

MODELLING AND ANALYSIS OF MANAGEMENT INFORMATION SYSTEM ARCHITECTURE AT NATIONAL LEVEL

by

Manmohan Prasad Gupta
CENTRE FOR MANAGEMENT STUDIES

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CERTIFICATE

The Thesis entitled, "Modelling and Analysis of Management Information System Architecture at National Level" submitted by Mr. Manmohan Prasad Gupta to the Indian Institute of Technology, Delhi, for the award of the degree of 'Doctor of Philosophy', is a record of bonafide research work carried out by him. He has worked under my guidance and supervision and has fulfilled the requirements for the submission of this thesis, which has attained the standard required for a Ph.D. degree of this Institute. The results presented in this thesis have not been submitted elsewhere for the award of any degree or diploma.



(SUSHIL)

Centre for Management Studies
Indian Institute of Technology, Delhi
New Delhi-110 016, (INDIA)

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ABSTRACT

This thesis aims at developing a methodology for modelling and analysis of MIS architecture for large scale strategic decision making systems in which ingredients of systems approach philosophy have been taken as a prime basis of its conceptual and theoretical essence. Structural or architectural design and analysis of MIS through this methodology provides important guidelines to planning of the detailed system design activities.

Initially, a general introduction to the problem is given with an overview of the systems and MIS concepts. A review of the literature is reported and it is attempted to present the growth of the different facets of the subject in chronological order. It is observed that current state of the art is disappointing, and there is vast potential for improvement.

Need for this methodology arose when a study of MIS of national level planning and decision making system (NPDMS) was carried out through a survey in Indian context. It has subsequently been emphasised that such a mega size systems need holistic and integrated approach to MIS development. National level economic system should, thus, follow a holistic economic planning where aspects relating to waste management get explicit considerations. Hence a waste management information system should be an integral part of the MIS in operation. A conceptual framework has been presented dealing with these aspects.

The methodology (MISARC) has been developed in two phases. The first phase INFLOS deals with the aspects of structural design and analysis of the MIS. Interpretive Structural Modelling (ISM), MICMAC method and Fuzzy Set Theory have been integrated to

make the INFLOS a useful tool. Extensive users involvement in the exercise is essential feature of the methodology.

Second phase of MISARC has been named INFOSYS for facilitating a meta level analysis of the MIS architecture obtained through INFLOS. It provides four alternative frameworks of analysis of the three key variables associated with the information linkages in the MIS architecture. These variables are information resource flow, its quality and cost associated with the resource flow. Analysis of these variables is also possible attribute-wise. INFOSYS frameworks or versions contain unique features for serving the different problem situations. Broadly it facilitates quantitative as well as qualitative analysis requirements. The methodology incorporates valuable ingredients of soft system approach.

Various stages of INFLOS and INFOSYS have been illustrated through a national level system catering to environment control policy implementation. Application and utility of MISARC have also been described for larger and more complicated system at national level making explicit provision for waste management activities embedded with the existing system. The problem area deal with the technical development issues of planning and decision making system at the national level.

Finally, in the end, it has been endeavoured to draw conclusions based on comprehensive synthesis of research reported in different chapters. Apart from the contributions, limitations of the study and scope for future research have also been identified. The thesis concludes with a detailed listing of references and a set of appendices.

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