

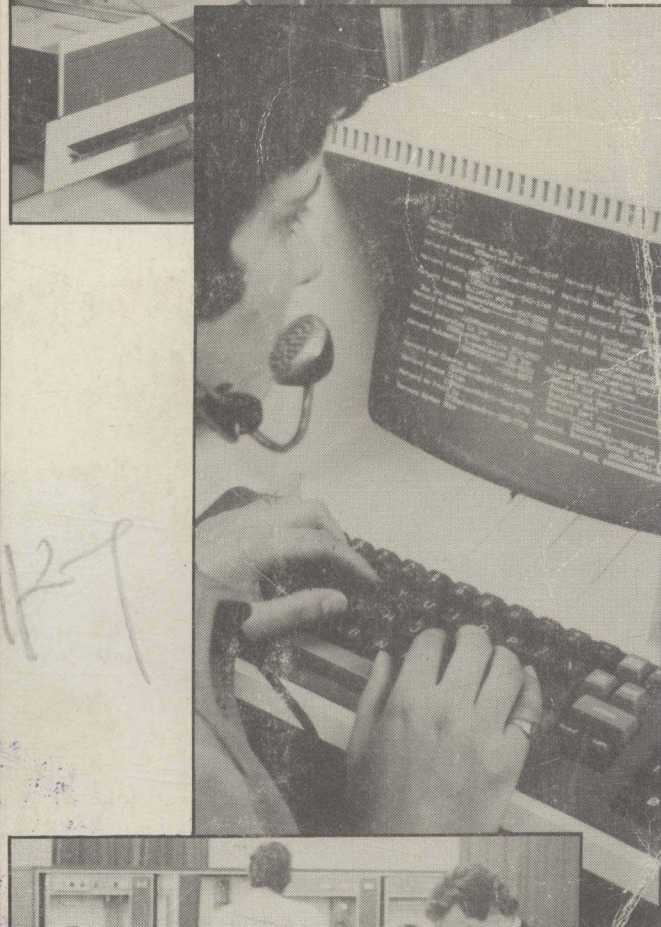
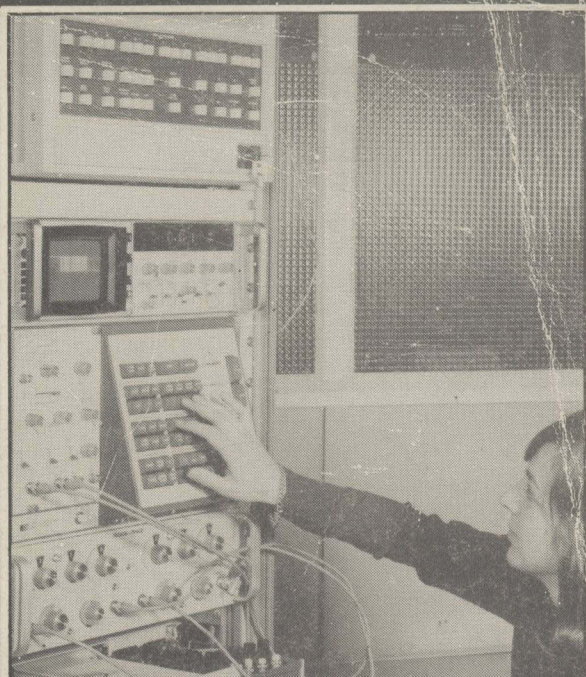
COMPUTERS IN DEVELOPING COUNTRIES

Bibliography

Edited by
S. Deighton



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COMPUTERS IN DEVELOPING COUNTRIES

A BIBLIOGRAPHY

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Computers in Developing Countries

There has been a growing appreciation over recent years of the many positive ways in which computer technology, or 'informatics', can contribute towards national development. At the same time, there is an increasing awareness of the importance of self-reliance, and of the need for developing countries to harness the new technologies effectively and to direct the process of technology transfer towards this end.

These questions have been the recurrent themes of discussion within the Developing Countries Group of the British Computer Society since its formation in 1976, and a considerable body of literature has now grown up around this subject area. We are grateful to Suzan Deighton of the I.E.E. for undertaking the preparation of this annotated bibliography and commend it warmly to all those with an interest in the field. So far as we know, it is the first of its kind.

