualisation: colouring, lettering, background and graphic elements, dynamics; navigation: menu layout and links, searching; clarity and usability: content, contextual help, teach-yourself manuals, content non-overload), others – the range of the service assessed by the number of clients using internet banking.

The author analysed four virtual banks with access only through electronic devices, without traditional branches. An individual account, the most popular of the available services, is selected for comparison. These were: mBank (e-account), Inteligo (individual), VWBank (e-direct) and Toyota Bank (personal account).

3. Comparison and analysis of electronic banking services for individual clients by means of multi-criteria scoring method

Comparative analysis of internet banking service packages has been performed on the basis of offers of four banks assigned to this category. To evaluate cost, functional, technological and other criteria the author used a preliminary table presenting bank offers related to Internet banking services and fees connected with using bank accounts operated via the Internet. This table has been generated on the basis of data obtained from websites of selected banks. Below, there is a simplified, basic combined table of criteria evaluations generated by experts, and constructed on the basis of combined table of basic data on banks obtained in the Internet.

Simple adding up scores obtained from the table shows a specified ranking of electronic banking services for particular banks. The first place in this ranking is taken by Toyota Bank (77,63% maximum number of points). Here the decisive factor were low fees for basic operations introduced by this bank when it was entering the Polish market. In the second position there is Inteligo (72,37%) traditional in terms of its service, leading by turns with the third mBank (68,42%) in various general and partial rankings (e.g. account maintenance, payment cards etc.), where mBank is considered to be the most customer-friendly. The fourth position is taken by Volkswagen Bank with e-direct service which until recently was one of banks with the best relation of functionality to the price we have to pay for it. Rating differences are limited 2,25 points, which demonstrates little price differentiation – these banks observe each other and draw conclusions from successes and failures of their competitors. In all banks there are no obligatory minimum monthly payments, transfers to the bank are free of charge, and the security level can be considered sufficient for clients (4 kinds of security). Other elements are the basis of competitive bidding on the market, striking a precarious, changeable balance between the wish to gain a competitive advantage and the profit for the bank. In particular it starts to concern the visualisation (tradition and new fashions and trends) as well as functional additional services (insurance, investment funds, cross-border transfers, foreign currency account, virtual card, etc.). All things considered, only two of them show results higher than the average (12,5) of using maximum of internet channels possibilities. The final results of the ranking are shown in Figure 1.

On the other hand, if we analyse the fulfilment of particular criteria by the selected banks we can observe that a transfer to the parent bank, security as well as obligatory, minimum monthly payments are free of charge. Other elements are subject to competitive bidding: three-quarters do not charge fees for issuing a debit card, opening an account, using a card; they are clear and easy to operate through the majority of available telecommunication channels. We should note that only

