

3.3. Computing in Hungary – Through the History of Five Institutions

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In the first three decades of the history of computing - i.e. by the end of the 80s – Hungary lived under a political system, in which the state had a dominating role in society and economy. It is no surprise that computing life was also shaped to a substantial extent by five state-owned institutions with leading positions in different areas of this new discipline. These were:

- The *Computer and Automation Institute of the HAS (SZTAKI¹)*, where the first computer in Hungary was built in the late 50s from Soviet documentation;
- The *Computer Application and Service Company (SZAMALK)*, created from several organizations playing a pioneering role in the market-oriented development of computer applications as well as in supporting services, first of all computer education and training;
- The *Central Research Institute of Physics (KFKI)*, where a PDP-compatible family of minicomputers was developed and manufactured with many applications in Hungary and abroad;
- The *Computer Research and Innovation Center (SZKI)*, being established originally for the coordination of the Hungarian activities in the Unified System of Computers (ES EVM) and later becoming an important R&D center for hardware, software and applications;
- The *VIDEOTON Computer Factory*, manufacturing (mini)computers and peripherals - mainly under French license - with considerable export to the neighboring countries.

These institutions had a considerable impact on the whole scene of computer related activities in Hungary, and it would be appropriate to describe the early history of computing in Hungary by telling the individual stories of these five institutions. That is what we aim to do in this paper.

1. The first computer in Hungary

The story of modern computing in Hungary starts ... in a prison! In late 1953 a group of inmates working in the engineering bureau at the Budapest Central Prison - having a fairly good access to Western professional literature (sometimes better than their colleagues “outside”) - got acquainted with the advances of computing in the West and formulated a proposal to the Hungarian Academy of Sciences (HAS) to design and build a computer. The prison management sent the letter to the appropriate department of the Academy, from where they received a polite negative answer. It might be, however, an interesting coincidence that a few months later, in February 1954, a small research group on electronic computers was established in the Research Institute for Measuring Techniques of the HAS. Moreover, when *Rezső Tarjan*, one of the authors of the letter mentioned above, came out of prison in 1955, he became the head of this group. After some preparatory work, in early 1956 the Academy decided on the necessity of purchasing an electronic computer and creating around it the Research Group for Cybernetics (KKCs). Then, the politics stepped in: the government agreed to the establishment of the new institution only if its director was a political nominee, *Sándor Varga*. So Tarjan became deputy director and KKCs started to work in September 1956, with placing an order for an Ural-1 computer. Political events in the autumn of 1956 interrupted these activities and in early 1957 the Soviet foreign trade company withdrew from the Ural contract. In this situation, director Varga, - who during World War II worked as an engineer in the Soviet military industry - made use of his contacts and arranged to receive through the channels of academic cooperation the documentation of a recently developed Soviet computer, the M-3.

In order to fully understand the situation a small detour has to be made to the early history of Soviet computing: One of the first Russian scientists who recognized the significance of electronic computers was *Isaac Bruk*, member-correspondent of the Soviet Academy, who as early as in 1948 – together with a young colleague² –

¹ The acronyms are abbreviations of the Hungarian name of the institutions

² His name was *Bashir Rameev*, who became later Chief Constructor of the Ural family of computers and in 1969 he advocated to build the Unified System on a license from ICL (UK) for the - IBM 360 compatible - System 4 series. This proposal was rejected, resulting in the (illegal) cloning of IBM hardware and software and in resigning of Rameev from his

received a patent for a digital computer with a common bus and prepared a detailed proposal for building a computer. The M-1 computer was built in 1951, followed by the more powerful M-2 in 1952, serving most of the academic computing needs for several years. In parallel, another computer was also developed, intended for smaller research organizations. This was the M-3, completed in 1956. However, due to some bureaucratic difficulties (“the M-3 was actually a self-initiated project independent of any state plans”³), it was not admitted to mass production, only a few experimental copies were manufactured and its documentation was spread through informal channels. In this way versions of M-3 were built – apart from Hungary – also in Estonia and China. Moreover, in Yerevan M-3 served as a starting point for the development of the Razdan family. Later, in 1959 mass production of M-3 started in the newly built computer factory in Minsk. (The history of the M series continued with sophisticated special purpose process control computers, intended mainly for military applications. So, the Bruk group disappeared from the open scene of Soviet computing.)

