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A STUDY OF
THE USE OF COMPUTERS IN MANAGEMENT DECISION MAKING
IN THE PUBLIC SECTOR OF BANGLADESH

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ABSTRACT

Computers can be used in management decision making through decision-oriented data processing and through using computer- based Management Information Systems (MIS) and Decision Support Systems (DSS).

It has become evident from this study that computers are not being significantly used in management decision making through using computer-based MIS and DSS. It has also become clear that the reasons behind this are, lack of growth of MIS expertise, less use of LANs, lack of adequate top management support, and placement of computer departments lower in the management hierarchy. However, there are potentials of future MIS and DSS uses in these organizations. The four problems mentioned above have to be solved in order to achieve significant uses of computers in management decision making in the public sector organizations.

Now it is the business of the computer professionals working in these organizations and their managements to recognize the advantages of MIS and DSS and take necessary measures to solve these problems.

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CHAPTER ONE

INTRODUCTION

Development of this country depends to a large extent on the effectiveness and efficiency of its public sector. Use of computers in public management can significantly increase its effectiveness and efficiency. Computers can assist public managers of all levels in their decision making. Computers can assist public managers not only in day-to-day decision making but also in making planning and policy decisions. By assisting them in making planning and policy decisions, computers can assist them in making better plans and policies.

Computers can be used as a support to management decision making by developing Computer-based Management Information Systems (MIS) and Decision Support Systems (DSS). An MIS may be defined as "... an integrated user-machine system for providing information to support operations, management, analysis and decision making functions in an organization. The system utilizes computer hardware and software; manual procedures; models for analysis, planning, control and decision making; and a database" (Davis and Olson, 1985:6). An MIS can assist public managers in their decision making by providing them adequate, timely, accurate, and high quality information.

A Decision Support System (DSS) may be defined as "... an integrated set of computer tools that allow a decision maker to interact directly with computers to create information useful in making semistructured and unstructured decisions" (Hicks, 1986: 524). A DSS can not only provide highly processed information to the decision maker but also can generate decision alternatives from which the decision maker can make a choice.

Many public sector organizations have already installed computers. Others are going to have computers very soon. If these computers are used only for word processing and routine data processing then that will be a severe underutilization of the computer technology. Using computers in decision making in addition to word processing and routine data processing not only ensures proper utilization of the computer technology but also increases the effectiveness and efficiency of public sector. It is therefore highly

necessary at the moment to know whether computers are significantly being used in decision making in the public sector in the country. Also it is important to know the problems that are involved in the use of computers in decision making and how these problems can be overcome. The present study was an attempt to obtain answers to the above questions.

1.1 REVIEW OF LITERATURE

No study has been done in Bangladesh before this one that has aimed to examine the extent to which computers are being used for decision making by public sector organizations in the country. This study has, therefore, been the first of its kind. Since use of computers in decision making can significantly increase the effectiveness and efficiency of management, it is highly necessary that computers be used for decision making in addition to word processing and data processing. The present study is expected to reveal how computers are being used in management decision making by public sector organizations in the country and what are the problems involved in such use. The study is expected to throw some light on how the country can achieve management improvements in public sector through the use of computers in management decision making. This report will be used as training material in the computer courses conducted by BPATC.

1.2 OBJECTIVES OF THE STUDY

The study had the following objectives.

- (1) Determine the relative status and characteristics of the aspects of computer use, such as, computer resources, computer personnel, computer management, computer applications, etc. in the public sector organizations in the country.
- (2) Find out, how and to what extent these organizations are using computers in management decision making.
- (3) Examine, how the problems of computer use in management decision making may be overcome.

1.3 SCOPE OF THE STUDY

The Study has examined computer use in 35 public sector organizations having computers. These includes, Ministries, Government and Semi-Government offices, Autonomous Bodies and Corporations. According to a list obtained from the Bangladesh Computer Council (BCC), in December 1990, a total of 33 public sector organizations had computers. The number, however, must have changed since. However, this study has collected data from the following 35 public sector organizations having computers.