Ian Shearer
Secretary, Specialist Group
for Developing Countries

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1. General

1.1 Official Reports

1.1.1

PROCUREMENT OF COMPUTER PRODUCTS AND SERVICES BY USERS IN DEVELOPING COUNTRIES

R.A. Simmons (Office for Science and Technology, Dept. of Economic and Social Affairs, United Nations, New York, USA)
(New York, USA: United Nations, 1975), 66p.

1.1.2

REPORT OF THE EXPERT GROUP MEETING CONCERNING THE APPLICATION OF COMPUTER SCIENCE AND TECHNOLOGY FOR THE BENEFIT OF DEVELOPING COUNTRIES

(Office for Science and Technology, Dept. of Economic and Social Affairs, United Nations, New York, USA)
(New York, USA: United Nations, 1975), 25p.

Report on the application of computers and communication technology for economic development in developing countries. Includes staff selection and training, data banks and information systems.

1.1.3

SECOND HAND EQUIPMENT IN A DEVELOPING COUNTRY

C. Cooper; R. Kaplinsky; R. Turner
(Geneva, Switzerland: International Labour Office, 1974)

1.1.4

APPLICATION OF COMPUTER TECHNOLOGY FOR DEVELOPMENT; SECOND REPORT OF THE SECRETARY GENERAL

(Dept. of Economic and Social Affairs, United Nations, New York, USA)
(New York, USA: United Nations, 1973), 89p.

Report on the application of computer science to economic and social development. Assesses the current situation in developing and developed countries. Makes recommendations on national government policy formation, training of computer personnel and international cooperation.

1.1.5

IMPROVING MANAGEMENT'S USE OF COMPUTERS IN DEVELOPING COUNTRIES

(Human Resources Development Dept., Management Development Branch, International Labour Office, Geneva, Switzerland)
(Geneva, Switzerland: International Labour Office, May 1972)

1.1.6

THE APPLICATION OF COMPUTER TECHNOLOGY FOR DEVELOPMENT

(Dept. of Economic and Social Affairs, United Nations, New York, USA)

(New York, USA: United Nations, 1971), 122p.

Report on computer applications for the economic development of developing countries. Covers the vocational training of EDP personnel, the activities of the U.N. and specialized agencies, the impact of computer-based technological change on employment, etc. and comments on relevant patents, copyright and tariff legislation.

1.1.7

COMPUTER COMMUNICATIONS POLICIES FOR DEVELOPMENT: A REPORT

P. Robinson (Office for Science and Technology, Dept. of Economic and Social Affairs, United Nations, New York, USA)
(New York, USA: United Nations, 1975), 37p.

Computer communications technologies for the economic development of developing countries. Includes details on national government policies.

1.1.8

CAN DEVELOPING COUNTRIES BENEFIT FROM COMPUTER TECHNOLOGY?

G.A. Pollitzer (University of Buenos Aires, Buenos Aires, Argentina)

(Geneva, Switzerland: United Nations, 1971)

1.1.9

COMMUNICATIONS, COMPUTERS AND AUTOMATION FOR DEVELOPMENT
(UNITAR RESEARCH REPORTS NO. 6)

I. Sola Pool; P. Stone; A. Szalai (Institute for Training and Research, United Nations, New York, USA)

(New York, USA: United Nations, 1971), 61p.

Futuristic speculation on the implications of technology transfer to developing countries in the framework of the second development decade, with particular reference to the applications of automation, computer usage and mass communication media.

1.1.10

COMPUTERS AND DEVELOPING COUNTRIES

V. Rajaramen

(New York, USA: United Nations, 1971)

1.1.11

OPTIMAL USAGE AND BENEFITS FROM COMPUTERS IN DEVELOPING COUNTRIES: PAPER PREPARED AT THE REQUEST OF THE U.N. SECRETARY GENERAL

N.W. Parlar (Electrical Engineering Dept., Middle East Technical University, Ankara, Turkey)

(New York, USA: United Nations, 1971)

1.1.12

INTERNATIONAL EXPERIENCE IN AUTOMATION - COMPUTER PROBLEMS

R. Kulkarni

(Bombay, India: National Federation of Petroleum Workers (India),
1968)

1.2 Conference Proceedings

1.2.1

GLOBAL POLITICAL FACTORS

L.G. Burchinal (Dept. of Sci. Information, Nat. Sci. Foundation, Washington, DC, USA)

Information Demand and Supply for the 1980's, Washington, DC, USA, 23-24 June 1976, (Paris, France: ICSU AB, 1978), p.151-61

The sharing of scientific and technical information with the developing countries is a global political factor that will continue into the 80's. Access services will benefit from this awareness and will continue to effect the technical advances that they have contributed in the past. The next decade will see full text searching in natural languages combined with distributive networking. It will be imperative, however, to protect and stimulate the economic viability of the private services while meeting the developing countries' user needs.

