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CONCEPT PAPER:

**COMPUTER SYSTEMS DESIGN STRATEGY
AND PRIORITY APPLICATIONS
FOR THE MUNICIPALITY OF BRASOV, ROMANIA**

**ROMANIA LOCAL GOVERNMENT ASSISTANCE PROGRAM
PHASE II**

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Prepared for the Office of Housing and Urban Programs
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1. EXECUTIVE SUMMARY

The present effort represents one of the three components of ICMA/USAID technical assistance to the Municipality of Brasov in the area of urban planning and local government (USAID Contract No. EUR-0034-C-00-2034-00, **Local Government and Housing Privatization**):

- Condominium Association Development;
- Urban Development Planning in a Market-Context Project; and
- Computer Systems Design Project.

1.1. The Project Objectives

The **objectives** of this project are to develop a general computer applications design for the City of Brasov. This design: (1) identifies the types of information and applications in which computerization appears appropriate and cost-effective; (2) ranks the applications in terms of priority and a logical systems development process; (3) identifies the principal data that should be computerized; (4) outlines an approach and procedure for developing and obtaining appropriate software to create the application identified; and (5) includes a scope of work for an initial priority systems development project. The systems will be used to support urban planning, budgeting and finance, more effective management and improved productivity.

1.2. The Project Tasks

The **principal tasks** which were undertaken by the ICMA consultant during the initial visit to Brasov, as part of the Computer Systems Design Project, include:

- Assessing the capability of the hardware purchased by the city;
- Conducting preliminary discussions with key city representatives about their data and information needs;
- Meeting with managers of city functions and departments to determine the data they collect and identify their data and information needs;
- Meeting with local software development firms to assess their capabilities;
- Preparing this paper, including a scope of work and level of effort estimate for an initial priority system, and distributing design proposal to key officials for comment.

1.3. Major Findings and Recommendations

The Brasov City Hall is at the forefront of computer applications in local government in Romania. The City Hall is willing to computerize local government functions, equipment and software were acquired, specialized personnel was hired to develop and supervise computer applications, and in-house training programs were developed.

The local view on computerization is an ad-hoc approach, with significant unknowns in the areas of goals, scheduling, and feasibility. Ambitious plans to automate the entire bureaucratic process of recordkeeping, planning and decision making are less than realistic, while hopes to implement sophisticated Geographic Information Systems (GIS), Decision Support Systems (DSS) and Executive Information Systems (EIS) do not match existing and projected local resources, both expert and financial, which would be required to put in practice these bold ideas.

ICMA's main **recommendations** to the Brasov City Hall in the area of information systems development for public administration uses are:

- Develop a systems design strategy based on a philosophy of incremental development, and on lessons learned from the experience of local governments in the United States and Europe.
- Evaluate realistically both needs and resources and follow ICMA's guidelines for successful development of computer applications for the local government (ICMA, 1988b).
- Develop information systems with a modular and flexible structure, to allow more complex applications to be integrated in the initial system.
- For the short term, rely on locally available software for planning and local government applications.
- Perform a cost-benefit analysis which should take into account the total system costs, i.e. initial costs and operating costs.
- Establish a local policy for software acquisition and designate an in-house expert or experts to develop City Hall guidelines and specifications for software evaluation and procurement.
- Develop a scope of work, level of effort, and schedule for an initial priority system which should address staffing and cost issues.

During the visit to Brasov, the ICMA consultant worked directly and closely with the Office of Information Systems in the City Hall, and assisted and guided the in-house specialists in all the areas highlighted above. Detailed recommendations and the design for an initial priority system are included in various sections of this report.

ICMA's role in this process will be one of providing periodic assistance and oversight in the implementation of the proposed work plan, once agreed by the Brasov City Hall officials. ICMA consultants will make quarterly visits to Brasov, to deliver assistance and support in the recommended action areas. They will help prepare the ground for 1995 activities and for longer

term and special projects.

1. 4. Acknowledgements

The author wishes to acknowledge the invaluable insight and advice of Mayor Adrian Moruzi of Brasov, the most ardent high tech promoter in the City Hall, in shaping the general strategy and initial computer applications, as well as the enthusiastic and highly competent support of Aniela Ghita and Bunel Moise from the Office of Information Systems. Remarkable openness and support to this idea was shown by virtually every single manager and officer interviewed by the author during this visit; their names are included in the list of persons interviewed in Appendix A.

2. THE GOALS AND OBJECTIVES OF BRASOV CITY HALL

The Brasov City Hall is actively pursuing the path of introducing and using microcomputers in the management of local government and the provision of services to the local population. The first step was taken in 1992 when **two specialists** in computer systems applications were hired by the City Hall and formed the new Office for Information Systems. They were required to develop a strategy for an initial system to support current clerk activities, budgeting and finance, and to improve productivity and develop more effective management.