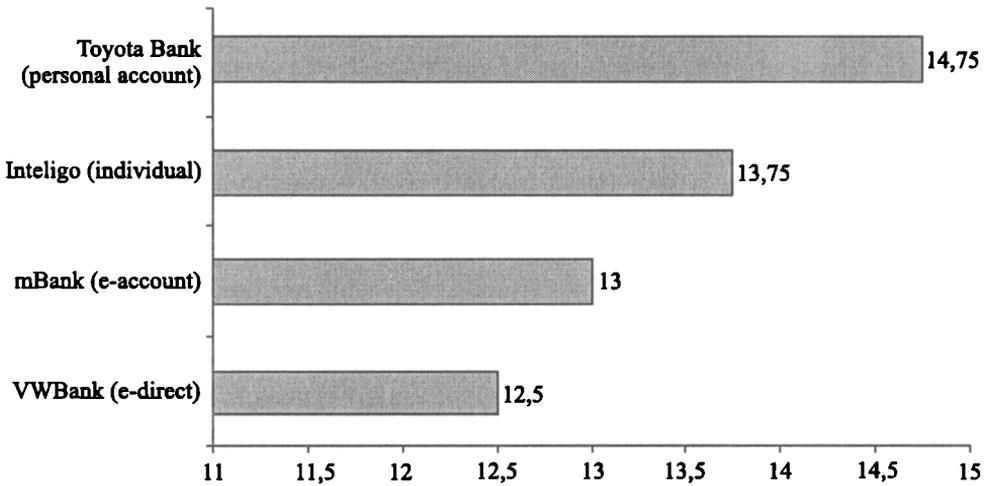


Figure 1. Ranking of internet banking services in selected banks

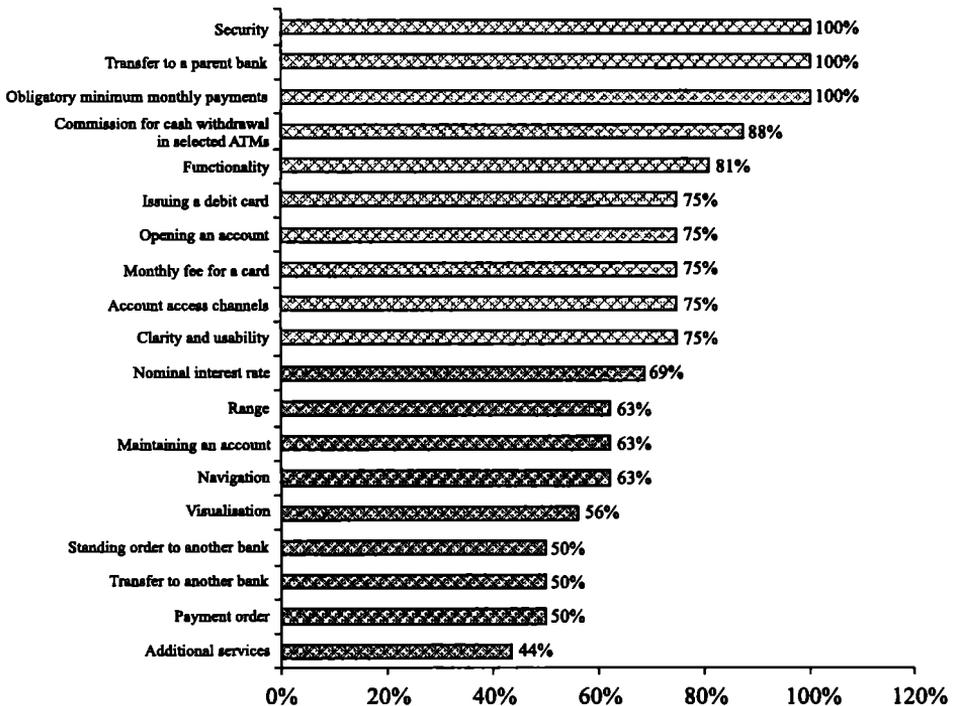


Figure 2. Ranking of using particular criteria in the evaluation of e-banking services of selected banks

four out of nineteen criteria are fulfilled in less than or in 50 per cent. Ranking of using particular criteria are shown in Figure 2.

4. Analyses findings for multi-criteria scores with preference scale

Internet banking in Poland has undergone a number of stages in its development: information stage, interactive stage, functional stage and strategic stage. We can assume that at present Internet banking systems belong to the two latter generations. A functional stage is characterized by the following attributes: Internet portals with almost full (80%), functional, versatile customer service via the Internet, which results in a considerable reduction of customer service costs, retaining existing clients, with the appropriate policy of interest rates on deposits and credits (possible due to cost reduction) gaining new clients, establishing virtual banking (without bank branches), availability of e-commerce transactions service tools (on the same portals as financial services), further reduction of employment in banks. A strategic stage provides: a possibility of creating a service package similar to traditional service (99%) guaranteed by widespread e-signature, a possibility of individual treatment of a bank's customer on the basis of analysis of clients' profitability (systems based on CRM), potentially greater opportunity of profit-making, full systems integration; the change of perceiving banking services as universal financial services. At present, we may state that Internet banking offers functionality which is almost comparable to traditional banking. We can even say that the level of complexity of various services and their mix starts to be close to a mobile telephone offer. Therefore, banks and financial institutions in their self-assessment for the last three years have started to move from overall comparative evaluations in favour of banks' evaluation in particular categories. Therefore, clients of such banks can sometimes feel confused when they are faced with a dilemma of choosing the best – from the point of view of their own interest – bank offering e.g. a given set of electronic banking tools. So, the presented methodology shows a relatively simple – intelligible for an average client, intuitive, scaling approach to this issue. Also, doubts reported in the beginning of this article can be overcome by means of several available methods.