1. Adamjee Jute Mills Limited
2. Agrani Bank
3. Bangladesh Agricultural Research Council
4. Bangladesh Agricultural Research Institute
5. Bangladesh Agricultural University
6. Bangladesh Bank
7. Bangladesh Biman Corporation
8. Bangladesh Bureau of Educational Information and Statistics
9. Bangladesh Chemical Industries Corporation
10. Bangladesh Diabetic Association
11. Bangladesh Inland Water Transport Authority
12. Bangladesh Institute of Development Studies
13. Bangladesh Internal Water Transport Corporation
14. Bangladesh Krishi Bank
15. Bangladesh Management Development Centre
16. Bangladesh Public Administration Training Centre
17. Bangladesh Space Research and Remote Sensing Organization
18. Bangladesh Water Development Board
19. Bangladesh Weather Directorate
20. Dhaka University
21. Economic Relations Division
22. House Building Finance Corporation
23. ICS Atomic Energy Research Institute
24. Implementation, Monitoring and Evaluation Division
25. Institute of Business Administration
26. Institute of Nutrition and Food Science
27. Investment Corporation of Bangladesh
28. Jahangirnagar University
29. Janata Bank
30. Jiban Bima Corporation
31. Ministry of Irrigation, Water Resources and Flood Control
32. Public Administration Computer Centre
33. Rajshahi University
34. Rupali Bank Limited
35. Sonali Bank

1.4 METHODOLOGY OF THE STUDY

The study has been based on primary and secondary data. Data has been collected from 35 public sector organizations having computers. Data has been collected from these organizations using appropriate questionnaires having both open- ended and closed questions. In the analysis of data, suitable statistical techniques of processing, analysis, and representation of data have been used. The study has also made use of relevant theories and models on MIS and DSS.

CHAPTER TWO

THE CONCEPT OF USING COMPUTERS IN MANAGEMENT DECISION MAKING

Computer technology is also referred to as Information Technology or IT. Also the revolution that computers have brought about is known as Information Revolution. Because of the information revolution the world is now said to have entered what has been called as the Information Age.

Decision making is an information-based activity. Through having revolutionary impacts on information systems throughout the world, computers have exercised significant impacts on decision making. The following is a discussion of how computers can assist Administrators and Managers in modern organizations in their decision making activities.

2.1 Computer as a Decision Making Tool

Computer has also been defined as a data or information processing machine. Its role as a decision making tool is manifested in two ways.

- (1) The computer can determine three major characteristics of information that can have significant impacts on decision making. These characteristics of information include, Timeliness, Accuracy and Adequacy.
- (2) The computer also helps decision makers use models developed in various disciplines by performing all the tedious calculations involved. The user only enters the values of the variables, and the computer processes them using one or more models and returns the results. The user presses only a few key strokes to get the whole thing done.

2.1.1 The Computers can Provide Timely Information

It often happens in our offices that decisions can't be taken at the right time as necessary information does not become readily available. This often happens during official meetings. With a computer-based information system this problem can be minimized.

Through a computer-based information system network, information may be made available from the computer database to all the decision makers of an organization having access to computer terminals. Information can also be made timely available during meetings by having one or more computer terminal in the conference room connected to a computer database.

2.1.2 The Computers can Provide Accurate Information

Decision making in our offices also suffers from inaccurate information. Although calculators are often used, errors still remain. This is because of the fact that calculators can be used to do calculations in a piece-meal fashion. Unlike the calculators, the computers can process the whole of the job to be processed by performing all the necessary calculations itself in an integrated and sequential manner. Hence computers can guarantee one hundred per cent accuracy of the information that will be output if the data that was input is correct and if the hardware and software in the computer system are ok.

2.1.3 The Computers can Provide Adequate Information

Decision making in our offices also often suffers from the inavailability of adequate information. This happens mainly due to the fact that we do not maintain proper collections of data or information generated within our organizations or outside with the hope of that data or information to be used by decision makers later.

