

# Sistemas de Informação e Novas Tecnologias na Banca

## – Information Systems and New Technologies in the Banking Industry

Gertrudes D. L. Saúde\*  
J. Dias Coelho\*\*

### Resumo

Os sistemas de informação, acompanhados das novas tecnologias, assumem uma importância crescente no sector bancário, tanto a nível de organização interna, como de novos serviços a fornecer aos clientes. A evolução do sistema bancário português mostra a introdução progressiva destes elementos. Hoje em dia o sistema de informação de uma empresa, no nosso caso de um banco, deverá inserir-se e condicionar a estratégia global da empresa. Os sistemas e novas tecnologias da informação também determinam uma nova organização funcional dos bancos, tanto a nível dos balcões como dos serviços centrais. As novas tecnologias têm múltiplas aplicações na banca, proporcionando novos serviços e melhoria dos tradicionais. Surgem assim os meios electrónicos de movimentação de contas e de pagamento (*electronic banking*), as transferências electrónicas de fundos e outros serviços como o correio electrónico, *electronic data interchange* e *office-automation*. A Caixa Geral de Depósitos (CGD) adoptou recentemente novas tecnologias e sistemas de informação em alguns dos seus departamentos, os quais se tornam interessantes de analisar, uma vez que se trata da maior instituição bancária portuguesa.

### Abstract

Information systems and new technologies are very important in the banking industry, both in the internal order and in the new services for the clients. The evolution of the Portuguese banking system shows the progressive introduction of those elements. Nowadays the information system of a company must be in and regulate the global strategy. The information system and new technologies defined a new functional order, both in the agencies and in the central services. The new technologies have many uses in the banking industry. They make possible new services as electronic means of payment (*electronic banking*), electronic transference of funds and other services as electronic mail, *electronic data interchange* and *office-automation*. The CGD (Caixa Geral de Depósitos) as the bigger Portuguese bank institution, has recently introduced new information systems and new technologies in the agencies and in the central services.

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- Instituto Nacional de Estatística e ISEGI  
Instituto Superior de Estatística e Gestão de Informação
  - \*\* Faculdade de Economia e ISEGI  
Instituto Superior de Estatística e Gestão de Informação  
Universidade Nova de Lisboa  
Trav. Estêvão Pinto, Campolide – 1070 Lisboa

## 1 Introduction

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To succeed in business nowadays companies have to use information systems of high efficiency and capacity, in order to have the chance of reacting quickly to the challenges they have to face.

Information technologies are constantly evolving, as seen by the daily appearance of options for hardware, software and communications, as well as a continuous reduction in the price-capacity relation-ship. As a consequence, their use has grown in organizations and in society. It is becoming clearer every day that without an effective and efficient use of those technologies, organizations can be neither competitive nor profitable. In many cases, survival itself can be in danger.

We will concentrate on information systems and the dynamics of new technologies in this paper, and more specifically on their use in the banking industry.

## 2 Evolution of the Portuguese Banking System

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The evolution of the Portuguese banking system in the last twenty years has been marked by the political changes and by the introduction of financial products and banking services which have had a great impact. We have witnessed a change in the realities of institutional information systems.

In the seventies we had as our main considerations:

- services;
- interbank cooperation;
- teleprocessing networks.

Due to an upturn in the economic cycle, we have witnessed a real "boom" in so-called banking services. Up to this moment, services had assumed a minimum value in the banking business and the information system of that time (almost exclusively manual, because banks did not have much computational equipment) could not satisfy the new demands of the market. So the banks had to seek support in the independent processing centers, which had their golden period. On the other hand, the banks themselves participated in the financing and destiny of many of those centers.

After this period, characterized by an increase in investment by the banks and by an increase in competition and commercial aggressiveness between institutions, we saw, in the middle of the 70's, an apathy towards what concerned the renewal of the information systems already set up, delaying decisions that were urgent. We saw a sharp fall in information systems investment. It happened because of the absence of a true modernisation policy. We can say that it is in this period, of which the main characteristic is the weak competition between banks, that Portuguese banks developed the spirit of cooperation, as a result of the effort of the working groups integrating several institutions and coordinated by the Bank of Portugal. An example of the positive results of the cooperation mentioned was the full and swift acceptance of the standardized bank check.

As far as the teleprocessing banking networks are concerned, they were introduced into Portugal at the end of the 70's. Although weak at the beginning, they opened a new concept in bank computation: the computer began to be seen as an active element in the organization of an agency. The "tele-bank" appeared with characteristics and demands of its own, causing the first of a lot of meaningful changes in the employment structure.

In the eighties, the most important steps in the evolution of the banking system were:

- 1) "Plastic money";
- 2) The opening of the sector to private initiative.

In line with the cooperation policy adopted by the banks, already in the 80's, the SIBS - Sociedade Interbancária de Serviços - (a cooperative company for banking information services) was created. To this, among others, the task of the

installation and management of automatic bank machines was assigned. This institution is quite innovative, in the adopted form - a cooperative company - and in the technical solutions chosen. Due to this it is seen as a model institution, even on an international level. We can present several examples of innovation introduced into the Portuguese banking system through this institution: security systems based on logical structures; the spread of "plastic money" (bank cards); the destruction of the so-called "psychological fraud"; the proliferation of computational systems giving information in real time about the balance of accounts. It is possible to say that Portugal has entered the era of "plastic money".

