

PROFESSIONAL OFFICE AUTOMATION

Ioan-Gheorghe RAȚIU*, Claudia CÂRSTEA*

*"George Barițiu" University of Brasov

Abstract: *In the context of today's techno-scientific revolution, informatics, telecommunications, information producing and communication have become incontestable priorities, with large applications in the scientific, economic and social life domains. Office automation represents a new way of utilizing the computers and has become possible together with the large scale popularization of micro-computers that have found a place in every office and/or secretariat office of an organization or institution. Office automation appeared from the necessity of integrating the means and techniques of administrative work and office work with the data communication and automated processing technologies, targeted at increasing overall performance and office work quality in all domains of activity.*

Keywords: *office automation, informational processes, informatics, telecommunications.*

1. INTRODUCTION

The entrance of the informatics on almost all the fields of the scientific, economic and social life become more and more obvious on the last few years. The processing of the information registered a qualitative caper once the multimedia systems appeared, through which the numerical information and the one type document improved with graphic, voice, sound and image elements.

Through the development of the calculation technique, of the modern systems of communication and of the soft products, become more and more accessible, the informatics processing transformed from a trump of the professional into an universal work instrument, used even by the unprofessional.

Under this context, the informatics of the office work became more important and began to be used under the generic name *birotique*. This domain of the informatics studies the techniques, informatical concepts and soft products which assures the automatics of the office activities. These operations refer to: elementary data processing, documents publishing, graphic representations, multimedia processing and to the modern

means of hoarding and sending information, which can include multimedia shots. Birotique uses modern technologies of the electronics, communication and informatics domains.

It uses soft products (text processors), tables, formulas, images, sounds, statistics analyses and forecast systems etc.), made using modern methods of programming, including artificial intelligence techniques.

The Birotique studies the ensemble of the production activities, distribution and exploitation of the information under the perspective of an office work, without substituting the informatics or the telecommunications. The birotique was defined by the French authors, Humbert Lesca and Jean-Louis Peaucelle (1988) as "the ensemble of techniques and means tend to the automation of the office activities, mainly of processing and communication of the word, texts and images".

These techniques, based on general informatics principle and transmission of dates, assures, through electronic means, analyses functions, classification and ordering of the dates, arrange on page of the texts, preparation of the documents and of the electronic correspondence, interrogation and distance consulting, graphic view.

The name of the domain was introduced in French by P. Berger and L. Nauges, after Informatical Convention from 1976, in order to translate the English collocation “office automation”, combining the words *bureau* and *automatic*, resulted *birotique*.

The office work is characterized as: the *predominance* of the informational and decisional process; the important weight of information and decisions communication.

The communication may be accomplished:

- *oral*, through direct dialog, as a long distance communications, mediate by telecommunication networks, eventually on group or conversation between the bureaus of the same organization, mediate by telephone or interphone networks;

- *written*, under a variety of forms (classic documents, legislative, decisional documents, rapport, demands, intimations, contracts, documents de plan, accounting, fiscal or social evidence, sketches, specialty drawings, graphics etc.).

An informatic office system contains hard and soft instruments rational integrated into a structure which contains a nucleus (calculating system) for complex processing, peripheral equipment which allows hoarding and remittance of the dates on different forms and interfaces for this kind of peripheral.

Office informatics systems may be seen as being fitted in the informational system of the company it belongs. This informational system may be seen modular, on a systemic conception, being made of components proper to office informatics systems, professional informatic systems, decisional manner, operational manner and of communications (intern and extern to the informational system).

The decisions and the settlements resulted from the decisional zone of the informational system will be taken over, processed and sent (through out informatic, birotique and intern communication subsystems) to the compartments of implementation from the operational modulus. This can include the systems: of production or the profile ones, commercial, financial-book, of personnel, of research-development etc. The information referring to the activities as part of implementation subsystems (operational) are

selected, analyzed and delivered having an adequate form to the decisional modulus (of management) through informational flux – decisional of the studied system.

As the connections with the exterior the informational system creates, through the extern communications system, integration on the social economic medium.

2. INFORMATION AND INFORMATIONAL OPERATIONS

The information is the main object of the birotique activities. The information can be classified as: after form, nature and after them support.

By the form they have, the information might be:

- *Analogical*, represented through physics dimensions, sounds or images on a physic form specific to the techniques devices which process them (registration devices), without using numerical coding (messages registered on tapes / audio magnetic cassettes with the help of analogical electronic equipments (tape recorder, tape), filmed images and represented with analogical devices as cameras, and video-recorders.

