

FORMS OF ELECTRONIC BANKING

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Making payments for goods and services in cash or non-cash forms as well as depositing money in financial institutions and managing these resources are an inherent constituent of economic life. Banks serve as important intermediators. In recent years, with the development of technologies and techniques, options for communication with banks are expanding for clients. New services are originating such as home banking, phone banking, internet banking and others.

Clients use modern communication media for remote communication with the bank: a modem, telephone, computer or payment card. A characteristic feature of these services is the client's uninterrupted round-the-clock account access, i.e., independent of banking business hours and the ability to execute local and international payments directly from the comfort of the home or office. This reduces cash handling and transport costs, lowers the risk of theft or accepting counterfeit bank notes, increases speed and enhances the comfort of making payments.

Electronic communication means are particularly coming to the forefront. These are more convenient, faster, and often cheaper for clients. Banking experience shows it is suitable to use combinations of several communication means, depending on individual segments, clients, and types of operations, products and situations. Electronic banking is a service that specifically uses electronic communication forms.

Electronic banking can be divided on the basis of the instruments used: telephone connection, personal computers, means of payment [bank cards] and self-service zones.

Electronic Banking Using a Telephone Connection

Telephone banking and the first banking services using classic telephone lines for communication date back to the turn of the sixties and seventies of the last century. These services grew very rapidly and at the close of the 20th century mobile phones also started to be used in banking with the development of information and communication technologies. In this period banks quickly responded to the dawning of a new era in using mobile telephones world-wide and began communicating with their clients by SMS messages, with GSM banking later becoming a natural component of electronic banking. Each financial institution offers this under a different name, but the essential

product remains the same. A mobile phone can be used to communicate with a so-called telephone banker or an automated telephone system, just as well as a fixed line. However, opportunities for mobile phone usage in communication with a bank are much greater. Mobile phone use represents a direct communication channel that spread on a massive scale through which clients have immediate access to typing a bank operation, ordering services or working with accounts.

Electronic banking using a telephone connection can be divided into phone banking (ATS, client advisor) and mobile banking (SMS banking, GSM SIM Toolkit and WAP).

Phone banking is the provision of banking services using a classic telephone line. A bank client can obtain the necessary information on dialing a telephone number specified in advance. Before the requested banking service information is provided, the client's identity is determined using contractually agreed terms. Using this banking service enables bank clients to obtain information concerning active and passive banking products, but a client can also actively use the bank payment system and request, for example, a payment order or a collection order, open or cancel a term deposit or a current account. In this case a fax connected to the telephone serves as an output communication channel.

The client advisor or so-called telephone banker is a bank employee capable of providing any information about products and services and, following verification that he is speaking with an authorized person, can also perform any passive or active operation. He can provide advice to the client and offer further banking products.

One advantage of this service is that it requires no additional technical equipment apart from a telephone. As a rule bank telephone center (call center) operators work 24 hours a day nonstop and it is thus possible to use their services from any place at any time.



A client advisor is a bank employee; the bank pays his salary thus increasing its costs and fees for this service. Banks therefore sometimes establish automated telephone systems.

Automated Telephone System

The technical means necessary to use this system are the same as for communication with a client advisor. A telephone is required, which must have tone dialing¹ or be equipped with an accessory adaptor (tone dialer).

An automated telephone system works on the basis of a menu through which clients can move around using buttons on the telephone. The service menu tree is usually designed to be simple so that a choice does not take too long. More extensive information is sent to the client by fax either to a telephone number agreed in advance or to a number requested by the client. Cost efficiency is the advantage. Some banks offer this service to clients free-of-charge because costs are negligible and comfort is significant. One disadvantage is that problems can sometimes arise when the client cannot choose a menu item that corresponds with his wishes or the computer responds to an instruction in a way that differs from what the client wanted. It is then appropriate to connect to an automated telephone system with a telephone banker who can resolve the problem. Secure communication for this system can be arranged in two elementary ways:²

1. END-TO-END security – the whole communication chain is secured by a verbal code. This is very secure but also expensive and only used in public administration and the army,

2. using so-called access rights – at the start the client must document his authorization to communicate with the bank.