1.2.2

SOME CONSIDERATIONS ON INFORMATION TRANSFER FOR DEVELOPING COUNTRIES

A. Wysocki (UNISIST, UNESCO, Paris, France)

Information Demand and Supply for the 1980's, Washington, DC, USA, 23-24 June 1976, (Paris, France: ICSU AB, 1978), p.137-49

The transfer of technological information will play a major role in efforts to include information on alternative technologies, sources of supply, minimum costs, guarantees of delivery and specifications, and manpower requirements. In order to achieve this, national information capabilities must be organized in a coordinated manner to include the placement of infrastructures, training of personnel, improvement of communication, and access to international networks.

1.2.3

BUILDING COMPUTERS IN A DEVELOPING COUNTRY

U. Galil (Elbit Computers Ltd., Haifa, Israel)

Information Technology 78, Jerusalem, Israel, 6-9 Aug. 1978, edited by J. Moneta, (Amsterdam, Netherlands: North-Holland, 1978), p.133-5

1.2.4

THE EVALUATION OF COMPUTER SYSTEMS FOR DEVELOPING COUNTRIES

R.A. Kanga

Information Technology 78, Jerusalem, Israel, 6-9 Aug. 1978, edited by J. Moneta, (Amsterdam, Netherlands: North-Holland, 1978), p.655-660

The paper explains why evaluations are necessary for determining the appropriateness of computer usage in different application areas in developing countries. It mentions some methods of evaluation including one which can take account of national objectives such as income growth and income distribution. It

then discusses some practical problems which arise when attempts are made to evaluate computer systems from a national viewpoint and suggests some possible solutions.

1.2.5

GUIDELINES FOR THE ESTABLISHMENT, MANAGEMENT AND MAINTENANCE OF SMALL AND MEDIUM SIZE COMPUTER INSTALLATIONS IN DEVELOPING COUNTRIES

Y. Paker (UER Mathématiques et Informatique, Université de Rennes, Rennes, France)

Information Technology 78, Jerusalem, Israel, 6-9 Aug. 1978, edited by J. Moneta, (Amsterdam, Netherlands: North-Holland, 1978), p.649-653

For the advancement of computer know-how in a developing country, the so called "minicomputers" have a special role to play. Under UNESCO sponsorship this author has written a document to serve as a guide book for those institutions interested in establishing a small-medium size computer centre. In the paper, based on this document, a classification of computer activity is presented. Then the importance of mini-computers which offer considerable computing power at low cost is emphasized. A classification of small-medium size computers is given. Computer configuration and selection, in the absence of full documentation, becomes a difficult task. A checklist to help to draw up the specifications and architectural aspects is included. Finally, management aspects are discussed. (6 refs)

1.2.6

TECHNOLOGY TRANSFER FROM DEVELOPED TO LESS DEVELOPED COUNTRIES. AN ANALOGY WITH THE TECHNOLOGY TRANSFER FROM GOVERNMENT LABORATORIES TO INDUSTRY

D.A. Golden (Telesat Canada, Ottawa, Canada)

Information Technology 78, Jerusalem, Israel, 6-9 Aug. 1978, edited by J. Moneta, (Amsterdam, Netherlands: North-Holland, 1978), p.1-7

This paper is a general outline of the transfer of technology process from developed countries (DC) to less developed countries (LDC) and a comparison with the transfer process when the parties are a government laboratory and industry within a developed country. The essence and the objectives of the transfer of technology are considered and the characteristics common to all transfers of technology are discussed. Consideration is given to the roles played by the donor and the recipient in such transfers. Stress is laid on the human factors involved and the fact that a transfer of technology can only be successfully achieved when each party fully understands the motivation of the other, the specific terms of the agreement and the probable downstream results of their collaboration. Examples are given of a number of successful transfers of technology in the Canadian experience. (10 refs)

1.2.7

TOWARDS A NATIONAL POLICY FOR INFORMATICS DEVELOPMENT

C.A. Rodriguez P. (General Secretary of Public Administration, Quito, Ecuador)

Information Technology 78, Jerusalem, Israel, 6-9 Aug. 1978, edited by J. Moneta, (Amsterdam, Netherlands: North-Holland, 1978), p.643-647

The adoption of a national policy for the development of informatics in Ecuador is an integral part of the policy outlined within the framework of the Administrative Development Program which is being implemented by the Government of Ecuador. The actions undertaken in this field by the Coordinating Group for Administrative Development, under the direction of the Public Administration's Secretariat General, have succeeded in integrating the isolated efforts previously made by public institutions that possess installed capacity for automatic data processing. Most significant results have been obtained as a consequence of research and of national as well as international conferences held in the country during the past two years. The awareness of the importance of informatics has spread throughout the public sector, and as a result there is now a national consensus regarding the objectives of a nationwide informatics policy as outlined in this paper.