Although it is possible to maintain collections of organizational and external data and information manually, i.e. without the help of computers, few organizations actually do it, such as, Banks, Insurance companies, etc. This is because of the fact that maintaining proper collections of organizational and external data becomes in itself a big job for many organizations.

With a computer system having appropriate software and storage systems, maintaining proper collections of data become an easy job. Huge volumes of data and information can be stored in a computer's database which can then be queried upon in numerous ways by any user given access to it. Information reports can also be generated

from the database at any time. The convenience of storing and retrieving information with a computer system prompts organizations to maintain computer databases. If a computer data- base can be maintained properly in an organization, the decision makers of that organization can be provided with adequate information for decision making through quering and report generating facilities.

2.1.4 The Computers help Use Models in Decision Making

In order to make decisions it often becomes necessary to use one or more models developed in various disciplines of knowledge. Models, such as, Correlation and Regression, Standard deviation and Variance, Linear programming, etc. have valuable uses in decision making and planning. Use of any of these models involves huge number of calculations even if the data is not that large. Doing these calculations manually becomes a tiresome job and there remains a high probability of errors. The computer can help enormously in the use of these models. The user only has to input the values of the variables of these models and he instantly receives the output through pressing a few keys only. In this way the computers encourage decision makers in using suitable models.

2.2 Use of Computers in Decision Making

Computers are being used as a tool for decision making in the following three ways.

- 1) Data Processing (DP)
- 2) Management Information Systems (MIS)
- 3) Decision Support Systems (DSS)

2.2.1 Data Processing

Data Processing Sometimes provides a crude way of using computers in decision making. The hardliners in the field of computer, however, would not consider any kind of data processing as a way of using computers in decising making. This author considers only those data processing works that can yield information on the basis of which management can make decisions. Periodic financial statements of an organization can be

cited as an example. Managements of various organizations do make many of their financial decisions on the basis of financial statements prepared through routine data processing using computers. In the absence of sophisticated uses of computers in decision making, discussed later in this chapter, this use of the computers can also be regarded as a crude way of using computers in decision making. However, there can be many other forms of data processing, the output of which is not used in making any decisions.

2.2.2 Management Information Systems (MIS)

Management Information Systems (MIS) is one of the two major ways of using computers in management decision making. An MIS may be defined as "... an integrated user-machine system for providing information to support operations, management, analysis and decision making functions in an organization. The system utilizes computer hardware and software; manual procedures; models for analysis, planning, control and decision making; and a database" (Davis and Olson, 1985:6). The concept of MIS can be better understood through analysing the three terms it includes, i.e. Management (M), Information (I), and Systems (S).

Management

Three levels of management generally exist within an organization, and managers at each level participate in certain characteristic decision making activities. These levels are depicted in Figure 2.1.

