

# INFORMATION TECHNOLOGY IN HUNGARY

Marking the 25th anniversary of the John von Neumann Society for Computing Sciences

The community of Hungarian informaticians celebrate two  
important dates in 1993. The  
**90th anniversary**  
of the birth of the great Hungarian Mathematician, the pioneer of  
computing  
JOHN von NEUMANN



and the  
**25th anniversary**  
of the foundation of the association bearing his name,  
the JOHN VON NEUMANN SOCIETY FOR COMPUTING SCIENCES  
which seeks to present through this book the achievements  
of our profession, our readiness for cooperation with partners  
abroad in research, development and education



*Miklós Havass*  
*President of NJSZT*

*"The number of educated people indicates the real power of a nation." (Count István Széchenyi)*

## **President's Greeting**

It is my pleasure and privilege to greet the readers of *Computing in Hungary: 25 years of NJSZT*.

As the president of an Informatics Society in a tiny country, which is poor in natural resources, and has survived so many turbulent times during her history, I believe, as "The Greatest Hungarian" Count István Széchenyi did, that the basis and the sole springboard for Hungary's advancement into the future is this nation's knowledge, pride and creativity. This belief has permeated Hungary's culture ever since we settled down in this territory embraced by the Carpathian Mountains 1100 years ago. The commitment to this belief is first illustrated our first King, St. Stephen, who placed a high priority on the adoption of Christianity and invited teaching priests to his country.

This thought also led to the foundation of the first Hungarian university at Pécs in 1367, only 19 years after the establishment of the first German university. In 1572, this spirit guided the national assembly at Torda in becoming the first in the world to declare the freedom of religion. And this spirit may have inspired those men, who, 25 years ago, earlier than in any other country in our region, founded a society of computer sciences - The Neumann János Informatics Society (NJSZT). NJSZT was established in order to create the opportunity for the adoption, circulation and transmission of new developments in computer technology, in a country isolated from the Western world. The founders believed that in spite of all the temporary hardships and obstacles, talent and ingenuity accumulate, it creates economic, cultural and social well-being. Thus, they set an example not only to the other suppressed nations in the region but also to the western communities.

As I look back on the work and efforts of the past 25 years, I am delighted and proud to see the unfaltering belief in knowledge, pride and creativity has proved itself to be well-founded.

The Society which started operations with just a few members, today has a membership of over 6,000 people, but its influence reaches beyond this circle, out to almost each and every Hungarian computer scientist. Its activities have put the Society in the centre of modern Hungarian informatic sciences.

Our innovations have significant influence in the field of informatics. Our successful track record spells a success for our profession as well. Despite economic uncertainties, informatics is vigorously developing; becoming more and more embedded in the vast networks of the international division of labour.

Since informatics is a multinational discipline, our main objective is to become an integral part of the European Community's work, to share their goals, efforts and standards. This ambition prompted us to become the first in the region to join CEPIS (Council of European Professional Informatics Societies), to cultivate contacts with ECSA (European Computing Services Association), and this motivates our close relationship with fellow professional societies.

The past and future of the Society are Integrity and Perfection.

These two ideals are symbolised by the inspirational picture on our cover page, "The Lonely Cedar", by the Hungarian painter, Tivadar Csontváry Kosztka. It is a hymn of solitary integrity and a longing for perfection of cosmic magnitude.

Budapest, March 15, 1993

A handwritten signature in dark ink, appearing to read "Miklós Havass". The signature is stylized with a long, sweeping underline that extends to the right.

**Miklós Havass**  
*President of NJSZT*

**This volume is published by the  
John von Neumann  
Society  
for Computing Sciences (NJSZT)  
by the occasion of the 25<sup>th</sup>  
anniversary of its foundation**

**Editor: Maria Tóth  
English revision: Stefan MacGill  
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**The illustrations have been provided  
by Győző Kovács, the Foundation  
for History of Informatics and the  
NJSZT**

**Has been prepared with the support  
of the Ministry of International  
Economic Relations, Investment and  
Trade Promotion Agency.**

***Cover picture:  
Lonely Cedar  
by Tivadar Csontváry Koszka***

**Produced by Corner Ltd.  
Director: Miklós Sarok  
Printed in 1993**

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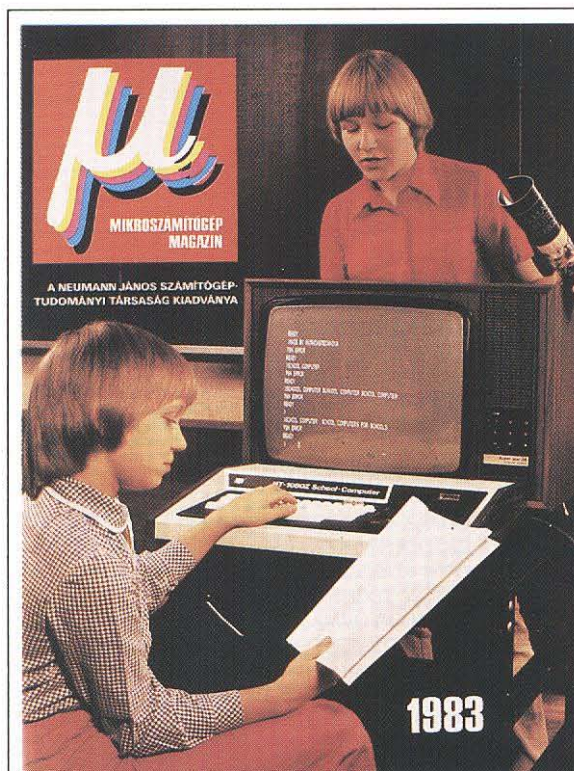
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Cover page of Micromagazin's first issue featuring the School Computer Program

The joint foundation of the John von Neumann Society for Computing Sciences, the ÁSZSZ Informatics Corporation and the Hungarian Technical Museum named

## “Informatics Historical Museum”

H-1502 Budapest Pf.: 135,  
Tel.: (361) 181-0500  
Fax: (361) 185-3236

all serve the development of Informatics. The Museum's purpose is to collect and demonstrate historical items on informatic science and technology and computer technology in particular. It safeguards and takes care of the collected material and makes it accessible for young people and anyone who is interested. Among others, an exhibition is going to be mounted in 1993 in the memory of John von Neumann. With this the Museum intends to serve the cause of informatics culture in Hungary. Financial donations are welcome from both Hungarian and foreign supporters.

(The USD account number of the Foundation: AGROBANK 401-5132-916-01/401-271-13-0083-00.

The HUF account number of the Foundation: AGROBANK Rt. 219-98629/9200-5407 “Donation”).

The picture shows the drum-memory of an M-3 type Hungarian computer made in 1959. The standing exhibition of the Foundation, called “History of Informatics” is open to the public in the head office of the ÁSZSZ Informatics Corporation, Budapest XI. Andor u. 47-49.

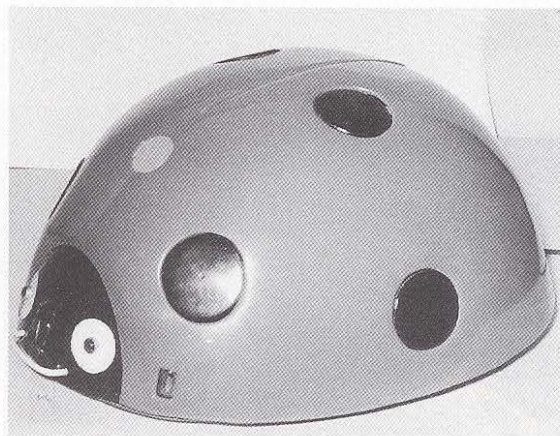
In the colour photo: detail of the exhibition “History of Informatics”



Part of the Museum for History of Informatics. In the middle the disc drive of the M3 computer

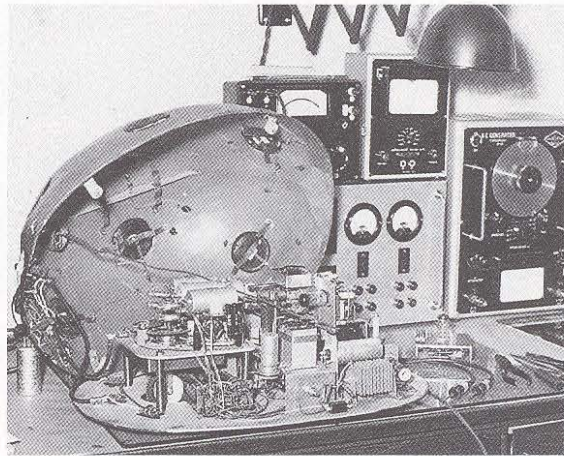


*László Kozma (1902–1983), academician, builder of the first Hungarian relay computer, MESz-1, completed in 1955.*

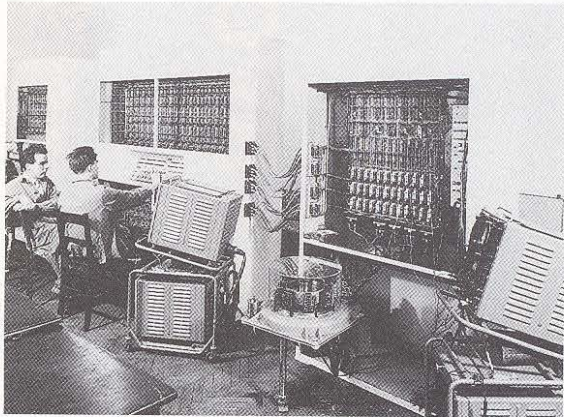


*The first Hungarian robot at the end of the fifties – the so-called "Ladybird" from Szeged*

**HIGHLIGHTS FROM THE PAST**



*The M-3, the first electronic computer built in Hungary in 1959.*



# ICLP

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Sweden  
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Nemzetközi kriminológiai  
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Budapest  
1991. október 11-14





LOOKING BACK

# FUTURE AND PAST CONFERENCES

"It is obvious that von Neumann, by writing his report, crystallized thinking in the field of computers as no other person ever did. He was, among all members of the group at the Moore School, the 'indispensable' one."

*(Hermann H. GOLDSTINE: The computer from Pascal to von Neumann.)*



*Győző Kovács*

## WHO WAS JOHN VON NEUMANN?

**The life of one of the greatest scientists of the 20th century and his importance in Computer Science.**

John von Neumann, whose original Hungarian name was Neuman János Lajos, was born in Budapest on 28th December 1903. The world of computer scientists and more less everybody, i. e. computer users worldwide celebrate the 90th anniversary of his birth in 1993.

My very unpleasant experience is that a fairly large part of the 'computerized people' do not know anything about John von Neumann, his role in the development of the first computers or about Neumann's principle. It is therefore important that educators become acquainted with the "father of the computers", because they can inform their students about the importance of this great scientist in the development of the first computers.

### **His childhood**

John von Neumann was born in Budapest in the time of the Austrian-Hungarian Monarchy in a rich Jewish banker's family.

"He had in his childhood and also later the same typical attitude of human warmth and friendliness, adapting to any situation, discussing any subject with interest; if it was his speciality, reducing it to understandable levels for 'laity', not necessarily with

unlimited patience, but most certainly for 5-10 minutes in subjects were also discussed in this manner, whether taken from high school studies or otherwise. If at first I did not understand all of it, I got an idea what it's all about, and when running into it later, it was already against some background and I was prepared for it" wrote his brother, Nicholas.

Margittai Neumann Miksa (Max), his father "...was ennobled in 1913 by the Emperor (r. the Hungarian King - GyK) with the Hungarian title 'of Margittai', which young von Neumann later Germanized to 'von'"

The years of the secondary school were very important in the life of John. He attended the Lutheran Gimnasium (Fasori Ág. Hitv. Ev. Főgimnázium), a denominational high school of eight years, of highest reputation. All religions were admitted, also tuition fees were graduated along distance from reformation: Lutheran, other Protestants, Catholic, Jewish. The atmosphere was characterized by mutual tolerance.

JvN presented his talent in Mathematics very early. "Von Neumann, who was known to almost everyone as Johnny - and to some as Jancsi - was so impressive in school that one of his teachers, László Rátz persuaded his father to have him tutored privately in addition to his regular schooling. Before he was 18 he published a paper with his tutor, M. Fekete, a well-known Hungarian mathematician. Nicholas A. Vonneumann writes about their school-mates: "The famous students: Eugene Wigner (one class above John). Antal Doráti, in Michael's class..."

### **The young scientist**

He graduated in 1921 in Budapest. In 1921 he enrolled in the University of Budapest, but he spent the years 1921-23 in Berlin, where he came under the influence of Fritz Haber. The wish of his father was that he should obtain a diploma in Engineering.

From Berlin he went to the Swiss Federal Institute of Technology in Zürich, where he had contacts both with Hermann Weyl, a superb mathematician (...) and with George Polya, one of the greatest teachers of Mathematics. Meanwhile, in 1923, he went to Göttingen, where a miracle group of scientists were working together; David Hilbert was the leader mathematician, but a lot of physicians were also in Göttingen at this time, as e. g. Paul Dirac, Werner Heisenberg, Pascual Jordan, Robert Oppenheimer, Wolfgang Pauli, Eugen Wigner and others.

Coming back to Zurich he obtained a degree in Chemical Engineering at the Federal Institute in

1925; and the next year, on 12 March 1926 – at the age of twenty-two – he received his doctorate *summa cum laude* in Mathematics with minors in Experimental Physics and Chemistry from the University in Budapest.

*The most important stages of his career very briefly:*

- 1927 Privatdozent in Mathematics at the University of Berlin
- 1929 Hamburg
- 1930 Invited professor of Mathematics in Princeton (USA)
- 1933 Professor of Mathematics in the Institute of Advanced Studies, Princeton

JvN married Marietta Kövesi in 1930. Their daughter, Marina, born in 1935, is now a Professor of Business Administration and Public Policy at the University of Michigan and the Vice-president of General Motors. His marriage ended in 1937 and he married again, with Klára Dán. She later became a programmer for the Los Alamos Scientific Laboratory and helped to program and code some of the largest problems done in the 1950's.

### **Around war-time**

JvN published many papers, e. g. in 1927 his famous paper on the problem of the freedom of Mathematics from contradiction, in 1927–28 he published several papers on the mathematical foundations of quantum theory and probability in statistical quantum theory, in 1928 a paper on game-theory, in the mid-1930s on the problems of supersonic and turbulent flows and fluids. Goldstine wrote in his book:

“Thus by the beginnings of World War II von Neumann was one of the leading experts of shock and detonation waves and inevitably became involved with the Ballistic Research Laboratory with the OSRD, with the Bureau of Ordnance, and with the Manhattan Project – all to their great good.”

Von Neumann was speaking about his war-time activity before the Special Senate Committee on Atomic Energy:

### **John von Neumann and the computer**

The task of von Neumann was the solution of some mathematical problems in connection with fluid dynamics in Los Alamos, which cannot be handled in an analytical way, it was also necessary to count very complicated differential functions numerically.

“In any case, von Neumann had a profound interest and capability in numerical calculations, but his work in hydrodynamics would have been impossible without computers and computing. It is

of course, fortuitous that he linked Aberdeen and Los Alamos. It is precisely to this fortuity that we all owe so much.”

*(Goldstine)*

Von Neumann and Goldstine met occasionally on the railway station of Aberdeen, where – walking together and waiting for the train – Goldstine informed von Neumann about a new high performed and programmed computer the ENIAC. It was the high speed computer, which von Neumann was looking for, for his enormous number of calculations. The ENIAC was a ‘miracle machine’ for von Neumann, because this computer could calculate 333 operations/second compared to the number of calculations with his electromechanical calculators, in which the length of a multiplication was about 15–20 seconds!

Von Neumann together with Goldstine visited the ENIAC in Philadelphia very soon and he never left the computers after this visit. Goldstine told about this occasion: “This point in time formed the beginning of a long and very fruitful friendship and working relationship between ourselves and the von Neumann’s that was to terminate only upon his untimely death.”

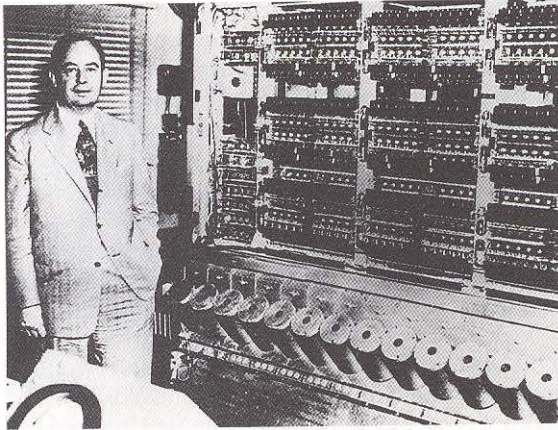
Starting in Aug. 1944 von Neumann visited the Moore School regularly for meetings with the hardware and software developers of the ENIAC: Burks, Eckert, Adele Goldstine, Mauchly and naturally Goldstine.

The ENIAC was the first really working electronic computer of the world, therefore it had a lot of problems, e. g. the life span of the vacuum tubes were relatively short, the programming time (in the original way, with wires) was too long, some thousand times longer than the calculation time, the capacity of the data memory was too small, etc. The developers of the ENIAC decided on the further developing of the original computer and simultaneously the preparation of a new computer, the EDVAC (Electronic Discrete Variable Computer).

Von Neuman, as a participant of the meetings on the development of the EDVAC, prepared a 101 page paper, the ‘First Draft of a Report on the EDVAC by John von Neumann’, in which he described the main characteristics and the logical structure of the computers. The ‘First draft...’ contained two very important requirements of the computers, first of all “it must have, a main memory of very large capacity in which instructions and data can be held. (...) Second, there must be a true control unit able to organize all the transfers between the different registers. (...) All the computers designed since the publication of the ‘First Draft...’

## LOOKING BACK

have possessed these two resources and thus have often been called 'von Neumann machines', even if they have not had all the other features recommended by von Neumann (1945) and Goldstine (Burks, Goldstine, and von Neumann, 1947)' as was written in the book of R. Moreau.



*John von Neumann and his EDVAC computer*

Tension was already high at the Moore School. Eckert and Mauchly (the two inventors of the ENIAC – GyK) had won their fight over the ENIAC patent. They understood that the work they were doing on EDVAC should also be patentable. They were technologists and had a clear understanding of the commercial possibilities of their machines. Many persons at the Moore School did not, or did not think any one or two people should benefit from them. Von Neumann was on the side of the latter, believing the work was for the war, but also for pure science. He represented, to an extent, the academician who opposed the technologist. Talk of patents seemed to upset him.

Goldstine writes about this situation:

"Von Neuman's keen participation and leadership of the logical design work on the EDVAC became a source of substantial conflict between him and me on one side and Eckert and Mauchly on the other. (...) Finally, after considerable acrimony a meeting was held on 8 April 1947 to try to resolve the problem relating to the EDVAC. (...) The upshot of the meeting was that von Neumann's 'First Draft...' was treated by the Ordnance lawyers as a publication in the strict legal sense. This meant that the distribution given to that report had placed its content in the public domain, and hence anything disclosed therein became unpatentable. The Ordnance lawyers thereupon withdrew from the task of preparing patents of the EDVAC work on behalf of Eckert and Mauchly,"

The end of the story above was that Honeywell started a legal procedure against the patent rights of Eckert and Mauchly on behalf of John Vincent Atanasov in 1974. "John Vincent Atanasov was the inventor of the first electronic computer. It was an automatic digital machine and it was special-purpose in that it solved only linear algebraic equations." He developed the ABC 1 (Atanasoff Berry Computer) together with Clifford Berry, but he never patented it. Atanasoff met Mauchly in Dec 1940 then Mauchly visited Atanasoff in June 1941, Mauchly adapted Atanasoff's ideas in the development of the ENIAC. "The judgment destroyed the ENIAC patent for several reasons, one of which was that some claims were derived from Atanasoff. As is noted in the current paper the judge said, "The subject matter of one or more claims of the ENIAC was derived from Atanasoff, and the invention claimed in the ENIAC was derived from Atanasoff." Von Neumann and Goldstine did not ever patent the licence of the stored program computer, i. e. the Neumann machine, but everybody knows or has to know, that they were the inventors of real stored program computers.

Von Neumann and Goldstine parted with the group of the ENIAC-EDVAC and they started the development of a new computer in the Institute of project Advanced Study. Their collaborators were Julian Bigelow, Arthur Burks, James H. Pomerane, Adele Goldstine, and others. The aim of this development work was the construction of the IAS machine, which was the first real 'Neumann machine'.

Von Neumann prepared one paper (Preliminary Discussion of the Logical Design of an Electronic Computing Instrument – 1946) then von Neumann and Goldstine prepared another three volume report (Planning and Coding of Problems for an Electronic Computing Instrument – 1947 & 1948) about the new computer.

These four papers became the theoretical basis for modern electronic digital computers. Paul Armer, a leading computer scientist writes about these books: "Who invented stored programming? Perhaps it does not matter much to anyone other than the principals involved just who gets the credit – we have the concept and it will surely stand as one of the great milestones in man's advance ... The leading contenders are the authors of the paper reprinted here (von Neumann and Goldstine – GyK) and the group at the University of Pennsylvania led by J. Presper Eckert and John Mauchly. Others undoubtedly contributed, not the least of whom was Babbage..."

Nevertheless the paper reprinted here is the definitive paper in the computer field. Not only

does it specify the design of a stored program computer, but it anticipates many knotty problems and suggests ingenious solutions. The machine described in the paper (variously known as the IAS, or Princeton, or von Neumann machine) was constructed and copied (never exactly) and the copies copied... At the time the paper was written, the principle of automatic calculation was well established (with Harvard's MARK I) as was the great advance gained by electronics (with ENIAC). The jump from that state-of-art to the detail of their paper is difficult to measure objectively today..." (Goldstine)

The inventors introduced a lot of new solutions in the IAS machine, its logical structure differed from the EDVAC. The IAS machine had a joint memory for the instructions and the data. It was a parallel, word organized computer, the length of the word was 39 bits plus a sign, i. e. 40 bits, therefore the IAS machine was faster than the EDVAC. The length of a multiplication took 600 microseconds in the IAS machine and 3 milliseconds in the EDVAC. Each instruction contained an operation-code, it was 10 bits and an address, which also was 10 bits. The IAS machine worked with about 2000 vacuum tubes, the EDVAC with about 3000 vacuum tubes and 8000 crystal diodes. The joint memory enabled self-modifying programs. They showed that self modifying programs are more powerful (can compute more sequential functions), than non-self-modifying ones..."

Von Neumann and the other developers of the IAS machine realized a lot of new methods, which facilitated the application of computers, e. g. they elaborated the flow-chart system, they published the first description of programming, the 'routines' and 'subroutines' (Planning and Coding...) etc.

They also contributed to the development of hardware, they developed and implemented a drum-memory for the computer. The original memory of the computer was a storage tube of F. C. Williams with 1024 x 210 bits capacity, which was too small for the programming tasks in the Institute.

They developed and implemented a magnetic drum memory with 2048 words capacity together with the Office of Naval Research in May 1953.

The first input/output device of the IAS computer was a teletype, which worked very slowly, therefore they implemented an IBM 514 similar punch equipment to the computer in 10th June 1952, when the computer was introduced to the public. Finally they realized a very early version of a "programmed graphical display on the face of an oscilloscope which was linked to the magnetic drum. This was very useful then just as its modern counterpart is today" (Goldstine)

## The successful scientist

The life of John von Neumann was very short, he was a very successful scientist, but he reached also a very high position in public life and politics. He received the two highest awards of the United States from the President, the Medal for Merit and the Medal of Freedom.

He received the D. Sc (hon.) acknowledgement from several universities. Seven Academies elected him their member, he was one of the most accepted and honored mathematicians in his time. He was very frequently an invited speaker at different conferences and scientific meetings. He published a lot of books and papers with varied subjects, the majority of his publications are in the volumes of J v. Neumann: Collected Works. See a short selection from his latest works in Annex No 2.