The opening of the banking sector to private money determined a new attitude towards the market, until then characterized by apathy towards competition. Some private banks, namely the most aggressive, came to show the importance, in business terms, of having an adequate information system. So, some banks invested a great part of their initial capital, with clear results, in information technology, directly through the introduction of new systems and products, and indirectly through a policy of buying-in specialized skills. A new reference for quality came out, created by the most dynamic institutions, which was to be followed by other institutions.

In the nineties the main factor influencing the Portuguese banking system was the creation of the European Union. As far as the banks are concerned the basic idea is the "single bank authorization".

The common idea of the single bank authorization says that a bank, once authorized to operate in one of the countries of the EU, can freely establish and exercise activity in any of the other countries (without further authorization).

This idea is good for the stronger credit institutions but obviously disadvantageous to the Portuguese banks (our biggest financial institution - Caixa Geral de Depósitos - was in 1989 the 164th in world terms, as far as its capital is concerned).

From now on Portuguese banks will always face the competition of foreign ones. Specifically big financial operations can be carried out without a network of agencies all over the country (which could be an advantage to the national banks).

International banks are more competitive than national ones, due to the high levels of quality they have obtained since they have competed in more competitive markets, where emphasizing the overall quality is essential for those who want to keep a good share of the market.

This does not mean that Portuguese banks cannot respond. They are in an advantageous position to attract national financial resources through their network of agencies, and on the other hand, they have a better knowledge of the market.

### **3 Information Systems in the Strategy of a Company**

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#### **3.1 The Notion of Information System**

How can we define the information system of a company?

In a broad sense, we can say that an information system consists of a set of data on which the decisions and the work of the company are based whatever their support (paper, magnetic disks, etc.) or presentation (voice, image, etc.). It also consists of infrastructures and processes, manual or automatic, that collect, process, store and distribute the data.

#### **3.2 Business Plans and Information Systems**

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Nowadays, the activity of companies is very complex and poses questions for which improvised answers are insufficient. It is essential for a company to make a business plan, which defines the principles of their activity.

We can define a business plan as the set of strategic goals, tactics and ways that a company has to establish in a given period of reference, as a way of planning its future.

It is important to know the difference between strategy and tactics. Strategy is a global decision, tactics are the best way of making that decision possible.

Strategic goals are one of the essential aspects of a business plan. It is from them that the activity of the company is defined for a certain time. These goals are corrected whenever required, according to the company's performance, the activity of other companies and the global activities of the market.

One of the essential rules to attain the strategic goal of quality is to create an open and flexible goal-oriented information system, so that it can change when the market and the basic conditions demand it.

Thus, we can say that an integrated and flexible information system is essential for a company to assure its position amid market competition, with costs as low as possible.

To create an information system suitable for the company one has to define what performance is desired and the technological means that must be used. This should be defined through a tactics plan.

This plan has 5 steps:

1) Definition of an integrated architecture of the information system

This means that the system must develop itself in an adapted form, be able to insert new "packages" (software available in the market) and allow the establishment of interfaces with other systems, if necessary.

2) The adoption of a database management system which ensures data security and integrity.

3) The implementation of a digital integrated network which serves as a communications infrastructure for the needs of the system.

In a banking institution the network has to cover: the large contiguous spaces (central services), the various, and widely-spread points of interface with the client (agencies), the clients directly ("home banking") and other institutions (stock market, etc.).

Obviously one has to use public telecommunication infrastructures, namely an integrated digital network of services.

4) The definition of the aspects connected with the people-computer interface, or with the choice of the working station.

As regards the person-machine "interface", the aim is to make the dialogue between the user and the system simple and effective.

5) The determination of the physical location of the database servers and working stations.

Nowadays it is easier to solve this problem, using integrated network solutions.

An information system is an important decision-making tool and so it must assure that the information is available and up-to-date whenever it is necessary.

## **4 New functional organization of banks**

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### **4.1 The Agencies**

Nowadays the idea that the client is the reason for the existence of the company is present among those who take the decisions.

The objective of any bank's strategy will be to satisfy the needs of the clients, in such a way that the services given will be profitable.

The agencies are planned with three objectives in mind:

- Functional
- Organizational
- Technical

The most important functional principles are:

- To make a distinction between clients, considering factors like commercial importance, the kind of operation they want to do, or their specialty, so that they can achieve a better and more efficient way of serving clients.
- To make the agencies profitable, following two guidelines: when possible, the operations should be done by the same person, in the same work place, who must be properly equipped for that purpose; as a privileged interface with the client, the agencies should do all the operations that are their responsibility, in a quick and efficient manner.

As regards organization principles we can identify:

- an increase in the number of operations that can be done by the clients, which leads to the creation of a self-service area working 24 hours a day;
- the creation of more space for the public, which alters the traditional division of space, in which 70% was for the employees and only 30% for the public;
- the creation of an area of personal attendance, besides the traditional counter area.