That was the story of M-3. One can say that it was born as an “illegitimate child of a very respectable family”.

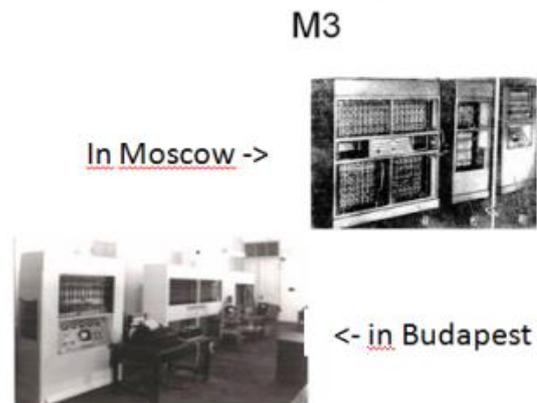
The documentation of this M-3 computer arrived in late 1957 to Budapest. A small group of freshly graduated engineers and mathematicians received the task to put together the computer and make it operational. It was not an easy task, since none of us had seen a computer before and in the documentation everything was described in much detail, but it did not say anything on how the electronic impulses running around different places of the circuits will result in the execution of instructions, from which the programs were composed. In other words – as we would say it now – we had to extract the architecture of the computer (its “principles of operation”) from a purely technical documentation. More difficulties were caused by the inherent unreliability of electronic tube devices, resulting in a rather low “main time between failures”. Nevertheless, we succeeded: the official launch of M-3 was in January 1959, one more year was, however, needed to reach a more or less stable operating condition.

So KKCS had a computer with about 1000 electronic tubes, a memory of 1024 words on a magnetic drum (1 word= 31 bits), with an average speed of 30 operations per second. (Later a ferrite memory was introduced increasing the speed to about 1000 op/sec.)⁴

Nevertheless, this first computer attracted many application ideas from different areas:

- Scientific-technical calculations, being performed “by hand” or mechanical desktop calculators could be speeded up on the M-3 (e.g. static calculations, optical lenses etc.);
- Mathematical methods started to gain acceptance in economic sciences, requiring a large number of calculations. E.g. experiments with the “balance of intersectoral relations” method (known also as “input-output tables”) were performed at the Central Planning Office, requiring the inversion of a 40*40 matrix. (As one of the first “real” applications to be run on M-3, it was a rather difficult task, considering that 40*40=1600>1024!)
- Application ideas started to come from different branches of science (e.g. linguistics, medicine etc.)

In 1965, M-3 was transferred to Szeged, where it served educational purposes until 1968. In the meantime, KKCs was renamed to *Computing Center of HAS (SzK)* and continued to perform its pioneering activities in solving various application problems as well as popularizing computing with courses, textbooks, lectures, etc. In 1965 an Ural-2 computer was installed, followed by a CDC-3300 in 1970.



leading position in Unified System. See in more details in B.N. Malinovsky: Pioneers of Soviet Computing. pp.107-134 http://www.sigcis.org/files/SIGCISMC2010_001.pdf

³ See p.73 of the same book.

⁴ See also in Gyozo Kovacs: The Short History of M-3, the First Hungarian Electronic Digital Tube Computer IT STAR Newsletter [Vol. 6, no.3, Autumn 2008/09](#)

In 1972 the Academy decided to merge SzK with its other computing-related institution, the *Automation Research Institute (AKI, established in 1964)*. The profiles of the two institutes complemented each other well: more software at SzK and more hardware as well as industry experience at AKI. In this way the ***Computer and Automation Institute of HAS (SZTAKI)*** was created, becoming the leading research and development center of the Hungarian computing field with significant results in a wide range of disciplines like process control, computer aided design and manufacturing, production informatics, operational research, computer vision, networking, etc.