Hungary, his native land, did not want to know about John von Neumann for a long time, because he expressed several times, that he could not accept the communist system. The official atmosphere was not very comfortable when the Hungarian Computer Scientists established the Computer Society and named it after John von Neumann.



*President Eisenhower decorates John von Neumann with the Medal of Freedom*

The highest award of the Computer Society is the Neumann Medal. Two secondary schools bear the name of John von Neumann in Hungary. The Computer Society declared the year 1993 the "Neumann Year" celebrating the 90th anniversary of the birth of John von Neumann. Hopefully the Hungarian Academy of Sciences will at last award posthumous Academy membership to von Neumann this year, as proposed by the John von Neumann Society for Computing Sciences.

John von Neumann felt his health problems first at the time when he delivered the Vanuxem lec-

## LOOKING BACK

tures (Machines and Organisms) on March 1953, in the Princeton University.

Goldstine describes this serious time in his book, too:

“Early in 1955 he was invited to deliver the Silliman lectures at Yale University during the spring of 1956. However, on 15 March 1955 von Neumann was sworn in as one of the Atomic Energy Commissioners, and he and his wife moved to Georgetown in May. Then three months later – in August – catastrophe struck: ‘Johny had developed severe pains in his left shoulder, and after surgery, bone cancer was diagnosed’. (This was written by Klara von Neumann in the Preface of the book: *The Computer and the Brain*.)

He was unable to finish his manuscript. He had however asked Herbert S. Bailey, Jr., Director of Princeton University Press, to release him from his tentative obligation to write up his Vanuxem Lectures. This permission he of course received, and the resulting unfinished manuscript represented what he wrote ‘in those days of uncertainty and waiting’

Klara von Neumann described that the disease became more and more serious, but JvN worked continually. The next very heavy fit came in November, his backbone had become damaged and everybody knew that his situation was hopeless. They thought that the doctors could delay the process, but all was in vain. Von Neumann had to use a wheel-chair from January 1956, but he worked and he went to his office. He cancelled his other lectures, he worked only the on the Silliman Lectures. The family saw in March that von Neumann would not be capable of delivering the Silliman Lectures either. The Yale University offered that somebody would read the manuscript out, but JvN could not finish it.

He went to the Walter Reed Hospital at the beginning of April, where he received the Presidential apartment. He was visited by the President of the United States, Mr Dwight D. Eisenhower, who gave him the Presidential Award, the Medal of Freedom. He received it sitting in his wheel-chair.

John von Neumann, the Hungarian born scientist, the famous mathematician, the inventor of the modern computers died on 8th February 1957 in Washington..

### **The public activity of John von Neumann after World War II.**

- 1945–57 Director of Electronic Computer Project, Institute of Advanced Study, Princeton, NJ
- 1947 D. Sc. (hon.) Princeton University Medal for Merit (Presidential Award)

- Distinguished Civilian Service Award, U. S. Navy
- 1947–55 Naval Ordnance Laboratory, Silver Spring, Maryland
- 1949–53 Research and Development Board, Washington D. C.
- 1949–54 Oak Ridge National Laboratory, Oak Ridge, Tennessee
- 1950 D. Sc. (hon.) University of Pennsylvania and Harvard University
- 1950–55 Armed Forces Special Weapons Project, Washington DC, Weapons System Evaluation Group, Washington D. C.
- 1950–57 Member Board of Advisors, Universidad de Los Andes, Colombia, South America
- 1951–53 President, American Mathematical Society
- 1951–57 Scientific Advisory Board, U. S. Air Force, Washington D. C.
- 1952 D. Sc. (hon.) University of Istanbul, Case Institute of Technology, and University of Maryland
- 1952–54 Member, General Advisory Committee, US atomic Energy Commission, Washington D. C. (Presidential appointment)
- 1953 D. Sc. (hon.) Institute of Polytechnics, Munich Vanuxem Lecturer, Princeton University
- 1953–57 Technical Advisory Panel on Atomic Energy, Washington D. C.
- 1955–57 U. S. Atomic Energy Commissioner (Presidential appointment)
- 1956 Medal of Freedom (Presidential Award) Albert Einstein Commemorative Award Enrico Fermi Award

### **Academy memberships**

- Academia Nacional de Ciencias Exactas, Lima, Peru
- Accademia Nazionale dei Lincei, Rome, Italy
- American Academy of Arts and Sciences
- American Philosophical Society
- Instituto Lombardo di Scienze e Lettere, Milan, Italy
- National Academy of Sciences
- Royal Netherlands Academy of Sciences and Letters, Amsterdam

**Győző Kovács** *Budapest (Hungary)*  
Former Secretary General and Vice-President  
of the John von Neumann Society  
for Computing Sciences

# JOHN VON NEUMANN SOCIETY FOR COMPUTING SCIENCES

## INTRODUCTION

John von Neumann Society for Computing Sciences (NJSZT) was established in 1968, closely following the installation of the first Hungarian computer by a few significant figures of the domestic computer sciences of that time.

According to its Constitution, the aims of the Society are to unite computer users from all walks of life, to promote the development of informatics, to diversify its applications, to represent the Hungarian community in international organisations, to publish information regularly, to undertake the high-level training of experts, to disseminate the computer culture and to defend the prestige, quality and ethos of this profession.

In order to fulfil these aims, the Society – mobilizing its members to active participation – organises lectures, debates, conferences, congresses, discussion sessions, professional and technical shows, exhibitions, gives professional advice, prepares study tours at home and abroad, edits and publishes professional material, deals with relevant educational questions (e.g., accreditation), and initiates, evaluates and reports on various research and development themes. It organises competitions and awards prizes for the solution of problems.



*The Board of NJSZT.*

*Standing (from the left to the right) G. Halmos (Treasurer), P. Hanák, D. Sima, G. Szépbalmi, C. Gergehy (Vice-Presidents); sitting: M. Tóth (Secretary-General), T. Vámos (Honorary President), M. Havass (President), B. Dömölki (Past President)*

## THE SOCIETY

The main body of the Society is the 80-member Council, which holds its meetings semi-annually.

Members of the Board include the President, the Past President, six Vice-Presidents, the Treasurer and the Chief Executive (Secretary-General).

The Board, having meetings every month, performs the operative administration of the Society.

The eight-strong Secretariat is the executive body of the Society.

The NJSZT is a founding member of the Federation of Technical and Scientific Societies (MTESZ), an association of 36 technical and scientific societies with about 160,000 members.

The President of our Society is, at present, one of MTESZ's vice-presidents.

Address: Budapest, Báthory u. 16.



*Exhibition accompanying the 5<sup>th</sup> national congress in Debrecen, 1992*

Postal Address: H-1372 Budapest, P.O.Box 451

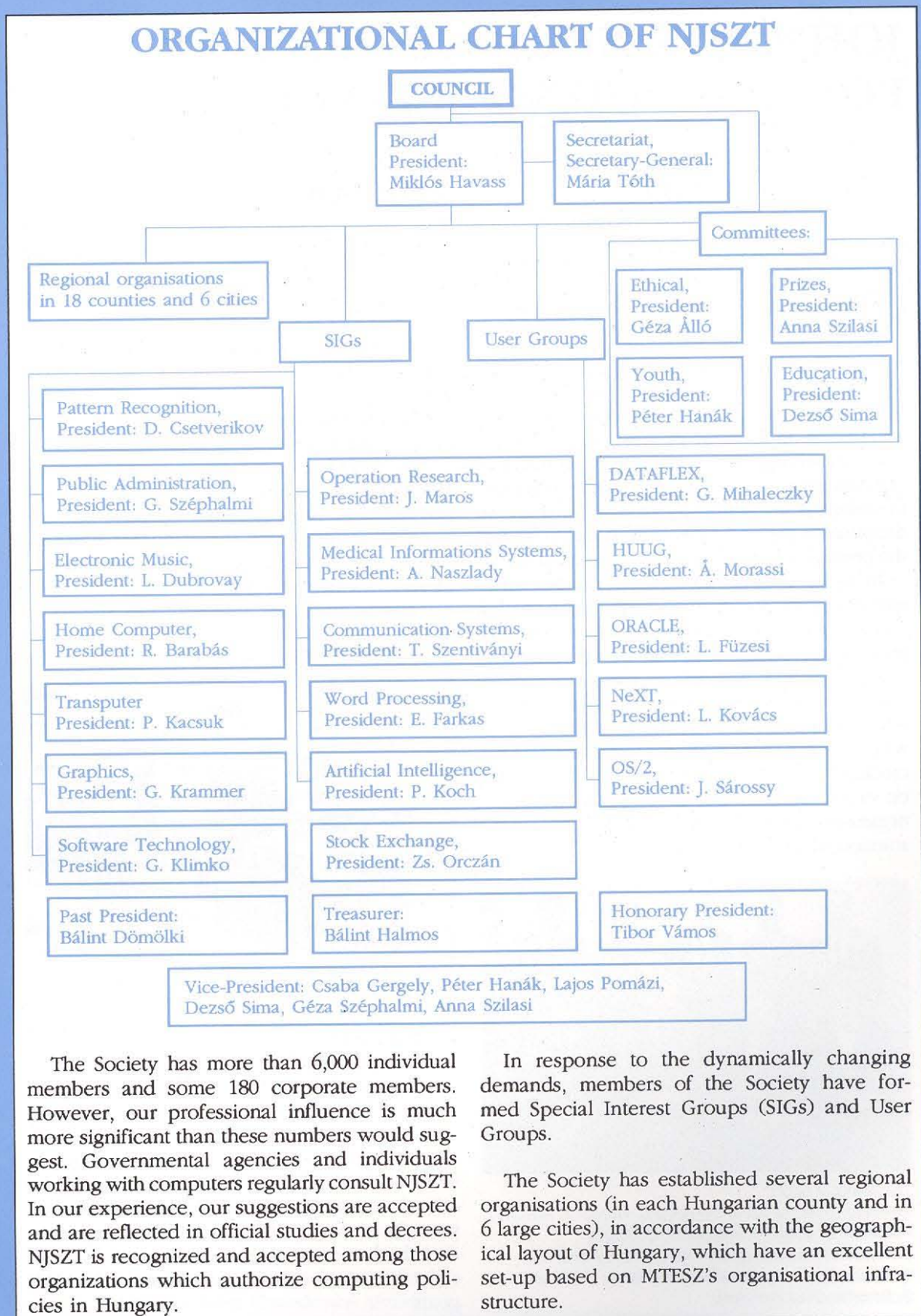
Tel.: (36) 1 132 93 49

(36) 1 132 93 90

Fax.: (36) 1 131 81 40

Anyone may become an **individual member** of the Society: He or she must accept its aims and ethical norms, take part in their fulfilment, and pay the subscription regularly. **Corporate members** are enterprises which provide financial assistance for the realisation of the Society's goals.

# A BROADLY BASED SOCIETY



The Society has more than 6,000 individual members and some 180 corporate members. However, our professional influence is much more significant than these numbers would suggest. Governmental agencies and individuals working with computers regularly consult NJSZT. In our experience, our suggestions are accepted and are reflected in official studies and decrees. NJSZT is recognized and accepted among those organizations which authorize computing policies in Hungary.

In response to the dynamically changing demands, members of the Society have formed Special Interest Groups (SIGs) and User Groups.

The Society has established several regional organisations (in each Hungarian county and in 6 large cities), in accordance with the geographical layout of Hungary, which have an excellent set-up based on MTESZ's organisational infrastructure.



## OUR MAIN ACTIVITIES

### SCIENTIFIC CONFERENCES and SEMINARS

Our Society is first and foremost a scientific association, and as such, it organises events, mainly through the activities of its SIGs, where Hungarian scientific workshops and individual researchers can exchange information. The proliferation of the Society's SIG organisations reflects the trends and changes in Hungarian scientific life.

Society members meet tri-annually at the John von Neumann Congress, where more than a hundred lectures on a wide range of topics illustrate the development of the profession and the recent attainments in Hungarian Informatics. The main topic of the latest Congress, held in Debrecen, was to sum up all the events which had a significant influence on Hungarian science since the opening of the Hungarian borders.

Several SIGs take part in the preparation of the Congress and one of the regional organizations hosts it.

Our biggest regular conferences:

*Conference on Operation Research* (held annually for the past 20 years);

*Application of Cybernetics and Computer Technology in the Medical Sciences* (held annually for the past 15 years);

*System Programming* (held annually);

*Conference of Computer Technology Teachers* (held tri-annually)

In addition to the above conferences, we organise about four to five major (mainly international) conferences, such as:

*Conference on Relational Data Base Management Systems,*

*HUNIX Conference,*

*Data Security and Safety Conference.*

### NEW INITIATIVES IN INFORMATICS

Our Society has always considered it an important task to support and promote new ideas in informatics while the institutional forms and organisations are being created to assist in their implementation.

On the initiative of our Society, the first-ever Copyright Law in Central-Eastern Europe was prepared to protect the rights of software authors. Our Society initiated "The Law on Freedom and Protection of Personal Information," passed by the Parliament in 1992.

Our Society has been dealing with the ethics of computer technology and developed an Ethics Code in 1993. Its promulgation among the Society's broader ranks is currently being effected.

Our Society has organised program testing and classification since 1985 to promote quality software. High-quality programs are entitled to use a distinctive marking.

The development of teaching informatics in Hungary plays a central role in our Society's functions. These issues are dealt with by the Educational Policies Committee. The Society works in cooperation with the British Computer Society on the issues of accreditation of high-level education in informatics. Our recommendations are elaborated with the assistance of the Ministry of Education. Our Society, through MTESZ, initiated a public debate about the law on Hungarian high-level education.

In the early 1980's, with no official governmental programme on computer education in secondary schools, our Society initiated and supervised the introduction of computer education in certain secondary schools, and at a later stage, in cultural institutions and institutions for adult education.

During this period, annual "Micro-festivals" played a crucial role in the exposure of secondary school students to computer culture. The festivals also made it possible to exhibit programs made by non-professional organisations and the most recent achievements in hardware development and application.

Our Society promoted the Tele-teaching programmes, and televised a BASIC series, at the end of which the audience could take an examination. These far-reaching Tele-teaching programmes resulted in thousands of successful exams and attracted thousands to the applications of computer technology.

The Society is widely recognized for its considerable knowledge and impartiality and is frequently requested to advise state institutions and private companies on their plans and computer developments. Our expertise is often tapped in professional debates, and we are entitled to award Experts' Certificates in Informatics.

## A BROADLY BASED SOCIETY

### AWARDS, DISTINCTIONS, COMPETITIONS

Our most outstanding distinction is the Neumann Medal, established in 1976 to commemorate our eponym. Up to three medals can be distributed each year to people who have attained successful results in the popularising of computer culture or who have performed outstanding work in the Society, for the Society.

Over the years, 108 Hungarian and 8 foreign experts have been awarded this distinction. Among the decorated Hungarian experts are founders of the Society; many excellent colleagues in computer production, applications management or professional publishing; and those assisting the Society's activity in many directions including the organisers of several successful international conferences.

Among the foreign recipients of the award:

One of the best-known network experts, Donald W. Davies was awarded the distinction on the occasion of the 20th anniversary of the discipline in a commemorative meeting organised in his honour.

Dr. Norbert Rozsenich was distinguished because of his efforts in the establishing and intensification of the relations between the Austrian and Hungarian Computer Societies.

Prof. Hermann H. Goldstine, a colleague of John von Neumann, was distinguished because of his computer developments and his life-long activity in informatics, which in itself is important from the viewpoint of scientific history.

Prof. Helmar Frank received the Neumann Medal for his attainments in educational cybernetics.

Prof. Heinz Zemanek received the Medal for his everlasting contribution to Computer History.

In 1992 four outstanding scientists were awarded the Neumann Medal:

Prof. Dienes Bjner (Denmark)

Prof. Volkmar Haase (Austria)

Prof. C.H.A. Koester (The Netherlands)

Prof. Roland Vollmar (German Republic).

NJSZT's second distinction, established in 1976, is the Kalmár László Award. Kalmár was a professor at the József Attila University of Sciences in Szeged, a founding father of cybernetics research in Hungary. The award is presented to a distinguished expert in the practical applications of computer science. 12 people have so far received this award.

The Society has recognised the importance of informatics education by awarding a separate prize in 1987 for prominent specialists in this

field. The eponym was Rezső Tarján, the first President of our Society, an academician and a leading figure in electronics.

In conjunction with two other scientific associations (OPAKFI, and The Telecommunication Association), our Society annually recognizes outstanding achievements in the synthesis of artificial speech.



*The distinctions of the society: the Neumann, Kalmár and Tarján Awards*

The Society takes a special interest in the education of gifted secondary school pupils. Illustrious computer experts regularly give lectures for these pupils and help them to solve their individual computing problems.

Each year, we organise a contest (The Tihámér Nemes Competition), with hundreds of students participating both from Hungary and Romania. As an acknowledgement of the results achieved in this contest, the first 10 students are automatically admitted to university without having to pass entrance exams.



*President of two European informatic societies. Miklós Havass (right) handing over the Neumann Award to Prof. Roland Vollmar, president of Gesellschaft für Informatik*

## THE SOCIETY'S INTERNATIONAL RELATIONS

Founded in a small country, with a peculiar language and lengthy historic isolation, our Society attaches great importance to international relations, cooperation and professional ties.

### INTERNATIONAL FEDERATION OF INFORMATION PROCESSING – IFIP



Hungary is represented by our Society in IFIP. Our experts have been working and fulfilling leading functions in its different technical committees and working groups for many years. There is often a Hungarian member on the programme committee of IFIP events. We have been hosts of several conferences, seminars and working group sessions. The COMNET Conference, established in 1977, is the biggest professional meeting of network users in Central-Eastern Europe. We were proud to be able to host the General Assembly of IFIP in September 1987.

We have organised meetings of several TC-2 working groups. Concerning TC-3 which deals with education, we initiated the first Tele-teaching Conference and the creation of The Working Group on Remote Teaching.

Our most noteworthy programmes included the following conferences: *Copyright Protection of Computer Software; System Modelling and Optimization; Municipal and Governmental Information Systems; and COLING'88.*

We are in the midst of organising our most significant programme, in cooperation with our fellow organisation, The Austrian Computer Society: *The IFIP World Conference* to be held simultaneously in Vienna and Budapest in 1998.

One of our members, Dr. Peter Kovács held the post of IFIP treasurer between 1986 and 1989.

### THE COUNCIL OF EUROPEAN PROFESSIONAL INFORMATICS SOCIETIES – CEPIS



In 1991, we were the first among the ex-socialist countries to join CEPIS which was founded in 1988; its mission, "To provide a coordinated European voice that is able to represent the views of European informatics professionals on major issues to other European institutions."

Our CEPIS representative (member of the Council) is: Pál Könyves-Tóth

Our members take an active part in the activities of

- Technical Cooperation Task Force (Maria Tóth)
- Professional Development and Qualifications Task Force (Alfonz Antoni)
- Computer Misuse Task Force (Pál Könyves-Tóth)
- Computer History Group (Győző Kovács)

In 1993, we shall host the CEPIS Council.

### OTHER INTERNATIONAL ORGANISATIONS

Our society has joined other international organisations as well, and represents the Hungarian computer community. Our Society is a member of the following organisations:

International Medical Informatic Association – IMIA



European Federation for Medical Informatics – EFMI



(the secretary of ERMI is a member of NJSZT: Prof. Attila Naszlady)  
International Association for Pattern Recognition – IAPR



European Coordinating Committee for Artificial Intelligence – ECCAI



European Forum for Open Systems – EurOpen

We have traditional cooperations with several national Computing Societies. This enables the organising of common events and a well-prepared exchange of experiences. Our major cooperations are with:

- Austrian Computer Society – ÖCG
- The British Computer Society – BCS
- Gesellschaft für Informatik – GI
- Greek Computer Society – GCS
- Transylvanian Society for Technical Sciences – EMT

Of these relations, we attach the greatest significance to the cooperation with ÖCG, based on the 400-year-old Austrian-Hungarian common cultural background. The members of the two societies are joined by a close personal and professional friendship that looks back on joint activities and scientific conferences organised annually since 1982.

We welcome and support the cooperation of our User Groups with their European organisations.

Our main activities and successful events have included: Dataflex, NeXT, ORACLE, UNIX in conjunction with European User Groups.

We provided the location and framework for the Hungarian section of DECUS, before the political environment made it possible for them to join DECUS-AT-LARGE, in 1992. Our long-lasting friendship is manifest in the fact that our Society continues to organise their annual conferences.

## A BROADLY BASED SOCIETY

We attach great importance to the international contacts of young informaticians: we regularly organise communal camps for pupils and in 1996 we are going to host the International Student Olympics.

The winners of our annual competitions for professionals and programmers working at universities, are entered for the unofficial world championships held in Sweden. In 1991, our team was rated third, with the Remind system developed in Hungary.

There are several million Hungarians outside Hungary – living mostly in neighbouring countries. The Society considers it to be an important task to transfer information to Hungarian experts living outside our borders and to promote their contacts with the specialists working in Hungary.

Based on our foreign relations, we organise study tours for 10–50 members of our Society to the most significant computer events throughout the world. We arrange a Hungarian national booth at important international exhibitions.

### SOCIAL EVENTS

The Society also plays a large role in the promotion of social life.

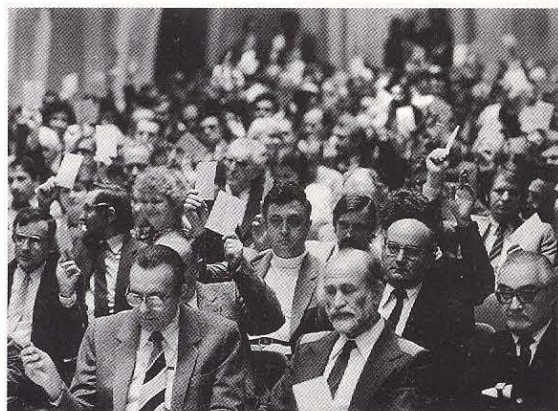
Every month, our members hold a social gathering at the **Neumann Club** in a pleasant atmosphere. In addition to friendly discussions, there is a talk given every now and then.

We also stage the **Neumann Carnival Ball**, with lucky draws, entertainment and dances.

This year we are celebrating an anniversary which coincides with the **90th birthday of János Neumann**, after whom our Society was named. On this occasion, we shall welcome the founders of our Society and the retired fellow members.

The Society launched several **charity campaigns** and forwarded the collected computers, books and programs to needy schools and countries.

We established The Aladdin Foundation to promote the education of gifted youth.



*Electing the Council in Council 1990*



**KNUTH  
Előd  
(1943–1992)**

He was educated at the Eötvös Lóránd University.

After graduation (diploma in Mathematics, 1966), he joined the Computing Centre of the Academy, which later evolved into the Computer and Automation Institute, Hungarian Academy of Sciences. Előd Knuth was affiliated with the Institute for his entire professional career. He obtained his Ph. D. in 1978, and the Doctor of Science degree in 1985. His scientific and technical interest areas covered a broad range of subjects, including geometry, concurrent processes, simulation, system description methodologies; in his last years he worked primarily on man-machine system, multimedia applications, visual technologies, and object oriented systems. He was exceptionally sensitive to new trends and ideas. Several new results and research directions were introduced to the Institute and to the Hungarian research community by him.

He also served the profession as a leader with remarkable vision for the future. He headed the Department of Information System (1976–1981), and was the Scientific Director of the Institute (1981–1990).