Finally, technical principles demand that the computer system that serves the agency should have:

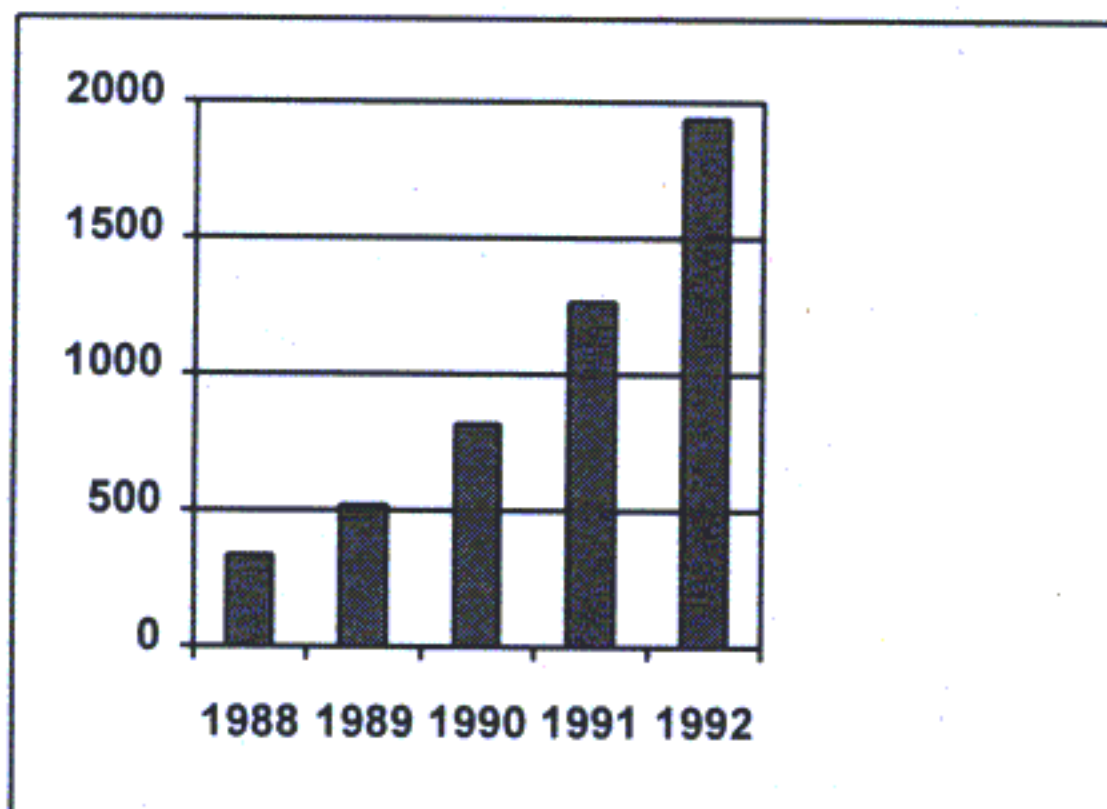
- software that supports the operations that have to be done by staff;
- software for the self-service operations;
- on line self-explanatory user-friendly person-machine interfaces.

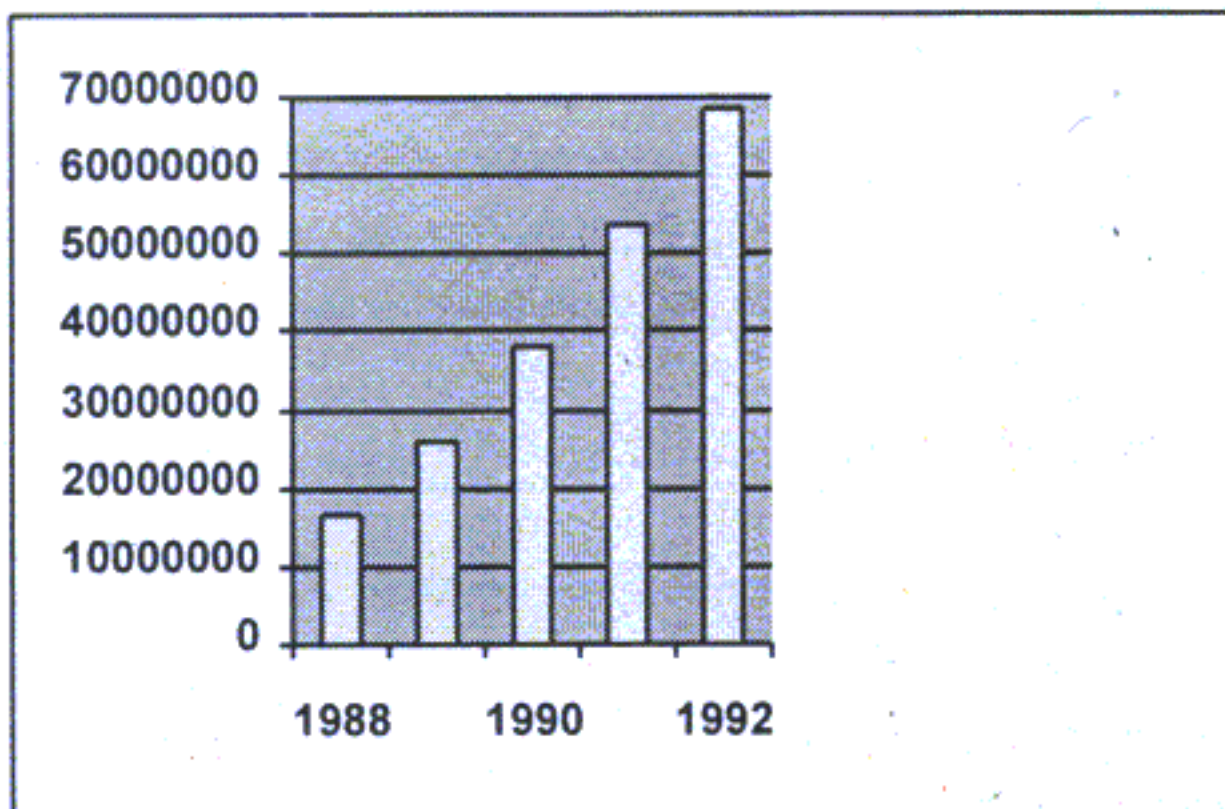
As far as self-service equipment is concerned, it is interesting to analyze the evolution of cash point machines in Portugal, as regards the number of machines and the number of movements:

TABLE I	1988	1989	1990	1991	1992
N.º of cas pont machines	339	522	815	1268	1943
N.º of operations	20.500.000	33.155.307	49.260.596	72.127.630	97.231.762
N.º of withdrawals	16.535.974	25.962.662	37.903.615	53.654.758	68.708.061
The amount of money withdrawn (1.000 escudos)	150.000.000	242.429.987	386.854.456	596.124.385	77.453.762

Fonts: SIBS.

Chart 1 - Number of Cash Point Machines



**Chart 2 - Number of Withdrawals from Cash Point Machines**

If we observe the graphics we can see clearly the increase in the use of cash point machines since 1988.

Finally, the area of personalized attendance is showing a growing importance within the banks. It is here that the clients whose operations are of some complexity and of great interest to the company are received. These clients are received by specialized staff and the interviews do not have a time limit.

The banks have to lay much more emphasis on the diversification of products and services, on efficiency, on the interface with the client, on their image, on the global quality of the products available, on the efficiency of service attention given and on technological innovation and integration. Then we will have bank management completely dedicated to the client.

To create this image, the agency is an essential element, because the bank-client interface is special. So any agency innovation that is easily understood by the client contributes to a better image of the institution.

In Portugal the main lines of the evolution of the bank agencies are:

- The creation of a large number of automatic agencies, mainly in urban zones.
- Proliferation of small agencies with a restricted number of clerks, where the areas of self-service have a growing importance.
- A decrease in the impact of front and back office functions: in the first case because of the inversion of normal operations to self-service and because of a lower circulation of cash; in the second case due to a greater automation of the tasks of administration.
- The growing importance of personal attention, which reaches high levels of professionalism with the help of videotext and expert systems. These instruments give excellent support to the task of advising and decision making.

The automated agency will be one without staff, where the client can carry out the operations referred to in the self-service area.

As a final note we can say that in the last two decades, information systems were essentially oriented towards processing large volumes of data, but in the nineties, those systems will be essentially the means of supporting decisions, so their goal is to serve the client.

## 4.2 Central Services

The strategic plan as regards the information system should include:

- A picture of the actual situation, in terms of data, processes, production circuits, and the manipulation and management of documents;

- A definition of the characteristics of "ownership of information" - Who can manipulate it? Who can read it? - establishing controls regarding access and security;
- Evaluation of the degree of users' satisfaction;
- Definition of the global model of information.

The above mentioned strategic plan must have in mind some of the limitations existing in the banking sector:

- A) A large number of tasks are done by hand (lack of information).
- B) A large number of employees have a low level of education and of professional training. The average level of education of a banking clerk is the third year of high school. This is insufficient, mainly when there is no specific training for the job - besides that, people normally only know one function, and only one way of doing it, which brings some resistance to change, to innovation and everything that is not traditional.
- C) A high average age. This can lead to a lack of initiative and to a decrease in capacity to innovate, although the importance of accumulated knowledge must not be underestimated or forgotten in strategic terms. The combination of innovation and technology with experience and tradition is an enrichment factor.
- D) Lack of integrated information systems.
- E) Centralization of decision-making.

But one of the most critical situations in the central services is the low level of computerisation, which provokes inefficiency and a high use of other resources. The amount of information that arrives today for anybody, at any point in the company, is far above their capacities to deal with it.

With text processing, the need to use computers was soon extended to the correspondence archives, to electronic mailing, to the database, to spread sheets, to personal and general agendas, and to external and internal communications. So the computerization of the central services is, nowadays much more than a need. It is an organizational goal, whose final objective is the existence of almost paperless offices.

The automation of the office carries several consequences:

- Administrative reorganization of the departments;
- An increase in speed and efficiency in elaboration and transmission of documents;
- A decrease in space and in the number of staff needed;
- Almost exclusive dedication, by the central services, to the decision-making process, more directly helping the agencies to satisfy the needs of the clients, because the handling and the storing of information are no longer their main task.

## 5 New Technologies in the Banks

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### 5.1 Electronic Transaction Methods

There are two main groups of electronic transactions:

- the ones for making payments (electronic means of payment); money
- the ones that transfer money (electronic transfer).