2. Computer applications

Apart from these mentioned above, an important source of application ideas for the new computer(s) has come from the processing of (business) data. Here, Hungary has had a long tradition of using punched card (Hollerith) equipment for data processing. IBM established a subsidiary as early as in 1936 and IBM Hungary Inc. existed continuously without interruption during World War II and also in the years of cold war as a US-owned company serving Hungarian customers with punched card machines and their support. A nationwide census of the population was performed in 1950 on IBM equipment.

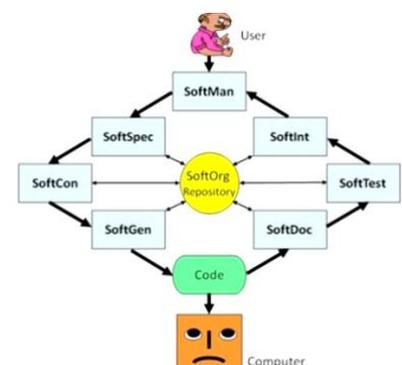
The *Central Statistical Office (KSH)* was charged with the overall responsibility of supervising the application of punched card machines in the country and gradually it was extended to the application of computers for data processing and later to the whole spectrum of computer applications.

In the centralized political system each organization belonged to one of the ministries (or similar high-level offices). Therefore, the data processing tasks emerging from punched card applications were usually solved - with more or less success - by the institutions for “accounting and system analysis” of the given ministry, which became gradually centers for computer applications coming from the given area of the national economy. This proved to be not a very efficient solution, since computer knowledge at that time was rather rare, so these specialized institutions could not have enough knowledgeable people in computing.

In this situation the KSH decided in 1965 - making use of its nationwide supervisory role about computer applications - to establish an organization with a “free license” to solve problems in any areas, belonging usually to the ministerial institutions mentioned above. (At that time this was considered a “revolutionary” move, a step towards the “market economy”, in accordance with the economic reforms coming in 1968). The new organization started to work as “*Information Processing Laboratory*” of the KSH, later being reorganized as a company under the name of *INFELOR*, becoming soon – what would be called nowadays – a successful “software house”, having a good concentration of computer experts in departments as hardware and software engineering, operational research, data processing, (macro)econometrics, etc. In 1975 it was renamed *Computer Research Institute (SZÁMKI)*.

A few examples of software projects successfully performed then:

- Development of basic software for the Hungarian designed EMG 830 computer
- Data processing and production control (ERP-like) systems for large factories (e.g. Chinoín, Ikarus)
- Industrial process control systems (e.g. Paks, together with KFKI)
- Integrated software development support system (together with SZKI), becoming a product exported under the name of SOFTORG
- Large registers for public administration (e.g. population)
- Operational research algorithms and applications (together with SZTAKI)



In the meantime, the Central Statistical Office has established a whole empire of institutions serving various aspects of the application of computers. For the education and training of computer specialists a large organization called *SZÁMOK* was established in 1969, receiving a substantial grant from UNDP and becoming a leading educational center, also for the neighboring countries. Companies for support and maintenance of computers and also computer-related publishing were also established, as well as a nationwide network of regional computing centers, performing data processing tasks for local enterprises (*SZÜV*).

In 1982 KSH decided to merge most of these organizations into the giant *Computer Application and Support Company (SZÁMALK)*, becoming one of the leading institutions of the Hungarian computing scene.