2.1. Hardware, Software, and Training

Over a period of one year, the City Hall gradually acquired **hardware** and **software** which allowed the Office for Information Systems to develop initial training and development activities in office automation and microcomputer support for local government. Currently, the City has 13 PCs, including three 486 machines and ten 386 machines. Two of the PCs are equipped with 330 MB harddisks, while the remaining 11 PCs have 130 MB harddisks. The hardware includes two Hewlett Packard III P laser printers, two 24-pin dot-matrix printers, and a more modest 9-pin Citizen dot-matrix printer.

The software currently available includes Windows, a word processor, a spreadsheet, DBase III, and a relational database, Microsoft Access. The first step towards introducing microcomputers to the City Hall officers was to develop a **basic training program** in computer use for each of the 12 offices grouped under three Departments: (1) the Department of Public Administration; (2) the Economic Department; and (3) the Technical Department. The training was performed in the Spring of 1993 by the two programmers in the Office of Information Systems, who trained 1-3 persons from each of the City Hall offices in the use of the available hardware and software, with emphasis on word processing and data base management.

Currently, the City Hall is seeking a significant expansion of the computer applications in local management and service provision, and recently hired four more staff who will function as **computer operators** for various offices, and will further train the local staff. In addition, the existing hardware is currently being connected in a Local Area Network (LAN), by using the two 486 machines in the Office of Information Systems as servers. Remarkably, the other networked 486 machine sits in the Mayor's office, as it is intended in the City Hall to eventually develop software applications leading to an Executive Information System.

2.2. The Next Steps

Two of the **next steps** in the information/automation strategy are: (1) to acquire additional hardware: a fax-modem 14400 to be used with one of the 486 machines, and/or on the network; a scanner, a digitizer, and a plotter; and (2) to buy more software packages for immediate office applications.

Although no strategic or business plan has been drafted for developing or promoting

software applications within the local government, the **three main applications** considered by the Office for Information Systems for the short term are: (1) **accounting**; (2) **budget planning**; and (3) **document tracking**. The general consensus is that financial applications should be given priority in developing microcomputer software for the City Hall. Several small programs have already been developed locally for one or two of the offices. Also, word processing is being used to type minutes, agendas and decisions reached in the City Council meetings, so that, by the end of each meeting, every member of the Council is given a copy of the transcript of discussions and decisions made in that meeting.

2.3. Plans for the Future

Discussions with managers of city functions and departments have revealed ambitious yet less than realistic **plans** to virtually automate the entire bureaucratic process of record keeping, plan making, and decision making at all levels. Under the most optimistic scenario, within a couple of years, networked PCs would exchange information not only between departments of the City Hall, but also between the municipality of Brasov and the *judet*, local and regional *regii autonome*, as well as surrounding localities. Electronic mail and sophisticated software packages, such as Lotus Notes for interconnected multiple users are being considered. Complex Geographic Information Systems (GIS) applications are being proposed for updating the City Master Plan, district plans, and the general cadastral plan for Brasov. Great hopes are being entertained for "solving" land ownership and *patrimony* problems by using crisp computer-generated and updated maps and records.

Moreover, at least on the surface, little concern is shown with the **resources**, both **expert** and **financial**, which would be required to put in practice these bold ideas. There is virtually no attempt at developing a **cost-benefit approach** or analysis of automating procedures within municipal management and service provision. There is no clear policy as to who should be responsible for drafting the **implementation plans** for the specialized software required for such applications, or whether contracting out software development is a feasible alternative. The above observations and concerns, some of which also surfaced in discussions with department managers, point towards **recommendations** made by this author in subsequent sections of this paper, and call for a simple, modular, and flexible approach to the design of a computer system for priority applications.

3. THE USE OF MICROCOMPUTERS IN LOCAL GOVERNMENT

Computers can be used by local governments effectively and efficiently, provide valuable information for management purposes, and do the work of many people. Many local governments in developed nations depend on the use of computers and would find the cost of replacing computer-performed functions with personnel to be prohibitive. On the other hand, many local governments around the world failed in their approach to computerization, by including systems that were too costly, failed to perform up to reasonable expectations, had hardware inadequacies, and experienced software failures.

3.1. The Purpose of Automated Data Processing

The purpose of automated data processing should be to provide complete, accurate, and reliable information for management purposes. Some of the **reasons** for buying microcomputers by the Brasov City Hall are:

- Improving accuracy
- Saving time
- Reducing or holding down the number of personnel
- Improving productivity
- Cutting costs
- Doing more work
- Doing work that could not be done before
- Making work easier
- Accomplishing tasks efficiently
- Improving the appearance of documents.

3.2. Types of Information Management

According to ICMA reports on computer applications in local administration, the two fundamental types of information management in local governments are: housekeeping activities and decision-making activities. As a rule, **housekeeping activities** may include: budget accounting, accounts payable, accounts receivable, payroll, personnel management, utility billing and accounting, tax billing and collection, departmental record keeping, word processing. **Decision-making activities** usually include "what-if" analysis, database management, and decision support. With the exception of word processing and departmental record keeping and personnel management, housekeeping activities are mainly concerned with financial management and preparing and controlling the flow of funds to, within, and from a governmental organization.