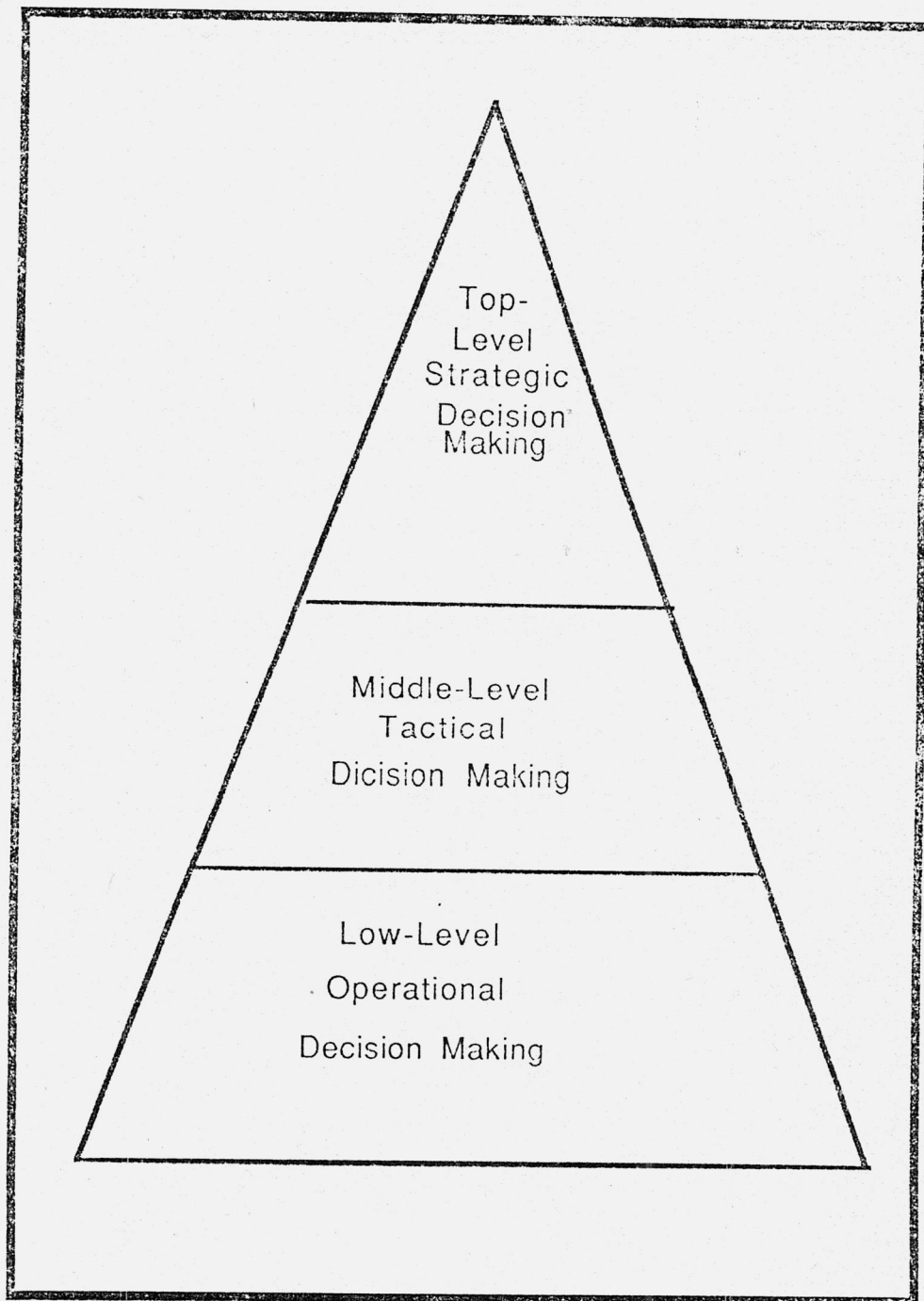
Top Level Management - Strategic Decision Making

At the top level, activities are future-oriented and involve a great deal of uncertainty. Examples include establishing goals and determining strategies to achieve the goals.

Middle Level Management - Tactical Decision Making

The Emphasis in middle levels is on activities required to implement the strategies determined at the top level. Thus, most middle management decision making is tactical.

Figure-2.1- Levels of Decision Making



Lower Level Management - Operational Decision Making

Members of the lowest level in the management hierarchy make operating decisions to ensure that specific jobs are done. Most of these operations are structured and the decisions are deterministic. They follow specific rules and patterns established at higher levels of management. The major function of lower level management is controlling organizational activities keeping them in line with plans and taking corrective actions, if necessary.

In addition to the breakdown of an organization into three management levels, there exists a breakdown of the organization by function. Each functional group generates a separate stream of information flow (Figure 2.2).