He published 76 scientific papers and two monographs and acted as editor of five conference proceedings. He was also active in Hungarian and international scientific organizations. He was the chairman of EurOpen Hungary (formerly the Hungarian UNIX Users' Group), and worked in several IFAC and IFIP Technical Committees. For his outstanding achievements in system description methodologies he won the Prize of the Hungarian Academy of Sciences in 1985, and the Kalmár László Prize in 1988.

IQSOFT Corporation is a Hungarian–Austrian joint venture company, established in January 1990, by a staff of professionals from a department of the Computer Research and Innovation Center. Its stockholder is among others Bank Austria, the largest bank in Austria.

An independent company with 60, employees, 54 of them with higher education.

IQSOFT's main activities involve creating information systems using **database management technologies**, as well as developing and applying advanced tools for **artificial intelligence**.

Apart from its own development activity it is importing high-quality software packages and technologies which have already proved their merits on the world market.

IQSOFT became the official **distributor of ORACLE products** in Hungary in 1990 and is participating in the development of a Hungarian version of ORACLE, using the **National Language Support feature**.

In order to maintain the standards of both its staff and its products IQSOFT **participates in a number of international research projects**, such as parallel implementation of logic programming languages and learning processes within neural networks.

IQSOFT concentrates on **document and information processing**, specially in office automation and library automation relying and based on its staff of experts.

Program packages: DOKTÁR and TIOS

The electronic archiving systems offer new technological and organizational solutions to process workflow activity for offices. Products distributed by IQSOFT with developing of workflow systems are DOKTÁR (developed by Hypermedia Systems Ltd., Hungary) and TIOS (developed by TechKNOWLOGY US).

#### **ORACLE\* LIBRARIES**

Oracle Libraries is a state-of-the-art solution both technically and functionally. It will respond to the requirement of the organisation's computer department and the library with no compromises.

It is a 4GE solution, from the world's third largest software supplier. It runs under UNIX and other operating systems on a range of hardware platforms, from bottom-end PCs to multiprocessor machines. Existing hardware policies and recommendations can be adhered to, enabling the library and information service to become an integral part of the organisation.

Hypermedia Systems Ltd. – HMS – is specialized in software tool and application development mainly in the fields of electronic publishing, data processing and multimedia. The company was established by mathematicians and engineers after several years of common software development experience in 1990. HMS employs twenty software engineers, programmers and operators.

HMS has built up a complete modular software tool-set which makes it possible to create multilingual versions of multimedia CD-ROM applications from Hungarian or international data quickly and at the best quality. We are making software for textual, graphical and hypertext database applications as well as for data processing, using our tool-set including modules for WYSIWYG document presentation, inserting graphics and tables in the formatted text, creating and managing hypertext links, various input data filtering, etc. We also undertake data processing itself. HMS also cooperates with West-European partners for building CD-ROM databases and applications.

HMS has developed a Windows based document imaging and archiving application which manages documents of different kinds (e. g. scanned documents, charts, graphics, sound, output of different text editors, etc.) This software has a high level of flexibility and can be integrated with other applications easily.

HMS publishes an electronic collection of Hungarian Laws in three languages (Hungarian, English, German). The CD-ROM publication, based on the printed version Verzál Ltd., intends to help joint ventures in Hungary and their international partners to find their way through the present quickly changing rules of law.

Our company undertakes developing custom software applications in MS-Windows, MS-DOS and UNIX environments. Main programming languages are C, C++, Pascal and Assembly. We are also doing digitizing, filtering and preprocessing tasks on printed or photographed graphics and on textual data. Special OCR processing is also possible.

We are looking for partners for international cooperation in the above fields.

# HMS

*Hypermedia Systems Ltd.*

*Budaörsi út 135, H-1118 Budapest*

*Post: P.O.Box 514, H-1243 Budapest*

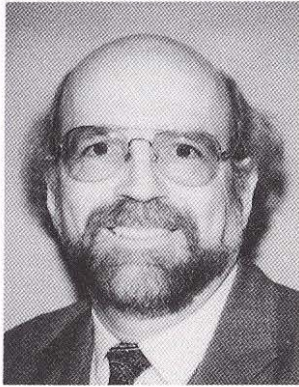
*Office: Pannónia u. 52/B, Budapest XIII.*

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*Fax: +36-1-118-9191*

*E-mail: h229hms@ella2.sztaki.hu*

## A BROADLY BASED SOCIETY



**Dr. Günter Haring**  
*Univ. Prof.*  
*President of the Austrian*  
*Computer Society*

### LONG STANDING COOPERATION

**It began ten years ago. At that time the political situation in the Central European region was completely different from what we have now. In the scientific and cultural community there always existed the wish to find ways to overcome this geopolitically caused situation, physically represented by the iron curtain.**

The International Institute for Applied Systems Analysis (IIASA), located close to Vienna, was a place where researchers from East and West could work together to solve global problems. It was in fact in the IIASA environment that first steps were initiated to start cooperation between the Hungarian John von Neumann Society for Computing Sciences (NJSZT) and the Austrian Computer Society. Also in this case, as is common in similar situations, the initiative was based on a deep personal relationship between persons like Academician Vámos and Dr. Rozsenich who had the strong will to start cooperation between the two computer societies. In this way the free exchange of ideas and the transfer of know-how between both parties could be encouraged in a joint cultural climate.

The first negotiations started in 1982 and were finalized by an agreement which was signed in 1984. A first joint conference on local area networks was perfectly organized in Budapest in 1984 by our Hungarian sister society in the typical environment of Hungarian hospitality. Since that time seven bilateral conferences have been organized which were alternatively held in Austria and Hungary. Each was dedicated to a special topic like man-machine, intelligent systems, software engineering etc.

In fact these joint conferences are the robust skeleton of cooperation and a series of joint activities followed as by-products in areas like tele-teaching, performance evaluation, software engi-

neering etc. The advantage for Austrian participants in this cooperation was to work together with highly qualified people who were extremely enthusiastic and innovative. Very often these people opened a new point of view to their Austrian partners by referring to less technology driven aspects.

The potential for cooperation and joint projects is not at all exhausted. On the contrary, the joint organization of international conferences, workshops and seminars will hopefully always guarantee strengthened success. The plan to jointly organize the 1998 IFIP world congress in Vienna and Budapest is a bold step forward. On a smaller scale the 1st Austrian-Hungarian workshop on Transputer Applications in Sopron in October 1992, is step in the right direction.

Experiences with curricula and university courses should be exchanged in the future. The mobility of university teaching staff can be intensified. For both cases the cooperation between the Technical University of Budapest and the University of Vienna is a good example. The two computer societies should encourage universities and research centres to use the opportunities for research cooperation provided either by bilateral agreements, like the agreement on technical and scientific cooperation between the Governments of Austria and Hungary, or by multilateral activities, like the Central European initiative or European research programs in general.

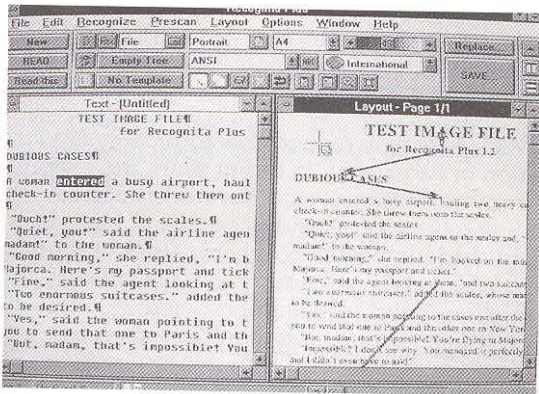
There are a lot of topics of joint interest, like communication and information systems, user interface technology, teachware, software engineering, high performance computing, etc. The exchange of research results and the reports on research activities could be organized by the two computer societies. Furthermore the two societies should trigger joint efforts in university-industry-cooperation which are of common interest to both countries. Today there are many more opportunities than we had ten years ago and it is up to us to use them for the profit of both societies and both countries.

Looking back at the 25 years of its history, the John von Neumann society can be proud of its rich and diverse activities, which are highly appreciated and internationally recognized. As current president and on behalf of the Austrian Computer Society I congratulate the John von Neumann society for its valuable contributions and excellent work carried out as part of our joint activities. In fact this results from the high motivation and enthusiasm of the management and staff of the John von Neumann Society.

**The Austrian Computer Society guarantees that it will contribute as much as possible to continue and even reinforce this fruitful cooperation between our two societies – per multos annos.**

# SZKI RECOGNITA CORPORATION

## On the road to greater recognition



### The Corporation

A team began working on Optical Character Recognition (OCR) in SZKI as early as 1985. Within four years they had a commercial product and a joint venture was established. It employs a staff of 50 with 24 national distributors and affiliated companies in Leipzig (serving eastern Germany) and USA. The German distributor is *Computer 2000*. 16,000 installations of the flagship product *Recognita Plus* exist world-wide. It has had four versions, the last representing a quantum jump forward. This new release, 2.0, will be launched at CeBIT.

### What is Optical Character Recognition?

It's a way of making printed text computer readable. The need to key in data can be avoided using a scanner to produce a computer image or bit-map from printed text, which an OCR product can recognize. Early OCRs used pattern matching; more efficient is contour analysis, resulting in *omnifont* recognition — different sizes and styles of characters can all be recognized by the same algorithm.

### Presenting Recognita Plus 2.0

This product uses contour analysis, together with a specially developed Self Assertion Technology (SAT), used to solve the most difficult character shapes and so attain a very high accuracy rate.

Recognita Plus 2.0 is software only, omnifont, pre-trained and trainable, for MS Windows or MS-DOS. It supports eighty scanner models and 42 output formats (word processor, DTP and spreadsheet) with new ones added as they appear. Image files can be created and read.

It can decompose complex page layouts, separate text from graphics, decolumnize and handle many fonts, sizes and styles (bold, italic, underlined, kerned, proportional, non-proportional).

The product is fast. On a 486/50 MHz, it reads up

to 300 characters/second. A good quality page with 2000 chs takes around 7 seconds. This on 4 MBytes disk space and 4 MBytes RAM.

The MS Windows user interface is redesigned, displaying all essential information in a toolbar. Almost everything can be set here, without using submenus. Text and image windows come up side-by-side with easy movement between them. Page decomposition is automatic, but the user can inspect the result and override it. Output format is defined when saving, so a text can be saved to several formats (including an internal one for deferred editing). The product has its own editor, in which characters can be compared with their bitmap sources, using a pop-up or a side-by-side verifier (the first gives immediate context, the second a wider one, whose magnification can be altered.) A unique OCR-specific search and replace function stops on any non- or unsurely recognized characters. A user can request stops on particular letter pairs (e.g. rn and m) and with one click replace or not.

Draft 9-pin dot-matrix can be recognized by a purpose-built algorithm, which can read accented characters. Fax output can be handled.

The program has three language implementations: English only, Americas (English, French, Spanish, Portuguese) and International, which offers 22 languages on screen, and can read eighty — including Polish, Hungarian, Czech, Slovak, Rumanian, Turkish, Greek, etc. This means it can distinguish between some 350 characters — far more than other products currently available in the same price/performance category.

Convenient saving and reloading of settings and templates are offered. So is deferred processing. Direct connections enable recognition straight to cursor in Windows-based word-processors or DTPs. The TWAIN scanner interface is supported. AUGÉ is a version for the visually handicapped. The program can run on CTOS and OS/2, with UNIX to follow.

### The Product family

*GO-CR* is Recognita's product for use with hand-held scanners.

*Recognita Select* is for use exclusively with the Hewlett-Packard IIc and IIp scanners with their AccuPage technology.

*Recognit-a-Form* is an MS Windows product for automatic optical reading of data from typewritten forms.

Recognita has used its image processing skills in one non-OCR area to create *Biometria*, a program for quality testing antibiotics with results automatically processed and entered into a data base.

All of these, and *Recognita Plus* in particular, are world class products, developed in Central Europe.

### A BRIEF INTRODUCTION TO THE HUNGARIAN ECONOMY, THE STATUS AND MARKET OF INFORMATION TECHNOLOGY



**Dr. Tibor Pongrácz**  
*Secretary of State  
Chairman  
of the Board  
of Directors of the  
State Property Agency*

First of all, let me briefly introduce present day Hungary a democracy for almost three years now, the Hungarian economy, foreign investment opportunities, and – in a few words – the status of information technology.

Hungary is targeting at establishing a social market economy, joining the European Community as soon as possible, and achieving good relationships with all the countries of the world, including the successor states of the former Soviet Union.

Hungary is a small country of 10 million people, characterized by the openness of its economy and, consequently, the basic condition for her development is a well-balanced, expansive foreign trade. Today our major trade partners are Germany (with 27%), the Common Market (with over 50%) and the developed industrial countries (with over 70%). Between 1989 and 1990, due to the world-wide collapse of communism, Hungary lost nearly 70% of her Eastern markets – this caused a major damage, although necessary in the long run – but in 1992 some improvements were achieved even in those markets. For the last three years the trade balance of the country has normally revealed over US\$100 million surplus, an evidence of the successful shift to the country's traditional markets in such a short period of time. Hungary's enormous, US\$22 billion debt accumulated during the previous communist era has been reduced by a few billion dollars and we are reliable debtors. 90% of the country's foreign trade has been liberated, foreign investors have had the opportunity for years to freely repatriate their profits, conditions for foreign ventures are clear and favourable and, in accordance with the international standards, the Government of Hungary provides state guarantees for investments. Therefore, the Hungarian currency, the Forint, is quasi convertible, its black market has

disappeared, and it is expected to reach real convertibility in a few years' time.

Market creation requires extraordinarily fast legislation in Parliament. In recent years, the majority of important business acts have been passed and the institutions of a market economy have been established (Competition Agency, Stock Exchange, etc.). When elaborating such acts, we followed the legislation of the European Economic Community in anticipation of our future full membership.

In respect to our market economy, other important factors are the privatisation of state properties, the share of which still exceeded 90% in 1989, and the widening of the scope of ventures. In 1989, 6,000–8,000 companies or business enterprises operated in the country; their number today exceeds 70,000 and approximately 600,000 one-man businesses have been set up. The number of joint ventures is around 14,000 including almost 3,000 German companies, out of which 937 were founded in 1992. Privatisation is a difficult and complex task; to date, some 17–18% of the former state properties have been privatized and private businesses generate 36% of the GDP today. In the past few years, a considerable amount of foreign capital entered Hungary – in 1991 and 1992 nearly US\$2 billion a year. In spite of that, accelerating privatisation is a major task.

We take the social element of the social market economy seriously, so the country is peaceful, there are no strikes or extremist movements paralysing the work. In spite of that, we are still struggling with many problems since we are seeking a specific Hungarian solution between the collapsed East European and the stagnant West European economies. The large deficit of the central budget, the unusually high unemployment of 12%, and numerous other problems also cause troubles. Nevertheless, the country is stable, its democratic institutions are firm and it has been led by the same coalition, the same government for almost three years.

German investors in Hungary are satisfied and, as the reasons for that, they cite the safety of sales, the possibilities to supply the neighbouring countries, the favourable costs of production and the highly qualified labour force. 85% of the interviewed entrepreneurs were able to increase their profits in 1992 and 73% are planning to increase their investments. Our economy supplies the world



## COMPUTING IN A CHANGING SOCIETY

with more and more up-to-date products and is increasingly capable of participating in the international division of labour.

However, telecommunication and information technology should also be mentioned here since, as I believe, information technology largely contributed to the world-wide changes since 1989, the spectacular victory of which could be seen in the 1991 "Desert Storm" operations. This a competition and the arrears of scientific technology finally broke the Soviet empire.

The weak and underdeveloped information technology industry of Hungary has been swept away by the changes and the removal of COCOM barriers, and only a few really outstanding products survived, which we intend to introduce, amongst others, in this publication.

However, software production, an important element of information technology, has always been one of the strengths of our country. Unfavourable hardware conditions may also have contributed to the development of software production; in this field, I believe, we are still able to maintain a significant share in the world trade today. Information technology in Hungary is now being fully renewed. Negative factors are, among others, that the former public and business administration systems have entirely collapsed and changed and that there is a need for a relatively fast replacement of the old attitudes and systems. The structure of research and development as well as the priorities in information technology also changed since now we can adopt the latest information technology of the world and we do not need to worry about it ourselves. Researchers, developers, producers and users should therefore adapt to such circumstances.

It is considered very important that telecommunication, which has been neglected in Hungary for several decades, will be renewed in the upcoming three years with considerable foreign capital involvement and it will not hamper the spreading of domestic applications any more. We think that with the world market conditions making inroads in Hungary, the price/performance indicator of information technology will necessarily improve, we have the opportunities to adopt international standards, we can join world-wide data and information networks and the information flow across our borders will become free.

The attitude of Hungarian entrepreneurs has also changed; the significance of retrievable business information has grown. In this field today we are experiencing the recovery from a recession since changes, supported by what I said before, were very radical. Based on the increasing demands, the sound

knowledge of our specialists (designers, system engineers, application implementors, programmers), and the performance of joint ventures operating on the Hungarian market, significant results will soon be generated on this market.

The demand for computer consultancy and consultants independent from producers is dynamically increasing and so is the demand for maintenance and service. The formation of a value-added attitude and distribution is very important since this market has its specific demands and cooperation between the foreign and the domestic market is especially important in this field of activities. A feature of the Hungarian nation is that we are able to provide a permanently influential intellectual elite – let us think of Semmelweis, Neumann, Teller – and such an elite is now existing also in this branch of the economy.

The Hungarian legislation on the freedom of information and the protection of personal data is very clear, thus both the conditions and the requirements of a reconstruction are provided for. Despite that, there is still a major backlog in the domestic information technology market but, at the same time, managers and entrepreneurs are aware of the importance of it. We can only partly meet such demands; we count on you, foreign entrepreneurs, to step in. We anticipate introducing our achievements in this field to your markets as well.

I wish to note that, according to my opinion, the real information technology revolution of the world is just beginning to develop. To date, computers have only been machines in a traditional sense. The work chain, consequently, consisted of the man and the machine, the results generated by the machine being used by another machine or the person.

A substantially new idea is the modification of the chain into a man-machine-man pattern, i.e. into the cooperation of man with the transmission of machinery, where all participants are active and there is no favoured direction. All this involves the drastic transformation of human labour by the creation of revolutionary new conditions. And, simultaneously, machines will also have new tasks of course.

If we manage to adapt to new, modern trends and relinquish previous achievements which we were not able to convert to applications, we may gain a good opportunity to catch up and eliminate the backlog we have had for several decades.

We consider information technology and telecommunication extremely important: they may bring people closer to each other and help them solve their problems. Hence the slogan of the 1996 Budapest EXPO: "Communication for a Better World".

## THE HUNGARIAN INFORMATION ECONOMY

**Information economy is the sector of the national economy which meets the information demand of society, outputting profit or non-profit information services such as telecommunications, education, research and development, business services and government services and also information goods like books, records and software products. This is the sector which operates and consumes information technology, among others computing devices.**

### Traditions

Hungary has always been famous for its creativity, enthusiasm, love of European and national culture, and a great number of inventors, scientists and artists including L. Eötvös, F. Liszt, J. von Neumann and E. Teller. Its information institutions like the high standard public education system and jurisdiction were widely appreciated in the late XIX and early XX centuries.

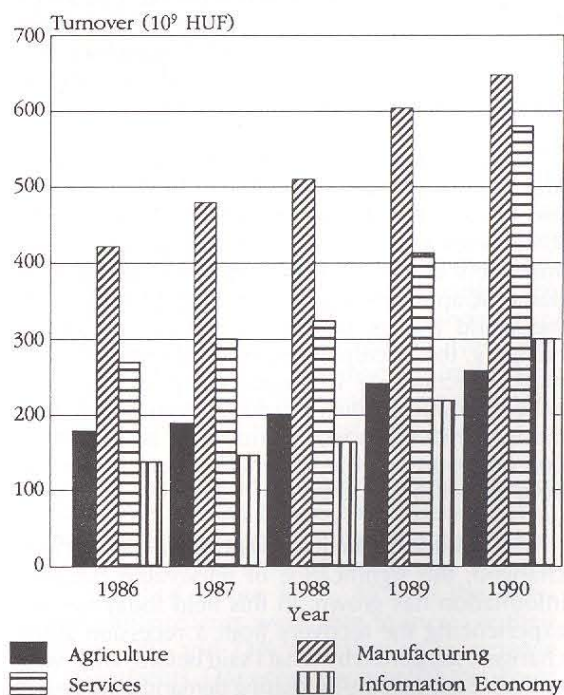
Though sometimes distributed, the **Hungarian information economy** has been growing slowly but quite steadily since the 50's when the first data are available. The proportion of those active in the information economy rose from 10 percent in 1949 up to 28 percent in 1984, the participation of the primary information economy in the GDP from round 11 percent in 1982 to 13 percent in 1986. These figures are regularly better than the respective indicators for other countries in the region. Altogether during this slow evolutionary period, Hungary succeeded in following the main international trends with a constant but not widening lag compared to the West. Hungary's position was relatively favourable when compared to its competitors in the Eastern Central European region as a consequence of the relatively liberal regulation of domestic economy and of flow of people and information.

In the 60's and 70's, the government didn't pay attention in its economic policy to the information economy and considered information and information monopoly mainly as a tool of its power and in cultural aspects as a non-market commodity. The importance of information as a market value and resource wasn't acknowledged. In the early 80's, the social and economic significance of the „fourth sector” was recognized.

### Information economy to-day

The new government has focussed its attention on the foundation of institutions and a general framework to the introduction of a social market economy. New local government, privatization, compensation of the former owners, liberalization of foreign trade, cooperation with the European Communities, strict monetary policies and a new system of social security were implemented to make the society and economy move. A great number of new laws defined the operation of such industries as agriculture, bank and financial institutions and telecommunications but has avoided the announcement of a new industrial or a new information policy.

**The Distribution of GDP by the Main Sectors at Current Prices**



## COMPUTING IN A CHANGING SOCIETY

With measures taken and not taken, the vitality of the Hungarian information economy and the worldwide experienced growth trend of the sector resulted in the further growth and development of the information economy as a whole, even its progress accelerated in some aspects. Participation of information economy was up to 17 percent of GDP in 1990, information industries employed 18 percent of all employees and accounted for 19 percent of all new investments. It was information economy alone out of the four main sectors, which was capable of producing more new jobs than it lost.

The **gross value of fixed assets** owned by the corporation and institutions of information economy totalled 509 billion (10<sup>9</sup>) HUF. There were about 133 radio sets, 124 TV sets, 19 videos, 6-8 cable TV plugs and 52 cameras per 100 Hungarian households and households operated more than 638 thousand phones in 1990, which indicates well both the levels and opportunities.

**Private users, corporation and the government sector exploited more than 500 thousand computers**, mostly micros. Of the computers there were 138 thousand at corporations and government institutions with a gross value of 49 billion HUF, on December 31st, 1991.

Acquisitions of **new intangible fixed assets put in operation in information industries** totalled 49 billion HUF in the year 1990 which was 19 percent of that of the national economy of which two thirds was spent for purchasing machines, particularly 6 billion HUF for purchasing computers and peripherals. There were uncompleted investments worth 36 billion HUF and acquisitions of existing tangible fixed assets amounting to an additional 9 billion HUF. Private investments amounted to more than 20 billion HUF without considering investments in phone lines and sets and satellite broadcasting antennas. This altogether amounts to almost 1 billion dollars. The dynamics of acquisitions were favourable; 12 percent in '89 and 18 percent in '90 at constant prices.

**The market sector** was vitalized by new general measures, a great number of new enterprises were founded. 10694 enterprises, 28 percent of all enterprises in the national economy were operating at the end of fiscal 1990 in the information economy.

Ten percent of GDP in the market sector belongs to the information economy. Profits related to net sales are as high as 230 percent, and profits to capital up to 261 percent of the average in the market sector of the Hungarian national economy. There are 474 billion HUF equities there, of which 54 billion HUF were accumulated by foreign investors. Net export sales of the sector totalled 54 billion HUF in 1990.

