Computerized Storage and Retrieval System for State Administration

J. F. Révész
A. Bárász


1. General

The operation of the state administration was recently subject of numerous critical notions. Every level of the administration was accused to be too bureaucratic. These critical opinions and the sophisticated functions of a


L'INFORMATICA AMMINISTRATIVA IN UNGHERIA

Nel corso di un primo incontro con gli organismi ungheresi che si occupano di informatica applicata all'amministrazione pubblica ebbi modo, nell'ottobre 1976, di prendere contatto con l'Istituto per l'Organizzazione dell'Amministrazione Statale presso il Ministero delle finanze ungherese. Frutto di quel contatto è l'articolo che segue, in cui si descrive il sistema di information retrieval legislativo messo a punto dall'Istituto stesso.

In attesa di poter disporre di un studio particolareggiato sulla struttura organizzativa dell'informatica ungherese, è opportuno richiamarne qui alcune linee generali. Il lettore potrà così situare l'esperimento descritto nell'articolo di Révész e Bárász nel contesto dell'informatica ungherese.

Il governo ungherese emanò nel 1971 un programma centrale per lo sviluppo delle tecniche informatiche. Il periodo coperto da questo piano va dal 1971 al 1985. Pur riservando in esso specifici settori a vari enti ed uffici pubblici, il governo ungherese conferì una posizione di particolare rilievo all'Ufficio centrale di statistica. Esso è oggi l'ente responsabile per il controllo su scala nazionale delle attività connesse con l'uso degli elaboratori nell'amministrazione pubblica. I suoi compiti si possono così sintetizzare: coordinamento della ricerca e dello sviluppo di tecniche informatiche, nonché controllo sulle ricerche centralizzate; contributo alla messa a
socialist modern state made necessary the modernization and simplification of the administrative functions. This could be accomplished only by the application of new methods and approaches.

The approach of these goals was possible only by using new tools and experiences of the third industrial revolution.

It was realized that the state administration is to be viewed as a system. So the methods of the systems approach can and must be implemented to accomplish this task.

The state administration as a system has all of the characteristics of a great system. The following basic characteristics:

— the activities,

pu n to di siste mi di elaborazione elettronica nei vari settori economici; installazione di reti e centri di calcolo per le elaborazioni più diffuse (come, ad esempio, le paghe); preparazione professionale di tecnici dell'informatica a tutti i livelli; pubblicazioni tecniche relative tanto ai risultati delle elaborazioni, quanto alla qualificazione professionale dei tecnici dell'informatica; organizzazione e controllo dell'appropriate ungherese nelle attività internazionali legate all'informatica.

La realizzazione di questi compiti è affidata a varie agenzie che dipendono dall'Ufficio centrale di statistica. La qualificazione professionale è curata dal Centro Internazionale per l'educazione e l'informazione informatica (SZAMOK). I suoi corsi hanno luogo in otto città ungheresi, oltre che a Budapest, e coprono l'intera area degli elaboratori provenienti sia dal mercato occidentale, sia dal mercato orientale.

I Servizi Organizzativi per l'Elaborazione e il Management (SZOV) costituiscono l'insieme dei centri di calcolo a disposizione dell'Ufficio centrale di statistica e, di conseguenza, hanno una tradizione più che ventennale: infatti entrarono in funzione con l'introduzione in Ungheria dei primi sistemi meccanografici. Oggi questo ente si trova al centro di una rete che copre l'intera Ungheria e che è destinata ad espandersi ulteriormente. In particolare, uno dei suoi compiti attuali consiste nel progettare e realizzare un sistema regionale per l'automazione delle paghe. Nel l'ambito del Comecon, la produzione degli elaboratori è stata suddivisa tra i vari stati, affidando a ciascuno di essi la realizzazione di un settore dell'intera gamma. L'assenza a questo sistema unificato è alquanto afflittiva alla società NOTOSZ, che viene così ad essere la corrispondente ungherese delle analoghe società di assistenza istituite nelle altre democrazie popolari. I compiti di questa impresa vanno dall'importazione degli elaboratori all'assistenza tecnica nell'installazione e nella programmazione. Attraverso questo ente passano anche gli elaboratori di produzione occidentale, importati in Ungheria.