#### 5.1.1 Electronic Means of Payment (Electronic Banking)

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Electronic banking allows financial institutions to:

- reduce the cost connected with agency network;

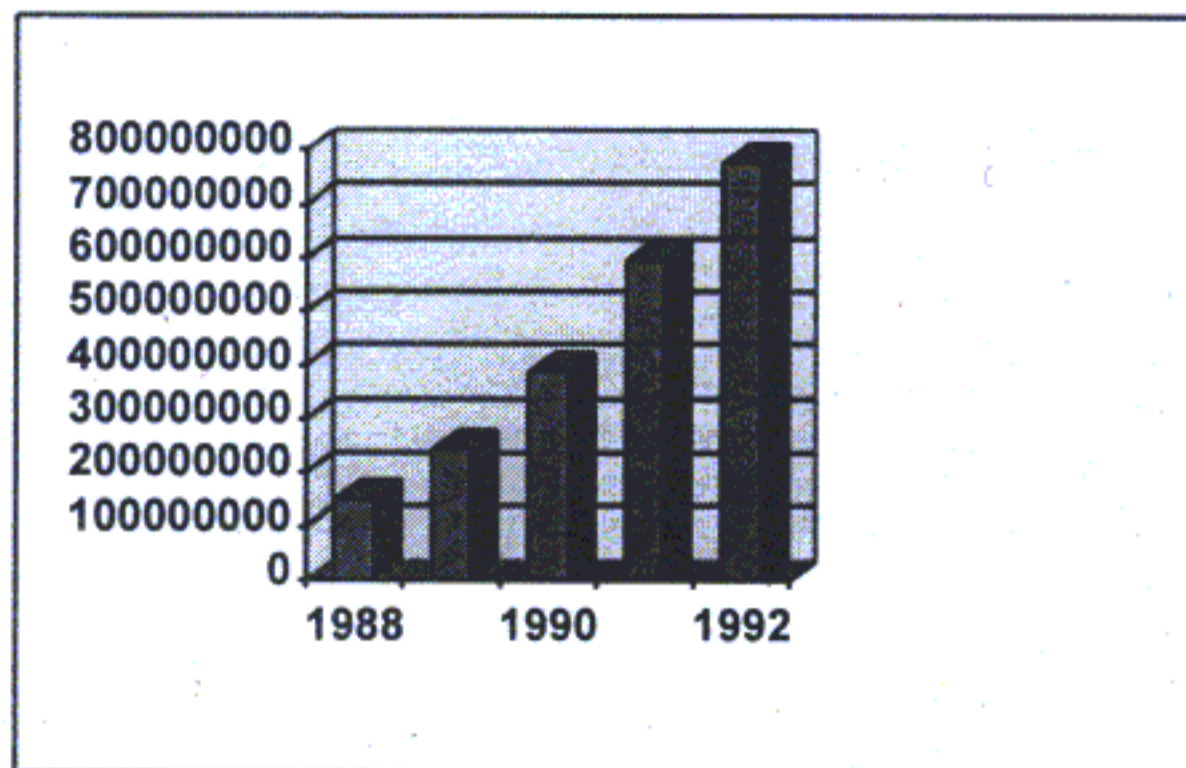
- reduce the number of workers needed to provide the services;
- reduce the volume of paper processed;
- create a new source of income;
- increase the number of new services offered to the client.

Electronic banking has advantages, for the financial institution and for the client. As far as the financial institution are concerned, besides what has already been said, it makes it more competitive in a competitive market. For the client, electronic banking represents more freedom in using the account (24 hours a day) and therefore in buying products.

Automatic teller machines (ATM) are at the center of electronic payment. In Portugal the first ATM appeared in 1985, and in 1990 they were being installed all over the country.

Table 1 and charts 1 and 2 clearly show the acceptance and growth of ATMs in Portugal. We can also see in chart 3 the high growth in the amount of money drawn from cash point machines.

**Chart 3 - The Amount of Money Withdrawn**



What makes a bank invest in the ATM network is the expected reduction in labour costs, as well as the growth in market share and quality of the services.

As for explicit costs, it has been proved that one ATM pays for itself by doing an average of 150 operations a day. It is also certain that two ATMs carrying out 300 operations a day can replace - in statistical terms - the work of a bank clerk in the same time.

It is important to say that the problem is not so simple as that, since the ATM service leads to a bigger volume of computer traffic to the bank, which causes extra costs.

An easier and less expensive way for a bank to benefit from an ATM network is to use the SIBS, because the costs include, besides the equipment, the setting up of the network and the management and the application software.

So, even the most aggressive bank institutions, fighting for market share, recognize the advantages of sharing the cash point machine network with the competition.

The cash point machine network in Portugal guarantees the coverage of nearly the whole country and includes almost all foreign and national banks working in our territory. For this reason, it has been held up as an example of cooperation and the sharing of resources and costs in exploiting this kind of network.

The technical solutions used by the SIBS, were certainly the most suitable. The basic principles used were standardisation and flexibility. So that it would be possible to use any equipment without regard to model or brand, an almost universal pattern of communications, the OSI (Open System Interconnection Model) and a protocol, the PDD, with the same features were chosen.