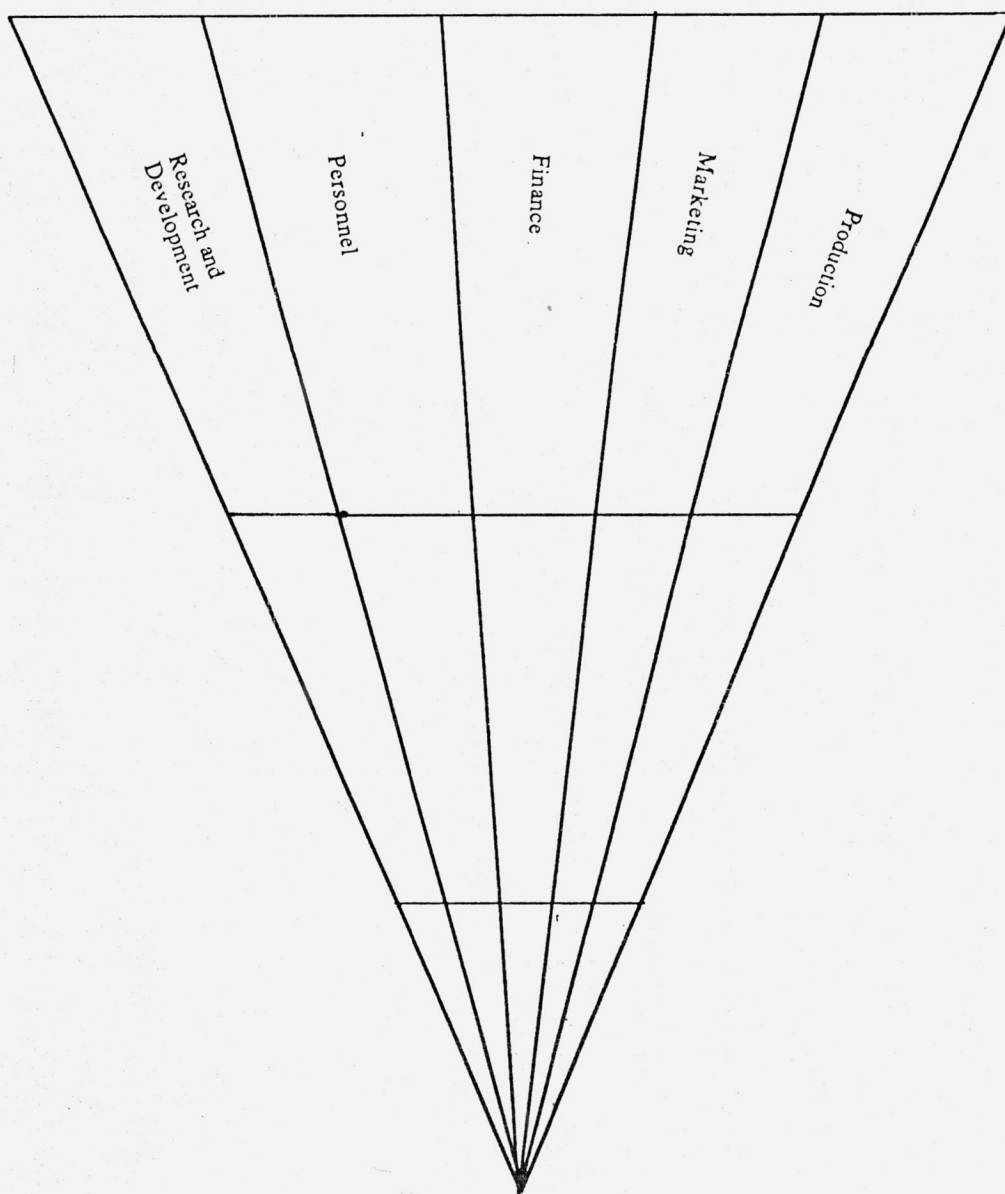
Information

Managers at all levels must be provided with decision- oriented information. The fact that the nature of decisions differs at the three levels creates a major difficulty for those attempting to develop an MIS. The information needs of each level differ, and the information system must be tailored to provide appropriate information to all levels.