3. Minicomputer family development

The *Central Research Institute for Physics (KFKI)* was established in 1950 to perform high-level scientific research in many areas of the physical sciences, including an experimental nuclear reactor. Capturing and processing of the results of the physical experiments required a large number of – sometimes rather sophisticated - measuring equipments. For their production a strong Electronics Department was created in KFKI. In mid-60s they started to realize the international trends of using computers for measurement automation. Since availability of a wide-range of application programs was considered important, they decided to produce computers compatible with members of the leading family of minicomputers, the PDP family of Digital Equipment Co. Development of these devices at KFKI was performed by a combination of “reverse engineering” and original design, taking into consideration the component base available at that time in Hungary. As the centralized system of the planned economy at that time did not permit production of computers (especially not in a research institute of the Academy of Sciences), they decided to call these devices Stored Program Analyzers, abbreviated in Hungarian to TPA.⁵ It was soon realized, that the TPA machines could be used not only for measurement automation at KFKI, but also for a wide range of tasks everywhere. So, the mass production of minicomputers was started at KFKI (causing some conflicts with the research institute status of that institution).

The members of the minicomputer family, together with the number of units produced is summarized in the table below⁶:

years	compatibility	type:	production
		-	
1966-80	PDP-8	TPA-1001 TPA -i TPA-L/**	~800
1970-75	original ! -	TPA-70, TPA-70/25	~100
1976-87	PDP-11	TPA-1140, -1148 TPA-11/428, -440 TPA-11/110, -170	~500
1983-89	VAX-11	TPA-11/540 TPA-11/58* TPA-11/510,-520,	~150



The TPA 11/440 computer

⁵ The name of the PDP machines, Programmable Data Processor, was the result of similar considerations: as in the early 60s the word „computer” was associated with very expensive equipments of gigantic sizes, Digital Co. did not want to use this word for their smaller machines. The term „minicomputer” became accepted much later only.

⁶ Source: J. Lukacs: From Punched Tape to Informatics – The TPA Story (In Hungarian), KFKI, 2003
A short summary of the story of TPA computers in English can be found at http://hampage.hu/tpa/e_index.html

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Configurations of TPA minicomputers were used in many different branches of the Hungarian economy and a fairly large number was exported to the neighboring countries. Main application areas did include:

- Measurement and control systems in oil and energy industries, nuclear power station (Paks),
- Laboratory automation systems in research institutes,
- Production and process control systems in various enterprises.

4. Unified System participation

In 1968 the Eastern Bloc countries, on the initiative of USSR decided on the joint development of a series of computers, being compatible with the IBM 360 family of computers, making use of its fairly large, widely available software supply. In developing the *Unified System* of computers, copying⁷ of the different models of the 360 (and later 370) series was divided between the participating countries. The role of Hungary was to produce the smallest model of the series and succeeded to be in a special position by convincing the partners, that the smallest model should play a specific role in the configurations, being satellite computers, terminal concentrators, etc. around the larger machines. Therefore, the smallest model could not be compatible with the rest of the series and Hungary developed the R-10 (and later R-12) under license from the MITRA-15 minicomputer⁸ of the French *Compagnie internationale pour l'informatique (CII)*. Besides, several peripheral devices (displays, printers, disk memories, etc.) of different Hungarian manufacturers were included into the Unified System effort.

In each of the countries participating in the Unified System, an institute was appointed for coordinating the efforts related to the cooperation. In Hungary, the *Computer Coordination Institute (SzKI)* was established in 1969 for this purpose with the tasks of

- Participating in the various technical organs of the cooperation
- Adapting Hungarian products to Unified System standards (and get them accepted)
- Developing some of the products (R-10, R-12, R-15).

These activities were performed by SzKI to the satisfaction of all interested parties, the management of SzKI, however, recognized that in order to be a successful institution, some own research and development activities should also be included into the portfolio of the institute. Therefore, SZKI started to perform significant R&D tasks not directly connected to the Unified System coordination. A few examples are:

- Development of network-based application systems (railways, banking etc.)
- Software products distributed in international markets (*MProlog, Qualigraph, Recognita*)
- Creation of innovative image processing methods with applications in many fields
- Operating the most advanced Siemens computers (allowed by the embargo, or beyond...!)
- Starting the organized software export activities (paying for Siemens equipment with work)
- Development and distribution of the first Hungarian made PC family (*Proper-8, -16*)



Proper 16

Later, such activities became dominant in the profile of the institute, so in the mid 80s the name of the institute was changed to **Computer Research Institute and Innovation Center** (keeping the SzKI acronym)..