The first method limiting specific subjectivity of expert group evaluations is applying unitary preferences with regard to particular criteria or sets of criteria. Table 1. above presents changes in ranking caused by assigning preferences to economic or functional criteria. Results shown in Table 1. demonstrate that depending on the relation of economic factors to functional ones we can conclude about the use of these groups of factors in the bank's operating strategy. Together with the increase of importance of functional factors, electronic services in Toyota Bank and Lucas Bank rank lower, which is the evidence of a greater influence of economic factors on a bank's policy. The reverse relation occurs in the case of mBank and Inteligo. Toyota bank entering the Polish market has a very strong position in

Table 1. The influence of preference on the position in electronic services ranking in selected banks

No.	Banks/criteria	mBank (e-account)	Inteligo (individual)	VWBank (e-direct)	Toyota Bank (personal account)	Preferences
1.	Economic factors	3,00	2,70	3,00	4,00	40%
2.	Functional factors	3,23	3,08	3,15	3,68	30%
3.	Technological factors	0,25	0,55	0,30	0,45	20%
4.	Other factors	0,10	0,08	0,05	0,03	10%
5.	Total	6,58	6,40	6,50	8,15	100%
1.	Economic factors	0,75	0,68	0,75	1,00	10%
2.	Functional factors	2,15	2,05	2,10	2,45	20%
3.	Technological factors	0,38	0,83	0,45	0,68	30%
4.	Other factors	0,40	0,30	0,20	0,10	40%
5.	Total	3,68	3,85	3,50	4,23	100%
1.	Economic factors	5,25	4,73	5,25	7,00	70%
2.	Functional factors	1,08	1,03	1,05	1,23	10%
3.	Technological factors	0,13	0,28	0,15	0,23	10%
4.	Other factors	0,10	0,08	0,05	0,03	10%
5.	Total	6,55	6,10	6,50	8,48	100%
1.	Economic factors	0,38	0,34	0,38	0,50	5%
2.	Functional factors	0,54	0,51	0,53	0,61	5%
3.	Technological factors	0,63	1,38	0,75	1,13	50%
4.	Other factors	0,40	0,30	0,20	0,10	40%
5.	Total	1,94	2,53	1,85	2,34	100%

the ranking despite the fact that it has a limited range if we compare it to other banks. Only lowering preferences of two basic factor groups allows Inteligo to move to a leading position. In other cases Toyota Bank dominates, the second place changes with regard to preference 'mix'. With dominance of economic factors it is mBank and functional ones – Inteligo. Volkswagen Bank with e-direct service occupies a secure mid position – higher in the case of dominance of economic factors. It shows a strategy which is acceptable for banks entering this market; however, the key players are still mBank and Inteligo, the oldest banks operating in this channel (or BreBank and PKO BP S.A. which they represent).