1.2.8

THE TRANSFER OF COMPUTER TECHNOLOGY

H.D. Huskey (University of California, Santa Cruz, CA, USA)
Information Technology 78, Jerusalem, Israel, 6-9 Aug. 1978, edited by J. Moneta, (Amsterdam, Netherlands: North-Holland, 1978), p.253-259

Successful transfer of computer technology is defined. Characteristics of computer hardware and software are given. Historical relations between public sector and private sector activities are described. Some options for a developing country are mentioned and development trends are discussed. (12 refs)

1.2.9

THE TRANSFER OF COMPUTER TECHNOLOGY FROM DEVELOPED TO DEVELOPING COUNTRIES

K. Priebe

Information Technology 78, Jerusalem, Israel, 6-9 Aug. 1978, edited by J. Moneta, (Amsterdam, Netherlands: North-Holland, 1978), p.109-13

The paper discusses some of the problems involved in the transfer of computer technology from a developed country to a developing country. It discusses some of the methods of technology transfer currently used and offers an alternative technique.

1.2.10

CAN DEVELOPING NATIONS TAKE A QUANTUM JUMP IN UTILIZING COMPUTERS?

R.C. Sprowls (Graduate School of Management, University of California, Los Angeles, CA, USA)
Computer Applications in Developing Countries, Bangkok, Thailand, 22-25 Aug. 1977, edited by J.A. Jordan and K. Malaivongs, Vol. 1, (Bangkok, Thailand: Asian Institute of Technology, 1977), p.17-36

1.2.11

EFFECTIVE COMPUTER UTILIZATION IN DEVELOPING COUNTRIES: POLICY QUESTIONS AND IMPLEMENTATION PLANS

M.E. Muller; W.F. Rayfield (Computing Activities Department, World Bank, Washington, DC, USA)
Computer Applications in Developing Countries, Bangkok, Thailand, 22-25 Aug. 1977, edited by J.A. Jordan and K. Malaivongs, Vol. 1, (Bangkok, Thailand: Asian Institute of Technology, 1977), p.1-16

The paper begins with an expression of concern for effective utilization of computers. The importance of an existing infrastructure of professional and management experience to have a successful implementation of a computer is noted. Attention is drawn to specific problems of computer technology transfer and the presence of constraints and uncertainty that make it important to plan for flexibility and growth while taking into account the dilemma of use and economies of scale. The role of minicomputers is considered. With these background considerations, attention is then focussed on specific policies and plans to meet the objectives of effective computer utilization. (3 refs)

1.2.12

A FRAMEWORK FOR THE TRANSFER OF SYSTEMS TECHNOLOGIES TO DEVELOPING COUNTRIES

R.C. Barquin (IBM Americas/Far East Corporation)
Computer Applications in Developing Countries, Bangkok, Thailand, 22-25 Aug. 1977, edited by J.A. Jordan and K. Malaivongs, Vol. 1, (Bangkok, Thailand: Asian Institute of Technology, 1977), p.47-63

This paper attempts to described a framework within which developing countries should analyze transfer of systems technology. Systems technologies are defined as those where a large number of components interact in systems fashion to produce the characteristic output of the technology. The framework itself consists of six phases: (1) Determine the degree of penetration. (2) Define the technological alternatives. (3) Identify the gatekeepers. (4) Identify and study the actors, channels and mechanisms. (5) Analyze the social, political and economic effects. (6) Define a structure for policy formulation. (16 refs)

1.2.13

THE MICRO-PROCESSOR REVOLUTION - ITS IMPACT ON THE DEVELOPING COUNTRIES

C.A. Argila (University of the Philippines, Diliman, Quezon City, Philippines)

Computer Applications in Developing Countries, Bangkok, Thailand, 22-25 Aug. 1977, edited by J.A. Jordan and K. Malaivongs, Vol. 2, (Bangkok, Thailand: Asian Institute of Technology, 1977), p.1183-95

The micro-processor, which is no doubt one of the greatest technological achievements of our age, has brought to the developing countries the potential for taking a quantum jump in economic and scientific development. In this paper we give a historical critique of the micro-processor, a brief survey of the current state-of-the-art in micro-processor technology and micro-processor based hardware, we describe two projects based on the new technology (a computer-oriented mathematics curriculum and a program in computer assisted instruction) and discuss some of the non-technical aspects of the "micro-processor revolution".