- *Digital*, represented through numerical codifications of one real phenomenon or ones of an analogical form. On the device the information will appear as a succession of binary values (0,1) correspondent with those codes (information inputted from the keyboard into the computers internal memory, information registered directly on magnetic devices specific to computers, information existent on the internal memory and process by the processor. Usually, for the transformation of the information from a numerical form into an analogical one, it uses conversion devices.

By *nature*, the information may be:

- *Dates* - numerical, alphabetic or alphanumeric (numerical / alphabetic) processed through specific operations.

- *Documents* containing words organized in paragraphs, sentences, pages, processed by special programs – documents editors – with make up facilities, page alignment, orthographic and syntactic checking. The

majority of documents editors allow also the insertion and processing, eventually through some specialized programs of some not text objects, as: tables, images, drawings, and graphic representations.

- *Audio sequences* generated by the human voice, real phenomenon, music instruments or. Windows operating systems for example, contains utilitarian for processing the audio information.

- *Video sequences* such as films or animated images can be managed by webcams or bi dimensions graphic programs (2D) and tri dimensions (3D). Images can be followed by audio sequences. Automatic systems which integrate the processing of the usual information with the sounds and images are called multimedia systems.

The information can be recorded on devices:

- *Magnetic*, such as: magnetic tape and cassette, magnetic disk, disk (flexible disk), magnetic card.

- *Optical*, such as compact disks, known as CDs. These can stock a large quantity of information in a digital form, which is read on optical principles. The optical recording and reading is done by specialized external devices. DVD-ROM is also an optical device but with a capacity higher than the CD.

- *Opaque* realized from paper and used in printers, plotters, scanners, photocopying devices.

- *Transparent*, such as movie film, microfilm, transparent sheets etc. utilized directly or as information source for further processing.

A large area of automatic processing of the information exists. They can be classified after the information type processed as follows:

- *Data processing* – The information is mostly *numerical* intervenes in mathematical calculus needed in diverse domains. The data organized under the form of *date files* are manipulated through copying operations, moving, deleting or their components can be accessed and modified with the help of some of the following programs (Pascal, C, FORTRAN, Basic etc.). The big volumes of data from the files are organized usually as a data base, for which processing specific soft

products exist, named data base management systems (DBASE, FOXPRO, and ACCESS etc.). The data from the files organized as *electronic calculus sheets* are processed by the table processors: LOTUS, EXCEL, and QUATTROPRO.

- *The documents processing* – It is refereeing to text editing operations (writing and modifying), to which special processing facilities are added: format (structuring on pages, paragraph, aspect modifying through the form and the dimension of the character), linguistic operations such as syllables, spelling check and partially of the syntax. The edited texts can be consulted on the display, printed on paper etc., sent to a certain distance or processed some more. Almost all the *documents editors* (soft products that allow the editing of the documents) allow supplementary creation and processing facilities for tables, formulas, images, graphic representations bi dimensional (2D) and tri dimensional (3D). The images and graphics can be directly inputted from the documents processor (soft product used) or can be taken over from other operations: created with specialized soft products and "imported" into the documents editor. In Windows operating system, the object transfer between applications it is realized by the OLE technique (**O**bject **L**inking and **E**mbedding).

Examples of documents editors: the most utilized is WORD (included in the products package of the Microsoft Office); another editor with fewer functions is WORDPAD. The documents processing can be realized with the help of techno redacting specialized programs, such as: VENTURA or PAGE MAKER.

Comparing with the documents, which contain diverse formatting symbols and not text, the programs wrote in programming languages, for being lexical analyzed, syntactic and translated into a typing machine language, contain strict character successions of characters of text type, created with text editors, included in programming mediums or in the data base management systems.

- *Sound processing* – It is referring both to the human voice (messages, phone conversations, recordings), and to the music,

natural sounds or obtained by electronic syntheses. The sound information are converted from analogical form to digital form and then processed by specialized programs and equipments. For the sound play, the computer must be equipped with a sound blaster; even acoustic interfaces can be created with the usual analogical audio systems (tape recorder, magnetic recorder, CD player) or with acoustic communication devices (telephone, interphone etc.). The soft products needed for sound processing are drivers for external audio devices and programs which process the sound files (MIDI, SOUND RECORDER, and MEDIA PLAYER).