Decision-making activities are significantly different from housekeeping activities. For example, the purpose of budgetary accounting, a routine housekeeping activity, is to produce information about actual revenues and expenditures in relation to their budgeted occurrence and in relation to the previous year's actual occurrence. Budget preparation, on the other hand, is a decision-making activity. Persons involved in the budgetary process will use data from the budgetary accounting system but their principal objective is to project future budgetary conditions. To do so, they will ask hypothetical or "what-if" questions about future revenues and expenditures. Budget preparation attempts to provide information so that policy makers can decide what to do in planning for the next budget cycle.

For computerized budgeting and accounting to be useful in making decisions in the Brasov City Hall, the applications have to go beyond routine housekeeping activities, into providing summarized information, reports, economic indices, trends and patterns of income and spending to support economic decisions by the City Council and the Mayor.

3.3. A Strategy of Incremental Development

Any approach to building a strong and lasting capability in computer applications for the local government should start with a **systems design strategy**, which must assess realistically the local present and future resources, identify cost-effective computer applications, rank the applications in terms of priority, identify the data that should be computerized. An approach and procedure should be developed for obtaining appropriate software to create the application identified, and a scope of work for an initial priority systems development project should be outlined.

The **general approach** should be based on a small steps strategy, with a modular and flexible structure, which would allow more complex applications to be added and possibly integrated in the system. Excessive and unnecessary integration might overburden the system and might not be justified. Certain longer-term sophisticated applications such as Geographic Information Systems (GIS), Decision Support Systems (DSS), Executive Information Systems (EIS), and Operations Research (OR) models, can be quasi-independent. Such applications should integrate only carefully selected information from less complex applications and routine attribute and geographic databases.

3.4. Acquiring Microcomputer Software

For most local governments, **application programming** is the single most important part of the microcomputer system. Each application program is made up of modules or sub-program elements. The more complicated the task, the more complex the program required, since a program is a step-by-step reconstruction of all procedures that must be performed manually to complete a task.

Like any local government, the Brasov City Hall has at least six **options** when acquiring microcomputer software (Norris, 1986):

- (1) off-the-shelf software
- (2) public-domain software
- (3) packaged software designed for local government functions

- (4) software developed by another organization which may have to be modified to meet local requirements
- (5) custom software written by an outside organization
- (6) software created by in-house staff.

Off-the-shelf software is relatively easy to use, inexpensive, and available. The packages most used by local governments are word processors, spreadsheets, and databases. **Public-domain software** is programming that is available with no copyright protection which is often free or available for a nominal fee from microcomputer users' groups, electronic bulletin boards, and distributors of public-domain software. It is unlikely that such a resource will be available

to the Brasov City Hall in the short term.

Packaged software is programming written by software firms or value-added dealers. This option is always open to the City of Brasov, but it can entail high cost, hard currency, translation difficulties, and a steep learning and training curve. **Software developed by another organization** can be an effective solution to getting good programming at lower cost. However, there are negative aspects reported in such situations, which include a possible lack of documentation, lack of training, and lack of support. Many times programs must be modified by the purchaser, either using in-house staff or by hiring outside programmers.

Custom-written software, whether written by outside programmers or in-house staff, can be a short-term, ad-hoc solution to local government computer applications. However, it can be excessively expensive. It involves the work of people, instead of technology, and people's time is expensive. Programming is a highly specialized discipline requiring persons with equally specialized skills. These skills are often not related to the functional requirements of local government; that is, relatively few programmers know much about governmental requirements. Overall, this is a viable solution for Brasov, although the choice of locally developed software is quite limited.

3.5. Software Applications for Local Governments

Software packages and solutions currently available to local governments in highly developed countries are extremely diverse and sophisticated. For example, **ICMA Software Reference Guide 1992** lists an impressive number of packages available which cover areas local government functional areas such as:

- Administration (general management, project management, and request for service)
- Building Permits, Code Inspection
- Clerk's Office
- Courts
- Economic Development
- Finance (capital financing and planning, investment management, accounting, financial analysis and forecasting, fixed assets, insurance and risk management, payroll, tax assessment)
- Geographic Information Systems (GIS) and Mapping
- Health and Human Services
- Housing and Community Development
- Parks and Recreation
- Personnel
- Planning
- Public safety (including animal control, computer-aided dispatch, emergency management, emergency medical services, fire services, jail management, law enforcement)
- Public Works (including energy management, engineering, environmental management,

procurement and inventory management, infrastructure-facilities-equipment management and maintenance)

- Transportation (including management, maintenance, planning and engineering)
- Utilities (including billing, management and maintenance)

4. GENERAL RECOMMENDATIONS TO THE CITY HALL

The overall **recommendation** to the Brasov City Hall is to take a hard look at the experience of numerous cities of similar size which have gone through the process of building a capability in the use of computers for various city departments and functions. It is imperative to avoid costly mistakes, traps and pitfalls which many American, French, English, and German cities experienced with computers, while following the positive developments of the ones which were able to carefully assess, plan, implement, and maintain successful systems. ICMA's Reports and expertise are an excellent resource for learning about these experiences (see Appendix B).