The progress was accompanied with a **reshaping** process. While computing services engineering and trade with computers were the big business in the late 80's financial institutions and later telecommunications took the leadership in the early 90's on the profitability toplist. Television and radio broadcasting and publishing are the most neuralgic areas of the information sphere. The administration enraged by sharp and from time to time unjust criticism from the press, is in permanent conflict with a prominent part of the profession supported by the Parliamentary opposition, and this complicates both the government's image and operations of businesses in this area. At the same time the media's role is crucial for they are able to initiate and catalyze the production of original and creative information.

**In the non-profit sphere** the new government's priority was a functional reorganization of the administration. The administration and legislation founded a number of new agencies which resulted in the inflow of personnel into this area. Though office automation wasn't a key importance subject, the new government also founded a centralized office for the co-ordination of information technology within the central government. The body is subordinated to the Secretary of State of the Prime Minister's Executive Office.

An accumulation of machines worth 31 billion HUF (gross value of fixed machine assets) at the institutions of central Hungarian government and machines worth an additional 14 billion HUF at local governments indicate both the dimensions of information activities and perspectives for implementing information technology.

While research and development has suffered a dramatic cutback with the number of full time scientists and also research costs having been significantly reduced, education exhibits a vigorous development with the in-

# COMPUTING IN A CHANGING SOCIETY

roduction of new types of schools and building a great number of new educational facilities.

The weight of the **secondary information economy**, that is internally consumed information activities, in the period of general economic stagnation, should have obviously fallen which was overcompensated by the growth of the primary information economy.

Concerning the **software and computing services industry**, a number of well known firms, like SZKI, SZÜV and SZÁMALK managed to survive the restructuring of the domestic market and intensive competition from the West. These firms diversified their output, bought out firms or merged with Western enterprises, which was accompanied by a change in their profile. Many firms which used to be interested in software development, underwent maintenance, training and trade of Western firms becoming their distributor or dealer. The net sales of software and computing services industry reached 11 billion HUF in 1991.

result of the new world order, Hungarian producers of information equipment lost much of their markets. At the prices of 1987, production amounted to 47 billion HUF which is some 60 billion HUF at current prices in 1990. This was no more than 83 percent of the production in 1986. Privatization and a change of orientation hopefully may lead to a new trajectory of development with a higher rate of growth which may compensate the losses of the past several years. Some producers like Műszertechnika and Microsystem survived the shock and founded joint ventures with such multinationals like IBM or SIEMENS and are set to regain lost Eastern markets.

Table 1.

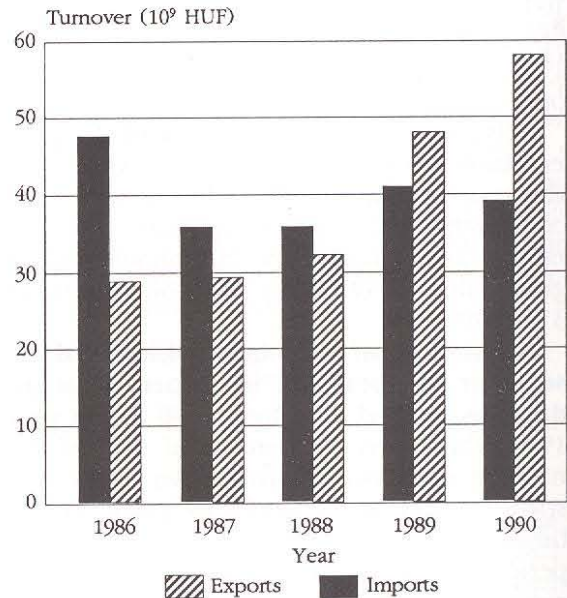
## Top Twenty of the Hungarian Computing Services Industry

Rank	Name	Share, % net sales of the industry	Rank	Name	Share, % net sales of the industry
1	KSH SZÜV	8.03	11	AUTOKER OMIKRON Kft.	1.58
2	PSZTI	6.91	12	KOPINT DARORG	1.39
3	MTA Geodézia	5.84	13	SZKI Recognita Rt.	1.36
4	Hungária Kft.	3.88	14	ÁSZSZ	1.34
5	Panex Ker. Kft.	3.81	15	Dunai Vasmű	1.33
6	AB Kft.	3.27	16	Interag Software Kft.	1.31
7	GRAPHISOFT Kft.	2.38	17	FÜTI	1.29
8	SZKI	1.74	18	MTA KFKI	1.27
9	SZENZOR Sztechn. Kft.	1.73	19	NERCOM Informatik Kft.	1.10
10	ICON Sztechn. Kft.	1.67	20	KERSZI Rt.	1.10

Still these companies face a tough situation. While some years ago it was evident that high profits could be realized in the new technology information industries, this isn't the case now, when privatization, and the phenomena of transition to the capitalist system provide better business opportunities and high margins to investors elsewhere in the economy.

The **production of information equipment** has earlier been based upon a special kind of West - East technology transfer. As a

International Trade with Information Equipment at Current Price



In 1990, 39 billion HUF worth of information equipment was exported, and 57 billion imported. The domestic market installed 80 billion HUF, round 1 million dollars worth of machines. The rapid change of orientation can be illustrated with the fact that while in 1986 the Soviet Union contributed with 19 percent, GDR with 13 percent and FRG with 21 percent in the imports of information machines, the participation of all socialist countries went down afterwards, that of the Soviet Union to 1 percent while FRG increased its share to 28 percent. The orientation of export changed less.

# COMPUTING IN A CHANGING SOCIETY

More and more information materials like paper, magnetic media and films were imported yearly, in 1990 for 8.33 billion HUF which wasn't balanced by the exports with a value of 1.65 billion HUF.

Table 2.

## The Number of Units

	1990		1991
	Active <sup>a)</sup>	Main profile <sup>b)</sup>	Active <sup>a)</sup>
In the software and computing services industry altogether	5770	1759	5845
of which enterprises	1421	796	1224
non-profit organizations	1332	50	1454

a) Those which sold own-produced software or computing services.

b) Those whose main output is software and computing services

Table 3.

## Revenue in computer application by activities, 1991 (million HUF)

	Revenue at current prices	Domestic sales	of which Export	
			Rouble	Non-rouble
Altogether	11275	9213	47	2014
of which Software	3038	1642	-	1395
Data products	503	503	-	-
Computing serv.	7008	6573	-	435
Research and dev.	726	495	46	185

Foreign capital has recognized the business opportunities within the Hungarian information economy. An important area which will be mature and open to investment and computerization to an increasing extent by the end of the decade and after is that of "language industries". The foundations are solid, the "human sphere"; education, publishing and film production in Hungary are traditionally well developed. Renaissance of the national culture, the impact of multimedia technologies and the lifting of some bans still persisting in the mass media area all will revitalize language industries. Hungarian language is probably the second greatest language, after Romanian, in the region. Some fifteen million Hungarians plus an estimated round six million non-Hungarian speakers of the language as possible consumers make this industry attractive.

**István Dienes**  
Senior Counsellor  
Hungarian Central  
Statistical Office

\* The data were taken from the publications of the HCSO.



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P.O.Box 126  
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## COMPFAIR 93

6th INTERNATIONAL COMPUTER EXHIBITION AND FAIR

on 12-16 October 1993  
at Budapest International Fair Centre



COMPFAIR 93

### Thematic groups

Computer design, hardware, software, office technology, office furniture, trade, accessories, sport, informatics, technical publications, intellectual export, organization, electronic entertainment, telecommunication

Diagrams representing the development of COMPFAIR exhibitions





## SZKI Computing, Communication and Innovation Technology Corporation

SZKI Computing, Communication and Innovation Technology Corporation is one of the well known computer system houses in Hungary. Since its foundation (1968), it has participated in the development and marketing of computer hardware, software and computer systems in Hungary. Among others SzKI took part in the development of the minicomputers VT 1010B, R10, R12, developed the minicomputer R15, the first Hungarian personal computer M08X, the first European IBM PC-compatible personal computer, PROPER-16 and the first Hungarian local area network, PRONET. SzKI has developed several worldreknown software products, e.g. MPROLOG, Qualigraph, RECOGNITA. Through its results and long term cooperation with some significant western companies (CII, SIEMENS, Bull, etc.) SzKI is well-known also abroad.

SZKI has recently appeared on the market as a systems integrator. As such, it exploits the experiences gathered during hardware and software development, system design, distribution, and as a user.

### SzKI undertakes

- development of different purposed application systems using data communication and different data base management systems (Lotus, Oracle, Clipper, etc.).
- development of data communication systems.
- development of different applications.

The systems integration philosophy of SZKI is characterized by the use of Open System Architecture (OSA), in compliance with de jure and de facto international standards, taking into consideration the conditions in Hungary.

### Characteristics of SzKI's

#### Systems Integration Solutions

- = UNIX and UNIX-like operating systems,
- = Mixed use of MS- DOS and UNIX,
- = NOVELL Advanced NetWare and XENIX-NET,
- = NETBIOS and TCP/IP,
- = Common Use of SQL (ORACLE, SQL NetWare, etc.) and RDBMS (Clipper) systems,
- = Common Use of the X. 25 Network, Public Switched Telephone Network and Leased Telephone Lines,
- = MNP5-Compatible Modems,
- = Fault-Resistant Data Communication Solutions,
- = On-Line Testing of Data Communication Facilities.

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#### a CASE Tool for

- Reverse Engineering
- Quality Assurance
- Maintenance
- Automatic Documentation
- Systematic Testing
- Independent Evaluation

If you have to **maintain** poorly or even not documented software, to **test** software that you develop, as efficiently as possible, to **measure** software quality, to **compare** software written in different programming languages, or to **improve** software quality

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## TECHNICAL DEVELOPMENT IN HUNGARY TODAY

– Interview with Sándor Bottka, Vice-President of the National  
Committee for Technological Development –



SÁNDOR BOTTKA  
Vice-president of the National Committee  
for Technological Development

Epochal changes are going on in Central and Eastern Europe. In Hungary, we are in the midst of a transformation process of the political system. Policies have changed, the formation of a market economy is under way. All this has had and continues to have a decisive influence on the development of technology and production, including informatics and computer technology. The National Committee for Technological Development has always endeavoured to promote the effectiveness of research and development activities in Hungary. Changes have also emerged in this field, some details of which are described below.

*Which components of transformation, in your opinion, have had essential impact in the last two to three years on research, development and production activities in the fields of informatics?*

– The transformation process commenced as early as the late eighties. A banking reform took place, a two-level banking system was established, the Corporate Law and the Foreign Investment Bill were approved by Parliament. Foundation of small enterprises, production communities and small co-operatives was made possible. By the end of the eighties, the number of small enterprises in Hungary had exceeded ten thousand. The state monopoly in foreign trade was abolished, more and more enterprises were granted a foreign trading licence. A large number of beginning small entrepreneurs learned for themselves what the owner function meant, and, in one way or the other, they

graduated in one of the main elements of system transformation, namely in a market economy. The newly established small organizations generally did not deal with development and production. They went in for service activities mainly, like trading, repair and maintenance. At the same time, the existence of numerous enterprises also provided a market for computer technology, providing an informatics background for a great number of small organizations. This was made possible by the PC-boom which began in the early eighties. This was the time when the function of computer applications changed. The earlier mainframe batch applications had only served governmental needs in providing statistics and budget balance reports, but were a poor basis for supporting operative management. From this time on, entrepreneurs tried to take advantage of computers in order to improve the effectiveness of their business activities. The rise of small enterprises was doubtlessly a positive change. At the same time, the Hungarian electronics and computer industry collapsed almost completely. About half of the production of this industry was sold in the eastern markets, primarily in the Soviet Union; these markets lost their solvency and disappeared. Moreover, industrial liberalization and the significant softening of COCOM restrictions further reduced chances for this sector. Part of the enterprises attempted to join some western companies and start joint ventures to survive. Others were wound up. A considerable part of the survivors do not deal with hardware development and production any longer; instead, they are in trade and services,

# COMPUTING IN A CHANGING SOCIETY

pursue value added research (VAR), or system integration. Where are the development investments of the earlier period, during which, affected by the ban, computer components like hard disks, CD-ROM drives, etc. were created. Those organizations have collapsed or deal with something else, but the knowledge acquired then can be utilized in new fields. Experience is really necessary because western companies with excellent references are present and they generally win the most important tenders. Domestic companies will only be able to survive in the field of services, but there also, they will have to face fierce competition.

## **The changing research sphere**

*What are the developments in the research sphere, in the position of research institutes?*

– There are considerable changes here, too. The bulk of the research institutes that had dealt with computer technology, were transformed into enterprises. For example, the Computer Technology Coordination Institute and Innovation Centre has been privatized. Several limited companies were formed from the Computer Science and Automation Research Institute of the Hungarian Academy of Sciences, and they started operations in the commercial and/or services sector rather than research or development. Several researchers have started their own private enterprises. From all this the question arises: when will the shortage caused by the above trend be tangible? It must be acknowledged, however, that the economy cannot any longer finance the research capacities established earlier. In 1991 the budget allocation for research and development was only 1.18 percent of the GDP while five years earlier it reached almost 3 per cent. Five years ago, the number of research staff was as high as seventy thousand, today it is below thirty thousand, out of which the number of full time researchers has decreased below fourteen thousand. All this means a limiting factor for future possibilities. At the same time I do not consider it tragic that part of the researchers go abroad to work because this is only an interim phenomenon. Most of them will come home in a few years and will make use of the knowledge and experience they acquired while working abroad.

## **Support of research work**

*How does the National Committee for Technological Development promote and support domestic research and development activities, which is one of its main objectives?*

– Earlier we implemented development programs for the national economy which were cen-

trally controlled large research and development programs. These programs do not exist any more as the transformation of the system evolves. They were replaced by a new competition system built up in an upward direction. Any organization that has a research and development task and really wants to fulfil it can submit an application for government support. Generally, this support is to be reimbursed but without interest and it is not a rigid rule that it must be reimbursed fully. Independent advisory boards have been established to allot research and development funds according to the law. The members of these advisory boards are not government bureaucrats but renowned scientists and public figures. In the jury, in each case, there are two independent experts. The decision brought by them is made public and the whole system is transparent. The most important competition form is the so-called applied research and development competition, in the framework of which it is possible to plan the development of a product, technology, or service and apply for governmental support in connection with it. Another nationwide competition is OTKA (National Scientific Research Fund) which makes it possible to apply for governmental support in basic research fields. The third one is a competition called "Social Conditions of Technical Development" comprising themes like infrastructure, international cooperation, preparatory courses and organization of symposia demonstrating achievements. The fourth one is a so called export expanding competition giving tax-reductions and credits at easier terms for those creating capacity to expand exports. Moreover, if the applicant also performs a technical development task, he/she can also apply for technical development support. The fifth competition form is connected with the encouragement of small enterprises. Innovative small enterprises can obtain about fifty percent interest reduction through the commercial banks.

In addition to the bottom-up structure, a top-down method has also been introduced recently in the competition system. Based on investment projects of the government, governmental programs organized as special competitions are launched. One example is the geographic informatics competition for local government, based on the fact that local administrations have been formed, vested with assets of their own, and they must manage the regions that have been entrusted to them. This competition will finance those topographers who create a standard technology for the digitalization of the existing maps and the measurement results. At the same time so-called accredited authentication centres will also be established to make sure that the digital maps on the market are authentic and reflect the current situation. We would like to create the technology and standards



# COMPUTING IN A CHANGING SOCIETY

for this task. This is a real development task because no final standards have been elaborated in this field anywhere in Europe. The other branch of development and competition financing addresses the means of adding local government applications to these digital maps, e. g. public utilities, records of buildings, management processes of local governments linked to these, etc.

## International cooperation

*Supposedly, the transformation process of the system has also modified the list of international R + D cooperation partners.*

- The introverted Comecon cooperation has been wound up. A considerable opening up has taken place toward Europe and other parts of the world, too. We have scientific and technical cooperation links with sixteen countries at a governmental level, coordinated by the National Committee for Technological Development. These links include the United States, Japan, several European countries, India, Mexico, South Korea, etc. These links are almost void of politics, they launch independent projects based on the mutual interests of the cooperating partners.

It is a considerable step forward that Hungary has concluded an Association Agreement with the European Community. A separate clause of this Agreement contains stipulations on scientific and technological co-operation. A joint committee was established and its scientific and technological sub-committee prepares future tasks. Cooperation agreements were concluded in this sub-committee that have taken us along the way to full membership in the COST program and in the EUREKA program. COST coordinates mainly basic and university research while EUREKA coordinates developments that can result in marketable products and technologies. In both programs the number of Hungarian projects exceeds ten.

Fifty-five million ECU have been released at EEC initiative for research and development cooperation of nine European countries.

From the nine countries a total of 11,722 applications arrived and 3,039 were awarded. In this number 382 were Hungarian projects. For example in the framework of COST, 48 Hungarian projects have won financial support. Hungarian participation in the COST program or in the so-called European framework programs is above average. Countries of "The Visegrád Three" also take part in COST but, of these, only Hungary is a member of EUREKA.

The European Community has far-reaching research and development programs which are closed for us. The reason of this is not political but legal. This is because these programs are fully financed

by the governments of the member countries from taxes paid by the citizens of the West-European countries. There are fifteen such programs, out of which five have partially been opened for us. We are not allowed to participate in the whole program but we can join separate projects. If we can finance our participation we can be full members. Hopefully, after the ratification of the agreement of our EC associate-membership, it will be possible to conclude an R + D framework agreement which will properly enable our participation in these programs.

Since 1991 we have been successfully co-operating with the European Space Agency. Hungary is a member of the CERN in Geneva participating in nuclear research. Likewise, we take part in EMBC, the European organization of molecular biology. Certain regional cooperations have also been started. There is a Scientific-Technological Work Group in the Central-European Initiative where Hungary actively participates in sixty projects. One of the interesting ideas to be dealt with is to establish a supercomputer centre on the island of Sardinia which we can join and where Hungarian informatics experts are welcome. It is also important that the PHARE program supports European-Hungarian research-development co-operation with ten million ECU. This support system is broken down into three chapters. The first is project co-operation by which, in the framework of a competition system, it is possible to apply for the coverage of research expenses. The second chapter provides scholarship stipendia of various durations for researchers in future projects. The third chapter supports the expansion of domestic research and development infrastructure and the improvement of research conditions. In addition to these, another regional PHARE program has released two million ECU for five countries to support their joining the COSINE program. In the framework of this program, Hungarian scientists will get a 64 kbit/s exchange and a oneyear line subscription clearance. I must also remark that we are associated in a way with the ESPRIT research-development program which is otherwise closed for us. And this is in the only possible way: we are sub-contractors to it. We perform commission work with no rights to intellectual property. In our opinion, this opportunity should not be belittled since valuable experience, knowledge and good connections can be gained through it. Finally it is important for us to seek connections with the member countries of the CIS, with those of the separated Czechoslovakia, of the former Yugoslavia and other countries of the region. Our aim is that the new connections should not just mean formal agreements but become fruitful in projects beneficial for all parties.

György Csányi

## Information Trade of the Hungarian Public Information Service



Bureau of the Hungarian Public Information Service

In November 1992 the ÁSZSZ Informatics Corporation (Rt.) opened its

Information Saloon  
in a central place in Budapest.

This enterprise was created by the boom of business life and its aim is to provide correct information to interested customers. The data base contains **company information** compiled from multiple sources. Among others, names, addresses, telephone and facsimile numbers, sizes of registered capital, names of managers and other data of 62,000 registered companies are available from SZÜV CÉGINFO (CompanyInfo system of the Company for Computerization and Management Organization). The data base of Mirotrend named Céginfo (CompanyInfo) also contains names, addresses, and other important data of approximately 60,000 companies, including private entrepreneurs, traders, small co-operatives, cultural institutions, schools and local governments. A third Company Information database contains the data of companies with over 15 million forints capital and more than one hundred employees.

However, the information market requires more and more profound determination of company activities. Company professionals and traders await quick information on **concrete products, groups of products and services**. The WHO? WHAT? database of the Company for Computerization and Management Organization (SZÜV) meets this challenge by categorizing the companies on the basis of 5000 entries pertaining to products and services. Services are retrieved from the database using practical notations and names.

The services of the Company Information Club widen the sphere of business information with product description, enquiries for business offers and **foreign trading information**. Investors can make good use of the database of the State Property Agency containing data on companies to be privatized as

follows: company name and address, director's name, phone/fax number, addresses of branches, main product groups, partners, composition of staff, price revenues, profits, owners' structure, capital structure, nominal value of the State Property Agency's part of the property to be sold.

The database of the Ministry of Foreign Affairs supports **international relations** containing the address and phone number of all foreign embassies and representations in Hungary along with the names of the chief representatives.

The names and addresses of over 3000 **mayors** in Hungary are to be found with office addresses, names of participating parties and precinct data in the Municipality Database of the Ministry of Internal Affairs.

A database in the Ministry of Industry and Trade contains names, addresses and professional fields of all the technical experts registered with the Ministry. The offer of information is expanded by the name and address list of economic units belonging to the Ministry of Industry and Trade, the database of the professional sector, as well as the technical/economic database.

The Office, in compliance with the respective legal prescriptions, also provides **census data** from the National Personal Data and Address database.

**Topographical information** is also available in the offer of the Saloon from the database of the Institute of Geodesy and Telemetrics. Topographical maps are available for the entire territory of Hungary in a scale-range of 1:10,000 to 1:200,000 with the corresponding contents and accuracy. These maps, until recently, were classified as "secret" and "for service use only". Inventors and entrepreneurs can find these topographical maps useful for both development projects and construction. E.g. maps at the scale 1:10,000 and 1:25,000 are suitable for drawing up planning concepts, synoptic drafts and plans. As the maps contain both horizontal and elevation data, it is easy to decide with their help, where to deploy e.g. objects representing an environmental hazard, consequently, it is unnecessary to perform detailed surveys on the terrain. As an example for the utilization of elevation data, the planning of the KIL system telephone network, in particular, the determination of the stations' location should be mentioned (avoiding tall obstacles).

The basic philosophy of the Hungarian Public Information Service is the endeavour to achieve versatility. Based on a system of extensive relations, in addition to everything mentioned above, statistical, demographical, legal, financial and many other kinds of information can be accessed here.

*Address:*

Magyar Közzszolgálati Adattár  
Budapest, XIII. Ujpesti rkp. 8.  
Tel/fax: 361-112-5411 • 361-132-8435 • 361-112-9229

**Géza Széphalmi**

## PUBLIC ADMINISTRATION INFORMATION SYSTEMS

Computer usage in Hungary was also implemented from the very beginning in state administration. The M-3 type Soviet computer produced in 1959 was running such applications as project matrix solutions (1000 x 1000) and price modelling calculations. The bulk of first computers were acquired in the 1960s by the bodies of state administration, e. g. the Hungarian Central Statistical Office (HCSO), ministries or the Central Planning Office (CPO). In 1975 the State Administration Computer Services were established (the predecessor of the SAO – State Audit Office – Computing Corp.), which using the appropriate network of advanced computers dealt with creating and processing huge central databases and information systems. Just to mention some of the systems of that time, computer technology was implemented in population registration, real estate registration, as well as in processing the large databases of agriculture or public health.

The growth of the level of computerization in the state administration ran alongside the development of Hungarian computer production (partly within the framework of common computing projects of the socialist block). Nevertheless, the use of information technology was not widespread in local administration; computers were mostly used in wage accounting. There were several obstacles blocking rapid expansion of information technology: the backwardness of the whole socialist block, the limitation – from the both sides – of import of high technology products from the West (COCOM restrictions), the undeveloped local infrastructure, as well as the relative simplicity and conservatism of state and public administration.