5. Computer manufacturing

⁷ See also the footnote 2. on page 2.

⁸ Later this situation was changed and R-15 was developed from the prototype of IBM 370/115-125. It has undergone the acceptance procedure of the Unified System, but did not go into mass production

VIDEOTON was established in 1938 as a small factory producing ammunition for hunting weapons. In the early 50s it started to produce items of household electronics (radio and later TV sets) and also military telecom equipment. This latter might have been one of the reasons why, with a rather unexpected decision of the government, VIDEOTON was appointed to be the home of the Hungarian computer industry, becoming the recipient of the licenses bought from France to manufacture minicomputers, partly as the smallest member of the Unified System series (see above).

Starting the computer profile “from scratch” VIDEOTON established a *Computer Factory* in Szekesfehervar (a provincial town 70 km from Budapest) and took over a research institute of electronics in Budapest, becoming the *VIDEOTON Development Institute (VIFI)*.

The first computer produced at VIDEOTON was the Hungarian version of the CII 10010 minicomputer, appearing under the name of VT1010B in 1971. Although it did not satisfy the Unified System standards, it proved to be a great success, both in Hungary and in the neighboring countries. Apart from its applications as a general purpose or as a process control computer, it was used also as a satellite machine. E.g. its linkage to a MINSK-32 computer realized the first “front-end” connection in the Eastern Bloc countries. The next step was the adoption of the license of the French Mitra-15 computer and its production under the name VT1010. This was already done in accordance with the Unified System standards and – with the contribution of SZKI – the official acceptance procedures were performed and R-10 (EC-1010) became the smallest member of the Unified System. This was followed by an improved version (R-12), also based on the MITRA-15 license.



The R-10 computer

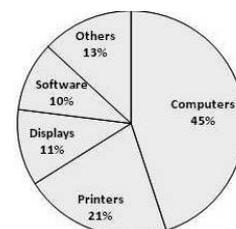
Meanwhile in France the *Societe Europeene de Mini-Informatique et de Systemes (SEMS)* was taking over the minicomputer profile of CII. They started the development of the “S” series and in the framework of cooperation the engineers of VIFI heavily participated in its development. As a result, the models Mitra-115 and Mitra-225 appeared in the mid 70s, produced in Hungary as VT-60 and VT-600, accepted in the Unified System as R-11 and R-10M respectively. An interesting episode was the development of the VT-1005 computer, realizing an original, stack-based architecture in a computer smaller than the 1010, for specific applications. A few prototypes were produced and experimental applications were developed, but it did not reach mass production.

In the second half of the 70s a new action emerged in the cooperation of the Eastern Bloc countries: the System of Small Computers (CM), compatible with the computers of the Digital Equipment Corporation (PDP and VAX). In Hungary it was coordinated by VIDEOTON, which had the task to produce the model CM-52. This was developed on the basis of Mitra-225, but in order to be accepted in the CM series, a unique technical solution was applied: CM-52 had a “bi-processor” architecture and it could work in two modes: in the “S” mode it realized the instruction set of the “S” series, while in the “M” mode it was PDP-11 compatible. VIFI engineers with success realized this rather difficult technical task and CM-52 was accepted in the CM series. Mass production, however, did not happen.