4.1. Develop a Systems Design Strategy

The City Hall approach should start with a **systems design strategy**, which must assess realistically the local present and future resources, identify cost-effective computer applications, rank the applications in terms of priority, identify the data that should be computerized. The ICMA consultant worked closely with the Office of Information Systems, which is in charge of developing such a strategy, to produce an approach and procedure for obtaining appropriate software to create the application identified. A scope of work for an initial priority systems development project is outlined in Section 6 of this Report.

The **general approach** should be to develop information systems with a modular and flexible structure, which would allow more complex applications to be added and possibly integrated in the system. Excessive and unnecessary integration might overburden the system and might not be functionally and economically justified. Sophisticated applications such as Geographic Information Systems (GIS), Decision Support Systems (DSS), Executive Information Systems (EIS), and Operations Research (OR) models, can be quasi-independent. Such applications should integrate only carefully selected information from less complex applications and routine attribute and geographic databases.

If microcomputers are successfully installed and running, and have been designed to support such local governmental functions as utilities, budgeting, and personnel, decisions can be made based on the information processed. However, the question remains as to whether chief administrators can use microcomputers effectively within their immediate offices. Brasov itself is a notable exception, since it has the privilege of having a Mayor who is also an expert in computers. For all the other cities in Romania, an Executive Information Systems (EIS) and a Decision Support System (DSS) would make sense only as specially designed systems which would sit on top of several databases, department record keeping and smaller applications. Such

systems would have to have specially designed interfaces for, say, busy decision makers, or for group decision settings.

4.2. Evaluate Needs and Resources

A careful **needs and resources evaluation** should be made prior to building an application system for the City Hall. Norris (1986) notes that: "Although the benefits of microcomputers appear to outweigh their liabilities, research suggests that experiences with them are not universally satisfactory. Inappropriate hardware and software are purchased; machines break down; users are not trained and supported adequately; computerphobia and increased job stress occur; and unnecessary duplication of effort takes place". The organizations that have been most successful in applying microcomputers have looked closely at the way work was done before implementing the computer systems.

In evaluating the need for computer applications for the Brasov City Hall, and to help current users evaluate new applications, the following **guidelines** are offered (ICMA, 1988b):

- (1) **Decide what information you need.** Computers can generate enormous amounts of information. Before a staff member spends hours typing information into a database or spreadsheet, be sure that you need the information that will be generated.
- (2) **Decide who should be trained.** Training is time consuming, and if you are not a regular user, you might need to be retrained every time you use the computer. A department might more effectively use the computer if only two or three people are trained.
- (3) **Determine what applications will be productive.** Various surveys show that word processing, spreadsheets, and databases are the most common applications in the local government departments and in the Mayor's office. They can be easily learned and, if properly used, will result in time savings, improved quality, and greater productivity. Caution is advised in evaluating other applications. It is easy to waste thousands of dollars and many hours of training on software that may have limited utility.
- (4) **Provide user training and support.** A variety of training possibilities are available, including joint training with a local school or university system or other local government. Staff must be given enough time away from their daily work tasks to learn to use the computer.
- (5) **Regularly evaluate the effectiveness of microcomputer use.** Questions to ask in evaluating the effectiveness of computers include:
 - Is more information being generated from the computer than is actually needed to make good management decisions?
 - Are expensive computer services being purchased although they have limited

utility for the office?

- Are the computers in the office compatible with one another? Are unnecessary software and hardware being purchased?

4.3. Evaluate Off-the-Shelf Software

In evaluating off-the-shelf software, the following **categories** should be considered:

- Performance
- Documentation
- Ease of learning
- Ease of use
- Error handling
- Support
- Value

Experts in software acquisition suggest **additional criteria** for off-the-shelf evaluation:

- Cost
- Internal product integration
- Interface/integration with software from other vendors
- Ease of installation
- Performance speed
- Purchase terms

4.4. Perform a Cost-Benefit Analysis

Some form of **cost-benefit analysis** should be used so that decision-makers will know how much the system is likely to cost. Total system costs should be identified both for initial installation and for continued operation. Total system costs include at least the following:

- Hardware: CPUs, monitors, printers, plotters, modems, cables
- Application programs, whether off-the-shelf or packaged, or the cost of program development and the cost of any required customization or modification
- Training
- Hardware maintenance

- Software support
- Supplies: paper, ribbons, toner, disks
- Electrical connections for LAN, including room modifications
- Additional furniture: desks, tables, storage
- Conversion of data from current systems and methods

The costs should be projected for one-year and either three- or five-year periods to provide a clear picture of both initial and system life costs. Out-of-pocket costs can be expected to be substantial, but the functional benefits and capabilities of the system may more than outweigh the monetary costs.