A project called Unification of Information System (UIS) approved by the socialist block for the 1970s, among other things foresaw the improvement of information technology in the field of public administration, but its success was moderate. The reason for this was the implementation of out-of-date technology running alongside the low level of production resulting in products, which were non-competitive on the Western market. Therefore institutions of central state administration no longer used systems made in socialist countries – HCSO ran its applications on IBM machines, SAO used Honeywell-Bull com-

puters, and at CTO site the ICL equipment was installed.

In the centralized system of socialist state and public administration the various aspects of information had less importance. The information was distributed within a narrow circle by special channels between special sources and central organizations – in accordance with the dictate of superior bodies. Mainly the central data processing required the benefits of information technology. This fact did not favour the development of infrastructure, being an obstacle on the way to the growth of data-transfer networks. The above negative influence on the development is observable even nowadays. The backwardness had its political base as well, since the ruling ideology intentionally blocked the way to advanced technology.



*Terminal in ÁSZSZ Corporation*

The computer equipment became widely utilized in local public administration essentially only with the appearance of PCs. The use of computers came to prominence in working places and in offices. Moreover, at the very outset PCs were believed to be a cure-all, apt to present desired solutions with any application. Nowadays the necessity of "system thinking" and other computer attributes is already common knowledge. In this way DEC machines and special systems are gaining more and more ground.

## COMPUTING IN A CHANGING SOCIETY

After the political changes in 1990 the significance of information and the demand for it increased among others in the state and public administration. Perhaps the free flow of information underlaid the breakthrough in the field of democracy. The decentralization, market orientation and business risk made access to information vital. Although the development of information systems did not belong to the primary objectives of the political changes, recently it has become a part of determined government policy. Many projects were launched to this end: the development of information infrastructure, the streamlining of information systems in public administration, education, health care, etc.

Within the framework of the overall reform of public administration a central body was established in the Prime Minister's Office to coordinate the development of obsolescent infrastructure, which contributes to the implementation of defined principles. E. g. unified information systems harmonized with the norms of the European Community should be created as far as possible. The systems should be open and modular to be able to handle the changing environment. The purchases and development should be implemented on an economic basis, through free competition. Shared systems should be established among the state administration bodies under central regulation. Electronic flows of information should be provided between the bodies and offices.

One of the most up-to-date systems is being integrated in the Parliament building. Flexible, expandable servicing systems will run in an overall network under Windows, or UNIX and Vines (Banyan Co.) operating systems, while the buildings will be connected by laser data transfer. Following the already operating electronic mail, word-processing and smaller information systems, advanced relational database management systems (ORACLE, TOPIC), desktop publishing tools (PAGEMAKER) and spreadsheets (EXCEL) will be installed soon on the system. There will be also some other office automation tools employed.

Nowadays in Hungary the usage of information technology is becoming common and indispensable. Personal computers can be found in 90% of a communities with a population in excess of 2000, and there are functioning networks (basically NOVELL) in more than 30% of them. In 80% of the communities, typing is facilitated with word-processors, half of the reception offices use computers. The bulk of the applications serve for registration and economic purposes.

Those operate with database management systems (typically with Clipper). Modern 4th generation database management systems are exceptional and in the process of implementation. Spreadsheet softwares have been gaining more ground at regional and city municipalities and central authorities during the last 5-6 years. In 70% of the communities with a population in excess of 3000 people the paperwork connected with official documentation in the municipality is computer aided. The other tools of office automation (XEROX-like photocopying, fax) are quite wide-spread. Only a few larger municipalities use DTP systems. Non-PC category computers (mostly DFC-clones) are used only in regional and city centers. Those substitute the obsolete supercomputers (IBM, ICL, BULL, etc.), and in a few places provide most functions of the electronic ("paperless") office. Full-text systems are rare. On a national scale the number of places where electronic document processing occurs does not exceed a dozen. Data storage on optical disks is used also at a few state administration centers (foreign affairs, police, court, etc.). OCR systems, use of scanners are also rare. UNIX systems operate, for example, at 50% of regional courts of company registration.

Only a few institutions having a nation-wide organization structure use nation-wide networks, HCSO, Population Registration operate an X. 21 based network, and some organizations employ closed X. 25 networks. Meanwhile many public administration organizations are connected to the public X. 25 network. The task of the country-wide Information Infrastructure Program sponsored from central sources is to provide as many users as possible with access to a wider database, both technically and financially.

More and more foundations, chambers, profit-orientated companies are attuned to the growing demand for state and public administration data and information. Among others the State Audit Office Computer Corp. (ÁSZSZ Informatikai Rt.) in association with state administration bodies founded the Hungarian Public Service Database (Magyar Közzolgálati Adattár). In cooperation with the state and public administration bodies it started providing public data and information from the available sources. This service is provided for a corresponding fee to any entitled Hungarian company, foreign inquirer, businessman or organization. It delivers domestic and foreign information, which can contribute to the development of the Hungarian public administration information systems.

## ARTIFICIAL INTELLIGENCE IN HUNGARY

Hungarian Artificial Intelligence has its roots in the midfifties. It was then that the late professor László Kalmár from Szeged University designed a machine which could be programmed in a mathematical formula language. With this and his logic machine (built in the USSR), he was a Hungarian forerunner of AI's aim: an information technology revolution. Thereafter the country came into the limelight again in 1975 when development of the Hungarian Prolog system started. This was noteworthy also from an economic point of view: by 1988 more than 1500 MProlog systems were installed in 25 countries all over the world. By the early 80's there were a number of AI labs doing research and/or applications in knowledge based technology. The most important kernels were the Computer and Automation Institute of the Hungarian Academy of Sciences (SZTAKI), the Central Research Institute for Physics of the Hungarian Academy of Sciences (KFKI), the Computer Research and Innovation Centre (SZKI) and the Computing Applications and Service Co. (SZÁMALK).

### AI associations and their activities

In Hungary it is the John von Neumann Society for Computing Science (NJSZT) that primarily handles the distribution of leading scientific results in computing, getting technical experience and for disseminating computer culture. The Hungarian AI community was officially formed by creating an Artificial Intelligence and Pattern Recognition Section within the NJSZT (in 1976). For example, the seminar series "Theoretical and practical problems in programming" (1979-1985) provided a high level weekly forum for those who were interested. Experts and researchers working in different fields of AI organized, more and more forums among others monthly/quarterly seminars within the NJSZT and outside of it. There also has been an impressive AI-activity in the framework of the Section of Medical Informatics (of NJSZT) elsewhere the English abbreviation is *cræd*. The first separate interest group in a field close to AI was the Hungarian Robotics Association (HRA, founded in 1985). Their objective now is to turn the association into a consortium formed by industrial companies, R&D institutions, individuals, universities and ministries having interests or duties regarding reconstruction of the Hungarian economy.

From 1990 the Artificial Intelligence Group and the Image Processing Group (of NJSZT) organize regular activities, e.g. triannual Hungarian Workshops on Image Analysis (1985, 88, 91); Hungarian AI Conferences (1989, 91, 93). From 1991 quarterly AI-days are held with lectures on selected topics of AI. Besides national AI gatherings there have been regular annual Austrian-Hungarian Conferences since 1988, touching on AI-related topics. International events held or planned in Hungary are the 5th International Conference on Computer Analysis of Images and Patterns in 1992, the ICLP'93, the KNOWHSEM'93 (IFIP/IFAC on KBS in Engineering and Manufacturing) and the ECAI'96.

### AI in the Hungarian press

There is no AI periodical in Hungary to date. Nevertheless, there are journals regularly reporting on AI developments. For instance, "Információ-Elektronika" published a thematic series on the 5G project in 1983/84, based on the above mentioned seminar series. After publishing the first national volume of studies on Expert Systems in 1988, this journal devoted a special issue to the state-of-the-art in the expert system field in Hungary in 1990. The national monthly computer magazine "ALAPLAP" is publishing a popularizing AI-series.

### AI education

Although some topics of AI had appeared in Hungarian higher educational programmes as part of already established subjects in the beginning of the 80's, it was not earlier than the middle of that decade that AI became a stand-alone subject on its own right; first at the Economic University of Budapest and at the Kandó Polytechnic of Technology. Presently a basic one semester course usually called Introduction to Artificial Intelligence, is typically a compulsory part of the first three years at more than 10 universities and polytechnics in Hungary.

### AI research

The Hungarian Academy of Sciences, the National Committee for Technological Development and other sources provide financial support for R&D activities. The research centres of today are more or less the offspring of those which were active in the beginning period of Hungarian AI. Some of them, however, became victims of the rationalization/privatization wave and ceased to exist or operate with a reduced staff. Many of them are being reorganized, sometimes split into a number of new companies and new researchers are entering the scene too. Significant research is being done into Knowledge Based Systems, natural (Hungarian) language processing, speech generation/speech synthesis, image processing and robotics at several national institutes with results that are useful in practice. Most of them are internationally acknowledged, e.g. CS-Prolog now in use in 13 countries and RECOGNITA PLUS (a Hungarian-made OCR-product) has 16,000 installations all over the world with distributors in 24 countries.

### KBS applications

In Hungary there are significant results in the field of Knowledge Based Systems (KBSs). Till 1991 the national KBS shells and applications were logic and rule based ones on PCs. After weakening of COCOM-restrictions and the appearance of multinational computer companies, shells in workstations and mainframes supporting multiple paradigms have been available and projects on intelligent, integrated applications have been started and application-oriented shells are being developed. Although potential users are beginning to recognize the advantages of the KBS technology, lots of the projects are delayed by lack of financial support and interest and/or because of reorganization of the Hungarian economic, financial and scientific life. Luckily extensive work is being done in the area of information and consulting systems. Based on them it is a real aim to build usable KBSs in the near future.

In the eighties work on KBS development tools was carried out in parallel with that on methodology, as well as with the application development. In this way the developers could also find answers to their application-methodological problems. Some better know successful Hungarian KBS projects between 1985-1992 (areas and number of projects): building industry: 7, chemistry: 10, computing: 6, energetics: 7, medicine and health service: 16 and other industrial projects: 11. More than the half of these projects use Hungarian-developed KBS shells and 5G languages. About 30 systems are at product level; more than 40 national institutes are engaged in KBS development and even more experts from a further 40 institutions are working on system building.

### Summary

We have given a short overview of AI activities in Hungary in the last 20 years. In spite of difficult conditions Hungarian researchers have achieved numerous internationally acknowledged results. We hope the new opportunities for international collaboration will help our AI R&D community to enter the forefront of AI research worldwide.

Sántáné-Tóth Edit

## BUILDING UNITY FROM DIVERSITY

**The Számalk Group is one of the most significant service companies in information technology in Hungary today. Here with their story is Miklós Havass, General Manager:**

The Számalk Group is the leading supplier of information technology (IT) in the Hungarian Market, a position it has enjoyed for nearly three decades. Since the company's foundation we have been determining and meeting the demands of our customers, keeping pace with the developments in IT, new trends, products and services. The Group consists of Számalk Systemhouse Ltd and 35 subsidiaries, many of them joint ventures. We will be privatized in the near future. One of our slogans is: **complete computer services**. By this we mean that we offer a complete range of services including large and small hardware systems, bespoke and package software solutions, consultancy, training and system integration. We have a nationwide distribution and training network. Számalk services are reinforced by relationships with companies of international reputation.

One of the company's strong points is its **very advanced educational infrastructure**. Számalk offers shorter and longer (degree) courses to 6,000 students a year in IT. Whether a junior or a senior associate, an analyst or a programmer, an operator or a chance user of a terminal – with us, all have ample opportunities for continuing their education. More than 75 per cent of all specialists in Hungary have upgraded their skills and knowledge through our IT training centers for Novell and Microsoft. We offer courses in English, German and French, employing lecturers who are native speakers.

Our main field of activity is near the borderline of IT and non-IT applications. This is why our staff also includes non-computer graduates with IT know-how. Among the IT application areas in which we are strongest are public administration and health care applications. We design software and are involved in adapting foreign program packages.

In trade we mainly act as value added resellers. We have an OEM (Original Equipment Manufacturer) agreement with Digital Equipment Corporation, a GMA (General Marketing Agent) agreement with IBM and a consultancy agreement with Tandem Computers Inc. We are distributors for Microsoft, Compaq, Borland, Information Builders, Logitech, Corel, Micrografx, and Grundig. We distribute 60 percent of the software Microsoft sells in Hungary. Besides meeting our customer's comprehensive IT requirements we undertake the fitting out of their offices with furniture and equipment. At one place you can get everything you need to furnish an office, from computers, faxes and copiers to office furni-

ture. Our range includes notebooks, PCs, minicomputers, peripherals, add-ons, magnetic media and many other items.

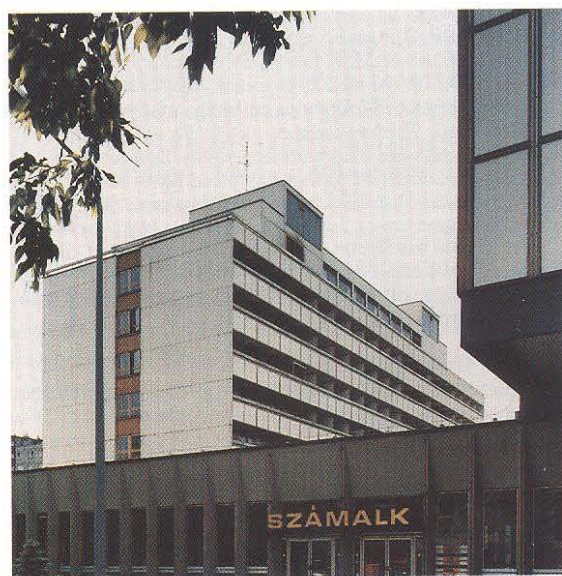
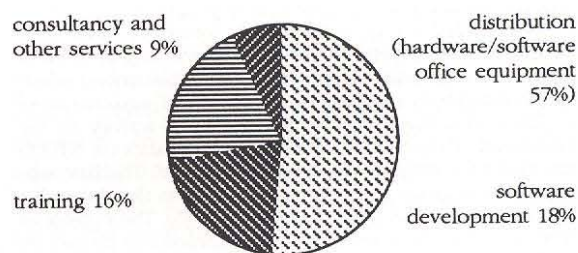
The Számalk Group supplies mainly government, industrial, financial and professional users in Hungary. Our internationally known clients include: Philip Morris, Shell, Glaxo, Unilever and Johnson & Johnson. Every year several hundred of our software engineers are engaged in foreign projects that boost our experience and international reputation.

### CORPORATE DATA

Számalk Group  
Turnover 1,8 billion forints  
Export 250 million forints  
Staff 500

1518 Budapest 112 Pf.: 146  
Telephone (361) 185-3111  
Facsimile: (361) 166-9085

### Revenue



## INFORMATION TECHNOLOGY (IT) TRAINING

### HIGHER EDUCATION

There are 25 universities and 51 colleges in Hungary. The nearly 110,000 students are taught by 18,000 professors. After the fundamental changes in 1990, the preparation of new development programmes and legislative features has been commenced in the fields of politics, economics, culture and education. The new codes of public education, specialized education and higher education, and the development programme for the higher education to the year 2000 are being prepared.

#### The fundamental elements of development of higher education

This education system plays a significant role in the economic and social transition of Hungary in catching up with Europe, especially in development of public and specialized education, as well as in reformation of the system of scientific research, and will promote the competitiveness of the Hungarian economy and society.

By the year 2000, the Hungarian higher education should have reached the European average. This involves the following steps:

A dual higher education structure, which means two institution types: the universities of wider, more modular and versatile education, and the colleges with more specialized, convertible education. From this aspect, the continental educational system is the pattern to be followed, although the Anglo-Saxon educational system could be involved in certain fields.

The most characteristic type of university is the multidisciplinary one with various faculties, a regionally integrated institute, with a higher number of students.

The training for teachers of students between the age of 10 and 18 will be standardized, and offered at the university level.

Some of the colleges will be regionally integrated, complex institutes. The college will base practice oriented education on larger grounds.

The development concept for 2000 sets out from the idea that arrears must be made up first in the field of university education, but in the relevant timeframe – simultaneously – the personnel requirements for the dynamic development of colleges are to be established.

The determination of state subsidy levels must

mainly be based on effectiveness and productivity.

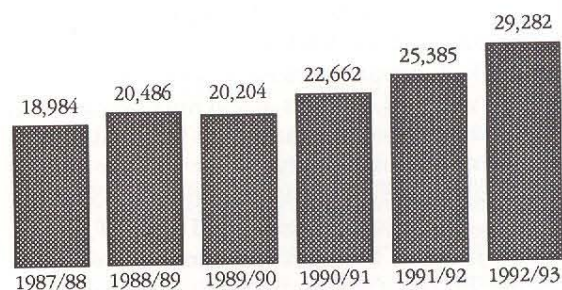
To justify the above-mentioned principles, a set of development objectives must be defined, economic analyses and scheduling of education must be prepared.

The scientific postgraduate education is to be institutionally shifted to universities, adaption of organized forms of postgraduate education, involvement of doctorates in education and research are to be provided.

There is a need for increase in the proportion of university-based research, and in financial means spent on research as well as for links between university and research institute capacities in order to have quality-oriented execution of complex university objectives and promotion of traditional values.

A determined organizational concentration and integration along economic lines – all aiming at rationalization of the institutional structure – are to be carried out.

**Number of 1st year students in higher education (university + college, full-time)**



#### Training of IT Specialists

*Universities of Arts and Sciences, Teacher Training Colleges*

The training of specialists starts at the Programmer Mathematician Training Department (college-level, 6 semesters). Student of high proficiency in possession of a college degree will have the chance to receive a university level programme-designer mathematician degree after four more semesters.

First, the Lóránd Eötvös University of Arts and Sciences (ELTE, Budapest) has offered this kind of education in both full-time and evening courses, and later on, both the Attila József University

# COMPUTING IN A CHANGING SOCIETY

of Arts and Sciences (JATE, Szeged) and the Lajos Kossuth University of Arts and Sciences (KLTE, Debrecen) has started producing nearly the same number of graduate specialists. Within the framework of the cooperation between the JATE and the Budapest University of Economic Sciences (BKTE), economic programmer mathematician and economic program-designer mathematician education have been offered in Szeged for several years.

The education of students with poor eyesight at the Programmer Mathematician Department is noteworthy.

Students of outstanding proficiency can work for their university-level doctorate in the fields of computer sciences and information technology.

Besides such education of specialists, the training for future teachers to specialize in computer technology has been launched to be accompanied with mathematics training. Many students of the teacher training faculty receive a degree in this field, when it is chosen as the second submajor.

The continuous changes in computer technology have resulted in reformation of the training in departments of computer sciences. Therefore, the Computer Technology Department was replaced by the IT Teacher Department at the ELTE two years ago. This year, it is going to happen quite similarly at the KLTE.

At the teacher training colleges, computer technology departments have been training elementary school teachers – reaching beyond the core training – for nearly five years. And the Teacher Training College-Level Faculty of the ELTE, and all the four teacher training colleges (TTC) – the Károly Eszterházy TTC (EKTF, Eger), Gyula Juhász TTC (JGyTF, Szeged), Dániel Berzsenyi TTC (BDTF, Szombathely) and the György Bessenyei TTC (BGyTF, Nyíregyháza) – train teachers specialized in computer technology.

## Technical Universities and Colleges

This course has been offered by the Budapest Technical University (BME) for 10 years, by the Veszprém University (VE) at the Technical IT Department for 2 years, and the Miskolc University (ME) introduces it in September, 1993. Three (academic) year-long production engineer IT specialist training has been offered at technical colleges for 8 years: Donát Bánki Technical College (BDMF, Budapest), Mechanical Engineering and Automation College (GAF, Kecskemét), Kálmán Kandó Technical College (KKMF,

Budapest), Mihály Pollack Technical College (PMMF, Pécs), István Széchenyi College (SzIF, Győr), College-Level Dunaújváros Faculty of the Miskolc University (MEDFK, Dunaújváros). Currently, there are three (private) foundation colleges, and the Dénes Gábor Technical IT College (GDMIF, Budapest) has been training production engineer IT specialists since September, 1992.

1,300 freshmen in technical universities and colleges are to specialize in information technology in the academic year 1992/1993.

Beyond the core training, thousands of undergraduates get acquainted with the latest results of IT within the framework of the training of specialized engineers and specialized production engineers. The education programme for the doctorate of technical universities has a sizeable number of students.

The dynamically increasing number of students has justified that the Technical IT Specialized Committee continuously examines the conditions of graduation, the human and material conditions of education, the number of students, and the criteria for issuing the degree. We want to provide the appropriate quality level by this accreditation procedure.

The various universities are actively involved in IT-related research and public promotion of IT.

Studies of the Scientific Circle of Undergraduates (TDK) indicate the dynamic increase of subjects related to teaching, research and application of IT.

The number of scientific degrees in the field of IT and computer sciences is steadily growing.

## IT Facilities in Higher Education

In the 85 institutes (and units), which provided the relevant data, there were 81,667 full-time students (98% of all full-time students) and 15,819 academic staff with full-time employment in the academic year of 1991/1992.

The number of PCs is 9,340. There are 8,7 full-time students and 1,7 academic staff for each, which means that on average, there are 10,7 users for one PC. This figure is lower in technical higher education (6,8), in institutes of the Ministry of Defence and of the Internal Affairs (7,9), in medical universities (8,2) and in agricultural higher education (9,1), while teacher training, art and theological institutes have significantly more (between 27 and 32,8).

43% of the PCs are connected to LANs. The



number of LANs is 316. The option for internal communication is provided in 55 locations, in two thirds of the institutes (units). The lack of internal networks is usually accompanied with a lower level of computerization.

There are 270 servers and workstations, and 710 terminals of high capacity. Most of them can be found at universities. The BME is the first with its 136 servers and 256 terminals (the number of PCs is over 1,500, 800 of them are connected to a network).

49 institutes (and units) have X. 25 connection for external communication, which is 56% of the data senders, with 3,110 units in total. The universities – excluding the two academies of theology –, are all connected to the data network. In most of the colleges, the X. 25 connections are being installed.

The number of students, researchers-professors using the PC for communication, training, word processing, graphical applications, programming, calculations, etc, and the frequency of use is only estimated. On that basis, the ratio of full-time students using the computer is about 45% of all students.

Within certain institution groups (and within the institutes themselves) there are significant differences in use of computers.

In technical higher education, the ratio of computer user undergraduates is outstandingly high (about 80%), and quite good in agricultural higher education (about 60%). In universities of arts and sciences and of medicine about every second student or professor uses a computer, in kindergarten teacher training and economic colleges only every fourth student uses the PC with different frequencies.

Hungarian universities and colleges established the HUNINET Association in 1990, and it has more than 25 members. The Association has joined the TRACE. According to plans, the objective is the establishment of a system of modern IT services, which can be used by undergraduates, lecturers, workers and managers. It can be adjusted to a national network – which observes international standards –, potentially capable of digital data, audio and visual transmissions. This means installation of expandable local institutional networks, which coordinates the appropriate number of PCs, workstations, middle-size servers, mainframes and phone centres.

**Dr. Elemér Biszterszky**

## DISTANCE LEARNING IN THE POSTGRADUATE EDUCATION

Its history started in 1985, when the first international conference of IFIP WG 3.6, TELETEACHING' 86 was organized in Budapest, where the working group was officially established. The foreign participants of the conference informed the Hungarian specialists in education about this relatively new technology in education, they showed a lot of case studies, e. g. the different institutions, open universities, colleges and schools.

The main problem of the spreading of this technology was the educational law, which did not permit such great freedom to the students as was permitted in the Western type distance learning institutions. The Hungarian educational system was always very rigid, it originated from the German system, modified by the Soviet educational methods. The system was teacher oriented, the learning was an obligation, the students could not select any subject matter, they had to learn what the educational authorities prescribed in the given schools, colleges or universities.