- *The images processing* – Static images or in movement / animated, completes the multimedia facilities. The most utilized product for static images processing is COREL DRAW (included in Windows) but for simple processing there also is PAINT, included in Accessories. The simplest way of retaining an image is *bitmap*, or BMP files – which presents the display a matrix of lightning points – *pixels* – and codes the color of each pixel. The attention for creating a static images code system which does a simultaneous compression led to the creation of JPEG standard (Joint Photographic Experts Group).

The dynamic visual information is the result of the displaying and perception of a number of successive images per the time unit (minimum 25 images per second); these generate the viewer the movement sensation. For coding this information on a smaller space and with smaller loses of information MPEG standard was developed (Motion Picture Experts Group), which uses the JPEG coding for each frame. JPEG and MPEG have been accepted as standards in 1993.

The processing of the visual information is followed by the audio information (with MEDIA PLAYER animated processing can be done with audio and video files se pot).

The video information sources Are diverse: images obtained with filming cameras, transmitted images (analogical or digital) by specialized communication systems, images realized using the computer, using diverse physical and logical devices (programs). Each video device connected to the computer must

have an interface logical driver. The development of the sound and images processing have created the *multimedia systems*; which contain physical equipments and soft products which facilitates these processing. A certain tendency exists for integration in the birotique systems, of the soft products for distance communication, by *accessing the Internet*.

3. OFFICE INFORMATICS SYSTEMS

The interdependent ensemble of physical and logical equipments (programs) which realized the office automatic activities by information processing – regarding the certain necessities – forms *office informatics system* or *the birotique system*.

3.1. THE FUNCTION OF THE OFFICE INFORMATICS SYSTEMS

The function of the office informatics systems are resulting from the birotique objectives, in relation with office automatic activities by using the modern communication techniques. They can be grouped as:

a) *The information inputting in the system function* is referring to the following types of information transfer:

- by manual input of the data and texts, recordings with adequate equipments of the sound and images or by transferring from files already existent;

- from a local data network (with the allowance of the owner, if it is the case);

- from communication networks (national or international, public or private), in this case a usage right must exist of this information.

b) *The memorizing and search functions of the information* is referring to the stock of the information within the system and the possibility to access it later for diverse processing or just as an answer to interrogations made upon the data collection on the system (finding of some information which answer to some demands).

The information can exist in:

- *the internal memory* of the computer while they are processing (internal memory does not have the role of data stock);

- *the external memory*, usually on magnetic devices – usually magnetic disks (hard disks) and rarely disks, due to the small stock space. These devices are used for data stocking for obtaining information or further processing. From here the data can be accessed and processed with specific soft products such as tables and data base management systems;

- *electronic archive*, composed out of information which are rarely consulted, and are deposited on specific devices (magnetic tape, ZIP disks, CDs, DVDs microfilm etc.). Sometimes the ZIP disks and CDs can be more often consulted, being preferred for their big capacity compared to the magnetic devices like disks.

The form in which these information are deposited on these devices is important for the posterior modifications; these being made with diverse soft products (documents editors, tables, database management systems). In case a big volume of data it is necessary to be organized, it is preferred that those data to be structured into *databases*.

c) *The processing function* of the information id referring to:

- *data preparation operations for processing*:

- *Information conversion* from analogical form into digital form done at the inputting of the data in the informatic system (entering conversions) and conversions from digital form into analogical form done at the extracting of data from the informatic system (exit conversions). The first type of conversion matches the data with the processing within the informatic system and the second type – with the recording analogical equipments, play or transmittal of audio-visual information.
 - *Device conversions* are referring to the information transfer from one type of device (magnetic, optic, graphic etc.) on another for facilitating certain processes.
 - *Duplications (related mainly to the data security)* – the copying of the information on the same type of device.
- *processing operations*:
- *The creation and load of the information base of the birotique system* is referring to the techniques through which the data are

structured in the data collection of the birotique system – normal, as data basis and how it is loaded using the presented methods.

- *Operations upon the data* referring to their *form* (specific operations for texts, documents, images) or to their *content* (comparisons, arrangements etc.).
- *Informational base consultation* with specific soft products is mainly referring to the searching of data which match certain criteria (answer to some demands). This operation is usually named *the interrogation* of the data base. It is important that the answers to be obtained in a very short time (if it is possible in real time), for being transmitted forward to a computer network, displayed on the screen or printed.
- *Refreshing the informational base* by inputting new information, deleting the useless ones, modifying the existing data for underlining a continuous changing reality.
- *Formatting the results to a convenient way*. The results of the data processing can be obtained as reports which are usually printed. It is necessary that the results form to be suggestive and convenient for the informatic system users.

d) *The extraction from the system function*.