La Casa Editrice Statistica (SKV) ha assunto dopo il 1971 una serie di compiti che non sono strettamente editoriali. Accanto alla pubblicazione di manuali e di risultati di elaborazioni elettroniche, questa impresa provvede anche alla preparazione di tutti gli stampati che possono essere utilizzati nei servizi informatici, contribuendo così alla standardizzazione delle procedure sul piano nazionale.

Infine, l'Istituto di Ricerche per l'Informatica applicata (SZAMKI) provvede ad effettuare gli studi in tre diverse direzioni. In primo luogo, ricerche per il software di base e applicativo destinati agli elaboratori costruiti in Ungheria nell'ambito del Comecon. In secondo luogo, sviluppo del software applicativo per l'amministrazione statale e per le grandi imprese economiche; in terzo luogo, studio delle reti di elaboratori e, in particolare, dell'utilizzo dei minicalcolatori prodotti in Ungheria nell'ambito di queste reti.

Come risulta da questo rapido esame, l'organizzazione centrale — costituita dall'Ufficio centrale di statistica e dalle agenzie fin qui brevemente illustrate — assiste i singoli ministeri o le singole imprese nello sviluppo dei propri centri di calcolo, senza però sostituirsi ad essi. Il compito dell'Ufficio centrale di statistica è infatti quello di coordinare le varie attività, evitando duplicazioni. (MARIO G. LOSANO).
— the operating organization to accomplish these activities,
— and the tool system

must be analysed.

Based on the functions of the state administration this means the analysis of the operation and co-operation of the general and specialized governmental and lower level agencies, the co-ordinative and hierarchical links, the remedy and legal norm systems.

It seems to be necessary to organize the unique elements of the administrative functions (e.g. special activities, organization, remedy types) in a standardized system. Well known is the sophisticated manner of the governmental activities. New and modern legal regulations must be effective within a conventional administrative organization – often in an uneffective way.

The conventional tools seem not to be efficient anymore to make the necessary information available.

The amount of the information to be processed justified the use of computers. Theory and tool itself do not solve the problem.

For the application of the computer technology all of the characteristics of the legal material must be expressed in the form of exactly defined key-system exactly interpretable by the machine.

The analysis of the elements of the state administration needs the development of a system of computerized dictionaries. These are expressed by legal rules and therefore form the basis of the methods for the computerized handling of juristic information.

After the analysis of certain characteristics of juristic information one could survey the degree of control and the resource system of specific activities taking advantage of high speed data processing capabilities.

The integrated information obtained in this way form the basis of the modernization and simplification activities.

This is one of the numerous computer application possibilities in the state administration which creates a good basis for an efficient storage and retrieval system of legal records.

Recently the research staff of the « Ministry of Finance Organizational Institute of State Administration » (Pénzügyminisztérium Államigazgatási Szervezési Intézet. 1369 Budapest József nádor tér 2-4. Hungary) developed an experimental system with the goals
— to make available a sufficient standardized data base,
— to obtain experiences on processing of textual data.
2. Organization, Content and Operation of the Experimental System

Being an experimental system, the scope of processed data was limited only to a specific section of the public administration. The methods considered are adaptable for handling legal information of different types as well.

The unit of information

The unit of information considered is the «function record». It contains some data-blocks:

— identification data,
— alphabetic information,
— analysis data,
— names of functional agencies,
— legal norm system for the function.

Each of the data-blocks contain a certain number of data elements characteristic for a specific function. These data elements are structured in specific sub-systems (called dictionaries) using a decimal identification code-system.

Information stored in the data-blocks above:

Identification data: The unique identification of specific legal functions. A code number identifying the primary agency and the order number of the specific function. The «key-number» of a given function is made up from both of these data.

It has its importance in respect of EDP.

Alphabetic information: Alphabetic description (descriptor) of the content and direction of the specific function, using the same expression as contained in the legal rules themselves.

Analysis data: The basic juristic characteristics of a specific legal function relating to:

— remedy,
— reasonableness,
— direction specification and restriction
— form of decisions,
— activities,
— interconnection with other juristic branches.
Functional agencies: All of the names of those governmental and local agencies, institutes, social organizations and individuals participating in the jurisdiction on any level of the state administration.