1.2.14

NATIONAL PLANNING FOR INFORMATICS IN DEVELOPING COUNTRIES, proceedings of the IBI International Symposium, Baghdad, Iraq, 2-6 November 1975, organized by National Computers Centre of Iraq - NCC. Edited by G.R. Pipe and A.A.M. Veenhuis. (Amsterdam, Netherlands: North-Holland, 1976), 531pp.

Several major dimensions of informatics are treated in detail in the papers presented in this volume. Together with the introductory statements and recommendations, these proceedings represent an important advance in implementing national informatics strategies and policies in developing countries.

1.2.15

COMPUTER NEEDS AND COMPUTER PROBLEMS IN DEVELOPING COUNTRIES

H.D. Huskey (Univ. California, Santa Cruz, CA, USA)

7th Hawaii International Conference on System Sciences, Supplement, Honolulu, Hawaii, 8-10 Jan. 1974, (North Hollywood, CA, USA: Western Periodicals, 1974), p.59-65

This paper surveys the computer environment in a developing country. Levels of development are considered and the educational requirements of countries at various levels are discussed. Computer activities in India, Burma, Pakistan, Brazil and a United Nations sponsored educational centre in Hungary are all described. (8 refs)

1.2.16

RESPECTING LEGAL RULES IN DESIGNING COMPUTER APPLICATIONS
R.N. Freed (Peabody, Brown, Rowley and Storey, Boston, Mass., USA)

2nd Jerusalem Conference on Information Technology: Computers for Social and Economic Technology, Vol. I, Jerusalem, Israel, 29 July-1 Aug. 1974, edited by C.C. Gotlieb and H. Maisel, (Jerusalem, Israel: ILTAM Corp. for Planning and Res., 1974), p.627-33

Persons in developing countries handling the acquisition of computer systems and persons designing these systems should be aware of the variety of legal techniques and rules of law relevant to these activities. Failure to do so can handicap computer users severely through serious supplier defaults and oversights in complying with legal requirements regarding such items as types and forms of records to be made and kept and legal liability obligations. The experience in the United States provides some guidance in handling this problem. After long failure to heed warnings of the significance of legal considerations, during which many transactions turned out very unsatisfactorily and ended up in litigation, computer users and system designers finally are starting to give the necessary constructive attention to legal considerations. (6 refs)

1.2.17

WHAT DOES A DEVELOPING COUNTRY EXPECT FROM INTERGOVERNMENTAL CO-OPERATION IN INFORMATION TECHNOLOGY?

F.K. Chapman-Wardy

Symposium on Systems Approaches to Developing Countries, Algiers, Algeria, 28-31 May 1973, edited by M.A. Cuenod and S. Kahne, (Pittsburgh, PA, USA: ISA, 1973), p.499-502

1.2.18

THE CREATION OF A CENTRAL SYSTEMS DEVELOPMENT UNIT FOR GOVERNMENT INFORMATICS SYSTEMS IN DEVELOPING COUNTRIES

A. Ireland

Papers of the IBIICC First World Conference on Informatics in Government 1972, Venice, Italy, 16-20 Oct. 1972, (Rome, Italy: Intergovernmental Bureau for Informatics, 1972), p.377-93

(In French & English)

(10 refs)

1.2.19

DEVELOPING COUNTRIES AND INFORMATICS

K. Best

Papers of the IBIICC First World Conference on Informatics in Government 1972, Pt. III, Venice, Italy, 16-20 Oct. 1972, (Rome, Italy: Intergovernmental Bureau for Informatics, 1972), p.832-3

Discusses the present and possible future roles of computers in government and industry in Liberia.

