TOWARDS A NATIONAL POLICY FOR THE APPLICATION OF COMPUTER TECHNOLOGY IN DEVELOPING COUNTRIES

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INTRODUCTION

1. BACKGROUND

Developing countries are faced with the difficult task of mobilizing their resources to enhance economic and social development. The resources are usually scarce and tightly stretched although a few countries are endowed with sufficient natural resources to form a basis for a rapid economic and social development.

In the utilization of these resources, however, all developing countries rely heavily on the technology of developed countries. This transfer of technology has recently raised several questions with regard to the relevance of the transfered technology to the problems of the countries, the extent to which such transfer should be maintained, whether developed countries are passing over only obsolete technology and whether such transfer is discouraging developing countries from initiating their own autonomous technological development. If, for example, a developing country is employing an extensive industrialization plan it may start importing a number of factories from developed countries and establish them in different regions according to certain criteria concerning availability of raw materials, etc Some of these regions may not be very developed and in some cases may even be inhabited by nomads.

The introduction of an industrial scheme of that kind, even if justified by the rationale of settling the nomads and/or maintaining a balanced regional growth, would precipitate these people from a nomadic or rural community into an industrialized state. In other words, the change will radically transform the pattern of their living.

The risk in such a development is that people skip the period of conversion or orientation usually allowed for in a slow development process. A greater risk, however, is that people concerned with development may not be aware of such a danger and even if they are aware, they may not have adequate understanding of its nature to propose a suitable remedy.

Developing countries, therefore, cannot accept the transfer of technology from developed countries without evaluating the technology with respect to its contribution to their social and economic development and at what cost. Such an evaluation assumes clear and precise definition of the goals and direction of economic and social development. Without this definition there is a risk that any technology transferred may be used in areas which are not conducive to development resulting in waste of resources, time, and a slowing down of the development process itself. Computer technology is no exception.

In developed countries the so-called computer revolution has been preceded by the industrial revolution. Consequently, the introduction of computers was preceded by an intensive process of industrialization that brought a degree of discipline and formality to the technical and administrative systems. At the same time research activities have reached a stage where manual and mechanical means of calculations were proving to be a serious handicap.

If an analysis is made of the environment in which computers were first used in developed countries, one would broadly expect to find the following characteristics :-

(a) A competitive economy that urged organizations to adopt 'the most efficient means' of running their businesses-even though it might have been just for the sake of status or public image.

(b) The availability of funds to finance investment on computers.

(c) A generally literate population.

(d) The majority of the populations being familiar with many technical devices through their use in daily life.

(e) A fairly large pool of technical specialists.

(f) A system approach that has continued to develop as computers have reached large scale production.

(g) A high cost of labour that made substitution of labour by capital economically desirable.

(h) Scientific research and development of research techniques such as operational research, specially after World War 1, have greatly enhanced the need for faster computation machines.

In other words, developed countries were ready for the computer technology and the ingredients for its successful application already existed. That has not meant that all computer applications have been successful. Many applications were complete failures mainly because of reasons unrelated to the nature of the technology itself, for example, lack of understanding of organisational problems, lack of management involvement; technocratic approach to system design, etc.

Thus, to attempt to 'transplant' computer technology to developing countries without any understanding of such countries, needs and environmental problems, is very risky and the consequences of rejection would almost be disastrous. Nobody doubts that developing countries may have genuine needs for computer technology, but without precise definition of those needs computer technology cannot be brought to fruition.

If we regard computer technology as an informatic agent of change, then we may broadly define the framework within which computer technology may be used in developing countries Having scarce resources, every developing country should have adequate information about its resources, how efficiently they are utilized and in what direction they should be allowed to be consumed or allowed to grow. There should be a constant flow of information between central and regional authorities. This flow of information in most developing countries is hindered by lack of proper recording, poor statistical surveys, inadequate methods and sluggish bureaucratic procedures. Information is not only out-of-date but often unreliable. Planning and forecasting activities are mostly based on an intuitive and subjective basis. This leads to such numerous changes in the origional plans that the whole exercise of planning is rendered meaningless.

The role of computer technology, however, should not only be in eliminating the negative features of practice in developing countries, but also in a positive contribution to the utilization of resources.

The application or transfer of computer technology is not without problems. As we mentioned earlier it has prospered in a certain environment and great care should be exercised to avoid undesirable effects. Developing countries should have adequate understanding of the technology itself. Such understanding could be achieved only by thorough and careful research and study of existing and possible computer applications

2. METHODOLOGY

(a) Problem Definition

Several statements (1) have advocated that governments should have national computer policies, etc. But generally 'how' to formulate such policies is only vaguely defined. It is hoped that the methodology described below and which has been used in the Sudan, may be of some use to other developing countries.

The first step is to define clearly the problem. Initial definitions usually tend to be vague or too general. It is very beneficial to spend sometime in reaching a detailed definition. This would later facilitate subsequent steps in carrying out the work.

The problem, in general, is how a developing country should approach the application of computer technology to enhance its economic and social development and subsequently raise the standard of living of its people. For investigation purposes, the problem may be divided into three sections :

1. The first section is concerned with the state of development of the economy to determine the areas where potential demand for computers may exist. Since detailed description of the economy is time-consuming and unnecessary, key areas are selected.

2. The second section investigates the existing applications of computers and to what extent they have been successful. It also investigates the attitudes and computer knowledge of prospective computer users, and the attitude of middle management in general.