Determining **cost-effectiveness** may be the most difficult part of the procurement effort. If it can be justified functionally (for example, to improve the performance of one or more activities) and a department has money in its budget, it may purchase the hardware and software. **Cost-benefit** alone may be insufficient to establish the feasibility of buying equipment. Analyses have shown that over a five-year period, a new computer system could be financed out of actual cost savings. In many cases, lack of communication between staff and elected officials has delayed considerably this activity.

4.5. Build a Consensus

Several **measures** can be taken to achieve a consensus for the procurement, development, and use of a computer system for the City Hall. They include a sound requirements analysis; objective cost-benefit analysis; and open, honest communication between key staff persons and elected officials. Communication is critical throughout the process because it promotes understanding of the need, costs, and impacts of automation. Understanding, of course, does not necessarily result in support, but, at a minimum it provides all participants with a common framework and promotes educated decision-making.

5. COMPUTER SYSTEMS PRIORITY APPLICATIONS FOR BRASOV CITY HALL

In its attempt to define and build computer applications to support local public administration and planning activities, the Brasov City Hall is confronted with major difficulties:

- Lack of financial resources and local financial autonomy
- Continuation of the command-and-control practices and hierarchical relationships of the old regime
- Confusion in the application of Law, in particular in the areas of land/ buildings/ assets ownership
- Lack of managerial skills for the implementation of its vision and its drive towards local autonomy
- Severe understaffing of the Brasov City Hall

Such constraints point towards a gradual implementation of a computerized approach in the City Hall, with major applications, such as a computerized Master Plan and cadastre system,

delayed until experience with simpler applications is gained and consolidated, and legal and operational clarifications are in place for dealing with land/buildings/assets ownership issues.

The difficult job that the City Hall is undertaking is somewhat facilitated by significant resources available at the local level, such as leadership and vision, technical expertise available on microcomputer programming and use, high potential for finding creative solutions to problems, and reasonably adequate and powerful hardware support.

5.1. Categories of Users and Types of Applications for Cost-Effective Computerization

Within Brasov City Hall, microcomputers software and applications could be used by four categories of officials or personnel:

- Elected officials
- Managers
- Professional-technical staff
- Secretarial-clerical employees

As applications develop, the principal microcomputer users must be the professional-technical staff and the secretarial-clerical employees. The **secretarial-clerical employees** must continue to be trained by the programmers and operators in the Information Systems Office to use basic micro software, such as word processing and spreadsheets, to prepare correspondence, memos, and documents. The **professional-technical staff** must be trained both by the in-house specialists and by specialized software vendors, in the use of spreadsheets, databases, and accounting, budget, and financial packages provided by the vendors. The targets for immediate and simple computer applications are the Offices in the three City Hall Departments:

The Department of Public Administration:

- The Secretariat, the Registrar's Office and the Archive
- The Office for Legal Affairs and Social Assistance
- The Office of Civil Status

The Economic Department:

- The Office of Management, Payroll, Personnel, and Administration
- The Office of Budget and Accounting
- The Office of Commercial Audits and Free Initiative Authorization
- The Office of Information Systems

The Technical Department:

- The Office of Architecture and Urbanism
- The Office of Regional Planning, Environment, Cadastre, Topographic and Geodesic Services, and Land Records
- The Office for the Records and Management of the Patrimony
- The Office of City Management and Services
- The Office of Investments, Auctions, and Public Works
- The Office of Housing

In one to two years, when comprehensive and carefully structured databases will be available in each of the Offices, **managers** (Office chiefs and heads of Departments) must be convinced and trained to use more sophisticated reporting packages, as well as communication software, such as e-mail and bulletin boards, in order to effectively and efficiently control the flow of information in their departments and within departments. At that stage, a target for computerization must be the recently introduced Office for Audits and Inter-Departmental Coordination, whose chief reports directly to the Mayor.

The involvement of Office chiefs and heads of Departments in the use of MIS is a prerequisite to developing, in a longer term perspective, of Decision Support Systems (DSS) and Executive Information Systems (EIS) for the direct use of the **Mayor and elected officials**. Although the topic is highly premature, it is useful to keep in mind that both DSS and EIS require a different interface development approach, with emphasis on user-friendly features and/or fully automated navigation to make the best use of the chief manager's limited time.

5.2. Priority Applications and a Systems Development Process

The first priority computer applications for the Brasov City Hall can be broken down into two categories: **internal housekeeping applications**, and **service providing to the citizens**. The immediate computerization needs within the first category are **accounting and budget planning**, while the critical application in the second category is **document tracking**.

The first applications should focus on **word processing** (minutes, agendas, reports, proposals, newsletters), **spreadsheets** (tables, simple financial reports, financial agendas and plans), and **relational databases** (inventories, lists of customers, suppliers, addresses and telephone/fax numbers, planners/organizers, etc).