The SIBS network, adapted to the telecommunication conditions of Portugal, has the following ways of operation:

- Off-line: withdrawals are made based on the figure stipulated for the card; other operations are not available. This happens when there is a break in the circuit ATM/ SIBS/ BANK circuit.
- On-line: withdrawals are made based on the balance that daily, or weekly, the banks send to the SIBS. It is most used during the weekends, when the banks are not connected to the SIBS for operational reasons.
- Real-time: withdrawals are made based on the real balance at that moment in the bank. It is the best way of working with the network, with information transmitted from the ATM to the SIBS and from there to the bank where the account is. The bank does the operation and sends the information through the same way, but in reverse.

To use the ATM network it is necessary to have a personal card.

There are several kinds of bank cards:

- credit cards;
- debit cards (directly connected to the ATM).

Cards with a magnetic band, have three tracks on the band, on which is the information recorded that allows the holder to use the card. On tracks 1 and 2 is the fixed information and on track 3 the variable.

Debit cards use, mainly, the technology of magnetic bands.

Besides the operations that can be carried out with the use of the ATM network, debit cards often have the function of guaranteeing bank checks.

With the use of the credit card, the client (user) has the right to a certain credit-ceiling.

Finally, chip cards are an alternative to the cards with a magnetic band. They have a small chip implanted with an independent capacity for the calculation and recording of transactions.

The advantages of chip cards are:

- More safety, because the pin can not be modified in the card itself, which prevents problems and fraud in off-line situations.
- It is almost impossible to duplicate the card for fraud, because this can only be done using chips that are extremely expensive.
- The possibility of recording all the operations in the memory of the card.

The disadvantages are:

- the high price;
- they have not been standardised yet;
- they demand special readers in the ATM and POS (Points of Sale).

### 5.1.2 Electronic Transference of Funds

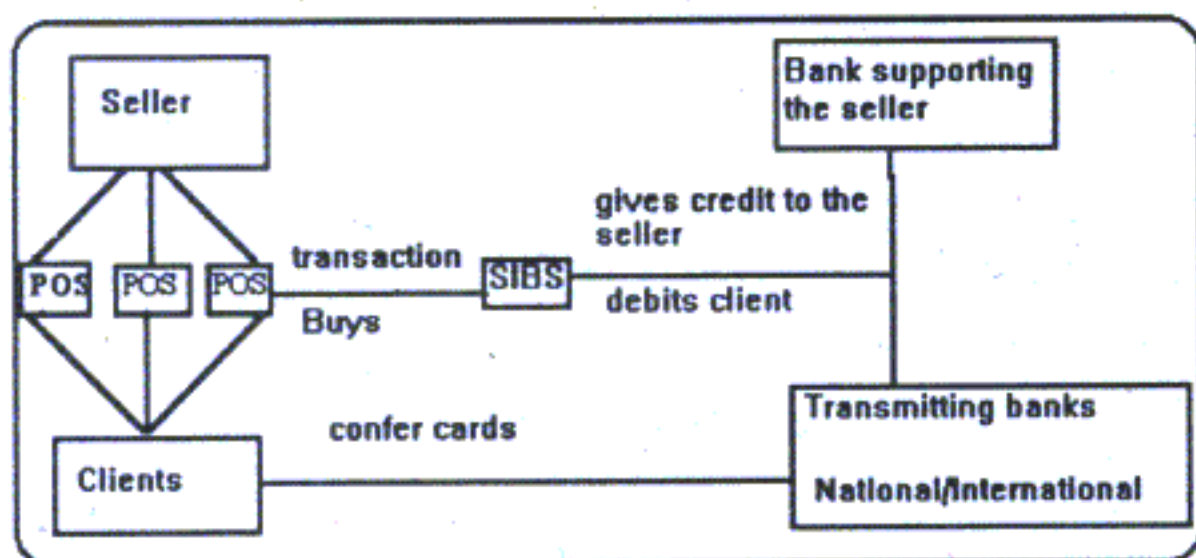
Within the system that allows transfers between accounts, we have the POS, Telecompensation, home banking and the "Swift" network.

The POS (points of sale) are terminals that allow all kinds of transactions, by transferring a certain amount from the client's account (the buyer) to the seller's account, to cover the amount of the transaction.

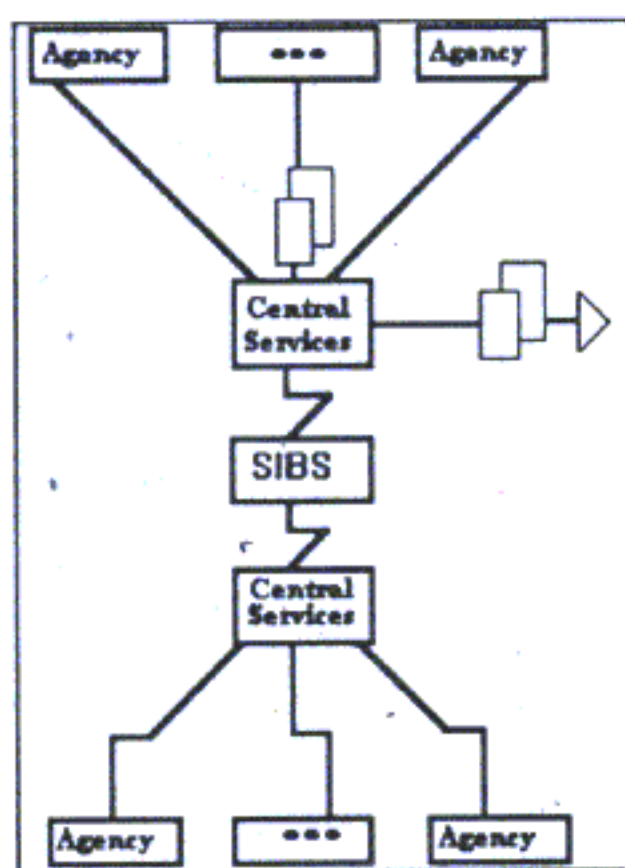
When connected to a computing center this terminal allows the use of debit cards as well as credit cards.