Legal norm system:

- issuing source,
- type of the legal rule,
- the order number and data of the legal rule,
- location of publication,
- date of coming into force and date of cancellation.

The structure of the dictionaries is in accordance with the conventional classification but contains new elements as well to make the handling of the information easy.

Sub-systems

To handle the stored information according to their juristic content, every function is qualified according to the grouping of each of the sub-systems. The only exception handled presently alphabetically is the sub-system of alphabetic information. The next step of development will be the logic structuring of these information.

The sub-system (computerized dictionaries) are the follows:

Sub-system for primary agencies

The dictionary itself contains presently 8 groups as follows:

- central organizations,
- administrative control,
- functional administration,
- branch administration I (branch economics),
- branch administration II (social administration),
- national organization controlling co-operatives,
- central administration of social organizations,
- administration of international affairs.

This sub-system contains the ministries and agencies on national level, the National Assembly, the Presidential Council, generally organizations having the highest controlling and auditing functions.

The belonging to this group is determined by the Constitution and the existing administrative practice.
The elected organizations like the National Assembly, the Presidential Council and others belong to this category because of their interconnection with the local administrative organizations.

The 8 groups contain at present as many as 35 primary agencies (organizations). The elements of the key-number of the relevant record stored in the computer's memory are the order number of a specific function and the code-number of the relevant organization.

**Sub-system of functions (function dictionary)**

It contains all the basic functions of the socialist state administration. The 138 basic functions (e.g. organization of elections, registration, public security etc.) are grouped into 13 functional categories, such as the enforcement of the people's supreme power, preparation of bills, state administration, personal and labour affairs, security etc.

This sub-system is considered to be the most important of all, because its role lies in analysing the contents of the «active state administration». This system shows the prevailing division of labour within the state-hierarchy. Static as well as dynamic analysis can equally be performed by using this system.

The basis of the improvement activity will be the analysis of the system elements and their interaction at all levels of the public administration.

The activity system has a dynamic character and does not accept «eternal» categories.

This fact has a set of consequences, as follows:

— The grouping of the sub-system and its elements should be considered merely as a basic sorting possibility relating to the content.
— It is considered an important task to set up a scientific basis for a development activity having the goal to establish the conceptual content of each of the elements.
— The possibility of changing the grouping of the elements of the sub-systems as a result of the development activities needs to be considered.

**Descriptors**

Alphabetic data elements relating to the content of the functions using the terminology of the given legal rules.

The list of the descriptors is already available. Structuring shall be completed in the near future. This set of descriptors fits the needs of a dictionary (thesaurus) for the area of the administrative law.
Sub-system for state agencies (Dictionary for agencies)

All of the state agencies and officially acting persons mentioned individually or in a collective manner in any valid legal rule (e.g. Ministry of Finances, municipal council, veterinarian etc.).

This dictionary supplies an information basis towards the build-up of the operative organization model.

Sub-system of legal sources (JOR dictionary)

The structured set of names of those organizations and agencies which were authorized to issue legal rules from 1867 up to now. The presence of ancient legal sources is justified by the fact that the system also deals with historical data.

The grouping of legal sources:
- National Assembly,
- Head of the State,
- Governmental Committee,
- Administrative Ministries,
- Functional Ministries,
- Branch Ministries.

The listing of local administrations, the trade unions as well as the central organizations of co-operatives serves to widen the system.

The system lists at present 126 different legal sources, some of them also divided into historic periods (e.g. National Assembly 1926-1944, National Assembly 1949... etc.).

Sub-system for formal standardization of legal rules (JOT dictionary)

This dictionary contains the classification of the different types of legal rules (law, order of the Presidential Council, ministerial order etc.). The dictionary itself is constructed according to the lay-out of the dictionary for legal sources, however, it contains more group-headings for the processing of the conceptual decisions of the courts.

In our legal system the formal type of legal rule issued by a specific organization is duly controlled by matching of the two last mentioned dictionaries, giving a good possibility to analyse.

The dictionary itself contains 81 items in 8 groups. The principle of grouping is based on historical considerations.
Sub-system for legal categories and sub-categories

The dictionary is based on the classical categorization of the Hungarian law-system. It also contains all of the theoretically and practically formed categories of the state administration. It contains the links connecting administration law with other legal categories.