1.2.20

NATIONAL HARDWARE AND SOFTWARE PROCUREMENT POLICIES FOR
DEVELOPING COUNTRIES

A. Benjamin

Papers of the IBIICC First World Conference on Informatics in
Government 1972, Venice, Italy, 16-20 Oct. 1972, (Rome, Italy:
Intergovernmental Bureau for Informatics, 1972), p.77-86

Developing countries are vitally concerned with computing
progress and realise that they must participate in this progress.
The purpose of this paper is to examine this concern and
participation in order to provide a check-list of actions for
developing countries in their computing activities. In
particular, the paper concentrates on hardware and software
procurement as a means of controlling and making effective this
participation in computing progress.

1.2.21

OBJECTIVES OF AND METHODS FOR NATIONAL POLICIES ON INFORMATICS

B. Jalon (Sinorg, Nairobi, Kenya)

Papers of the IBIICC First World Conference on Informatics in
Government 1972, Venice, Italy, 16-20 Oct. 1972, (Rome, Italy:
Intergovernmental Bureau for Informatics, 1972), p.394-6
(In French & English)

The paper discusses a government ADP policy for developing
countries. The structure of computer centres and the kind of
expertise required is dealt with.

1.2.22

COMPUTER TECHNOLOGY AND THE DEVELOPING COUNTRIES: AN EXPANDING
VISTA FOR USEFUL INTERNATIONAL CO-OPERATION

B. Barg (Office Sci. and Technol., United Nations, New York, USA)
Proceedings of the Jerusalem Conference on Information
Technology, Jerusalem, Israel, 16-20 Aug. 1971, (Jerusalem,
Israel: ILTAM Corp. Planning and Res., 1971), p.37-88

This paper considers a report which gives special consideration
to the situation of the developing countries with regard to:
the results already obtained and the needs and prospects for the
use of electronic computers in accelerating the process of
economic and social development; the various forms which
international action may take to intensify co-operation in the
field of computers; the role which the United Nations can play
in promoting international co-operation in that field, with
emphasis on questions concerning the transfer of technology,
the training of personnel and technical equipment.

1.2.23

MANAGEMENT OF COMPUTER RESOURCES IN LDC'S

E. Friedmann

Proceedings of the Jerusalem Conference on Information
Technology, Jerusalem, Israel, 16-20 Aug. 1971, (Jerusalem,
Israel: ILTAM Corp. Planning and Res., 1971), p.295-309

Modern technology and modern management are essential tools

that less developed countries (LDC's) need in order to achieve their economic and social goals within the constraints of time and bearable hardships that their populations are prepared to accept. The key role of computers in the effective application and further program of technology and management makes it imperative to give the highest priority to its appropriate introduction in LDC's and for this purpose the lessons that have been learned in the advanced countries (AC's) about the uses and management of the computer must be passed on in order to avoid failures and waste they cannot afford. (16 refs)

1.2.24

RESEARCH AND DEVELOPMENT

S. Ruhman (Weizmann Inst. Sci., Rehovot, Israel)

Proceedings of the Jerusalem Conference on Information Technology, Jerusalem, Israel, 16-20 Aug. 1971, (Jerusalem, Israel: ILTAM Corp. Planning and Res., 1971), p.250-2

A natural development of the computer area in a developing country might start with an application phase when computers are procured from abroad along with all associated services for government agencies and public institutions capable of using them effectively in administration, planning, development and education. A support phase would follow when local talent takes over system analysis, application programming, and perhaps also software and hardware maintenance. Assuming an active parallel program of education in mathematics, science, and engineering, a third phase should be reached when advanced study and research in computer science is undertaken, hardware and software systems are developed, mostly special purpose, and mainly for local use. Finally under special circumstances, a fourth phase may be reached, one of major innovation and industrial production.

1.2.25

SERVICES ESSENTIAL TO GOOD UTILIZATION

G. Akos

Proceedings of the Jerusalem Conference on Information Technology, Jerusalem, Israel, 16-20 Aug. 1971, (Jerusalem, Israel: ILTAM Corp. Planning and Res., 1971), p.1-19

In this paper, the organisational conditions for high computer utilization are discussed, with respect to developing countries. Another important aspect is emphasised here: the educational aspect of the preconditions to computing.

1.2.26

SYSTEMS APPROACHES FOR DEVELOPMENT

G.B. Gresford

Joint National Conference on Major Systems (abstracts only received), Anaheim, CA, USA, 25-27 Oct. 1971, Publ.: Bull Op. Res. Soc. Am. (USA), Vol. 19, Sup. 2, p.B222, 1971

Abstract only received substantially as follows. Some of the approaches being developed within the management sciences can assist in a more effective definition of some of the critical