In the 80s the Unix –based VT-32, VT-320 and VT-3200 models were produced with success. Apart from computers, VIDEOTON manufactured several peripheral devices as well:

- The production of terminal displays was a real success, with more than 90 000 units sold in several countries, especially in the USSR (in the Russian professional slang for “terminal” sometimes they said “”видеотон”). The most popular model was the VT-340, followed by more sophisticated models like the VT.52000 and VT-47000 series as well as the microprocessor-controlled VT-56000.
- The line printers VT-2400, -2500 and -2300 were produced under license for Data Products. A matrix printer (VT-21400) was also manufactured. The VT-LP laser printer was accepted in CM under the code CM-6314 was the first laser printer produced in the Eastern Bloc.
- Optical discs also were produced on magneto-optical principle, with 640MB capacity.
- The personal computers VT-110, VT-160 as well as the TV-computer proved to be not a success on the market, mainly due to the high competition from smaller companies, being able to more cost-effective production.

The distribution of computer related revenues of VIDEOTON is shown in the following chart:



This is the story of the five institutions dominating the computer field in Hungary in the late eighties.⁹ While competing with each other in many areas, they formed a loose cooperation called *Computing Research and Development Association (SzKFT)*, performing also a few projects of common interest.¹⁰

6. Three outstanding personalities

There were several outstanding personalities, whose activities were not directly connected with these institutions. Three of them are mentioned below:

Laszlo KOZMA (1902-1983)



In the late thirties he was working on the development of telephone exchanges at a subsidiary of Bell Laboratories in Antwerp (Belgium). He had several patents there on computing devices based on electromechanical relays. Back in Hungary after World War II he became a leading personality in the Hungarian electrical industry until his arrest for fictive political reasons. In the prison, he was one of the authors of the letter mentioned above. Later, he became a respected professor at the Budapest Technical University, where in 1955 he built the MESZ-1 relay-based computer for education purposes.

Laszlo KALMAR (1905-1976)



Being a well-respected researcher in the area of mathematical logic and set theory, he was the first among Hungarian mathematicians to realize the significance of electronic computers and fought for the recognition of computer science as a separate discipline. He also made a lot of efforts to find application possibilities of computers in different areas of science and industry and organized computing courses (with degrees) at Szeged University as early as in the late 50s. He developed a Logic Machine, evaluating logical expressions without active elements and outlined principles of operations of a Formula Based Computer. Some of his ideas have been realized in the MIR computer family in Kiev.

In 1996 the IEEE Computer Society recognized the achievements of Kozma and Kalmar with its prestigious Pioneer Award.



Arpad KLATSMANYI (1923-2007)



Established development of digital equipments in the Electronic Measurement Factory. After several desktop calculators (Hunor), in 1966-68 he developed a medium sized computer family with completely original, modular architecture and software system (EMG-830)¹¹. This might have been suitable for being the basis of an independent Hungarian computer industry, after manufacturing 15 configurations, however, computer development was stopped at EMG in 1970 for industry-political reasons.

7. Present situation of the five institutions

⁹ More details about the situation of the computer field in the late 80s can be found in the booklets *Computing in Hungary*, published by NJSZT in 1987 and 1989 (see http://itf2.njszt.hu/324rtr4/uploads/CinH_87.pdf and http://itf2.njszt.hu/324rtr4/uploads/computing_1989.pdf resp.

¹⁰ Such a project was the development of a compiler for the programming language Ada, intended by the US Department of Defense as standard language for their applications. For obvious reasons programming tools for this language were not available behind the Iron Curtain, where our compiler was the most serious attempt to make this language available to users. By the end of the 80s it was „almost ready”, due to the political changes, however, its development became obsolete.

¹¹ For a short description of the EMG-830 in English see <http://ajovomultja.hu/emg-830-computer?language=en>

The political changes in 1989-90 had a considerable impact also on the Hungarian computing field, by removing the embargo restrictions, privatizing many state-owned institutions, entering multinationals to the Hungarian market, etc. The following short account is on what happened with our five institutions in the past twenty-five years:

- *Computer and Automation Institute (SZTAKI)* continued all the time being in the forefront of computer oriented research and development in Hungary. The Institute has wide external relationships and since 1994 is a full member of ERCIM (European Research Consortium of Informatics and Mathematics) and also a Center of Excellence of the European Union. Its name has changed recently to "*Institute for Computer Science and Control of the Hungarian Academy of Sciences*", keeping the „MTA SZTAKI” acronym. (The celebration of the 50th anniversary of SZTAKI will take place on September 23-24, 2014 at the Hungarian Academy of Sciences).