The dictionary contains 6 categories and 23 sub-categories.

Publication of legal rules (JOL dictionary)

This contains the alphabetic sequence of the names of the official and practically used papers (periodicals) with their officially accepted abbreviations, in which a legal rule may appear. The number of items is as many as 102.

Sub-system for remedies and reasonableness

It contains all of the remedies and the possibilities for the application of reasonableness in the frame of administrative actions. The right for complaint as a generally accepted form of remedy is not necessarily recorded.

The dictionary in its initial approach contains 14 forms of remedy and 6 levels of reasonableness.

Beside the dictionaries mentioned above there are some additional specific characteristics relating to the functions:

— type of acting agency (governmental, local, social organization);
— direction of the function (acting inside or outside the state administration);
— character of the function (subtractive or procedural);
— the form of restriction (explicit or free considerations);
— numeric features, such as

order number of the legal rule,
date of issue,
date of coming into force,
date of cancellation.

Retrievial sub-system

Each active function is identified by the code numbers contained in the dictionaries mentioned above,
The inquiry is made by the use of key-words or by the grouping code numbers together with the individual ones of the dictionary system.

Inquiries can be made on the information content as a whole, as well as for the function of one specified primary agency.

The possibilities for inquiry:

— individual questions (one or more groups or elements of a dictionary);
— combined questions (limited combination of the elements contained in one of the dictionaries, whereby the mode of widening of a more specific question is determined by the sequence of the combined question-elements);
— requests for statistics.

The form of output must be specified by the inquiry statement. The possible number of combined elements contained in an inquiry is limited mainly by the programming technology. At present inquiries are processed in a batch mode because there is no technical possibility available for direct man-machine dialogue.

**Outputs**

The output of the system has either a textual form or may be a table of statistical information.

According to the combination possibilities of the data-block the textual output form may have five different formats:

<table>
<thead>
<tr>
<th>Format</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function</td>
<td>Text information. Data for analysis (remedy, reasonableness, function, legal branch, direction, character, restriction) operating agencies, norm system (Fig. 9).</td>
</tr>
<tr>
<td>Operating agencies</td>
<td>Text information, acting agencies, norm system.</td>
</tr>
<tr>
<td>Active norm system</td>
<td>Text information, norm system.</td>
</tr>
<tr>
<td>Actions of the authority</td>
<td>Text information.</td>
</tr>
<tr>
<td>Analysis of the function</td>
<td>Text information, data for analysis, norm system.</td>
</tr>
</tbody>
</table>

To receive readable textual output, the code numbers contained in the dictionaries are converted by an internal numeric-alphabetic translator program.
**Statistical information**

Numeric information, as

— the functions of a primary agency,
— the different functions of operating agencies,
— the time scale of the legal material.
Special programmes are provided to produce different indices. (Alphabetic index of legal rules, numeric index of legal rules)

**Storing of archive material**

Besides the handling of up-to-date material a special archive storage system is provided for

— cancelled functions,
— legal rules out of force,
— dissolved agencies and their legal successors.

This historical file is structured in the same way mentioned above with the same form of output. The two systems, up-to-date and historical, can be linked to produce outputs of the continuous historical chain of legal rules concerning a special function.

**Access to the system**

The access to information qualified as confidential is controlled by a password system.

All other data can be reached at present by any political, state administrative, social and co-operative organization, perhaps later by individuals as well.

**Outlook**

The computerized information system is to be developed in two directions:

— internal development, and
— adaptation for other legal branches.

The internal development is based on the analysis of the state administrative activity. The results obtained will suggest the modification of the structure, contents and techniques of the system.

**3. Organizational and Computational Process**

The topics of the system need new methods for data collection and computer techniques,
By means of flow-charts the following paragraphs will show some of the solutions archived.

*Data collection and input*

The information on state administrative functions originates from the text of the relevant legal rules. Thus the sources of the input data are the different official papers.

The contents of the function record is collected by an actual judicial staff. Besides the basic laws the text of the modifying rules and amendments to the legal rules were considered as well.

The logic processes of the primary data collection are illustrated in Fig. 1.

The contents of the data sheets produced this way were subject to a logical and contextual test before converting them into a machine-readable form. The essentials of this test were:

— does the work formally conform to the relevant prescriptions?
— is the text intelligible with respect to the linguistic and judicial points of view?
— do the descriptors duly express the contents of the specific function?