Accounting and budget software development should be contracted out to local software companies which should provide support, training, upgrades, and services related to the software. Then, the accounting and budget applications will, of course, become a daily routine for the City departments involved.

Long-term and special projects and applications, such as Geographic Information Systems (GIS), Decision Support Systems (DSS), Executive Information Systems (EIS), and Operations Research (OR) models, can be quasi-independent. Such applications should integrate only carefully selected information from less complex applications and routine attribute and geographic databases.

5.3. The Principal Data that Should be Computerized

While in Brasov, the ICMA consultant had discussions with the Department heads, the chiefs of Offices, and the specialists in the Office of Information Systems. Based on the preliminary discussions, the principal data and information recommended for computerization are (by office):

- The Secretariat, the Registrar's Office and the Archive
 - Document tracking
- The Office for Legal Affairs and Social Assistance
 - Welfare records for large families
 - Children subsidies records
- The Office of Civil Status
 - Births and deaths records
 - Marriage and divorce records
- The Office of Management, Payroll, Personnel, and Administration
 - Personnel data
 - Payroll
- The Office of Budget and Accounting
 - Materials and assets inventory and management
 - Fixed assets inventory and management
 - Invoicing and billing
 - Accounting

- Budget planning and operation
- The Office of Architecture and Urbanism
 - Certificates of urbanism and building permits
 - Brasov Master Plan (long-term or special project)
- The Office of Regional Planning, Environment, Cadastre, Topographic and Geodesic Services, and Land Records
 - Land use and cadastre data and maps (long-term or special project)
- The Office for the Records and Management of the Patrimony
 - Patrimony/records keeping
- The Office of City Management and Services
 - Data on municipal services
 - Data exchange with *regii autonome*
- The Office of Investments, Auctions, and Public Works
 - Records on public bidding, proposals, etc.
- The Office for Audits and Inter-Departmental Coordination
 - Records of citizen complaints, tracing, and decisions

5.4. Approach and Procedure for Developing and Obtaining Appropriate Software

The specifics of local government in Romania, both historically and during the current transition to a market economy, make it difficult to apply directly off-the-shelf software widely available in developed countries in the local public administration process, in Brasov and in other Romanian cities. A specific legal framework, the different needs and different organization and management of the local government, as well as the language barrier, increase the difficulty of using internationally available software packages, certainly during the first stages of computerization. Consequently, **the immediate solution is to rely on locally available software** for planning and local government applications.

In order to make recommendations to the City Hall on developing and acquiring appropriate software, the ICMA consultant had discussions with several **local software development companies** and **software vendors**, both in Brasov and Bucharest, which were considered by the City of Brasov. To get himself acquainted with the local software vendors and software availability, the author participated in a two-day CAD/CAM Conference and exhibition which took place in Brasov during his stay. The software companies and vendors contacted were:

- **RELAI**, Financial Software Company, Brasov
- **INFOSTAR** (Enterprise for Information Services), Brasov

- Center for the Transfer of Information Technologies to Public Administration (*Centrul de transfer al tehnologiilor informatiei in administratia publica - CTTI-AP*), Bucharest
- Electronic Design & Consulting Group (**EDCG**), Bucharest
- **A & C International**, Romanian AutoDesk Distributor, Bucharest

The Center for the Transfer of Information Technologies to Public Administration (**CTTI-AP**) offered information about software development companies in Romania and provided the author of this Report with a Proposal for the Development of Management Information Systems for the Local Government (*Propunere de proiect pentru informatizarea administratiei publice locale*), dated October 1993. The CTTI-AP survey shows that, ironically, Brasov is one of the most advanced municipality in introducing computer applications in the local public administration. Most private software companies in Romania, according to CTTI-AP, are too small to be reliable, and to effectively and efficiently provide cost-effective software applications, maintenance and support to local governments.

Unfortunately, CTTI-AP, which was founded by the National Commission of Information Technology, closely reflects the views of the central government, which have not changed much from the previous regime. The Commission's Master Project of Information Technology in Romania (*Proiectul Director al Informatizarii in Romania*), issued in September 1992, displays an incredibly rigid hierarchically structured strategy of computerization of all socio-economic activities in the country.

Similarly, CTTI-AP's Proposal for the Development of Management Information Systems for the Local Government proposes a highly unrealistic and useless scheme of a hierarchy of computer and software centers to support applications and to train staff from the local government, all coordinated by a central unit located in Bucharest. In addition to that, CTTI-AP is engaged in promoting sophisticated GIS and other applications, which most municipalities lack the resources to acquire, use, and maintain. The implied assumption is that funds for such applications will be available - sometime in the future - from the central government.

Equally unrealistic are the solutions offered by local and national software resellers, such as **A & C International**, who try to sell to the local governments sophisticated packages, such as CAD/CAM systems, GIS, Lotus NOTES, which not only require a significant initial investment, but also local expertise, training, dedicated staff and, more important, clear and transparent management structures, with well-defined responsibilities, lines of authority, and reporting procedures. Such is clearly not the situation with the local governments in Romania during the transition to a market economy.