3. The third section is based on the previous two sections. It arrives at conclusions regarding the areas where computer applications should be encouraged and how the government should seek to use computing facilities in the best possible way. Other policy issues e.g. regarding training and computer acquisition may also be discussed.

(1) United Nations : 'The application of Computer technology for development'. Second Report, U.N. Publication ST-ECA-176, N. Y., 1973

In each of the first two sections a number of questions are asked before the start of the investigation. The advantage of asking detailed questions is that the information needed is eventually defined thus eliminating any vagueness or waste of time in gathering information which is not relevant.

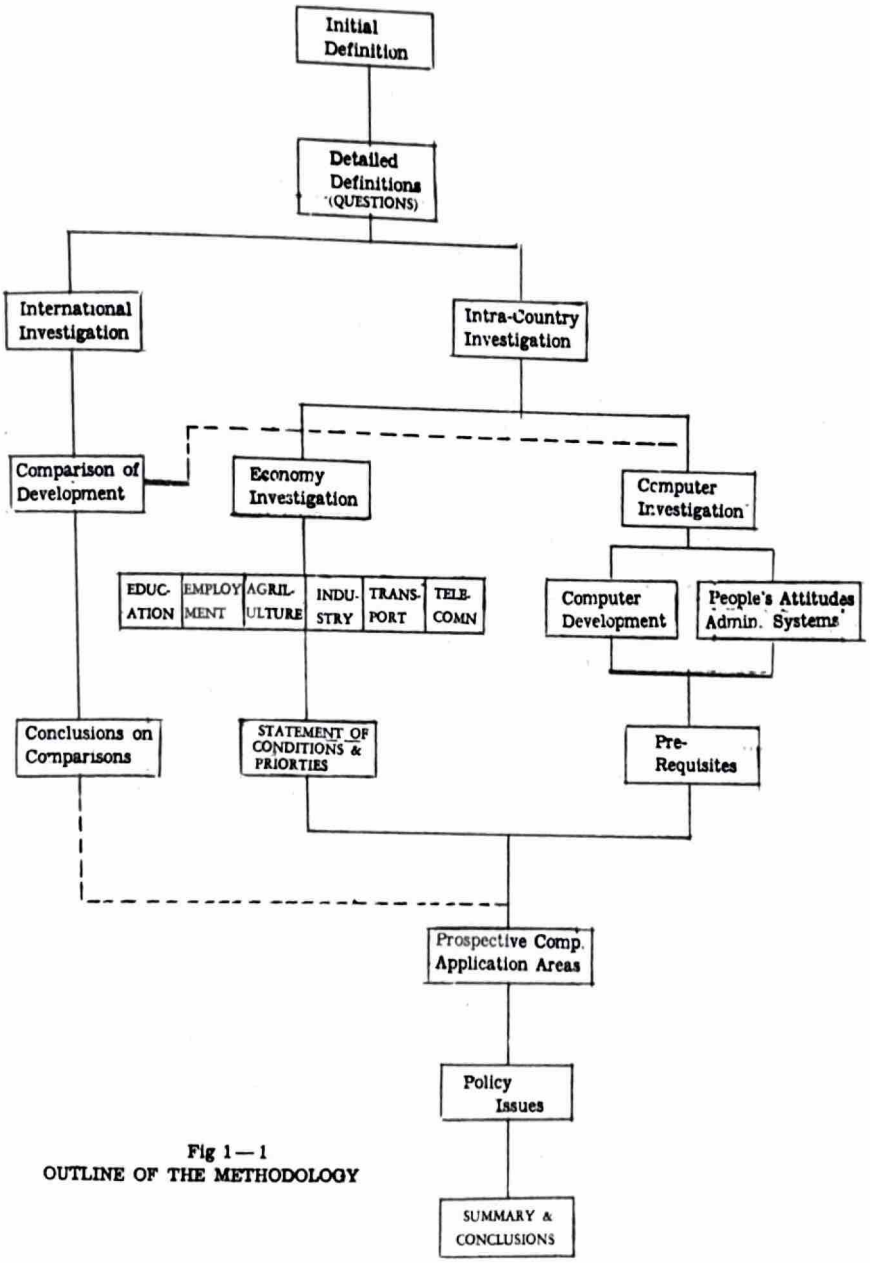

Fig 1—1
OUTLINE OF THE METHODOLOGY

It is always difficult, however, to find information to answer all the questions and it may be necessary to amend, change or delete certain questions at subsequent levels of the enquiry. Yet it is important just to note the absence of information. The questions also help in formulating the questionnaires.

Figure 1 - 1 gives an outline of the methodology. It is bene ficial whenever possible to make use of other countries ex perience and therefore, the outcome of the study should be compared with similar information from other countries.

(b) Data Collection

The information regarding the description of the economy is usually based on economic plans, government documents and reports, bulletins and national statistics. The process of collecting date on the economy may prove to be time-consuming since reports and statements tend to give only a general picture of the economy. Beside the literature search two questionnaires are needed. One to investigate computer development and the other to investigate attitudes of peoples, their perception of and reaction to change .. etc.

Finally all the findings should be pooled together to give an outline of how computer technology should be best utilized. The economy investigation should result in priority areas and applications, whilest the other part of the investigation should give an idea about the resources available, constraints and difficulties to be overcome. ,

REFERENCES

1. UNITED NATIONS; "The Application of Computer Technology for Development;" Second Report, U.N. Publication ST/ECA/176, N.Y.1973

2. EL MILIGI, I.S.: "Computing for Development in the SUDAN." Proceeding of the 13th Conference on Statistics, Computer Science and Operations Research, University of Cairo, Cairo, 1978