The connection for valid code-numbers, the relation between specific code-numbers etc. is built in the respective computer programmes. The messages of the programmes are evaluated again by the jurist staff. The corrections using «updating forms» are performed during a specific correcting process.

Actually the correction was made at various stages because the corrective actions themselves were found faulty.

The logical process of the correction is shown by Fig. 2.

The result of the primary input was a master file containing 18,500 function records as well as a set of dictionaries, as was previously mentioned.

*Computerized data handling*

To meet requirements of the system the programmes were built up in a modular way. A certain degree of generalization was needed however. The system deals originally with the state administrative rule system. To be adaptable for different juristic branches having different characteristics the programmes are built to follow the differences of the logic content of the basic information.
The modular programme-system works with a number of modules, as follows:

- input,
- retrieval,
- updating,
- miscellaneous.

The models are either controlled by a common master programme or by a set of parameter cards.

The logic structure of the system as a whole is shown on Fig. 3.

**Input**

The routine task of this module is to read the primary data and to store these data into a master file in a predetermined manner.

While doing this, specific modules perform a semantic and formal checking function (e.g. necessary connection between legal sources and the types of legal rules, checking of code number, the inherent logic of the numeration of the legal rules, checking of the dictionary elements, etc.).

In the case of a mistake a message is printed out on the lineprinter containing the invalid record together with its functional identifier (Fig. 4).

**Retrieval**

These programmes perform tasks necessary to answer the inquiries in the form of individual or combined questions or requests for statistical tables. The inquiry may contain the code numbers of the dictionaries or of alphabetic key-words. The program performs different output tasks, prepares statistics and numeric as well as combined alphabetic juristic indices. It helps to prepare an alphabetic juristic thesaurus using the key-word system already processed. Helped by the system the manual preparation of generalized and specialized juristic thesauri is made easier.

By processing the manually prepared thesauri not only the character-wise matching or the key-words will be easier to handle together with the retrieval of all the conceptual structures contained in the thesauri. In this way the retrieval process is faster, its scope wide and its reliability improved. The preparation of a thesaurus of this type needs, however, more than one man-year of linguistic and juristic effort.

The function of the retrieval process is illustrated in Figures 5 a-c.
Filing and updating

These programmes perform all the types of modifications necessary to update the master-file (cancelling, modification of a legal rule). Like all input operation this computer-function is preceded by the manual work of the juristic staff. Their task is to determine all the necessary changing operations caused by the issue of a new legal rule.

The first step of the process is an inquiry into the system. Every legal rule must contain in its last paragraph the numbers of all those existing legal rules being anyhow influenced wholly or partly by the new one. So the first step is to search for the legal rules influenced. As a result of this inquiry the computer lists all the numbers of the influenced legal rules and in a separate list those not found in the master file. Together with the list of the items found in the master file, the programme prints the whole contents of the relevant function records as well. In this way all of the necessary information is available to the juristic staff which can directly analyse the contents of a new legal rule concerning the modification of the contents of the master file.

The logic function of the modification process can be seen in Fig. 6.

The modifying data are to be written on updating forms as well.

The input and checking process is the same as that of the primary input function. The manual and mechanic operations of the updating process are shown in the Figures 7 a-b.

The function of the filing and updating module is threefold:

— updating the dictionaries,
— logical updating of the function records stored on the master file,
— preparation of the archive data set.

The groups and elements of the computerized dictionaries need to be continuously updated. Similarly changes in the contents of the function records need to be updated as well. The archive data set contains all of the cancelled function records, the specific legal rules put out of force and information about dissolved state agencies. Thus by constituting a so-called « chain linkage » there is always an interconnection within the up-to-date master file and the archive data set. Inquiries for the archive data set — when needed — can be made in the same manner as in the up-dating system.

The logic flow of the module is illustrated by Fig. 8.

