The Future of Information Systems
Lessons from the Eighties

September 16–18, 1986
Johannes Kepler Universität Linz

Sponsor:
Austrian Society for Informatics(OGI)
Society for Informatics (GI)
Swiss Informatics Society (SI)
in cooperation with
Institute for Informatics, University of Linz
Linz Special Events Planning Corporation (LIVA)
Austrian Broadcasting Corporation, Regional Studio for Upper Austria.

Purpose of the conference

In the future, companies will not be able to exist for long without information systems. The conference "FUTURE OF INFORMATION SYSTEMS" discusses the technological development trends in hardware and software in the coming years with special focus on applications in economy and public administration. Experience gained during previous years, and prognoses for further development will be presented. Topics such as office automation and communication, 4th generation languages, expert systems, information systems for small and medium-sized companies, 5th computer generation and future computer structures will be analyzed, in order to provide the user with decision making aids for the application of information systems.

An interdisciplinary discussion will concentrate on the impact of the production factor information and expected changes affecting all areas of our life.

The Fifth Computer Generation and Future Computer Structures
Prof. Dr. Wolfgang Händler

Faster and smaller – this has been the aim of the four computer generations. The computer architecture for the fifth generation strives for more intelligence and reliability.

In existing programming, the computer is told HOW it should work. Main objects are data, mostly in the form of figures which are normally "calculated" according to applied mathematics processes.

Computer architects of the fifth generation, particularly Japanese, demand that computers "understand" images and spoken language as to their contents (semantics). The programmer should then only try to define WHAT should be calculated.

The term "calculation" is, in the most general sense, a process which helps the computer to produce results from given instructions, parameters, images and even from inaccurate specifications. The principle is the (mathematical) "inference" mechanism. In the fifth computer generation emphasis is placed on the structured storage of knowledge and processing of knowledge. These changes affect the computer structure as well as the computer architecture.

New Communication Technology and its Impact on Information Systems
Dr. Ing. Friedrich Ohmann

The demands of modern information society require new communication networks for the worldwide, extensive exchange of all types of communication. With high innovation rates in the key technologies microelectronics, optical communication techniques and software, integrated services digital networks are developed worldwide which in the basis of international standards allow open communication for everyone. A uniform communication plug gives the participant access to all information sources independent of time and area.

The communication network of the future requires the further development of the present information systems: in their presentation of information for a manifold structured high number of participants, in their search and store technique, in the processing of knowledge and in their user surface.

The combination of communication and information systems for the user of public networks, for office and production processes has far-reaching results for social structures. These must be analyzed, optimized, tested, and receive social consent.

Data Base System – A User's Point of View – State of the Art and Future
Dr. Albrecht Blaser

Trends
Data base systems are becoming increasingly more important in practical data processing. The design of data bases as well as the development and the application of data base systems have therefore resulted in the development of an engineering and science discipline within applied informatics.

The object of this contribution is to introduce this discipline in the form of questions and terminology, to portray the formatted data base systems in the present technical status, to arouse unterstanding for problems occuring by centralized and decentralized data organization and to present a few development trends. Questions regarding data base systems structure, the data model and data manipulation language, the interactive use and the data independency and data integrity will be discussed. Problems which relate to the use of data base systems in office, technique und science, will be granted a certain space.

Expert Systems in Business Applications – State of the Art
Prof. Dr. Peter Mertens

Application possibilities of expert systems in business areas are being systemized. Typical features are business functions and branches of industry as well as the application purposes (e.g. diagnoses, consulting). Distinctions should be made between the theoretical possibilities, the development of pilot systems and the realization in practice.

Public Administration of the Future
Prof. Dr. Heinrich Reinermann

We are approaching the edge of the first wide development stage of computer application in public administration. "Transfer to EDP" lurks in the background. The next development stage could have another main topic "How can information techniques assist the further improvement of the administration structures?"

The idea does not appear entirely wrong, after administration reforms starting with the administration organization (regional and functional reform), administration personnel (service law reform) and the administrative functions (de-nationalization, reducing/eliminating bureaucracy), the working techniques used by the administration are now next in line for reform.

"The administration of the future" should be seen from these perspectives. Whereby an estimation of the administration position within the framework must be given, the question is how this can be included in the transfer to an information society.

Information Technologies of the Future – New Functions for State and Society
Dr. Norbert Rozsenich

The topic provokes the question: "How have the state and society defined and fulfilled their previous functions in connection with the development of the information technology?" At the beginning of the 80's, the following two problems were on the daily agenda:

1. Use of economical-technical innovation potential of these new technologies

2. Setting up a framework in order to prevent negative effects on the working place and society.

With perspectives on the 90's, additional problem areas are visible, which could be diverted by the fusing of the information processing, information transfer and reproduction techniques: value added networks, telesoftware, computer aided education, electronic publishing, factory automation. In dramatic ways, classical production technologies and business and organizational structures (also in service sectors) will be affected. In the sense of the conference of the OCG on the occasion of its 10 year existence (Laxenburg, November 1985) the speaker does not believe in the necessity of technical development by law of nature, but rather in the humane ways of design of modern technologies.

Structural Change and Economical Significance of Information Technology
Dipl.-Ing. Leo A. Nefiodow

That the societies of the future will draw their driving power substantially from the "information" resources, is presently uncontested. Numerous indicators emphasize this thesis: More than 60 % of the employees in the USA are employed in the production, collection, processing or distribution of information. In today's America, more people are active in universities and administration than in agriculture. On the national economy level, the development of the information society is one of the most important features of the structural change.

The information techniques gain significance in this transformation process. The efficiency of many branches already depends on their use of information techniques. Four economically relevant effects should be distinguished:
1. IT as end product (e.g. DP systems)
2. IT as component (e.g. car manufacture)
3. IT as design aid (e.g. CAD in engineering or EDP application)
4. IT systems in the end use (e. g. in finance and accounting)

A considerable economical effect can be expected in the future outside the information industry, namely in places where the extensive application of information techniques opens up new markets for goods knowledge, finances, production techniques and services. It should be shown that the structural change will be determined in the secondary sector as well as in the tertiary sector by the extension of the information techniques.

Innovation and Qualification – Company and Political Strategies
Dr. Hans-Herbert Wilhelmi

A simple formula is: Machines have increased human power, information techniques increase human intelligence. Programmable information processing for every one is no longer a

slogan, rather reality for all types of manufacturers and users. Science and technique drive forward with this process, economy transfers it into new products or new production processes. These are partly new working aids or working processes.

Innovation competition characterizes the competition between developed countries and also between them and the developing countries forced on the market. Rapid control and economical use of new technologies is an important prerequisite for economic success. There is a basic connection between innovation and qualification. On the one hand the role of the human being changes in the economic and working process, while on the other hand, there is already proof that the application of new technologies contributes to the humanization of the working world and that the accelerated work sharing can be reduced.

The motto "no innovation without qualification" means that the situation and requirements of all participating persons should be considered – from management to skilled and unskilled. That means an extraordinary challenge for the education system, in the general as well as vocational education. Public education authorities and industry are requested to accept this challenge. In the coming years, priority will be placed on further education. Not only vocational and workplace-related measures should be given priority; many more must be simultaneously considered, such as status, hierarchy, flexibility and mobility problems, in order to give the employees a chance to share in the changes and the responsibilities.