A client's personal number (e.g. account number) and PIN as a numerical password are often used for passive operations. Here, however, the risk of misuse is relatively great because everyone who gets to know the personal number and password will be able to enter the system. The following methods are safer:

- when an account is open the client selects several keywords. An operator stores them in the information system. During client authorization in the course of the next call the system generates a request for specific letters from these words. The operator rewrites them

into the information system terminal which then confirms or rejects the client's authorization. Hence not even the operator ever sees the whole keywords. One exception to this is when the account is initially open.

- using a so-called authorization code – on the principle of a tear-off notebook. Each authorization code is used for one day only and then becomes invalid.

- electronic key – a special device similar to a calculator. The bank's information system gives the client a random number, the client types it into his key and the key answers with the authorization code. The authorization code is activated by the system and the system either confirms or rejects the authorization. The key itself is protected against misuse by a PIN which the client can change at will. No password or answer is repeated twice.

- A two-level system of protection is often used. During entry a client types his personal number and a password. If he wants to perform an active operation he must enter a nonrecurring password. When the client signs a contract on using telephone banking services he receives a set of several passwords, whereby for every active operation with an account he uses one, by which he authorizes the given operation. Once used the password cannot be used repeatedly. Changing the numerical password after some time further increases safety. When an incorrect password is repeatedly entered the system blocks access to the given user.

SMS Banking

SMS banking uses short text messages sent through the client's mobile phone. SMS text messages can be used for both passive and active operations similarly as with classic telephone banking. A client can automatically receive information about his account balance: an SMS is sent to the client immediately after a certain operation is performed, or on request: a client sends the bank a correctly formatted message which processes it and answers the client's request by SMS.

Information sent on request mostly concerns current interest rates or currency exchange rates. Providing these is simple for the bank because this is publicly accessible information that needs no protection. A client however can request information about the balance in his account, which is not public information and must be protected when it is provided. Passwords are used for this purpose or technologies based on the principle of an electronic key. A client however is required to know the code of every transaction including constant and variable symbols. The whole message containing data separated by # symbols sometimes

¹The difference between tone dialing and pulse dialing on a telephone is that a telephone with tone dialing assigns a different tone to every digit when a number is dialed and a telephone with pulse dialing a different number of impulses.

²Korauš, A.: Bankovníctvo na Slovensku (Banking in Slovakia). Kritériá a kontext vstupu do Európskej únie (Criteria and Context of Accession to the European Union). Bratislava: Sprint, 1997, pg. 126.



has up to fifty characters. Users can easily make mistakes. This is frequently a limiting factor for clients, reducing the comfort factor in this service.

GSM SIM Toolkit

The GSM SIM Toolkit service can only be used from a mobile phone supporting this technology. GSM SIM Toolkit is a software interface that enables arbitrary changes to the mobile phone menu. Operators supporting this technology can use it to personalize mobile phone menus. This means that only functions activated and paid for will appear on the user menu. This technology dates back to 1998. Among the first companies to use it in banking applications based on the GSM SIM Toolkit standard were RadioMobil and Expandia Bank in the Czech Republic.

Most mobile phones now on the market support for the GSM SIM Toolkit. To use this service the client needs to be using services of an operator supporting this standard in its network, be a client of a bank that offers handling of accounts through the GSM SIM Toolkit, have a mobile phone supporting GSM SIM Toolkit technology and use a special SIM card for banking services.

After buying a special SIM card and activating it at the pertinent bank branch the client can begin using this service. The mobile phone menu will be widened to include the Banking Services item, through which it is possible to carry out active or passive banking operations. The precise structure differs from one financial institution to another. Security is what is important here. To access banking services it is necessary to know BPUK (PUK for banking applications) and BPIN. BPUK is assigned to a client by the bank when the application is activated and recorded on the mobile phone's SIM card. BPIN is used for every access to protected items in the banking application. When a client makes three unsuccessful attempts to type the BPIN, access to the banking application and its items is blocked, it is necessary to know the BPUK to unlock it. When the client fails ten times to type the right BPUK the SIM card can no longer be used for banking services. The main advantage of this service is its simplicity. A client just follows instructions on the mobile phone display.

WAP (Wireless Application Protocol)

WAP is often compared to web pages, although this is a simplification. Unlike pages appearing on a computer monitor, WAP presents its output on a small mobile phone display, therefore concentrating on text information. It is a form of gateway to various services prepared by a mobile network operator or another

firm. One condition for using the service is that the client must have a mobile phone supporting WAP technology. Security is again provided by an electronic key. WAP banking has not caught on very well so far, some banks however continue to offer it despite the relatively low number of users.