The content of the results extracted is important for the birotique system user, so that the answers to respond, in a semantic way, to the requests and demands formulated. The extraction way is influenced by:

- *The nature of the information* transferred through the exist devices: data, text / documents, audio sequences, visual or combined. Depending on the nature of the information, different types of external devices for data extraction and (the audio sequences can be recorded pr replayed).

- *Choosing a way of communicating the results, suitable for their beneficiary*. Inside the birotique system, the results can be seen by direct consultation at one of the station of the local area network, by consulting the printed documents, plotter or displayed by a multimedia device. The results can be kept in the informational base on magnetic devices or

in the electronic archive. The communication outside the birotique system it is realised by data transmittal through communication networks. These can be: computer networks or national or international telecommunication networks (telex, telephone, fax, phone conferences, video conferences etc.).

d) The command and control function it is referring to the guiding and adjusting of the system as follows:

- the best resource allocation composed from physical equipments, soft products and informational base;
- the input process control, processing and information extraction.

3.2. OFFICE INFORMATICS SYSTEM STRUCTURE

The essential elements of the birotique systems are: *physical equipments* (hardware), *programs* (software) and *information* which represent the purpose of the processing.

The physical component represented by an electronic computer or a network of computers, together with the communication equipment. These can be detailed as follows:

Computer (computer network) (generally PC) composed from: processor, internal memory, interfaces with external equipments and optionally network and connection cables.

Input-exit devices characteristic to the computers (keyboard, monitor, mouse, printer, scanner, plotter, and speaker) or optional the multimedia and communication systems:

Input devices:

- *the keyboard* allows the manual input of the data and commands;

- *the mouse* allows the operation at the computer through positions, information selections, control objects and menu options;

- *the scanner* for images inputting in the birotique system, where they will be retained on digital principles;

- *the microtone and the sound interface* for the direct capture of the messages, comments and reports, interviews, negotiations, conferences, etc.

- *the webcam and the compatible audio-video interface* for recording images and their transformation into a digital form;

- *the CD-ROM (DVD-ROM)* transfers based on optical principles the information stocked on the CD (optical);

- *the optic reader of microfilms and the specific interface* transfers the documents images recorded on the film as a microfilm, so that these may be “projected” on the display.

The exit devices contain:

- *the display* black-white or coloured which assures the displaying of the information (as physical interface video board is used);

- *the printer* for typing (black-white or colour) of the data, texts / documents or images;

- *the plotter* for making schemes, plans, speciality drawing | black-white or colour;

- *CD writer* (can be considered input-exit equipment), allows the writing of information on the optical disks;

- *the audio interface* for sounds transmittal (memorised or about to be received) in the local or distance network. Electronic devices can be used like sound amplifiers, speakers, acoustic devices - *video projector* – receives the images displayed on the monitor and displays them on a wide screen;

- *the printer for microfilm and its interface* allows the documents transfer from the internal *memory* on the specific device, integrated in the electronic archive.

The input –exit devices comprise:

- *Magnetic devices units* (fix disks, flexible, ZIP disks) for digital memorisation, like *files*, of diverse types of data: numeric, text / documents, sounds, images. Due to the contained information nature and the creation mode, the files will have specific types (documents, images, sounds etc.), which will be reflected on their name (extension). Each type of file will be processed by a specific soft product.

- *Audio-analogical units of magnetic band and their interface* – are *electronic equipments*, of mass usage or professional, designed for recording, stocking and replaying of the audio documents in an analogical form. For example tape recorders, magnetic recorders, voice recorders, dictaphones which use tapes and magnetic bands.

- *Video-analogical units and their interface* with the informatic system are video electronic

equipments which can record on magnetic band audiovisual information; this can then be processed and replayed with equipments like video player / video recorder.

- *Phone device and its interface* for: sound message receiving analogical communicated or digitally and their digital recording; message transmittal directly recorded or like digital files.

- *Telefax and the telefax interface* for receiving fax messages, their direct printing at the fax printer or their digital recording; distant transmittal of the fax documents, in quick time (directly from the document) or memorised (by lecturing the documents from the internal or external memory of the computer).

- *Telecopying machine* with: input interface for local or distance receiving, of the document type; exit interface for transmittal, to a copying machine, local or at a distance (by communication networks), of images (documents) digitally memorised.