- *Computer Application and Service Company (SZAMALK)* was privatized in the early nineties. Many parts of its profile have gradually disappeared, since in the new economic climate application development and some of the services could be more efficiently performed by smaller companies (sometimes “spinned-off” from SZAMALK). The only profile being intact and developing with success is education, where SZAMALK is holding a leading position in Hungarian adult education, operating the *Dennis Gabor Technical College* and many product-oriented courses for hardware and software manufacturers.

- The story of the *Central Research Institute for Physics* started with an interesting episode: in 1989 the Digital Equipment Corp. established a joint venture with KFKI and SZAMALK, employing part of the persons who earlier in KFKI were dealing with the development and application of PDP compatible computers (Later Digital Hungary bought out both Hungarian partners). This started the split of the computer-oriented departments of KFKI.
 - The “business part”, those dealing with the minicomputer development and applications created a management-owned private company, keeping the name KFKI Inc. In the nineties it became one of the leading Hungarian system houses, operating as a holding of several companies with different profiles. In 2006 the whole KFKI Group was bought out by Hungarian Telekom and its parts have been integrated into *T-Systems Hungary Inc.*

 - From the “academic part”, the researchers in computer science joined SZTAKI in 1997, while the Computing Center continued to serve the researchers in physics in different parts of KFKI (having undergone also a lot of organizational changes). Their recent success story is winning a tender of CERN for establishing a Tier-0 data center for the real time processing of physical experiments at CERN (e.g. the Large Hadron Collider). For this purpose the *CERN-WIGNER Data Center* was built in 2013 on the territory of KFKI, being now one of the most powerful data centers in Europe.

- The *Computer Research and Innovation Center (SZKI)* has dissolved completely in the early 90s. Some of its spin-off companies survived, e.g.
 - *IQSOF*T became a successful software house in the 90s, dealing with application development and distributing advanced software products like Oracle, BEA etc. until joining the KFKI Group (see above) in 2002;

 - *Recognita* started as a joint venture to sell its unique optical character recognition (OCR) product worldwide. After a series of acquisitions, it was bought by *Nuance Communications Inc.*, the market leader in intelligent human-computer interfaces, and a considerable part of research and development activities of Nuance is performed now in Budapest.



- At *VIDEOTON* all computer related activities were stopped in 1990. Being privatized in 1991 it was reorganized into *VIDEOTON Holding* with a completely new profile: to provide infrastructure and services for companies manufacturing electronic products. (e.g. IBM produced a considerable part of its data storage equipments at some time in Szekesfehervar). At present *VIDEOTON* is considered the 5th largest Electronic Manufacturing Services (EMS) provider in Europe and the 28th worldwide.

8. And much more....

The story of the five leading institutions and three outstanding personalities provides a fairly good overview of the first three decades of the history of computing in Hungary. However, this cannot cover the whole picture. A few important issues are outlined below:

- Government policies

Starting from the mid-sixties, development of computing in Hungary was considered by the government as an important priority area, being supported by nationwide government programs, providing coordination and ample state financing:

- The aim of the *Central Development Program for Computers (SZKFP)* was to promote the development of computing expertise in Hungary, including subprograms for supporting basic research, education, and training and application of computers to a wide range of tasks. The most important measure of SZKFP, however, was the creation of a computer industry in Hungary (see e.g. the *VIDEOTON* story above)
- In early 80s the government decided to focus “on computer applications with an aim of increasing their effectiveness in socioeconomic processes, and providing favorable conditions for their extensive introduction into society.” Thus, in 1985 SZKFP was transformed into the *Central Economy Development Program for Electronization (EGP)* to help encourage the nationwide introduction of electronic devices¹²

All these efforts were managed by the *National Committee for Technology Development (OMFB)*, an organization at ministerial level, maintaining a coherent, long-term technology policy not only for the computer field, but also for other perspective areas.