5. Analysis by means of Saaty's method

Subjectivity of evaluation occurring in this traditional, common-sense scoring methodology can also be limited by applying Saaty's method³. Roughly, it is a

³ T.L. Saaty: *How to Make a Decision: The Analytic Hierarchy Process*, European Journal of Operational Research, No 48, 1990, pp. 9-26, T.L. Saaty: *Fundamentals of the Analytic network process*, ISAHP, Kobe, no. 8, 1999.

relative, multi-criteria expert evaluation consisting in pairwise comparison of experts' evaluations. The stages of the procedure are the following:

- on the high level (pairwise comparison of evaluation criteria) a brainstorming method has been applied – experts who filled in a survey created a combined preference matrix as a result of the discussion,
- CI - consistency index has been calculated – as its value exceeded 0,1 the assessment procedure of combined preference matrix has been repeated until finally value of 0,0489 has been reached,
- according to AHP method the square matrix has been calculated, and subsequently – on the basis of the sum of rows – weight vector, and normalised preference vector with regard to criteria (through referring particular elements to the sum of the preference vector elements),
- for each criterion a low level preference matrix has been constructed for each pair of compared banks,
- by collecting scores for each criterion a low level preliminary matrix has been constructed and a preference vector has been calculated with regard to particular banks,
- data matrix has been multiplied by preference vector with regard to criteria, and subsequently a preference vector with regard to particular banks,
- obtained findings were analysed.

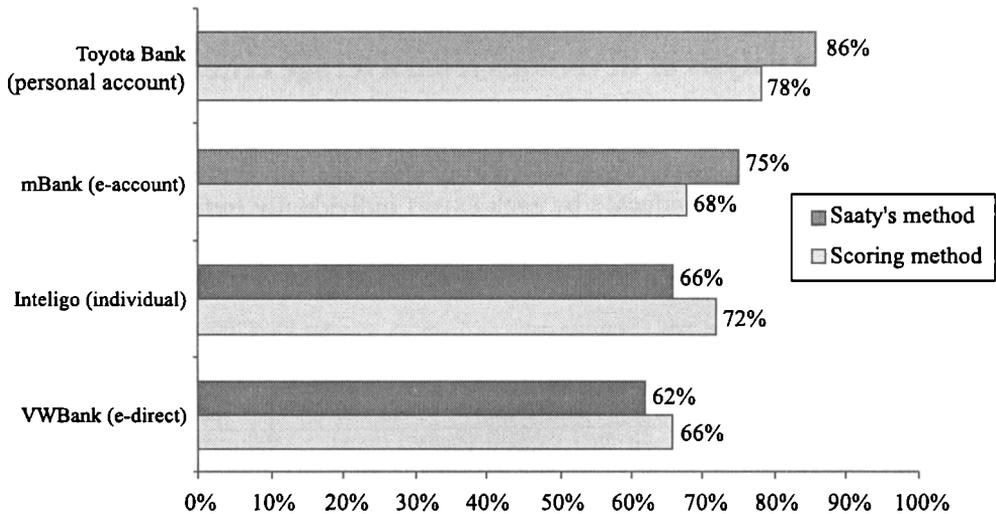


Figure 3. Ranking of use of particular criteria in e-banking services evaluation of selected banks by means of Saaty's method in comparison to scoring method

Saaty's methodology has caused some difficulty for the gathered experts panel. First problems concerned pairwise comparison of criteria. While within particular sets of criteria it seemed possible and reasonable, in the case of comparing e.g.

functional and economic criteria the importance and advantage of ones over the others did not seem that obvious. The final form of the table was a result of a compromise between experts. There was a common view (which did not appear during scoring method), that there are too many considered criteria. It would be definitely easier to evaluate the degree to which the criterion has been fulfilled and its relation to the criteria fulfilment in case of other banks. The problem was that there were as many as nineteen tables. Interesting results have been obtained. Apart from the first position of Toyota Bank and the last of VWBank, the remaining two swapped places in favour of mBank. Also, the proportions between particular banks' fulfilment of the maximum number of points have changed. Results are shown on Figure 3. We have observed the increase of importance of previously underestimated criteria such as: service range, nominal interest rate, the costs of opening and maintaining an account. Unexpectedly low in the expert preference scale were technical criteria such as: usability, visualisation, or navigation which are usually very important in the evaluation of the best Internet shops in client ranking. Perhaps, gathering expert panel consisting only of bank clients would produce entirely different results. Generally, it is difficult to state whether Saaty's method allowed for eliminating evaluation subjectivity. Certainly, it has become fuzzy in the relativity of constant references of particular criteria to each other. For the expert panel, which are used to other methodology, this procedure was difficult and perplexing, and its application was a real challenge.