Several – mostly private, but also some public – institutions were established in the last 2-3 years using this technology and system.

One of the first institutions is the SZÁMALK OBS – Open Business School (founded in 1987/88). It was established as an original English College, as the Hungarian representative of the Buckinghamshire College (London). The OBS used the similar subject matter as the College in London, the same rules were valid and the exams were controlled by the members of the English institution and by the British government. The postgraduate students, if all their exams were successful, received their British diploma from the Buckinghamshire College. This diploma was valid in Hungary, too, if the students also wished to get the equivalent Hungarian diploma, they could obtain it from the Hungarian authorities under the equivalency agreement between the British and the Hungarian Governments.

Several foreign schools, colleges and universities found partners in Hungary, e. g. the Oxford Politechnics and the Open University of Germany, the Fernuniversität, but from France and Australia, too. The majority of these distance learning institutions taught business administration and management, because such learning opportunity was not attainable earlier in Hungary. Distance learning was also used very early in the language education.

The opinion of the author is that the main problem of the Hungarian educational system is the lack of a public and general Open University, where any body can learn, which does not check the earlier exams and certificates, where the students can learn what they like, they can get knowledge which is very personalized. They can learn slowly if they do not have enough time to study or they can learn quickly, if they are talented. At the end of their learning period after a series of successful exams they can get an individual diploma, which will be accepted worldwide. Unfortunately the educational authorities have refused such suggestions till now, however an Open University would be very important for the Hungarians, who are living in the neighbouring countries (more than 30% of the total Hungarians) and cannot come to Hungary for learning. The Hungarian Open University would be very important for those who had to interrupt their education and would like to finish it and lastly for the unemployed people, who can use usefully their "free time".

**Győző Kovács**

## INFORMATION TECHNOLOGY SERVICES IN HUNGARY

### Introduction

Simultaneously with the introduction of large-scale automation, the developed economies around the world saw the advent of the information technology services industry. Suppliers of information technology helped to avoid, or lower expenses associated with computerisation. Although the total picture is far more complicated today, organisations still turn to the information technology industry for the same basic reasons.

### Conventional services

The conventional services supplied by the information technology industry are still the same as in the early beginnings of the industry.

#### *Consulting services*

The services companies offer today are generally the same as earlier and are still in wide use in today's industry. For example:

- "The survey". This is generally a review of the current information system, with the identification of problems and the main aspects of a proposed solution.
- Office organisation. This usually is an analysis of an organisation's administrative processes with the goal of simplifying those processes.
- Identifying the requirements for the new information system
- Evaluation and selection of the hardware and/or software to be used for a specific project.
- Planning for new systems:

Technical development plans

Introduction plans (project, education, etc.)

Operations plan (including system supervision).

#### *Classical Service Bureau Services*

Contracting with service bureau companies was a common practice in the early stages of the development of the industry. The service provider usually received input document in various forms and processed the data. After the processing was completed, the results were delivered to the client. Today the service bureau is less popular except in the case of large-scale seasonal activities such as campaigns, promotions, or one time mass governmental activities. While the service bureau concept is less popular today, economic realities are improving their potential popularity.

#### *Maintenance and Repair Services*

Early large computer users in Hungary often tried to be totally self-sufficient. One way to do this was having their computer maintenance technicians trained by the manufacturers. Quickly the market reacted and we saw the introduction of companies that specialised in computer maintenance and repair. This sector is still active today, but focusing on the smaller computer environments, such as PC and mini based technology.

#### *Telecommunication Services*

In the early development of the industry, the requirements for telecommunications access to remote locations appeared. There were other examples where the data that was generated in various parts of the country needed to be collected quickly. The Hungarian Telecommunications Company and its predecessor, the Hungarian Post Office tried to offer solutions to these problems. Some of the developments in this field are the most spectacular. Today, with the advances in space-based technology, ordinary users

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can set up their own satellite networks (VSAT).

### **New services**

As the business community matured and the computer industry developed, information technology companies saw additional needs and began offering new services. These services are directed at the management side of the user community.

### *Identification of institutional and business targets*

Today the effectiveness of a computerisation investment must be measured against its contribution to an enterprise's business objectives. In Hungary, this is a relatively new concept. Even if business targets are published and generally known, objectives are usually not clearly defined within each of the institutions operating sub-units. Quantifiable targets have to be used to measure the success of projects, investments, and managerial actions. Computer service companies are clearly interested in this field.

### *Strategic Planning*

Like institutional objectives, strategic planning is relatively new in the Hungarian business environment. Today information technology service companies are offering well developed methodologies, supported by advanced software tools to assist institutions in developing strategic business plans.

### *System Integration*

Another of the relatively new offerings in Hungary is the concept of Systems integration. Many of the organisations that began the application of computer information technology in the early years of the industry can serve as good examples of the need for this service. Without well defined organisational objectives, and solid working business plans, the industry saw the mass proliferation of separate, non-communicating approaches that are very much different in technical terms and methodology within single organisations.

Integration of systems does require a total rethinking of current and planned systems. Rethinking of the intended purposes and the technology to be used. This re-thinking usually means re-planning of future information technology implementations. The information technology service organisations have gained experience in this field by pioneering the concept.

### *Facilities Management*

Facilities management is one of the services that information technology service companies see as a product that offers true value to the management of a company. Today many members of the senior management in the business and government worlds find it increasingly troublesome to cope with the rapid changing and costly world of information technology. Troublesome and costly, but still very important to the success for their core business needs. With today's telecommunications advances and the introduction of high capacity computers, it is relatively easy for a company to turn to other alternatives such as facilities management.

Facilities management can take many forms. The most common in the western world is for an organisation to sell all, or a major part of their information technology resources to a service supplier. In turn this supplier would sell computer services back to the organisation, usually at a lower cost (outsourcing).

### **Fee of the services**

As the Hungarian forint approaches convertibility domestic prices climb towards the European level. The range of items worth going abroad to buy is becoming smaller and smaller, but the public is reluctant to accept that with respect to service fees. This is especially true in the area of information technology services. The reasons for this are complex and numerous.

One reason is that all information technology services have not been fully appreciated in the past.

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The second reason is that most companies are not really aware of the true costs of information technology services. Institutions having their own computer facilities and staff consider internal services to be practically free of charge. For obvious reasons service providers usually set their fees taking into consideration all the costs of doing business. Costs like office rent, telephone, taxes, staff hiring costs, education, maintenance, administration, transportation, backup, etc.. Potential users of information technology service providers weigh their "internal" cost against the proposed fees charged by an external service providers and develop a distorted picture.

The third reason: the fact that quality and timeliness of the services is not appropriately appreciated. It is known that it is a very rare case when the real business impact caused by incorrect, or delayed system implementation is scrutinised.

The fourth reason is that during the process establishing a project for an information technology upgrade, real cost benefit analysis is not considered on the total activity. It is still a fact that even today when evaluating a large complex information technology project bid, a low price is generally a decisive consideration. The true price of success is not measured against the potential costs of failure.

The result of this policy is frequently real. Real in the sense that successes are not achieved. Sooner or later the market will begin to understand the true costs of information technology services.

### **Foreign Companies, the role of know-how**

After the change in the establishment here in Hungary, large numbers of foreign service providers began to appear. In addition to the large companies of several billions of dollars sales revenues that offer a full range of services, smaller consulting groups also began operations here. Most of these companies

are western in origin. In the western results-oriented world project failure is not something treated lightly. The approaches used successfully in the west to guarantee results are being introduced here too. If these services are really necessary and required services in the west, they are most probably necessary in Hungary.

There are many experts in Hungary who are specialised in information technology. But, their strengths and weaknesses are well known. Their strengths lie in technical matters related to hardware and software. Their weaknesses generally show up at the beginning and at the end of the project life cycle. Their weaknesses can be classified as a lack of experience in the business related matters of information technology. Recognising the situation, the foreign companies have given priority to these areas.

Foreign companies present themselves in the Hungarian market in several forms. The joint venture and the wholly owned subsidiary are the most common. Today these companies form an important part of the information technology service industry in Hungary. A base that will set the quality standards and prices and fees in the near future. Standards and fees in line with the international market.

### **The market of information technology services in Hungary**

Some years ago, experts predicted a shrinking of the information technology services market. The appearance of personal computers on the desks of executives caused real questioning of the very existence of many conventional information technology services. However, innovative companies survived the crisis through adjusting their service offerings to the new environment. In fact, some companies continued to develop at an uninterrupted pace by marketing systems integration, and facilities management services etc. For the purpose of improving competitive-

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ness, the manufacturers also appeared on the services market. They offer their products with an increasing number of accompanying services. However, their primary objective, the selling of the machines, has not altered. Both the service companies and the hardware manufacturers are major players in today's Hungarian market.

Hungary has never spent so much money on information technology as it has in the last two or three years. This has been necessary for the process of "catching up" with western methods and standards.

The tasks are huge. There are many who are of the opinion that Hungarian companies may not have the sufficient experience in the application of new technologies. Many who feel that these companies are haunted by old solutions. That they do not have the capital adequacy and therefore are not good choices for long term co-operation on major projects. But these local companies have the great advantage that they know the how to operate in the Hungarian environment and command the local language.

Critics of foreign companies say that it is difficult to communicate with them. They do not really understand the Hungarian situation.

Today this contradiction is being resolved in ventures by mixing the Hungarian and foreign staff, or companies. This is especially true in the case of large projects. With a strong company in the forefront, the mixture is almost transparent to outsiders.

### **Financing**

Impetus to upgrading the information technology infrastructure in Hungary has been given by the receipt of World Bank loans and the abolishing of embargo restrictions.

Currently, there are other financial resources available to support information technology developments other than to the

World Bank. Besides loans, grants can also be obtained from various sources. These sources, supplemented by our own (domestic) resources could provide realistic financing in order to realise our, not always modest, development concepts.

There is also a new phenomenon that is worth mentioning. In the case of large projects, the main contractor frequently can make arrangements for favourable financing. Large foreign associated companies are generally able to do this based on their strong banking relationships outside Hungary.

### **Summary**

Information technology is not an end in itself. According to the current generally accepted logic, the starting point of any information technology development must be the objectives and business plans of organisations and institutions. However, in each application, the costs of the approach and the profit or benefit offered by it should be closely evaluated.

The bids were for the normally hardware and some package software, but in many cases the updating of the client's information technology applications was not completed due to the lack of experience. Today, we have enough experience in this field to avoid these mistakes.

During the long process of development, high levels of different professional skills are required. These skills must be supported by well proven methodologies. In order to ensure the overall quality, deliver the results according to the time schedules and finally to insure actual measurable success, it is necessary to seek help. The best source of this help today is from external companies. These companies, information technology service organisations, seem to be the most practical and affordable alternative.

*Majtényi, György – Mounce, John*

## DOING BUSINESS IN HUNGARY

**One of the consequences of the transformation of Hungary's political and economic system is the radical change in the Hungarian business environment. To avoid frustrations and annoyances foreign businessmen trying to make deals with Hungarian enterprises need to be thoroughly informed and well prepared. The following article tries to help the "newcomers" with useful hints and advice.**

It can be hardly denied that doing business in Hungary is still more difficult than in the West. However, the pace of transition to a real market economy and the speed of adapting marketing and business methods widely used in market economies, seem to be considerably faster in Hungary than in any other countries of the region. The transformation of the economic and commercial infrastructure follows Western models and takes place often with the involvement of experts from the West. Major international business consulting firms have set up their offices in Budapest; their high quality services offer security for the foreign clients and manifest, at the same time, a challenge for their local competitors and a model to be followed by them.

What we see today is the evolution of a complex, refined economic fabric in Hungary. The earlier system of central planning has left behind an oversimplified economic structure: the smaller the number of business actors was, the easier the authority of a one-party, monolithic political rule could prevail in the economy in those years. Although the elimination of the rigid corporate structure had already begun in the early 70s, the first step to open really free space for private entrepreneurship was taken only in 1988 by introducing a new and liberal corporate legislation (VI/1988 Act on Economic Associations). By 1991 all administrative restrictions of foreign trade had been abolished and nowadays the number of firms involved in export and import deals exceeds 30,000.

As said before, the present era is that of a transition to a market economy and – in this context – also that of a dynamic privatization process. This process involves a "spin-off" of former large enterprises on the one hand, and the setting up of new ventures, on the other hand. Thousands of new private enterprises are emerging, mostly with only a modest initial capital, venturing first of all in trade or in various services. The involvement of foreign capital is sizeable in both categories of the privatization process.

Foreign business-people who wish to export goods to Hungary have to apply, by and large, the same

marketing methods that are generally used in any other country with relatively long traditions in trading and with a fairly developed economic infrastructure. In the following we shall list and describe briefly the most important sources of marketing information, as well as the organizations providing large-scale business match-making services.

### Sources of information

If the required information will serve "only" as preliminary material for the preparation of a general marketing plan, data and information on the general trends of the Hungarian economy and foreign trade can be obtained from the Hungarian diplomatic and trade missions abroad, in the libraries of the major trade promotion organizations and, in the EEC member states, the local Euro Info Centres. Diplomatic and trade representations in Budapest are also helping their citizens with information on the Hungarian business environment.

Ample marketing information is available at the Hungarian chambers of commerce and industry and the various trade associations. The Central Statistical Office (1024 Budapest, Keleti Károly u. 5–7, Phone; 361-20240-11, Fax: 361-115-9085) issues many statistical publications; the trade statistics with English headings. Foreign visitors are always welcome and readily served in the Office's library. The Ministry of Trade and Industry (1024 Budapest, Mártírok útja 85, Phone; 361-156-3373, Fax: 361-175-3295) has many foreign language publications on the industrial and trade policy of the country and on the economic performance and output data of the various branches of industry and trade. The information department of the Ministry of International Economic Relations (1055 Budapest, Honvéd u. 13–15, Phone: 361-153-0000, Fax: 361-153-2794) issues a monthly Newsletter in English with relevant information on Hungary's foreign trade policy and legislation. The State Property Agency (1133 Budapest, Pozsonyi út 56, Phone: 361-129-4800, Fax: 361-120-8850) has English language publications with information on matters related to privatization of state-owned enterprises. On customs duties and related issues the National Headquarters of

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the Customs and Excise (1054 Budapest, Szent István tér 11/b, Phone: 132-3320).

If the aim of collecting information is to prepare a detailed plan of business operations, the best approach is to assign a specialized marketing agency. Many of the large international business consulting firms have already set up their offices in Hungary, others have close co-operation with Hungarian partners, all offering a wide range of marketing services. There are plenty of Hungarian firms, as well, in the same line, two of them have particularly long traditions and experience: KOPINT-DATORG Co Ltd. (1051 Budapest, Dorotya u. 6, Phone: 361-117-6171, Fax: 361-118-6483) and Marketing Centrum (1051 Budapest, Szende Pál u. 3, Phone: 361-117-6171, Fax: 361-118-4421).

Only a few business directories, general trade catalogues and registers have been published in foreign languages so far. *HIT Investcenter Tradeinform* has recently published the Directory of Hungarian Exporters/Suppliers, which contains the contact data of 3500 Hungarian companies, arranged also by product categories. A short buying guide and a substantial list of useful addresses make the book a handy tool for those who wish to buy products from Hungary. A German publishing house, *Hoppenstedt Verlag* issued a directory in German and English with the basic data of the 4,000 largest Hungarian enterprises. Another publication of the same kind has been published recently by the US-based *Dun & Bradstreet*. The Industrial Almanac published by *CompAlmanach* gives information on a selected number for companies in the manufacturing sector while *Kompass Hungary* also covers the service sector. Company data are also available in diskettes or CD-ROM from various sources.

### Match-making

Until the late 1980s when there were only a few dozen state-owned, strictly profiled foreign trade companies and a few hundred producers entitled to export their own products it was not too difficult to find the appropriate trading partners in Hungary. Nowadays, however, more than 30,000 firms are eager to make direct deals with foreign parties and at least 5,000 of them are already busy in doing so. No official trade promotion organization would take the responsibility of selecting between among them, on the basis of any criteria, or to favour some while ignoring others. Trade promotion organizations, therefore, use various media in order to make the trade inquiries sent to them accessible to the largest possible number of Hungarian entrepreneurs.

One of these organizations and, undoubtedly, one with perhaps the richest traditions in business match-making, is the Hungarian Chamber of Commerce (1055 Budapest, Kossuth Lajos tér 6-8, Phone: 361-153-3333, Fax: 361-153-1285), a federative organization of the regional chambers and trade associations in Hungary.

HIT Investcenter Tradeinform (1051 Budapest, Dorotya u. 4, Phone: 361-118-5044, Fax: 361-118-3732), a company founded and supported by the Ministry of International Economic Relations, publishes business offers and demands free of charge in its weekly newsletter, which reaches several thousands of subscribers. Hungarian investment and trade proposals are published in HIT's English language publications, which are sent *gratis* to some 4,000 foreign addresses.

Business ideas can also be sent to the National Association of Entrepreneurs (1118 Budapest, Szüret u. 15, Phone/Fax: 361-115-8453) for circulation in the Association's newsletter. Banks also promote trade between their Hungarian clients and foreign enterprises, and many private firms offer similar services. Several business dailies and monthly economic magazines (among others the "NAPI", and "Privát Profit") run regular business partner seeking columns.

### Business reports

The Hungarian economic scene is full of new firms founded only one or two years, or only some months ago. Even behind the old, well-established names, one will often find new owners and new activities. Extra care has to be taken, therefore, when selecting trade partners from among this new "breed" of companies. It is always useful to order financial assessments with in-depth analyses of the solvency and trustworthiness of the prospective partners. These business and credit reports can be obtained from well-known international networks or directly from Hungarian firms. The best-known Hungarian business information sources are Dun & Bradstreet Hungária, Creditreform-Interinfo, and Intercredit.

### Concluding Business Deals

Business practices in Hungary follow international norms, standards and procedures. It is good to know that

- \* legal entities do not need any special licence to carry out foreign trading activities;
- \* the import licensing system is being reduced in scope and liberalized. Over 90 per cent of all import items no longer require licensing. Certain products of vital strategic importance, (such as fuels, radioactive materials, precious metals, arms and explosives) can be imported only with special permission. The exports of some goods are limited by so-called self-imposed export restrictions or quantitative quotas. The export of some agricultural produce and food products is controlled in order to ensure a balanced domestic supply.
- \* business partners are free to agree on the terms of payment. Cash against documents or remittance upon delivery are usual payment forms in the case of smaller amounts, while letters of credit (L/C) are customary when larger sums are involved. To ensure higher financial security bank guarantees may be obtained from the Hungarian commercial banks.

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The Forint is not yet freely convertible, the Hungarian state, however, guarantees that the banks will pay the foreign currency, once the forint equivalents have been deposited by the importer.

- \* as to terms of trade, INCOTERMS is widely used and accepted. Terms of transportation are to be determined by the contracts. In Hungary many international and domestic companies provide high quality transportation and forwarding services;
- \* a number of provisions and regulations demand compulsory quality control prior to the importation or exportation of a certain product. Ignoring these rules might result in the suspension or final ban of the products' sales;
- \* there are no export tariffs in Hungary. Import tariffs are structured according to the Harmonized Tariff System. Tariffs are classified in two columns: the first listing the preferential tariffs granted primarily to developing countries. Customs fees and VAT are also charged during the clearing procedure;
- \* in Hungary, VAT is called "Általános Forgalmi Adó" (in short: AFA = General Sales Tax) and can amount to 0, 15 or 25 per cent of the net price. A special consumption tax may be imposed on consumer products, such as tobacco wares, alcoholic beverages, cosmetics, etc;

### **Hungary as an export market**

The Hungarian domestic market is relatively small, with regard both to its absolute size (the population slightly exceeding 10 million) and to the number of well-off consumers. Average incomes are low, for many people bread-and-butter worries narrow down significantly the range of accessible products. At the same time a still small but thriving class of new entrepreneurs are emerging with a sizeable buying capacity and a demand for high quality up-market luxury products. Consumers' preferences may, however, quickly change; new tax decrees, customs rules, a raise of interest rates or similar provisions may lead to fast adjustments in consumer habits. In the up-market range (domestic appliances, entertainment electronics, cars, sport articles, fashion clothing) branded products are extremely popular and domestic fashion trends follow Western patterns. In the food sector, on the other hand, Hungary has never depended on imports, here consumer habits are difficult to alter. New flavours are generally met with dislike, even the most outstanding Western brands face difficulties in finding a stable market here.

In the market of industrial machinery, former trends and interdependencies have ceased to exist as a result of the drastic changes of the Hungarian economy. To conduct successful business operations in this field, accurate marketing research is of vital importance.

Previously imports, just as the whole foreign trade, was in the hands of large state-owned foreign trading companies. FTO's employed professionals to deal with the specific aspects of import deals: banking, customs procedures, forwarding, etc. The situation has radically changed today: hundreds of small firms

have appeared as potential foreign trade partners, in many cases with insufficient experience and professional routine. Foreign businesses wishing to export to Hungary may enhance their feeling of security by entrusting a local proxy or agent. This can also be an appropriate solution to overcome language problems.

A foreign enterprise needs no official permit to employ a Hungarian proxy – a firm or a private person – to act on its behalf in Hungary. It can also open its own representative office in Hungary after a simple registration procedure at the competent ministry. The representative office, however, must not conduct business activities (i.e. export or import) on its own, since this would require a firm to be incorporated at a Hungarian court of registration.

Interest rates are now extremely high in Hungary, and credit conditions are very severe. The relative scarcity of financial resources forces every entrepreneur to seek ways to circulate his capital with the highest possible speed. In trade transactions fast and safe returns are desired and therefore there are not too many who would risk importing a larger amount of products without envisaging a sizeable and stable market demand. With smaller quantities, however, it is difficult to reach competitive prices. Consignment warehousing seems to be an ideal way to cope with this contradiction. Goods stored in these warehouses will remain the exporter's property. Customs duties will be imposed, but payment delayed until goods are cleared from the consignment warehouse.

Hungary is traditionally a transit post and Hungarians are traditionally trading people even though the four decades following the war did not provide much opportunity to prove their talents in the art of commerce. Now this trading spirit may soar again. Sometimes, however, new entrepreneurs are carried away by their enthusiasm and newly discovered business spirit. It is then that they, in the course of business talks, could create unfounded expectations in their foreign partners, feed them with the perspectives of fantastic business opportunities, which may never materialize, or even lure them to legally swampy terrains.

In spite of a national fervour to learn languages most Hungarians still have difficulties in communicating with foreigners. Do not suspect laziness or a lack of interest by the other party, if you do not receive an answer to your business letter within a reasonable time. The reason for the delay might well be the problem of finding a suitable translator or correspondent. Language problems should be considered also during business talks. Hungarians, especially those in business circles, are very polite. If you find what they say too rude be sure they never meant it. It is just that in foreign languages sometimes they cannot express themselves with the necessary subtlety and style.

Traditional Hungarian hospitality is often expressed during business talks. Meetings are unthinkable without the repeated servings of black and sometimes exceedingly strong coffee, soft drinks and, in some cases, a mouthful of apricot or cherry brandy.



# SZÜV

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Possessing a network of computer centers, training and service networks, the largest Hungarian leporello printing house and a prosperous retail network extending to each larger town, the SZÜV Group is one of the oldest and greatest Hungarian enterprises for development and services in the field of computer technology. This enables for us to provide dependable and high standard services to our customers throughout this country. In the provision of such services we are also supported by our excellent staff of experts, our expertise gained over several decades, our homogeneous software and hardware environment as well as our concerted central and territorial coordination. Our computer centers are equipped predominantly with IBM machines and provide large volume data processing services for our customers. If requested by our customers, we install at their locations data terminal equipment enabling interactive connection to our mainframes.