One of the most far-reaching actions of OMFB was that as early as in 1986, together with the Academy, it started the *Information Infrastructure Development (IIF)* program to create a computer network for researchers (academic institutions, universities, even individuals). Since networking equipment was at that time still at rather strict COCOM restriction, many of the hardware and software tools had to be developed in Hungary (mostly in SZTAKI). As a result, Hungarian researchers had the possibility to gain “hands on” experience in networking (and to establish connections with foreign colleagues), so they were well prepared for the “internet age”, coming to Hungary a decade later.

- Hungarian Software

May be as compensation for the relatively less advanced hardware development and manufacturing situation (due to many reasons not to be outlined here), always high emphasis was given to the area of software development in Hungary. At the beginning it was mainly devoted to solving individual application tasks, but for making the further steps towards a software industry, several factors had to be considered:

- As a positive factor, the good human resource preconditions can be mentioned, appearing in a fairly good educational system with high emphasis (at that time!) on mathematics and natural sciences, as well as the overall respect of Hungarian mathematical traditions;

¹² See in more detail in *Zsuzsa Szentgyörgyi: A Short History of Computing in Hungary Annals of the History of Computing, Vol. 21. No.3. 1999.*

- As a negative factor, market limitations did appear, due to the size of the domestic market and in relation to the Eastern countries the so-called “Sofia Concept” requiring the free-of-charge exchange of “research results” (and software for a long time was considered belonging to that category).

As a result, Hungarian software activities were driven towards the Western markets with considerable success with some “niche products” (e.g. *Recognita*, *ArchiCad*, *NavNGo*) as well as with the wide practice of, exporting the work of Hungarian programmers worldwide appearing in many forms ranging from individual hiring to “manpower leasing”, or to outsourcing development projects to be performed in Hungary.

This has created a fairly good reputation around Hungarian software abilities, which is in our days is being manifested in the success of quite a few Hungarian startups (e.g. *Prezi*, *Ustream*, *Tresorit*, *Gravity* etc.).

- Civil organizations

Civil society has always played an important role in the Hungarian computing scene. Apart from the *John von Neumann Computer Society (NJSZT)*, being the host of our conference (and shortly described on p. of the Introduction), several similar organizations exist also for “neighboring” areas as

- the *Scientific Association for Infocommunications (HTE)*,
- the *János Bolyai Mathematical Society (BJMT)*,
- the *Scientific Society of Measurement, Automation and Informatics (MATE)*
- the *ICT Association of Hungary (IVSZ)*,

as well as “umbrella” organizations, like

- the *Federation of Technical and Scientific Societies (MTESZ)*, being very active in the past
- and the *IEEE Hungary Section (IEEE HS)*, established in 1987.

The overall aim of these organizations is to help the development of the information society with their specific methods, like spreading scientific-technical information, organizing national and international conferences, competitions, voluntary work etc. Goals and forms of activities may vary, e.g.

- BJMT organized a conference on Automata Theory in 1956, being the first computing-related scientific event in Hungary, and
- in the seventies the NJSZT was in the forefront of the popular “microcomputing” movement, organizing youth groups, publishing the “MicroMagazin” journal, broadcasting a Basic course on TV etc.

An important task of the civil society is the preservation of past values. One of the professional communities of NJSZT, the *IT History Forum (ITF)*, is organizing memorial meetings about past events and building a comprehensive IT History Data Archive, providing an organized collection of data about Persons, Institutions, Products, Papers and Conferences relevant to the history of Information Technologies. The collection is published on the website <http://itf2.njszt.hu>.

And, last but not least, NJSZT has organized and operates the *IT History Exhibition*¹³, being the host of our conference.

¹³ See the paper of Alföldi et al. in the present proceedings