6. Analysis of deviations from average criteria

It seems that evaluation subjectivity in experts judgements can also be eliminated if we relate them to averaged values. It is more difficult (but more effective), if such an evaluation is conducted by each expert individually (refer to analysis of Internet shops websites⁴), and it is also justified in the case of experts panel constructing evaluation taking into consideration criteria and their values.

Table 2. Standard deviations from average expert evaluation for particular banks

Banks	mBank (e-account)	Inteligo (individual)	VWBank (e-direct)	Toyota Bank (personal account)
The sum of square deviations	1,52	2,02	2,20	2,08
Standard deviation	0,282	0,326	0,341	0,331

In the case above the lowest average deviations from arithmetic mean for particular evaluation criteria are demonstrated by the two oldest and the most stable

⁴ W. Chmielarz: *Systemy biznesu elektronicznego (Electronic Business Systems)*, Difin, Warsaw, 2007.

virtual banks: mBank and Inteligo. It can be evidence for several facts. First, the selection of criteria made by experts has been performed on the basis of experiences gained through contacts with these banks. Second, in this case experts' judgments were more accurate. Third, these are the banks where evaluations are the most credible (the most averaged evaluation subjectivity). In the case which is analysed it is difficult to compare the ranking we arrive at with previous methods. Nevertheless, if tens of experts are engaged in the evaluation, and their judgements vary this method can produce good results. You simply need to produce a combined table of mean-square contingencies for expert assessments and calculate standard deviations for each object of investigation. It has to be noted that the comparison concerned mainly basic functionalities of electronic banking systems – which are very simple to operate and do not require specialist knowledge. The reason is that so far Internet distribution channel is not effective in sales of complex products and banking services. Poles still prefer buying mortgages, investment funds, credit cards or insurance in bank branches or with the help of a physical adviser⁵. However, we can expect that in the nearest future it will be changing – as clients will gain experience using services via the Internet. And this market area will probably become a field of competitive struggle between banks, which in this particular area will be offering more and more versatile range of services. However, it requires a more educated client, a fact which should be catered for by the banks, mainly for their own sake, as well as methods which could measure and evaluate these processes from various viewpoints in examining of which this article may prove useful.

References

- Chmielarz W. (2007): *Systemy biznesu elektronicznego (Electronic Business Systems)*, Difin, Warszawa,
- Chmielarz W. (2005): *Systemy elektronicznej bankowości (Electronic Banking Systems)*, Difin, Warszawa,
- Macierzyński M. (2007): *40 procent rachunków obsługiwanych jest przez Internet (40 per cent of accounts are operated via the Internet)*, Warsaw, <http://www.bankier.pl/wiadomosc/Juz-40-procent-rachunkow-obslugiwanych-jest-przez-internet-1588175.html>.
- Opłaty za usługi świadczone klientom indywidualnym (Fees charged for services provided to individual clients)*, (2006), Raport Związku Banków Polskich, Warszawa, <http://www.zbp.pl/photo/pr4/Raportceny%20ost.doc?PHPSESSID=69e70898f2a57154c92340ce0d47f49>,
- Saaty T.L. (1990): *How to Make a Decision: The Analytic Hierarchy Process*, European Journal of Operational Research, No. 48, pp. 9-26,
- Saaty T.L. (1999): *Fundamentals of the Analytic Network Process*, ISAHP, Kobe, no. 8.

⁵ Macierzyński M.: *40 procent rachunków obsługiwanych jest przez Internet (40 per cent of accounts are operated via the Internet)*, Warsaw, 2007, <http://www.bankier.pl/wiadomosc/Juz-40-procent-rachunkow-obslugiwanych-jest-przez-internet-1588175.html>.