With debit cards, the computing center establishes a connection with both banks involved, to transfer the funds from the client's account to seller's account.

In the case of credit cards, the transfer to the seller's account, instead of being done from the client's account, is made from the client's bank if the latter is the one which manages the card, or otherwise, from the account of the managing institution (both managing institutions and banks deduct their commissions from the value transferred to the seller).

**POS Flowchart**

The telecompensation of checks is a system of electronic payment. Banks no longer exchange documents: now they exchange data. This exchange is carried out electronically and the balances are settled automatically through the Bank of Portugal.

**Telecompensation**

Though it speeds the exchange of checks, this system has slightly increased the possibility of fraud. But this small disadvantage is counterbalanced by the efficiency of the process.

Home banking allows the client to connect his or her terminal to the bank's computer and carry out financial operations from his house or job.

The home banking system is based on the videotext technology. Videotext is a service that allows interactive dialogue between an entity that supplies information (a bank, for instance) and a user who wants access to that information. The necessary equipment is a terminal and a conventional telephone.

In Portugal there is a videotext service available from the CTT/TLP. This videotext insures the norms CEPT1<sup>1</sup> (German norm) and CEPT3 (English norm or Prestel), with automatic conversion between them, and supports the norm CEPT2 (French norm or Teletel).

## 5.2 Other Electronic Services

Besides the ones already referred to there are other electronic services suitable for all companies, including banks:

- electronic mail;
- electronic data interchange;
- office-automation.

Electronic mail is intended to establish electronic support for the correspondence between companies. It consists of an application that essentially works like the traditional mail, i. e., there is a computing center for each company to which clearly identified mail boxes are assigned. Communication between centers is effected through specific protocols namely X.400.

The X.400 is a group of protocols that allow the communication of messages, ensuring the electronic mail service. The data is communicated through a network that uses the protocol X.25.

EDI (Electronic Data Interchange) is an electronic document-transfer service and tries to satisfy the demands of the modern company in that field. The decrease in bureaucracy and the dynamism allowed by EDI are so impressive that companies where competitive factors are more aggressive, and where it is important to produce high quality at the lowest prices, are pressing to adopt this system. What still obstructs greater penetration of EDI is the lack of norms, in spite of the existence of the EDIFACT norm.

Office-automation is the use of technology suitable for the processing of information, i. e., it corresponds to the establishment of connection points between several elements, so that a piece of information once entered into the system, can be processed and directed from one point of the organization to another, with minimum human intervention.

It can be said that office automation has four fundamental components: the philosophy of performance, the technology of support, the systems that use it and the people who command it.

<b>Main areas covered:</b>	<b>Systems and applications that deal with the areas:</b>	<b>Most important advantages:</b>
<ul style="list-style-type: none"> <li>- Management of documents (data, text, audio and graphics)</li> <li>- Electronic mail (data, text, audio and graphics)</li> <li>- Management of files (data, text, audio and graphics)</li> <li>- Teleconference</li> </ul>	<ul style="list-style-type: none"> <li>- Editing and eriting texts</li> <li>- Systems of graphics management</li> <li>- Personal and group agendas</li> </ul>	<ul style="list-style-type: none"> <li>- Increase in productivity</li> <li>- Advantages over the competitors</li> <li>- Increase in control over information</li> <li>- Costs reduction</li> </ul>

## 5.3 EIS and GIS

The EIS (Executive Information System), besides being fast and easy to handle, gives the managers absolute control over their business. It provides information which is presented in a multidimensional form. It is a management software for executives, able to gather in a single interface the information throughout the company, concentrating in the most relevant aspects. Each user can activate his or her specific areas of interest from the initial frame; then he will have access to other levels of analysis through graphics that call attention to good or bad performance in the areas of their organization. The executive can go down to the lowest level of the company's indicators and detect the possible causes of low productivity, in case the results do not correspond to what is expected. The EIS still permits many detailed predictions (it can, for instance, predict next year's profits, so long as the financial strategy defined previously is strictly followed).

Ideas like population density, traffic, access to certain places, the road network, transportation networks and even telecommunications networks are normally quite important factors in decision-making processes and they are all based on

a geographic paradigm. That is why banks appear as one of the biggest users of GIS (Geographic Information Systems). This system can include geographic data, like information relating to roads and access to the cities or alphanumerical data and statistics, like information collected by census operations, making possible the production of thematic maps that compare, for instance, the penetration of a certain service in a particular group of the population.