Electronic Banking using Personal Computers

Along with significant growth in the usage of mobile phones in banking practice, personal computers have also come to the fore, which to an even greater extent facilitate and modernize banking service provision. In an information society this communication instrument plays an irreplaceable role and is indispensable for the present day banking sphere. The area of electronic banking realized through personal computers can be divided into home banking, internet banking and mail-banking.

Home Banking

Home banking is a service that enables a bank client to handle his accounts from a computer from a place selected in advance, at home or in the office. The main features of home banking systems are the high level of security, comfort, simplicity of use, openness of the system, wide communication possibilities, networking, definition of users and their rights, automated data transmission and the option to define a combined signature specimen.

A home banking system usually consists of two parts: a bank computer program and a program in the client's computer. The bank program works as a communication server. It receives calls from clients, verifies their identity, receives data from them, authenticates digital signatures, generates digital receipts and sends data to clients. A home banking computer system is a multi user application, meaning that several of the client's employees can work with it, in particular:

- a) administrator – can define new employees, change rights,
- b) sender – ensures communication with the bank and transmission of prepared data,
- c) accountant – can type payment orders and orders for collection,
- b) viewer – can browse through statements and announcements received.

This system is open and can be expanded in the future without great cost.

Internet Banking

Internet banking can be used from the home or the office, as well as an internet café, although the latter is not recommended for security reasons. In order to



handle his account a user just needs an internet browser (such as MS Explorer or Netscape Navigator). A client cannot avoid visiting the bank though, because he must first ask for an identification code. After opening the bank's web site the client simply selects internet banking and, further to proper identification, can perform passive or active operations. Good internet banking should provide a maximum of services. No less important are the graphic interface, clarity, simplicity, and unambiguity of usage. The intelligibility of texts determines simplicity and speed of understanding of the meaning of menu items, data fields, and general text information displayed to the client.

Safety for concrete applications is assured by client authentication, verification of data and data protection by encryption. Client identification is done using passwords or codes. The client chooses some of these and the bank assigns others. It is recommended to choose a password made up of various types of characters, which can be a combination of numbers, lower case and capital letters, and special symbols.

Banks usually protect large volume transactions with additional security means, such as an encryption (authentication) calculator, or a token, which generates nonrecurring random passwords, which a client types on confirming an order. The token itself is protected by certain security features. Work with it is only enabled after the client types a four-digit PIN code, whereby the user can change the PIN at any time. In the event of three failed attempts to type the correct PIN the token blocks itself. After 60 seconds of inactivity a token automatically switches itself off and once switched back on, it again requests the PIN.

When a client generates several (for example 10) authentication codes in succession and types none of them into the client system, the key becomes desynchronized. This protection serves to prevent use of the key for other purposes. A cheaper and, based on its dimensions, more practical alternative to a token is a grid card. This is a card with a mesh drawn on it with fields with random generated characters. The user authorizes an active operation by typing the right code from the field of the card the operator requests from him.

Mail Banking

Mail banking is another electronic banking service that makes it possible to communicate with the bank by electronic mail or e-mail. The most frequently used service is sending account statements at agreed periodicity to the client's mailbox. E-mail is not used for more complex operations.

Payment Instruments and Self-Service Zones

Apart from those already mentioned, there are other more or less widely known forms of electronic banking, including a payment card, an electronic wallet and a self-service zone.

A payment card is currently one of the most widely used payment instruments designated for authorized holders through which they can perform non-cash payments or cash withdrawals from an extensive network of automated teller machines. An electronic wallet represents a chip card similar to a payment card that contains a record of a financial sum that is available to its owner. A self-service zone is a fully automated alternative work place of a bank with terminals and devices that clients can use to get various bank services. It enables active and passive operations offered by the bank to be made without the presence of a bank employee. Devices are constructed for very easy use with simple intuitive controls (user friendly). Equipment includes modern security systems outside and inside a self-service zone. A payment card in combination with a password is used to access a self-service zone. It is also possible to use other authentication devices, such as an electronic key, but also a fingerprint. Self-service zones are available 24 hours a day, 7 days a week.

In expert circles it is sometimes possible to encounter another form of electronic banking: fax-banking. A fax is however mostly used as an addition to other forms, such as telephone banking, when a client agrees with the bank that all output would be sent to him by fax.

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