The scope of our company's activities includes

- data systems design and implementation, data capture, loading up databases as well as data processing
- development and selling of software applications for a large variety of architectures
- commissioning and operation of computers and computer networks
- trading in computers, office automation equipment and auxiliaries in the framework of our retail network
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- production of leporellos, certificate forms and dedicated printed matter required for the operation of computer equipment
- training, provision of educational or consulting services in computer technology and application
- distribution and agency.

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OF HUNGARY AND ON FIRM GROUND  
IN COMPUTER TECHNOLOGY.**

## INTERSOFT

### The software house builders

**"Since 1987, we have been proceeding on the road to support our wide range of users with complex, integrated computer applications based on a mature know-how", sums up InterSoft's mission statement CEO Péter Eckhardt.**

*"What objectives did InterSoft set six years ago?"*

"We have always aimed at building up a classical software house matching European standards. Now that InterSoft has grown into a group of companies we have essentially achieved our goal."

*"What do you mean by 'classical' in the case of a software house?"*

"Let's have a look back in time to the very beginning! Our firm was founded by people with expertise in IBM technology. This straightly led us to a business partner relationship with IBM, and, soon after the introduction of the AS/400 line, we worked as a General Marketing Agent of Big Blue. We developed and offered own and imported solutions for the AS/400.

Last year, however, we took measures to break this dependence on one hardware. We train our staff for Unix, invest in open systems, develop our products in that direction and soon we are going to take up IBM's RISC/6000 series into our offering.

Returning to the original question, up to now InterSoft has concentrated almost all of its activities, including development and support, in one single company. Recently, however, we have begun to diversify, and as a start, most sales activities have been assigned to our subsidiaries, such as InterSoft R + S and InterSoft haus/400 in Hungary or Binario in Switzerland. The parent company focuses on pure development. We want to boost technology and knowhow content as well as the portability of our products."

*"This makes one even more curious about the profile of the InterSoft Group."*

"Our activities include consulting on computing and business management issues, the complex coordination of IT projects – investment planning, installation and maintenance of systems, customization and adaptive development of computer systems, training and technical support. Following today's trends, we primarily sell non-user-specific software packages. Our own programs are developed to 90 to 95% completeness, i. e. they need just customized parameter tuning upon installation.

*"What systems have you developed yourselves?"*

"We have written a trading system for wholesale companies which has become very popular among AS/400 users and has also been modified for mail-order firms. The latter version is used for instance by the Hungarian subsidiary of Quelle, one of the largest mail-order chains in Europe. Of course, in addition to the trading system we offer a full range of business applications to meet any IT demand of a business organization. We have systems for ledger/accounting, inventory control, personnel management and payroll. We have developed a number of systems for the Hungarian Social Insurance Administration, the Pension Administration, the Economic Office of the Hungarian Parliament and several ministries.

One of our bestsellers, the personnel management and payroll system deserves special attention. This field of administration varies from country to country, so we decided to assign parameters to these differences. In this way, we could achieve such a high level of functionality in the AS/400 environment that many of our customers opted for AS/400 hardware just because they wanted to use our system. In Hungary, it is used by Providencia, General and Strabag Hungary, but it is also distributed in German-speaking countries and in Bohemia."

*"What foreign software products do you represent and sell?"*

"We have relationships with several leading software companies worldwide. We carry one of the best and most popular accounting packages in the world, the Sun System which is a product of Systems Union, a British company. The Hungarian version of this system has been included in the elective curricula of the Budapest University of Economics. We sell Baupaket, a special basic system for the construction industry made by BDS, Austria, which is also a leader in its class and has a large number of references. Besides, we have also a relationship with Cognos, another well known software company."

To sum up InterSoft's strategy, Mr. Eckhardt says, "In today's market environment, we want to remain a software producer and vendor company which lays a growing emphasis on open solutions and we would like to complement the range of packages supplied by our partners with some software products developed by ourselves."

**Kálmán Fejes**

# MULTINATIONALS IN THE HUNGARIAN MARKET

**The fundamental changes in Hungary brought about in 1989 have led to many multinational companies setting up offices and services. Today they already feel at home here. The following interviews try to convey their experience in the new East European markets.**



*ELEK STRAUB, Managing Director of IBM Hungary*

## **IBM**

### **A witness to history**

"With its sales exceeding \$ 60 billion, IBM is the largest IT industry conglomerate in the world. In line with this, for many years it has been IBM Hungary's aim to achieve the highest turnover in this sector in Hungary", says managing director Elek Straub when asked to introduce his company.

Present in Hungary since as early as 1936, IBM has survived a world war, political storms, a revolution, the COCOM embargo and the fall of the communist regime. Therefore, it has established many ties with the local economy and users. As years passed, however, its key products have continuously changed in the Hungarian market. In the fifties and sixties, the focus shifted from Hollerith systems to office equipment. Nearly by rule, state-owned companies or public administration authorities used IBM electronic typewriters and copiers.

Computers arrived late to Hungary. The first IBM 144p's were installed in the mid-sixties. They were followed by a pioneer specimen of the famous 360 series. Further installations were blocked by the embargo provoked by the Soviet attack on Afghanistan. Then, for several years, IBM was not allowed to sell computers in the country. At that time, their only major source of income was servicing.

In the late eighties, economic liberalization was started, and political changes began to melt the ice of COCOM. Meanwhile, IBM developed a new product structure and stopped the production of typewriters and copiers.

*"After this brief overview of history please tell us who your users are today?"*

"With economic restructuring, our old customer base of large state-owned companies (where IT departments have been dissolved) has been replaced by transformed firms, joint ventures and developing Hungarian private enterprises. We have traditionally strong positions in the financial sphere, at banks and insurance companies. As for the latter, nearly all of them are IBM AS/400 users except Hungaria Biztosító which, due to its size, is an ES 9000 mainframe site. By the way, one of our largest mainframe installations is just on the way at OKHB, a commercial bank."

*"How is IBM represented in education?"*

"Within the framework of a special programme for Central Europe launched by IBM two years ago, mainframes have been installed in the university networks of Warsaw, Prague and Budapest. These machines provide access to the data bases on the university networks of Western Europe. Since last year, educational institutions have also acquired a large number of RISC/6000 workstations.

*"Could IBM take advantage of the fact that the market of ex-East-Bloc were isolated, and these countries cloned IBM and DEC equipment?"*

"Of course, none of the two firms had anything to do with that, but undoubtedly this process established and disseminated a culture which indeed brought us an advantage in the beginning when the market opened up. Today, however, we have to face here the same tough and fierce competition as anywhere else in the world."

*"Has this competition anything special?"*

"Yes. It has, in fact, two special characteristics. Firstly, the big Japanese companies are not our competitors here yet – because the mainframe market where these companies are strong simply does not exist. Secondly, as COCOM prevented well-known PC brands from entering this region, products from the Far East and from local assembly caught on, resulting in a closed market with aggressive players and prices. Two years ago, quality PC vendors ar-

rived into this rather saturated market, and, in addition, Hungary features by far the lowest PC prices in the region.

*"What is IBM's strategy to keep and make use of its competitive advantage?"*

"We focus our efforts on improving the quality of our services and on expanding our product range. We want to balance the sales of our four computer lines as much as possible. Currently, the mid-range is the driving force and this trend has gained further impetus from RISC/6000's which we began to sell last year. Though we are virtually the only vendors of new architecture mainframes, there is hardly any market for them in Hungary.

It may come to many as a surprise but I have to say that last year the highest number of quality PCs was sold by IBM. Our market share is still only around 5 to 10%, much below the IBM world average."

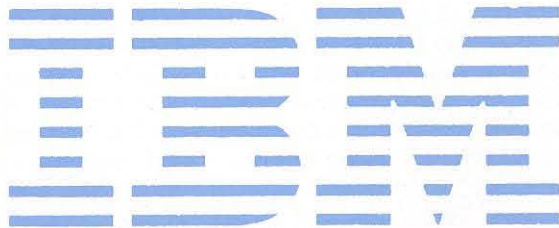
*"What is IBM Hungary's sales strategy?"*

"In order to move our sales force closer to our customers, we have built up a countrywide distribution network which includes several major Hungarian companies. We have some 30 Business Partners dealing with our PCs and at least that many General Marketing Agents providing value added services (software development) for the AS/400 line. This is why there are so many applications available for these machines. In addition, we cooperate with a number of servicing and engineering contractors. It is worthy of note that while IBM Hungary itself employs only about 100 people, altogether some 3,000 carry its products in its satellite companies."

*"About a year ago, IBM hit the headlines with its investment in Műszertechnika, a Hungarian private enterprise. What have you been able to realize from your expectations?"*

"For their cooperation, the two firms set sales and professional objectives. As for PC sales, in line with our goals, Műszertechnika has become one of our most important partners. Due to the lack of time, professional cooperation has produced less evident results, but we plan large-scale joint projects and development work in the near future."

**Kálmán Fejes**



## FRUITFUL COOPERATION IN JOINT VENTURES

Economic cooperation and relationships with Hungarian businessmen, specialists and organizations is feasible in many ways, such as purchasing and selling goods, contracts relating to the use of inventions and patents, cooperation aimed at joint production and/or development. The form of joint venture is, perhaps, one of the most effective and the most reassuring ways for the both parties. Within the framework of this form, the parties not only agree about correct cooperation but also are bound to consider the interests of each other via the joint venture to protect and increase their invested capital.

### Forms of joint ventures

- a) You can set up the joint venture together with a Hungarian partner. This is, the most straightforward, and serviceable form. In this case the realization of conceptions is not restrained by existing conditions. You can choose the location, build appropriate premises, establish the most suitable equipment, employ the most suitable staff, etc. There is also a Hungarian partner chosen by the foreign party, which is cognizant of local conditions.
- b) You can associate with an existing Hungarian company/enterprise. This possesses some advantages: the structure already built up, the possibility to evaluate the potential partner, the opportunity to start operations immediately, since you have the premises, a part of the necessary equipment, the personnel, and perhaps, the market as well.

There are two basic ways of association:

- to acquire a part of the existing owner's equity (shares in the case of a public limited company and part of the share capital in the case of a private limited company)
- to join the company by increasing its capital.

A combination of these two ways seems to be the most effective:

- increasing the capital finances the business and strengthens its liquidity,
- acquiring a share of its capital makes it possible to arrange the share proportions in compliance with the conceptions of the future partner.

- c) You can establish a venture on your own. Recently this form is the most preferable one among foreign investors, since they can easily implement all their ideas quite independently of minor partners. In this case the local knowledge and relationships are provided through involvement of a Hungarian manager. On the other hand a Hungarian manager, holding shares in the company, will feel closely involved in the company.

### **Why is it worth investing in Hungary?**

- There are good specialists with low salary demands, especially in the field of software and electronics: technicians, engineers, specialists in economics. The knowledge and experience of the latter is based on the fact that Hungary made the first moves towards a market-orientated economy already in 1968. The entrance of capital and foreign participation in Hungarian companies became a reality in 1972.
- Quite a lot of people speak foreign languages, as usual in the computer profession, above all English, but German as well.
- The economic and social environment is quite comfortable, mostly from the viewpoint of its social environment Hungary did not become detached from Europe during the last four decades.
- Wide-ranging assistance is available from the joint (American, French, Swiss) chambers operating in Hungary, from the numerous German chamber representations, from accredited economic advisers ready to provide their services more eagerly than "average" ones. The Union of Joint Ventures has been operating for 7 years, and represents the interests of joint ventures and - on a voluntary basis - the 100% owned foreign companies, providing its members (1,300-1,500 companies) with information and assisting in solving individual problems. It provides foreigners intending to establish a company with objective and sincere information before their decision is taken. (The Union's address is: 1012 Budapest, I. Kuny Domokos u. 13-15. PO box: H-1525 Budapest Pf.: 88, Telephone-fax: (36-1) 156-0728, telephone (36-1) 175-9722.)
- The company legislation in Hungary complies with the Western legislation.
- Ensuring in general higher salaries, a joint venture does not have to reckon with strikes.
- Geographical closeness facilitates the establishment of personal relations.
- Hungary is an associate member of the European Community.
- There are many legal, consulting, auditing and asset valuation firms with foreign participation and joint banks - subsidiaries of the most well-known western companies. Foreign businessmen have a wide range of options in these fields.
- A foreigner coming to Hungary to hold a managerial position does not need to obtain a work permit.  
Hungary is a politically and economically stable country. The Hungarian monetary unit, the forint (HUF), essentially enjoys convertibility in business life and the difference between its black market rate and official value is approximately 5 percent.

### **A few words about the legal rules:**

- taxation rates are favorable, agreements about excluding double taxation are concluded with most western countries,

- any amount of HUFs resulting from a foreigner's company activities may be transferred in hard currency,
- the protection of inventions and patents is unconditional,
- standards are equal to those of many western countries,
- beyond registration no permission is required for a company: any kind of legal business activity is permitted,
- to compensate for non-satisfactory infrastructure there is the Investment Stimulation Fund (without repayment obligation),
- foreign trade activity (export-import) is liberalized; the only exception is that incoming hard currency for buying products should be paid into a bank, but you may always request from the banks the amount necessary for the import.

### **As a result of the favorable conditions:**

- nowadays there are 14,000 registered companies with foreign participation in Hungary, 95% of which were established during the last 4 years,
- the amount of foreign capital invested in Hungary is about USD 5-6 billion,
- 45% of the capital of companies with foreign participation is of foreign origin. 20% of the companies, a majority share-holding is held by the foreign party,
- there are 54 companies having a share capital of HUF 1 billion (USD 11.8 million) or higher,
- many companies deal with electronics, softwares, computer development, data processing, therefore you have a broad range of choice in looking for a specialist.

### **Step-by-step to a Joint Venture:**

- finding the partner by
  - evaluating advertisements published in Hungarian and foreign newsletters,
  - placing the same kind of advertisements,
  - using the help of organizations specialized in this field, e.g. the Hungarian Chamber of Commerce (1055 Budapest, Kossuth L. square 6/8., telephone: 153-3333) or the information given by Invest Center (Budapest Dorottya str. 4., telephone: 118-6064),
- contacting joint ventures dealing - among others - with involvement of foreign investors; you can find their names and addresses in a special publication called "Companies with Foreign Participation in Hungary" (available through the above organizations as well as from the MAGAZIN Publishing House - 1068 Budapest, Dózsa Gy. st. 84/a);
- coming to an agreement with the partner regarding the future activity of the company, creating feasibility studies and well-based calculations;
- with the assistance of a lawyer or a consulting company preparing the articles of association, and submitting it to the company Court for registration.

## MULTINATIONALS IN THE HUNGARIAN MARKET



Mr. John W. Mounce  
Managing Director of EDS Hungary Ltd.

### **“PEOPLE MAKE THE DIFFERENCE”**

— Says the one of the mottos of Electronic Data System (EDS), the giant but rarely visible servant of IT users in nearly every country of every major continent. “Indeed, it was its unique approach to business and people that made EDS the largest IT servicing company in the world”, explains Mr. John W. Mounce, the managing director of EDS Hungary Kft. (Ltd.), the Budapest-based wholly owned subsidiary of the U. S. company.

Founded over 30 years ago and now owned by General Motors (GM), EDS has grown through the years and now has a turnover of over \$8 billion and employs over 70,000 people in over 30 countries. Though it entered the international market as late as 1976 and its staff in Europe numbered just 100 in 1983, today there are more than 14,000 on its personnel file in the old continent. The company offers its services to all branches of the economy, including manufacturing, banking, retail, social insurance, etc.

“After a thorough study of the ex-East-Bloc markets, we decided to open an office in Budapest in 1990. When I came here, I thought I would find a country with an IT culture 30 years behind the West”, says Mr. Mounce.

“What I actually found, however, was an up-to-date knowledge base and an incredibly high level of technical expertise. So, when we hire

our staff we can rely on local people. I have developed a strong sympathy and respect for the Hungarian computer community.”

Still, there are some misconceptions here in Hungary that EDS has to correct. First of all, in spite of (or maybe just because of) their highly technical IT culture, when Hungarian engineers and managers launch an IT project, they tend to look at the technical side only. They think of the cost of the hardware, the software and the consultants, but not the overall cost impacts to the organization of the project. According to Mr. Mounce, “Instead of using a comprehensive cost-benefit analysis as a basis they tend to award contracts based on a purely technical analysis versus the lowest price. They analyze costs in an encapsulated form without taking into account how their decision will influence the overall operating cost and profits of the organization. You should never forget about your utility bills, the costs of staff and floor-space and the organizational time required for a project. The impact of a change in IT on the ability of the organization to conduct its business is often underestimated or completely overlooked!”

Misconception number 2: though EDS actually has a vast array of products, such as PC software or systems for banking, manufacturing, hospitals and telephone billing, it does not sell products in the usual sense.

“People often ask me here if we are a hardware supplier or a software supplier or consultants. These questions are incorrect. We are all of the above and in some ways none of the above. There is not much in the field of IT that we do not do. This is one of the points where EDS is unique: We are not tied to any hardware, software or specific methodology. With some 7,000 clients worldwide (some of them carried for over 25 years), we use all kinds of technology in both hardware and software. In addition to operating the world’s largest private telecommunications network, EDS is one of the largest users of hardware technologies.

DEC, IBM, Unisys, ICL, Tandem, HP, Compaq, NCR, Bull and many others all fit within EDS’ business.”

Independence, strength, conservative tradition in financial management are all key elements in the EDS image. Though the company

## MULTINATIONALS IN THE HUNGARIAN MARKET

is somewhat conservative in business, by no means does it offer conservative solutions! Says Mr. Mounce, "Another misconception with IT I often encounter here is that people think that buying a lot of equipment will automatically make things better. These people are usually focused on only the symptoms of an organization's problems and do not see the underlying causes. When, back in 1990, we were invited to one of our first Hungarian clients, a large organization, we found that less than 13% of their major problems affecting their operation were IT-related. Our recommendations were primarily organizational and procedural. In another case, we suggested to our client to stick with its existing manual system rather than to replace it with a computer-based one because the manual system was running so well."

EDS considers its mission to understand the business side of an organization. IT technology is only a tool to help drive an organization's business. The business needs should be understood before applying technology. EDS' IT advisors live in the environments of the organization they work for to get a full understanding of the client's problems. "This is where (people make the difference. We can form international teams to deal with a certain client's problems. These teams work in close cooperation with our customers. The watchword is partnership."

EDS has come here to stay. With already a long list of distinguished references, they expect a dynamic growth in the Central European region. In Mr. Mounce's view "Hungary plays a primary role in our business in the region. We want to build a strong company for EDS here, based on fully local expertise. I hope even my position can be given over to a Hungarian colleague in the near future."

EDS' message to Hungary is that for societies in such a deep change as the transition from communism to market economy the key issue should be the management of change. Says Mr. Mounce, "You need businessmen here first. In many cases, you should begin with changing company procedures and policy rather than replacing technology. EDS, however, is ready to help Hungarian organizations with both. We can identify the symptoms, the problems and can provide customized solutions, including strategic business planning,

the implementation of new IT systems or even complete outsourcing of IT tasks. I am convinced that Hungary can avoid the trap of centralized, mainframe-based systems, the mistakes that the U. S. and Western Europe made in the seventies and eighties. I hope EDS also can help to usher Hungarian users into the world of downsizing, open and distributed IT solutions."

**Zoltán Mikolás**

Some major clients and projects of EDS Hungary

- Primé Minister's Office: strategic IT development study (with the Hungarian Academy of Sciences)
- Ministry of Interior: DPO automobile registration system study
- Social Insurance Administration: information system planning study, definition of future computer system
- National Bank of Hungary (Magyar Nemzeti Bank): ATM security study
- GM Hungary: complete IT planning, implementation and support
- Westel (a cellular telephone company): billing system
- MALÉV (Hungarian airlines): IT consulting projects
- Budapest Technical University – donation of a CAD/CAM and simulation system

The logo for EDS, consisting of the letters "EDS" in a bold, white, serif font, centered on a solid blue rectangular background.

## MULTINATIONALS IN THE HUNGARIAN MARKET

# SIEMENS NIXDORF

## SIEMENS—NIXDORF WITH LONG TRADITION AND A NEW ORGANIZATION IN THE HUNGARIAN MARKET

To be read not only on household appliances and industrial electronic equipment but, for as many as 21 years, also on computer products, the Siemens brand name is well known in Hungary. Earlier, the firm was represented here by Sicontact, a joint venture between Siemens and Hungarian companies, which – in the field of computing – was primarily engaged in servicing. At that time, computer sales were controlled by Siemens' headquarters in Munich. A few years ago, however, Siemens bought out the shares of its Hungarian partners and since then it has been represented by Siemens Kft. (Ltd.), a wholly owned subsidiary. Siemens-Nixdorf computers are now carried by a division of this new company, and the related sales activities are gradually taken over by the Budapest team which is establishing itself as a Hungarian distribution organization.

*We asked Mr. Csaba Gergely, the manager of Siemens—Nixdorf in Hungary.*

"During the past few years, the Hungarian computer market has changed considerably. COCOM bans have been lifted and virtually all computer vendors in the world have set up representations or found distributors to sell their products. What is the role of the Hungarian market in Siemens-Nixdorf's strategy?"

"For a large computer manufacturer like Siemens-Nixdorf, the Hungarian market is small, its share in worldwide sales can be expressed only in thousandths. Therefore, along with other countries with nascent business and distribution networks, we belong to the International Business Development (IBD) Region. For the time being, we work with limited autonomy and strong support from our parent company. The majority of our staff of 35 are hardware and software service people. Our objective is to dynamically develop sales and marketing activities."

*"How has the position of Siemens, as a computer manufacturer, changed in the Hungarian market in the past years?"*

"The Siemens of the mid-seventies had a very strong position in Hungary. More than

50 Siemens computers were used in state administration, including the Ministry of Foreign Trade and the Ministry of the Interior, in the banking sphere and elsewhere. Some 30 of them, including machines with 10-12-year old technology, are still in operation. In Hungary, the cycle of innovation is much longer than in countries with a highly developed electronics industry. Models that we still have to supply with spare parts or software maintenance have virtually been forgotten in Germany. In this respect, we can rely less and less on our parent company. We solve these tasks by tricks, by reusing or overhauling parts of dismantled machines.

It is rather difficult to do business in Hungary, despite the fact that the part of GDP spent on IT has somewhat grown here during the past years. We have to compete for orders. There is a strong price competition and profit margins have shrunk. Besides low prices, customers also expect pilot systems for free testing and solution proposals to be elaborated in advance. Thus we have to invest in advance in the hope that in the end we can translate enquiries into business. As the cost/benefit ratio of a contract is higher here than in the West, our sales teams, though they do not work less, can produce only more moderate results.

For really large-scale computer investments, customers also require credit constructions. As other vendors, Siemens-Nix-



dorf has to consider tenders where, for instance, the contractor is asked to become a co-owner and to operate the planned computer facility as a joint-venture service center. Such a structure may be advantageous for a Hungarian partner with limited capital"

*"Siemens offers a wide range of computers from PCs to high-performance mainframes. Which of them are the most popular in the Hungarian market?"*

"Today, PC sales are the driving force all over the world. In line with this trend, even Siemens-Nixdorf had to extend its range to cover the PC sector, though we were happy to install recently a new mainframe in one of the Hungarian ministries. We sell our PCs and some midrange systems under an agreement with Műszertechnika, one of the biggest private enterprises in the country. These machines have been sold, among others, to the Ministry of Justice and to MÁVTRANSSPED, the forwarding company of the Hungarian State Railways (MÁV). At the State Population Record Office (OSZH, previously ÁNH), a traditional Siemens user, we have recently installed a high-performance electronic (LED) printer. By the way, we are a leading firm in the field of non-impact printers.

By now, the demand to apply open and mixed architecture computer systems has become natural in Hungary, too. Siemens-Nixdorf's product range meets that demand."

*"What relationships do you have with Hungarian companies?"*

"I have already mentioned our PC sales agreement with Műszertechnika. We cooperate with a division (PSE) of the Siemens-owned Budapest Telephone Factory (Telefongyár) and with Economical Data Systems Kft. (Ltd.) which is also our qualified partner. We would like to expand these relationships - this is necessary to achieve a strong market position in Hungary. We are looking for VAR partners rather than dealers. In this way, we are able to serve customers who, besides ordering hardware, require complete systems solutions as well.

*Gitta Takács*

DEXON the software/hardware development company

## **X Window and UNIX development**

DEXON Systems Ltd. is a high-tech development company for X Window and UNIX related software/hardware projects. We have special expertise in the following

- X Window - porting, modifications, application systems, X11R4, X11R5
- UNIX - related kernel works, communication, application software systems
- Hardware - design, development. High-resolution graphics systems for PCs, VME bus, microprocessor based design.

We are ready to work according to our customers' specifications.

## **High quality for reasonable prices**

Some of our products:

TMS34020 based TIGA board integrated into SCO environment with 256 colours and max 1600 x 1248 resolution

DOS based X terminal emulation software and hardware system for 1280 x 1024 resolution

Full-colour TIGA board with 1600 x 1248 resolution VMW board for 16 line asynch communication and UNIX VME based video-insertion board

Phone/Fax.: + 36-1-131-7367; + 36-1-138-3415

*Address:*

DEXON Ltd, H-1052 Budapest,  
Aranykéz utca 6.  
Hungary

## Ten years of success

Graphisoft was founded in 1982, the year that saw private enterprise allowed in Hungary again. From the very beginning, Graphisoft's main profile has been CAD. The company develops large and comprehensive software on relatively small hardware: CAD for personal computers.

After gaining some experience on HP, DEC and IBM computers, the Hungarian software house concentrated on Apple Macintosh. Starting on this hardware in 1985, Graphisoft has developed two products: topCAD, a high-end parametrized mechanical design software and ArchiCAD, a dedicated 2D/3D solution for architects, interior designers and builders.

ArchiCAD is the most successful product of Graphisoft: over 10 000 copies have been sold worldwide, making ArchiCAD a 'de facto' standard for architectural design on Apple Macintosh. Today, Graphisoft is the largest CAD software development company on this platform: its share of sales accounts for 50% on the European market of Apple-based architectural design systems. The Windows version of ArchiCAD will be launched in September 1993.

In 1990, Graphisoft started the distribution of Apple products in Hungary. Graphisoft Trade Co., the Apple IMC in Hungary, has over 20 resellers today.

The headquarters of the Graphisoft group (revenue: \$10 M in 1992) and development of all software products are in Budapest, Hungary. Graphisoft GmbH Munich, Germany is the central publisher and distributor of all Graphisoft products since 1988. Graphisoft USA, founded in 1989 in South San Francisco, is distributing ArchiCAD in the USA and Canada. Beside the above Graphisoft-owned companies, there are 34 exclusive distributors of ArchiCAD worldwide: most of them are partners of Graphisoft for five to seven years.

*Graphisoft Software Development Company  
H-1145 Budapest, Kolumbusz u. 29.,  
Phone: (36 1) 251-1000, Fax: (36 1) 251-1890*

*Graphisoft Computer-Programme GmbH  
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Phone: (49 89) 471036, Fax: (49 89) 4708358*

*Graphisoft USA  
400 Oyster Point Blvd., Suite 429, South San Francisco, 94080 CA, USA  
Phone: (1 415) 737-8665, Fax: (1 415) 871-5481*



# MULTINATIONALS IN THE HUNGARIAN MARKET

## The market conquerors

# UNISYS

**Unisys, the \$ 9 billion American owned multinational company turned to Hungary in 1988–89 – at the time when the political and economic changes began. First they entered a partnership with KSH–SZÜV, the computing company of the Hungarian Central Statistics Office, but after a year, this attempt failed. Since then, Unisys has been represented in the country by another company, Sysland. Early this year, the maturity of the market led to the formation of Unisys Hungary, a joint venture which operates in parallel with the earlier local partner. We asked manager (Péter Antony) about the goals and the strategy of the new company.**

"We want to set up an expert staff of 40 to 50, the kernel of the team which we are going to work with in the future. For a large-scale project, we may hire as many as 100 people. In order to replace obsolete technologies, it is essential to acquire know-how and to catch up with the level of developed countries.

Our other aim is to establish a kind of regional Unisys technology center in Budapest with responsibility for the neighboring countries."

*"How can you import this know-how to Hungary and the whole region? How can it be acquired?"*

"For our projects, we get the know-how through foreign experts. Meanwhile, however, we are also training a highly skilled Hungarian team which can then be used in the neighboring countries. Due to historical and geographical reasons, Hungarian professionals can relatively easily be trained to adapt to the conditions of the neighboring countries. This is important because to transfer their knowledge effectively, consultants have to learn first themselves: They have to get acquainted with the local culture, organizational structure, communications characteristics, etc."

*"What are your key fields of business in the region?"*

"In two to three years, we want to be present in each major Unisys business sector also in Eastern Europe.

Our primary targets are large organizations, as Unisys' traditional customers include banks, financial organizations, insurance companies, public administration, social insurance, utility companies, health care, defense, tax authorities, transportation companies, air traffic control, and more recently, wholesale companies.

As a strong supporter of open systems, Unisys offers all of its above systems in the UNIX environment as well. Obviously, enterprises of this size need more than just hardware. They require complete solutions to establish their IT base, therefore we provide everything, including engineering, implementation, development, maintenance and servicing. But, as Unisys is still a newcomer in the region, our profile is not as balanced here as in other parts of the world. It will take us years to achieve that. We have to invest in the market, establish references and, last but not least, we must develop local versions – our applications should be localized for each country and customized for each user."

*"Banking is a very important source of income for Unisys. What are your expectations in Hungary and in Eastern Europe where the banking system is undeveloped and in a stage of transition?"*

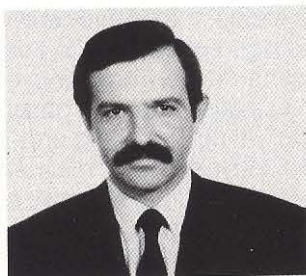
"Indeed, a considerable part, some 30 to 35% of our sales go to the financial sphere. Therefore, though our present share is rather modest here in the region, banking is a key element in our strategy. In Hungary, for instance, the banking sector is just reaching the stage of maturity when, in our view, with the support of Unisys, it can take a giant leap forward in technology. Today, none of the banks has a smoothly running, countrywide integrated solution covering all areas of business or an up-to-date, automated branch office system. We hope that the first such large-scale banking system in the country will be provided by Unisys. Such an excellent reference will establish a very strong market position for the vendor and will positively influence its perspectives in the whole region.

**Kálmán Fejes**



# HEWLETT PACKARD

## Hewlett-Packard Planned growth rate: 75%



Rumen Stoyanov  
Director general

Once best known for its measuring instruments, today also one of the strongest players of the computer market and heading towards becoming a systems vendor, Hewlett-Packard (HP) manufactures five groups of products. Last year, 73% of its net revenue of \$16.4 billion came from computers and peripherals, 14% from test and measurement devices, 6% from medical electronics, 4% from analytical equipment, with the remaining 3% from components.

"Despite the dominance of computer related products, each group is equally important in our strategy", says Mr. Rumen Stoyanov, the managing director of HP Hungary. "Having such a wide product range enables us to offer complete solutions, i.e. integrated systems rather than isolated devices. We can combine powerful computers with top-quality measurement technology."

"Today, for instance, computer hardware and software are integral parts of telecommunications systems. But you also need instruments, networking products to solve a telecom problem. Here comes the advantage of being a many-sided manufacturer. I can give you another example for this concept: medical systems. A hospital needs patient monitors in its intensive care department, but these

monitors may be used in a much more efficient way with strong computer support. You may add a clinical information system, i.e. hardware and software to provide the top level of services that doctors demand. A similar combination of our resources is needed in pharmacology. In the first phase, HP's analytical instruments are used to measure some characteristics of the compounds studied. Then HP PCs or workstations can be used as data concentrators for the various groups of instruments. Finally, the PCs can be connected via a network to a HP server (probably a UNIX machine) which would synthesize and document the results."

The fact that the company's product groups complement each other — the number of catalog products exceeds 18,000 — is certainly one of the key factors of HP's success. In the recent years, when other major computer vendors suffered heavy losses, HP remained profitable and was able to grow. Its net revenue has more than doubled since 1987 and its net earnings totalled as much as \$ 549 million last year, in spite of the reduction of \$332 million due to the change in U.S. accounting regulations. Orders for the quarter ended January 31, 1993 were a record of \$5.2 billion, compared with \$4.2 billion for the first quarter of 1992 and net revenue jumped from \$3.9 to \$4.6 billion.

Today, the company employs more than 92,000 people all over the world. It has some 600 offices in 110 countries and its manufacturing and R&D facilities are spread in 52 cities in 18 countries. Says Mr. Stoyanov, "I have already mentioned one of our success factors — product diversity. Another one is innovation and continuous effort for quality improvement. HP's innovation cycle is getting shorter and shorter. Since about 1989, year by year, 75%

## MULTINATIONALS IN THE HUNGARIAN MARKET

of our orders have come from products that were announced in the preceding three years. R&D expenditures are growing continuously, and last year they were more than \$1.6 billion or 9.9% of our net revenue. Our third strength is in human resources management and, more and more, in environmental protection. HP was one of the 55 firms that were able to do the list of {{The 100 best companies to work for in America}}, a bestseller by {{Robert Levering}} and {{Milton Moskowitz}}, both in the first edition in 1984 and in the revised edition published last year. Employees and customers, social commitments and growth are all equally included in the company's corporate objectives. This is how HP could appear again as {{America's Most Admired Corporation}} in the computers and office equipment category of the survey in {{Fortune}} magazine's February 8 issue."

HP follows the same mission statement in each country where it operates: "to create information products that accelerate the advancement of knowledge and fundamentally improve the effectiveness of people and organizations." Hungary, belonging to the so-called South-East Area of the worldwide HP organization, is no exception.

HP has been present in Europe since 1962. Expanding from Geneva, Switzerland, the company conquered virtually all countries in the continent. Its main fortresses are Germany, France, the U.K. and Italy, but it has also been shipping its products to Hungary for about 20 years. In the beginning, the country was supported from Vienna, but the development and the growing demand of the eighties led to the establishing of a Budapest office in 1987. In May, 1991, HP and Controll, one of the largest local IT firms, established a joint venture called HP&C, which was taken over by HP last summer and now it operates as Hewlett-Packard Magyarország, a wholly owned subsidiary of the international company.

Says Mr. Stoyanov, "We stick to the standards of the HP representations in the Western European countries. We follow their organiza-

tion structure, their hiring philosophy, the level of their services. In 1991, HP&C started with a staff of 23, some of them from the Budapest office, some from Measurement and Instrumentation Service of the Hungarian Academy of Sciences (MTA MMSZ) and the rest coming from Controll. We were 38 in the end of 1991, 47 last December and we plan to be 70-strong this year. We try to hire the best local experts but whenever we face a problem that we cannot solve with our current staff, we get immediate support from HP's international organization. We have projects where our employees work together with German or French colleagues."

With revenues of \$6 million in 1990, \$10.4 million in 1991 and \$16.2 million last year, HP Hungary grows very rapidly. Their growth objective for 1993 is not less than 75%! In the early days, they, as distributors, had just 3 VAR partners. Today, they have 16, all of them major players of the Hungarian market. For PCs and peripherals, they work with 2 wholesale companies and 7 dealers. They organize a growing number of seminars and presentations and they are present everywhere where open systems and UNIX may become an issue. Besides the large number of LaserJet and DeskJet printers used in the country, HP Hungary has sold HP Series 800 systems to the local organizations of Credit Lyonnaise and Unilever and its Series 3000 machines are used at several paper factories. For a better future, the Hungarian subsidiary has recently donated workstations and other computer equipment worth \$130,000 to the Budapest Technical University.

According to Mr. Stoyanov, "HP Hungary's growth must be accompanied with a quality improvement process. We try to meet all kinds of demands of our customers and offer the widest range of services. This year we launch a quality development programme and, by December, I hope we will have passed the first quality auditing, in compliance with the ISO 9000 standards."

Zoltán Mikolás



# HEWLETT PACKARD



## In ten years to the top

Anyone who is just a little familiar with the Hungarian market will put Controll among the first on the toplist of large computer firms in the country. Established back in 1981 by four young engineers aged between 26 and 37, the company soon began to deal with PCs which, at that time, were very expensive and hardly available in Hungary. They bought components from various sources, produced the missing parts themselves and assembled the machines.

The year of the great leap was 1986, when their sales increased ten-fold. In the following two years, riding the wave of demand for computers, they achieved another sixfold growth and by 1988 they had become one of the largest computer enterprises in the country with a turnover of billions of forints.

Later, in the years of stabilization and profile expansion, some of the owner-managers have resigned from executive positions (they hired new experts, managers) and decided to focus on strategic issues.

In the spring of 1990, Controll was transformed into a non-public joint stock company and it grew into a group with majority ownership in several firms, such as Lizing, Tandem, Hill, CTC, etc. Though these satellite companies work in different fields, belonging to the same group requires some coordination. Therefore Controll holding was formed with various members including a financial organization, a personnel consulting agency and a logistic firm.

In 1992, manufacturing and management was moved to Controll's new, HUF 210-million headquarters in Budaörs, just outside Budapest. 75% of Controll's staff of 190 have a university degree. 120, 90% of them with a degree, mostly engineers – work for the computer division, still the largest unit of the company.

Today, Controll has two distinct fields of activity: systems integration and direct sales. As a systems integrator in Office automation, the company offers HP's NewWave and Lotus' Notes object oriented, portable, distributed computer environments. These software products support workgroups and can easily be integrated with the Clarity document retrieval system, so they provide a complete solution for the automation of office work both in small and large organizations.

Another key area for Controll is management information systems. They have an exclusive distribution agreement with U. S.-based qad. inc for the MFG/PRO management information system, which,

by its distributed database and multiplatform (HP-UX, DEC/VMS, IBM OS/400, etc.) technology can cover the whole financial, production, sales and maintenance activity of even a multinational company operating at several geographical locations.

For retail shops and department stores, Controll developed CasWork, a trading system.

The company also represents well known firms in the field of networking. Proteon, Inc. from the U. S. primarily provides a non-IBM alternative for Token-Ring network services. SynOptics Communication, Inc., another U. S. networking company, which has a 40% share in the American hub market, has also chosen Controll as its distributor in Hungary. Support, engineering, pre- and after-sale consulting, training and warranty services are all provided to these products by the skilled experts of Controll.

In the field of telecommunications, Controll primarily sells telephones and PBXs made by Samsung, Philips and Ascom.

Of course, they also develop custom applications, Unix- and Sybase RDBMS-based systems. PCs and PC LANs play still an important role in Hungary – Controll's wide offering includes both hardware and software, from vendors like HP, Compaq, Mylex, etc.

Direct sales are assigned to a separate division of the company which runs a network of Controll-owned shops and resellers. Their two major areas are POS equipment (with a 20% market share) and office furniture, equipment (e. g. copiers) and accessories. They sell Multiform furniture and accessories by Elba and Boeder.

In this way, they are a one-stop source of office supplies.

So far, Controll has used only its own resources to achieve its results. Now, to realize their strategic goals, they are looking for outside funding, as they want to capitalize on the market expansion they expect and the business opportunities related thereto at a higher level than their current amount of capital would allow.

For more information contact: (dr.-Ing. László Vinkovits) sales and marketing director.

Phone: (36-1)-113-6243  
Fax: (36-1)-133-7392  
Mail address: 1091 Budapest, Üllői út 101.,  
Hungary

Zsuzsa Szekeres

# PRESS UNDER PRESSURE

The Hungarian media market is very rich in computer publications – no wonder that these periodicals are in fierce competition.

Professionals can read one or – if they wish – each of three IT weeklies and the four color monthlies. (We just note in brackets that hobbyists also have several publications, specializing in the various home computer families, such as Commodore, Enterprise or Atari machines). But let us have a short look at the professional publications!

## (Computerworld–Számítástechnika)

Published by IDF Hungary Kft. (Ltd.) and in its eighth volume, this 32-40-page international IT weekly is priced at HUF 64 and is printed in newspaper (DIN A/3, 29.7x42 cm) format with one accompanying color: magenta.

## (Heti CHIP)

An IT weekly launched in 1992 by CT Press Kft. (Ltd.), a joint venture of Germany-based Vogel Verlag. It comes in magazine (appr. DIN A/4, 21x29.7 cm) format, with 32-48 pages, some of them in full color. It has section on computers, telecommunications and office automation. Though it is available also at newsstands for HUF 49, 7,000 copies are delivered free to a mailing list of managers and other decision-makers.

## (Monitor)

This 3-year old IT weekly is published by Út Kft. (Ltd.) in newspaper (DIN A/3, 29.7x42 cm) format, in 8-16 pages with one (changing) accompanying color. With its price of HUF 9.70 it is the cheapest computer publication in Hungary.

## (Alaplap)

Founded by the John von Neumann Computer Society (Mikromagazin, 1983) and taken over by Cédrus Informatikai Rt. (Corp.), this 66-100-page monthly microcomputer magazine carries full color blocks and a

floppy disk supplement. The 11-year old publication, now sold for HUF 235, was acquired last year by IDG Hungary.

## (CHIP)

A monthly computer magazine with a strong, regular tests/reviews feature published by CT Press Kft. (Ltd.) in 80-100 color pages. The publication is in its fifth volume and is priced at HUF 236.

## (Computer Panoráma)

A monthly computer magazine in its fourth volume with 80-100 pages, including some color blocks. Published by Computer Panoráma Kft. (Ltd.), a joint venture of HVG Rt. (Corp.), a Hungarian publishing company and Markt und Technik, Germany, it is sold for HUF 265 and comes with a special Software supplement which includes source code listings for various programs.

## (PC World)

This international computer magazine, priced at HUF 237, was launched in early 1992 by IGD Hungary Kft. (Ltd.). It is printed on 100 color pages and features MacVilág, a regular supplement for Macintosh users.

Gitta Takács



Hungarian IT journals and magazines

# **VOLÁN ELECTRONICS CO. LTD**

## **Administration Softwares of Volán Electronics Co. Ltd at the Cebit Exhibition**

It was more than ten years ago that VOLÁN ELECTRONICS COMPANY'S experts began a product level development and distribution of administration program packages. As a result of the professional reliability and expenditures of several hundred millions the marketing of these softwares means more than 8,000 software applications in its circle of customers estimated at about 2,800.

The variants of Hungarian language of the softwares shown at the CeBIT won prizes on more occasions in Hungary, e.g. the Prize of the Forum of Excellent Goods and the Compfair Grand Prize that are considered as a high professional recognition.

Modules of its administration software systems are interrelated, but they are able to receive not only the outputs of programs developed by this Company, but also inputs of softwares marketed by other companies. Their output files can also be managed by other software.

Meeting the market demands, after having completed the necessary development the system can already be operated not only in the DOS operational system, but also in NOVELL, UNIX, OS/2 2.0 and WINDOWS systems. The adaptation of the accounting systems to the AS-400 mainframe has also been completed. The connection between modules running with database managers on various platforms is also guaranteed. Such an integrated mixed operation can be achieved in the DOS - NOVELL - UNIX operational systems or on dBASE (CLIPPER, FOXBASE) - SQL (ORACLE, SQL/400) distributed databases.

In its MÉRLEG (Balance) variant beside the variants written in English, German, Italian and Rumanian a variant written in Ukrainian (Cyrillic) can also be offered:

Distributing systems written in Ukrainian was one of the reasons that a Ukrainian-Hungarian joint venture has been established, namely: UVE International Ltd., with its headquarters at Uzgorod.

Ukraine  
Uzgorod 294018  
1 St. Cyril and Methodius Street  
Phone: 00-703122-21566  
Fax: 00-703122-33660

It was about 2 years ago that UVE International Ltd. began to distribute the software shown at the Exhibition CeBIT, suitable for

- BALANC accounting system
- MATERIAL registering of material, stock, goods, finished products, semi-finished products
- ZARPLATA for preparing statistics of wages, wages accounting and employment.

The number of reference sites relating to these systems exceeds twenty.

These softwares are marketed in Hungary by Mikro Volán Electronics Co. Ltd. with exclusive rights. The Company allows considerable discounts to customers purchasing larger quantities of the information system.

A high level customer service is of crucial importance for the Company. It is for this purpose that a national retailers network has been established. They have agencies in almost all major cities; their partners can turn to more than 50 retailers, who guarantee a continuous development and maintenance and offer of any new variant to all users running their programs in any operational system, as they did before. In working hours you can turn to them by phone or in person with confidence if you have any problem.

They are at the disposal of their partners with short delivery times and introductory terms and with a reliable and low cost offer.

**Volán Electronics Co. Ltd - Mikro Volán Electronics Co. Ltd.**  
Karolina St. 65. Budapest, 1113 Hungary,  
Telephone: (36)-1-186-8122/200, 201, 101, 117  
Telefax: (36)-1-182-0809



# **VOLÁN ELECTRONICS CO. LTD**

## **CCSS\*400 The CLIPPER Client/Server Solution for the AS/400**

CCSS\*400 is a productivity tool that enables software developers to utilize the AS/400 relational database in CLIPPER applications and within the boundaries of existing AS/400 security. It is a software library of numerous database functions that can be linked via CLIPPER source code to produce executable applications and as such it creates new opportunities to exploit PC resources and flexibility without sacrificing central Data Processing control.

CCSS\*400 also allows developers to write user-friendly application interfaces that shield users from complex screens, enabling data entry from PCs operating under DOS. Data entered into those slots is then mapped into the correct AS/400 database format and sent to the host. Conversely, AS/400 based data can be accessed by a particular field instead of downloading an entire file, which reduces demand on AS/400 processors. The AS/400 data is mapped for display on the PC screens.

CCSS\*400 applications can also be constructed so that if the AS/400 link goes down, data entry operators can continue keying data as if they are AS/400 connected. The data is then stored on the PC and when the communication is reestablished, the application can conduct a batch upload to the AS/400.

Creating PC application programs developed with CCSS\*400, developers become more efficient, even when the AS/400 is down, so they can satisfy user requests more quickly.

CCSS\*400 also protects the investments of enterprises by working with existing hardware, AS/400 and PC software, and PC-to-AS/400 cooperative databases.

The capacity of CCSS\*400 for integrating PCs within AS/400 environments opens the door to new opportunities, without security problems. The bottom line is simple. CCSS\*400 lets developers do more in less time, at a lower cost and maintain control over the entire process.

In summary, CCSS\*400

- allows access to an AS/400 directly from CLIPPER
- enables easy development of friendly PC front-ends for AS/400 applications
- dramatically decreases development time and cost
- protects investments of hardware and software
- provides competitive edge.

MLS/400 Media Library Management System for the AS/400

MLS/400 is the proven Media Library management System for your AS/400 installation. Easy-to-use command interface or menus perform all functions associated with backup, recovery and media management. MLS/400 is an all encompassing product, providing superior functionality for managing tapes and other media.

Some of the benefits of using MLS/400 include:

1. Complete maintenance of the AS/400 tapes, cartridges and other media.
2. Spool file management.
3. On-line inquiries for media and backups.
4. Never having to leave MLS/400 for operating system functions. All operating system (OS/400) commands are provided from every screen.
5. Off-site (vault) Storage Control System.
6. Totally automated or on demand (select your own) scheduling of backups.
7. Automatic label printing for processed media.
8. Multi Language support.
9. Screen and Report customization on the fly.

**Volán Electronics Co. Ltd – Integrál Co. Ltd.**

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