The most difficult step in this process is the predetermination of the types of possible changes. This means that the kind of changes that may occur in the structure or content of the master file caused by new
issues must be predetermined mainly by juristic terms. These changes as well as their processing methods must be strictly defined by the juristic staff for programming purposes. The specific updating procedures of the programmes are determined by the needs of the jurists. Also the user jurist's task is to define the data which is to be archived for the purposes of codifying functions. It would not be essential but the determination of the names of the predecessor and successor state agencies and their foundation and dissolution data respectively caused difficulties in a later stage of the development due to the poor definition of the items to be stored in the archive data set.

Access to confidential data

Some of the stored information is qualified as «confidential». The protection of this data against illegal access is provided. This data is archived using passwords. The user authorized access to confidential data applies the appropriate password on his inquiry card. Without implementing this password the system outputs only «public» data. The programme-system itself checks the authorization by testing the password inputs. However, this protection system is essential only when implementing direct man-machine dialogue terminals.

After a certain experimental period the system itself is already in function. Its whole documentation is available.
FIG. 1
The logic flow of data-preparation

START

Input of legal rule data

Does it contain any official functions?

Yes

Coding of the characteristics of the function according to the stored dictionaries

Is it found?

Yes

Production of a «function» form

Does other legal rule exist in connection with this legal rule?

Yes

Processing of this legal rule

Does this legal rule contain any other function?

Yes

Is this the last legal rule?

Yes

STOP

Completion of the dictionary

No

No

No
FIG. 2
Correction of invalid data

START

Read the list of faulty data

Which primary agency and function?

Matching of data

Is the basic document non valid?

No

Production of a new updating form.

Yes

Correction of the updating form

Next message for the primary agency

Yes

No

Last message?

No

Yes

STOP

Yes
FIG. 3

Flowchart of the overall system

PARAMETER

Control program

Input data

Retrieval job

Input job

Updating job

Function file

Function archive data set

Legal rules archive data set

Agencies archive data set

Function's list

Diagnostic message and list of modified functions

Correction list
FIG. 4

Flowchart of the "input" job
FIG. 5 a

Parameter

Control program

Function file

Individual inquiries

Combined inquiries

Distribution of the functions

Chronology of legal rules

Retrieval routines

Listing routines

Numeric index of legal rules

Index of legal rules

Distribution of operating agencies

Dictionary

File of technical types I and II

Numeric-alphabetic translator

The development of this branch will be completed in the near future.
FIG. 6

Process to modify legal rules

START

Reading of modifying legal rules

Does it contain any functions? 

No

Yes

New function?

Yes

Production of new function forms

No

Retrieval of legal rules to be modified

Production of inquiry list

Last modifying legal rule?

No

Yes

STOP
FIG. 7/a
Manual and computerised steps of the updating function

START

Listing of the legal rules issued during the updating period

Reading of the new legal rules

Are they to be processed?

Yes

How to proceed?

New function

Updating of stored data

Inquiry data

Retrieval of stored data

Matching of computer outputs

Data updating

No

New function needed?

No function found

Cause of the absence?

No

All found?

Yes

Valid data

Non valid data

2
FIG. 8
Filing and updating

Parameter

Control program

Updating of the dictionaries

Componding of the function file

Legal rules to be modified

Checking of the modifying records

Sort

Modifying records

Sort-out

Updating program system

Function list

Retrieval of functions to be modified

Correction list

Archived legal rules

Archived functions

Function file

Archived agencies

Next step of development

Dictionary files

Dictionary files

Duplicate tape

Archive data set of functions
FIG. 9
Printout of a function record

Date of output 31/08/1976

FUNCTION

1. Name of prim. agency: MÜM.
   Serial nr. 1931.

2. Social security fees of artisans and traders
   regulation of exemption

3. Analysis of the function:
   Restriction: free consideration
   Direction: outside
   Function: social security
   Remedy: none

Type: substantive
Legal branch: social security law
Reasonableness: none

4. Acting agencies:
   I. lev.: National Council of Trade Unions

Consenting agencies:
   I. lev.: ministers
   National Org. of Retailers
   National Org. of Artisans

5. Legal sources:
   1955.: 39 TVR 27 § /2/
   type of legal rule
   order of President Council
   71./1955./12.31./MT. 115 §
   type of legal rule
   governmental order

Location of publication: Magyar Közlöny 1955. pp. 1452
Into force: 01.01.1956
Out of force:

Location of publication: Magyar Közlöny 1955. pp. 1460
Into force: 01.01.1956
Out of force: