Norbert Szyperski | Erwin Grochla

# Design and Implementation of Computer-based Information Systems

INFORMATION SYSTEMS

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# DESIGN AND IMPLEMENTATION OF COMPUTER-BASED INFORMATION SYSTEMS

edited by

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Erwin Grochla

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BIFOA is the Institute for Business Administration, Organization and Automation at the University of Cologne, Federal Republic of Germany.



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# DESIGN AND IMPLEMENTATION OF COMPUTER-BASED INFORMATION SYSTEMS

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# Preface

From 18th to 20th September, 1978, about forty scientists and practitioners from Australia, Canada, Denmark, Finland, Great Britain, the United States and the Federal Republic of Germany joined in an international symposium entitled "Design and Implementation of Computer-based Information Systems".

This symposium was initiated by the invitation of the BIFOA (*Betriebswirtschaftliches Institut für Organisation und Automation an der Universität zu Köln*) as a part of the institute's research project IMPLAN (Development of Tools for the IMPLementation of Computer-based PLANning Systems).

This book includes the opening address, the papers presented at the symposium —revised by the authors after presentation—the chairmen's summaries of the various working group sessions, and an edited version of the concluding "Blueprint for Research on Implementation".

# Acknowledgements

The symposium was made possible by a federal grant from the *Bundesminister für Forschung und Technologie* (BMFT), Bonn, represented by the *Gesellschaft für Mathematik und Datenverarbeitung* (GMD), St. Augustin, who sponsored the whole IMPLAN research project and the symposium. We are extremely appreciative of their valuable cooperation and support; in this respect our special thanks go to Mrs. Katharina Gregor and Dr. Jürgen Marock of the GMD.

Our sincere thanks and appreciation are due to the authors for the many hours of work, for their contributions and for preparing and revising them after the symposium. We appreciate the valuable help of the chairmen for conducting the working sessions and preparing summaries of the sessions.

We should also like to extend our thanks to Mr. Frank Kolf, Mr. Hans-Jürgen Oppelland and Dr. Thilo Tilemann (all of the BIFOA) for their help in preparing the concept of the symposium. We appreciate the unstinting efforts of Mr. Hartwig Garmers and Mr. Albrecht Windler (both of the BIFOA) for their help in the organising and smooth running of the symposium. They also made valuable contributions towards the preparation of the present book.

Finally we express our sincere thanks to Sijthoff & Noordhoff International Publishers, especially to Mr. Arne Visser and Mr. Robert Lyng, for their support in editing the proceedings of the symposium and for the excellent care they have taken over printing this publication.

Cologne, August 1979

Erwin Grochla
Norbert Szyperski

# Opening Address

by Prof. Erwin Grochla, Ph.D.

It is a great pleasure for me to welcome all of you as participants of this symposium. Since many of you are attending a BIFOA-symposium for the first time, I would like to give you some general information about our institute, its scope of activities and its research philosophy. BIFOA is an abbreviation which stands for Betriebswirtschaftliches Institut für Organisation und Automation an der Universität zu Köln. The institute was founded in 1963 by me in cooperation with managers from business practice. The main purpose of the institute has been to intensify research in the fields of Business Administration and Management as well as Organization and Automation.

Throughout the past years the institute developed its particular research philosophy which has proved to be very successful up to now. To make this clearer let me shed some more light on this particular aspect. First of all, the institute attempts to emphasize the practical application of its research results. This is achieved through a close cooperation with pilot user-companies and software companies in the various projects that have been undertaken by the institute and through the manifold seminars and workshops that are offered by the institute for managers from business practice.

Apart from this close cooperation with business practice, the institute emphasizes the permanency of its contacts with academic institutions such as universities. Especially to be mentioned are personal relationships with the *Seminar für Allgemeine Betriebswirtschafslehre und Organisationslehre* (Department for Business Administration and Organization), the *Seminar für Allgemeine Betriebswirtschaftslehre und Planung* (Department for Business Administration and Planning), the *Institut für Informatik* (Institute for Informatics), all of which belong to the University of Cologne. Apart from this, the BIFOA has a strong personal relationship with the University of Essen.

The activities of the BIFOA are to communicate, show applications, and to elaborate research results in special study circles consisting of members from the institute and from business practice, in workshops, seminars, and international symposia as well as in publications. To be able to undertake its projects, the institute participates in governmental programs such as the Federal Government programs for the development of automatic data processing, information and documentation, and the humanization of work organization. It is essential for the institute to perform all of its activities in close cooperation and with intensive feedback from German industry. German industry is represented in an association that was founded for the financial and nonfinancial support of the institute. This association was founded in 1963 by fourty business firms; currently this association has about 140 member firms.

The milestones in the past work of BIFOA were:

—First memorandum of BIFOA published in 1968:
"Application Systems for Automated Date Processing: The Gap between Research and Education in the Federal Republic of West Germany."

—Second memorandum, published in 1969:
"Business Informatics as a Necessary Application Oriented Supplement to General Informatics."

—Model for the Development of an Integrated Data Processing System (KIM—*Kölner Integrationsmodell*)

—Proposition of a MIS-research program to the Federal Ministry of Education and Science.

Currently the institute has a broad range of research activities which seem to be of high practical interest. One field is the production of data. Another field of research is office automation and automated text processing, both being of utmost importance in German industry. Yet another subject of BIFOA-research are methods of systems planning and documentation. Besides this, a broad field is the development of practical aids for particular managerial decisions. The three decision areas currently studied are materials management, organizational delegation and the selection of ADP-facilities. Another area of BIFOA-research is the organizational implementation of systems which is the topic of this symposium.

Former symposia were held on

—Model and Computer-based Corporate Planning

—Management Information Systems—A Challenge to Research and Development

—Organizational Structure and Structure of Information Systems

—Man-Computer-Interaction in Management Planning

—Modelling Tools for Corporate Planning.

After these introductory remarks let me try to give a first definition of what is to be understood by implementation, and let me equally describe the context of the present symposium.

The general purpose of implementation is to transfer conceptual schemes into reality, that is to say into actual running systems. Implementation processes always have to focus upon two aspects, a systems technical aspect, and an organizational aspect. Both are equally important and require a broad set of concepts and techniques in order to be performed in an efficient way.

The organizational implementation includes the setting of systems-specific and organizational rules for the users of a prospective system as well as the systematic training of the users to enable them to interact with the system. The system implementation process thus covers a whole set of technical, organizational, and, last but not least, psychological problems that still require thorough research.

The background of the present symposium is the BIFOA project IMPLAN (as mentioned in the foreword). The structure of the proceedings reflects that this project is composed of two related subprojects of the institute. The first is PORGI

which stands for Planning of Organizational Implementation. It deals with organizational and human aspects of implementation, as an attempt to develop procedural and substantial concepts and tools for preventing and overcoming implementation problems. The second is APIS which stands for Development of Models for Analysis and Planning in Interactive Systems. APIS deals with problems of modeling methods and data processing-technical questions in the design and implementation of systems. It is intended to give procedural help especially for medium-sized firms.

Due to our experience in the development of running systems (ISAS, CORPIS) and methods (SIMMIS) in MIS-research, we became aware of the problems of organizational implementation. Our experiences gave us the know-how that is necessary for dealing with the problems. We discovered a lack of knowledge especially in the following respects:

—Organizational and human resistance in the development of systems
—There are few efficient instruments for overcoming the problems of resistance and a lacking acceptance.
—It is necessary to analyze which strategies are efficient in which situations and how to design and shape them in an operational way.
—It is necessary to analyze which of the relevant factors can be influenced at all and in which way they can be influenced.
—It is necessary to analyze which support can be offered to system designers in order to enable them to evaluate design alternatives and alternative models and to identify their consequences.

It has been the objective of this symposium to discuss the problems mentioned so far and possibly others with the participants, and to discuss the results of the project IMPLAN achieved so far and to compare them with other research results and developments.

I would like to emphasize the working atmosphere of this symposium which can already be seen from the fact that most of the participants out of the reasonably small number will present a paper here. Contributions from all of us are needed to tackle the broad set of problems lying ahead of us. The institute therefore highly appreciates all of your submitted papers and welcomes your contributions to the discussions that are to be expected.

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