## **6 The New Technologies in the CGD (Caixa Geral de Depósitos)**

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The CGD wants to become one of the top five Iberian banking institutions, according to its president: *The CGD is maintaining a dynamic policy of expansion, looking ahead to occupy in time one of the first five places among the Iberian banks, which will naturally demand a relevant position in the Spanish market.*

Besides the solutions adopted in the new building of the CGD, they made the experiment of applying an integrated solution for electronic office and image treatment for forty-two users in the Department of Credit to Industry (DCI) of the CGD.

The system has two facets: production and circulation of information, and electronic storage and automatic management.

As regards production of information it was tried to standardise the software used as word processor to guarantee the compatibility from user to user and give the system a standard form for the information.

The question of the circulation of information was solved by the use of electronic mail, where the major concerns were speed, reliability and security even when there is a great number of messages.

Digital was responsible for the project, based on its multimedia product, Link Works Office. For the image Megadoc, a documentation manager, was used.

The platform used was an Ultrix station - the Digital UNIX - Decstation 5000, to perform the functions of serving the link works, of database Oracle and of fax. The CGD service, DCI, was already equipped with PCs, so a local network of Pathworks, the operative system of the network for Digital, was set up. For the image three PC486 were chosen, two of them connected to scanners (one high and the other low speed), with the third servicing filed documents. The Megadoc runs on SCO UNIX, connected to a jukebox of optic discs (a reader and recorder of optic discs that allows several elements to be put together at the same time).

Another recent system in the CGD is the System of Credit to the Economy (SCE).

This system completes all the computational steps involved in a credit operation, from the first proposal to the final repayment of the loan by the client.

The SCE includes all credit operations to companies, the public administration and entrepreneurs.

The main characteristics of the system are:

- the possibility of access to all departments of the CGD;
- the integrated and uniform treatment of credit operations;
- automatic interface in real time with the various systems of the CGD;
- control of the integrity of records in connections with other systems;
- the availability of all information in real time.

As said, the SCE is related with other systems used in the CGD:

- The Manager System of Clients (database of clients);
- CGDNET (teleprocessing network);
- CAT 92 (a list of products and services);
- The Statistical Model;

- Accounting;
- The Risk Center.

The Manager System of Clients has the same environment as the SCE, which allows the use of two systems at the same time.

The SCE is composed of 5 integrated systems or subsystems, and corresponds to the 5 areas included in a credit operation:

- proposals;
- products and guarantees;
- the account;
- general functions;
- accounting.

Within the subsystems, the SCE permits some validations and the search for necessary information, via connections with other CGD systems.

## 7 Technologies and the Bank of the Future

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It is difficult to present a definite picture of the banks in the future vis-à-vis new technology. This is because this area is changing so fast.

But it is possible to indicate some of the general lines of evolution in the banking system. The information system will be perfect; "plastic money" will be common; electronic payment will be wide-spread; more self-service areas will exist in the agencies; there will be growth in competition and the supply of point of sale and alternative services.

In bank operations we will see:

- the continuation of the growth of electronic payment, with it becoming generalized in the EU;
- the choice of bank for the quality of its services;
- a slow decrease in the number of clients going to agencies;
- a decrease in the use of bank checks and the importance of money;
- an increase in the need to operate in real time, so it is essential to have a support system for management;
- new opportunities for business supported by technology;
- the financial companies will be guided by the market, with them preferring the products that are best for the client;
- segmentation of the market and the appearance of products for the different groups of clients.

The companies Arthur Andersen and Andersen Consulting recently questioned 400 European managers, who pictured the "Bank 2000" as a "slim" bank.

The results of the inquiry are going to be presented soon.

Critical factors of success for all kinds of banks (merchant and retail) will be:

- activity centered on the client;
- low operating costs;
- highly motivated personnel;
- a good capital base.

Additional factors will be:

- wider use of new technologies;
- a policy of quality and control of client satisfaction;
- company management, delegation of power, and a more direct relation between work performance and payment.

From the clients' point of view the "slim" look implies fewer agencies, with fewer people, yet more products, though some not financial.

The agencies will be replaced by automatic services, home banking, and telephone banking. But the agencies will still exist, because personal contact is necessary.

Although the advances of technology save money they are not easy to introduce, because of the social problems and the gigantic investments.

The "slim" bank presupposes a greater centralization of operations in the bank's head office. But credit policy will distinguish between credit to individuals and to companies. The first is less centralized: the computational system Scoring allows immediate evaluation of a request for credit. Scoring decides if the request is in the green or red area. If this happens it is decided immediately. If it goes into the orange area it has to be studied. This kind of system is only apparently less centralized: the control is still centralized. The main advantage is speed: no one loses clients because the answer comes too late.

As for credit to companies, the rule is to centralize. Everybody agrees that credit to companies is not going to increase its share because it is too risky. This can make situation of the small and medium-sized enterprises more complicated.

Another tendency points to people being able to do cross selling.

Hire purchase is just now beginning in Portugal, and it will increase. But some people consider that it causes difficulties for the banks.

The other side of the evolution is the replacement of credit margins by commissions. It is easier for big companies than for the medium-sized and small ones to discuss prices.

To conclude, we can say that, without question, we are facing a process of technological evolution that is endless.

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