- *Video interface* for: sound images and sequences transmitted through local television networks with a close circuit or distant television networks; the transmittal of images and sounds through the same types of networks.

Communication equipments include the totality of the technical connection devices (the network cabling), coding/decoding, and transmittal/reception at distance of the information used in an office activity. These depend on the informatics equipments used, the type of communication and the nature of networks used. The computer networks connections are also a component of the communication system.

The logical component of the birotique system is composed out of *soft products* (the programmes) used:

- Before the Windows operating system appeared, in the DOS system specific *utilities* were used for the management of the files and *directories* (Norton Commander, PCTools, and XTree Gold etc).

- *The Windows operating systems, with a visual interface* introduce a way of graphic operation, intuitive (starting with Windows'9x), and a quality leap for soft products

development. These systems are easy to use by users and have large diverse applications:

- Usage of files and directories (File Manager in Windows 3.x, Windows Explorer in Windows '9x);
- Simple text editing / documents (Notepad for a non-document, without formatting and Write / WordPad for documents);
- Drawing (Paintbrush / Paint);
- Sounds and images processing (MIDI in all the Windows versions, Sound Recorder, Media Player in Windows '95);
- Diverse accessories, including those for communication;
- Applications which allows quick installation of drivers for external devices, fonts etc.

- *Documents editors*: WordStar, WordPerfect, Word, Ventura Publisher, PageMaker etc.

- *Images and graphic processors*: CorelDraw;

- *Tables*: Lotus, Excel, QuattroPro;

- *Management systems for data bases*: Access, FoxPro, dBase etc.

- *Communication soft, network soft*.

The information (data, texts/documents, sounds, images) are the object of the informatic birotique processing. These can be in one of the following stages: of inputting into the system, already exist in the informatics base and optional to be in processing or extraction status, as results or communications. Regarding a processing which is developing, the information can be either of input either of exit.

The input information within a processing can come from:

- *local direct sources*: inputted by keyboard (data, texts), scanned (documents, imagines), audio recorded (microphone) or video (webcam);

- *taken directly from the data base*;

- *taken from local or distant networks*;

- *intermediary results*, of some previous processing.

The information resulted from a processing can have the following destinations:

- *on-line search* - the results are displayed on the screen or on printed (data, texts, documents, graphics), drawn on the plotter

(drawings, graphics, schemes), played at the speaker (audio);

- *transmitted locally* or at a *distance*, by communicating systems;

- kept on medium term on the external memory, for further processing, or on long term on the electronic archive.

4. CONCLUSIONS

Informatics systems have a more profound impact over the human work, physical and intellectual, with social and economic involving.

The professional informatics transforms the physical work by automatics, like robots, production assisted by computers in intellectual work using the performances of the soft products used in many different domains. As an informatics domain, the birotique will take away from the intellectual work the operations with a routine character which requires a long effort, with a positive influence of the management and decision processes.

The utilization of computers and computer networks for memorizing, processing and digital information transmittal has as effects the growing of the transfer speed and of the memorizing capacity, quick searching of the information. An office informatics system processes the information in a digital form and just a small number of external devices manage the analogical information.

REFERENCE

1. Avram, V., ș.a., *Birotică Profesională*, Editura Tribuna economică, București, 2002;
2. Mezey, Gy., *The Cybernetic Paradigm*, Revista Academiei Fortelor Terestre, Nr.2, Sibiu, 2004, pp.132-158;
3. David, N., Damian, D., Ratiu, I.G., *Publishing Multimedia Presentations on Web*, The 32nd International Scientific Conference of the Military Technical Academy “Modern Technologies in the 21st Century”, Bucharest, Romania, 1-2 November 2007;
4. Rațiu, I.G., David, N., *Concepte de bază ale Tehnologiei Informației (IT)*, Chișinău, Editura UTM, 2007, ISBN 978-9975-45-049-2;
5. Ratiu, I.G., David, N., *Open Systems Architecture*, The knowledge based organization, The 13th International Conference, Computer Science, Modelling and Simulation, E-learning Technologies and Solutions for the Engineering Domain, Land Forces Academy Publishing House, November 2007, ISSN 1843-6722;
6. Rațiu, I.G., *Birotică Profesională*, Editura Didactică și Pedagogică, București, 2007, ISBN 978-973-30-2018-9;
7. Surcel, T., ș.a., *Informatică economică – Tehologia informației și comunicației*, Editura Tribuna economică, București, 2005.