5.5. Cost-Effective Software Solutions

In contrast, certain local software development groups have been producing simple, easy-to-use applications in the Romanian language, for **accounting**, **payroll**, and **financial** purposes. While in Brasov, the ICMA consultant reviewed the capabilities of **RELAI**, a local software company, which has provided such solutions to *regii autonome* and commercial enterprises.

RELAI presented a Proposal to the City Hall to customize their proprietary financial software for use by the local government. Their turnkey modular MIS costs less than \$2,000 and provides the following modules:

- Materials and assets inventory and management module (MICE)
- Fixed assets inventory and management module (EFIX)
- Accounting module (CONT)
- Payroll module (PERSAL)

In addition to the turnkey system, the company offers to develop applications for the City Hall in the following areas:

- Budget planning and operation
- Capital investment program management
- Directory of streets and address matching
- Birth and death records

The additional applications are equally cost-effective, and a rebate is offered by the company in case the products developed for Brasov are sold to other municipalities. RELAI offers training and free support and upgrading for one year. The software applications are straightforward and practical, built on platforms like FoxPro for DOS, Windows and ACCESS, and usable on NOVELL and UNIX networks.

6. SCOPE OF WORK AND LEVEL OF EFFORT FOR AN INITIAL PRIORITY SYSTEM

6.1. The Initial Priority System

In addition to providing assistance in developing a systems design strategy, evaluating the City Hall needs and resources, and assessing the availability and feasibility of acquiring locally developed software, the ICMA consultant worked closely with the Office of Information Systems to layout a work plan for an initial priority system for the Brasov City Hall.

The following table details the scope of work, level of effort, and schedule for the initial priority system. It covers the first year (1994) of a broader effort involving more sophisticated software and more specialized applications. Before adopting the plan, the detailed initial and operating costs and budget implications must be assessed by the City Hall. A preliminary set of recommendations accompanying the work plan are given further below.

<u>DEADLINE</u>	<u>PROPOSED APPLICATIONS</u>	<u>HARDWARE/ SOFTWARE/ STAFF</u>
March 1994	- Off-the-shelf applications & training:	- Network the computers in a LAN (outside contractor)
	- Word processing	- Acquire software: Microsoft WORD, ACCESS
	- Relational databases	- (2) Programmers and (4) Computer operators
	- In-house software development:	- (2) Programmers
	- Calendar	- DBASE III, Microsoft ACCESS
	- Planner/Organizer	
	- Phone Director	
June 1994	- Off-the-shelf applications & training:	- Acquire software: Microsoft EXCEL, WORKS
	- Word processing	- (2) Programmers
	- Spreadsheets	- (4) Computer operators
	- In-house software development:	- (2) Programmers
	- Welfare records for large families	- Microsoft ACCESS
	- Children subsidies records	- Buy modem, scanner
	- Custom software/outside contractor (RELAI, Brasov)	- (2) Programmers - (4) Computer operators
	- Materials and assets inventory and management module (MICE)	
	- Fixed assets inventory and management module (EFIX)	
Sept 1994	- In-house software development:	- (2) Programmers
	- Patrimony/Records keeping	- Microsoft ACCESS

- City Hall invoicing and billing

- Custom software/outside contractor - (2) Programmers
(RELAI, Brasov) - (4) Computer operators

- Accounting module (CONT)

- Payroll module (PERSAL)

Dec 1994 - In-house software development: - (2) Programmers

- City Hall Newsletter - Desktop publishing software

- Document tracking - Microsoft ACCESS

- Custom software/outside contractor - (2) Programmers
(RELAI, Brasov) - (4) Computer operators

- Budget planning and operation

In order for this plan to be approved and implemented, it is **recommended** by the International City/County Management Association (ICMA) that the City Hall addresses the following **issues**:

- **Cost issues: how much will the work plan recommendations cost?** The preliminary estimates made by the ICMA consultant show a cost range for hardware and software acquisition in the order of \$10-20,000.
- **Who will be responsible for what? Does the City have the skilled staff to input the data which should be computerized?** The role and responsibilities of the Office of Information Systems should be clearly laid out. What would the role of the two programmers in the Office be, and how would the computer operators support this effort?

The ICMA consultant's recommendation is to encourage the programmers' direct involvement in in-house software development and training activities in the first implementation stages of this plan, while assigning them supervision and management roles in the later stages, when a host of software applications are in place, which need

to be coordinated. Likewise, the four computer operators should gradually receive increased responsibilities for training designated microcomputer users in the City Hall departments, and should begin working closely with the end users for developing data entry and processing procedures, as well as simple, customized applications responding to immediate needs of those departments.

- **How should technical services and software be procured, i.e. sole source or competitive? Who is going to be in charge of writing procurement specifications?** ICMA recommends that, with very few exceptions, competitive bidding should be put in place for software and service procurement. In order to receive the best quality of services for the expense, i.e. the most cost effective services, the City Hall should consider breaking down the jobs and services procured into smaller tasks, to encourage smaller businesses and individual consultants to participate in the bidding process.
- **How is the plan linked to future City Hall activities in the information systems area? What is the role of ICMA in supporting this plan?** The ICMA consultant's recommendations in this area are included in Sections 6.2 and 6.3 below.

6.2. Long Term and Special Projects

The next category is long term or special projects, requiring substantial financial and human resources. Such projects become feasible only if substantial funding is available internally (either from the central government, or from local sources, once local governments become financially viable and autonomous) or from external sources. For extensive projects, a combination of technical assistance projects, with grants and loans from international donors might be necessary. Such projects could be:

- (1) **Geographic Information Systems (GIS) applications in developing the Master Plan of Brasov.** Such a project would allow the municipality to update the land and asset inventory, and to control growth, while attracting and retaining businesses and, possibly, foreign investors.

A cost-effective solution would be to use a desktop GIS, such as Atlas GIS for Windows, MapInfo for Windows, or ArcView 2.0, and purchase satellite pictures for easy annual updating of the land use maps. All implied costs should be taken into consideration, including the cost of contracting out the socio-economic and demographic surveys, or special studies, such as the touristic potential of the region. Also, the updating and monitoring should be costed in order to insure the efficiency and effectiveness of the effort.

- (2) **The Municipal Cadastre System.** Such a project can be extremely complex and expensive and requires careful planning and feasibility studies. There are numerous examples of cities in developed countries which failed miserably in a too ambitious attempt at implementing sophisticated cadastre systems which eventually cost three to ten

times the projected costs, and had to be abandoned.

- (3) **Decision Support Systems (DSS) and Executive Information Systems (EIS).** Such applications require not only extensive, accurate and structured databases and Management Information Systems (MIS), but also clear and transparent management structures, with well-defined responsibilities, lines of authority, and reporting procedures.

6.3. The Role of the International City/County Management Association (ICMA) in the Implementation of the Brasov City Hall Computerization Plan

ICMA's role in this process will be one of providing periodic assistance and oversight in the implementation of the proposed work plan, once agreed by the Brasov City Hall officials. ICMA consultants will make quarterly visits to Brasov, to deliver assistance and support in the recommended action areas. During their visits, the consultants will:

- Evaluate realistically both needs and resources and monitor the development of the computer applications proposed in the work plan.
- Assist the Office of Information Systems in performing feasibility studies for an evolved information system, as well as cost-benefit analysis to take into account the total system costs, i.e. initial costs and operating costs.
- Help establish a local policy for software acquisition and assist the designated in-house expert or experts to develop City Hall guidelines and specifications for software evaluation and procurement.
- Help prepare the ground for 1995 activities and for longer term and special projects. This activity includes:
 - Identify Geographic Information Systems (GIS), Decision Support Systems (DSS), and Executive Information Systems (EIS) which are relevant for, and applicable to the City of Brasov.
 - Acquire the software and perform computer demonstrations of relevant GIS, DSS, and EIS applications.
 - Develop pre-feasibility analysis for cost-effective GIS applications, including remote sensing, satellite imagery, etc. to support the Master Plan and cadastre efforts.
 - Developing hardware, software, personnel and data requirements for such more complex applications.

7. APPENDICES

7.1. APPENDIX A: PERSONS INTERVIEWED

Brasov City Hall

Adrian Moruzi, Mayor of Brasov

Corneliu Popa, Deputy Mayor of Brasov

Aniela Ghita, Office of Information Systems

Bunel Moise, Office of Information Systems

Gheorghe Risteiu, Director, Economic Direction

Csaba Kovacs, Director, Direction of Public Administration

Lucian Isa, Chief, Urban and Architecture Office

Records

Daniel Cincu, Chief, Regional Planning, Environment, Cadastre and Land Office

Mugur Loga, Chief, Records and Management of the Patrimony

Marcel Laurentiu, Chief, Investments, Auctions, and Public Works

Dana Cazacu, Chief, Audits and Inter-Departmental Coordination

Software Firms

Dumitru Muresan, Director, RELAI, Financial Software Company, Brasov

Victor Streza, Manager, INFOSTAR (Enterprise for Information Services), Brasov

Manuela Dobre, Center Manager, Center for the Transfer of Information Technologies to Public Administration (*Centrul de transfer al tehnologiilor informatiei in administratia publica - CTTI-AP*), Bucharest

Bucharest

Costin Mihai, Director, Electronic Design & Consulting Group (EDCG),

Mihai Botez, A & C International, Romanian AutoDesk Distributor, Bucharest

Brasov Chamber of Commerce and Industry

Mircea Florescu, President

Mircea Suman, Vice President

International Consultants

Robin T.A. Hardie, Senior Financial Advisor, Coopers & Lybrand,
"Transylvania" Private Ownership Fund, Brasov

7.2. APPENDIX B: REFERENCES

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