Decisions made at the lower level are generally routine and well defined. The needs of first level managers can be met by normal administrative data processing activities such as preparation of financial statements and routine record keeping. Although this level of decision making is fairly basic, it provides the data processing foundation for the entire organization. If the information system is faulty at this level, the organization faces an immediate crisis.

Tactical decision making is characterized by an intermediate time horizon, a high use of internal information, and significant dependence on rapid processing and retrieval of data. Many middle level decisions are also ill-structured and difficult to plan for. The major focus of tactical decisions is how to make efficient use of organizational resources.

Figure 2.2 Functional Information Flow



The main problems in MIS design arise when planners attempt to define and meet the information requirements of top level management. It is extremely difficult, if not impossible, to clearly define these information needs. Most problems are non-repetitive, have great impact on the organization, and involve a great deal of uncertainty. Most information systems serve the needs of the two lower levels but are not adequately designed to cope with the variety of problems encountered by top management. However, well-designed management information systems can help.

Table 2.1 summarizes the differences among the three levels of decision making. Since the information needs at the three levels differ, data has to be structured differently at each level. For routine operating decisions such as payroll preparation and replenishment of inventory, separate employee and inventory files are adequate. To serve the middle and top levels, the data should be organized to provide query capabilities across functional lines and to handle routine information reports.

Table 2.1
Characteristic Differences in Levels of Decision Making

Characteristics	Levels of Decision Making		
	Operational	Tactical	Strategic
Time Horizon	Daily	Weekly/Monthly	Yearly
Degree of Structure	High	Moderate	Low
Use of External Information	Low	Moderate	Very High
Use of Internal Information	Very High	High	Moderate/low
Degree of Judgment	Low	Moderate	Very High
Information Online	Very High	High	Moderate
Level of Complexity	Low	Moderate	Very High
Information in Real Time	High	High	High

System

Through the perspective of Systems Approach, every organization can be conceived as a System. Basically, a system is an aggregate of interrelated components interacting with each other to achieve certain goals. According to Hicks (1986:96), a System may be defined as "... a set of interacting components that operate within a boundary for some purpose". Thus from the viewpoint of systems approach, every public or private sector organization consists of interacting departments that operate within a boundary for some purpose. Each of the departments of an organization has an information system. One department of an organization may need data generated in another department. Managers of middle and top management levels of an organization needs data generated in all the departments. Thus using the systems approach, the information system of an organization can be viewed as an aggregate of information subsystems operating within a boundary. The function of MIS here is to integrate all these subsystems so that it can work as an effective and efficient information system.

The Function of MIS

The function of an MIS is to provide information to the administrators and managers for decision making. It does this through generating several different types of reports, including, scheduled listings, exception reports, predictive reports, and demand reports.

Scheduled Listings : Scheduled Listings are produced at regular intervals and provide routine information to a wide variety of users. Since they tend to contain an overabundance of data much of it may not be relevant to a particular user. Such listings constitute most of the output of current computer-based information systems.

Exception Reports : Exception reports are action-oriented management reports. The performance of office activities is monitored, and any deviation from expected results triggers the generation of a report. Such reports can also be produced during routine batch processing. Exception reports are useful because they ignore all normal events and focus management's attention on abnormal situations that require special handling.

Predictive Reports : Predictive reports are used for planning. Future results are projected on the basis of decision models. Such models can be very simple or highly complex. Their usefulness depends on how well they can predict future events. Management can manipulate the variables included in a model to get responses to "what if" kinds of queries. Thus, such models are suited to tactical and strategic decision making.

Demand Reports : Demand reports are produced only on request. Since they are not required on a continuing basis, they are often requested and displayed through online terminals. The MIS must have an extensive and appropriately structured data base if it is to provide responses to unanticipated queries. No data base can provide everything, but the data base of an well-designed MIS should include data that may be needed to respond to such user inquiries. Providing demand reporting can be expensive, but it permits decision makers to obtain relevant and specific information at the moment they need it.

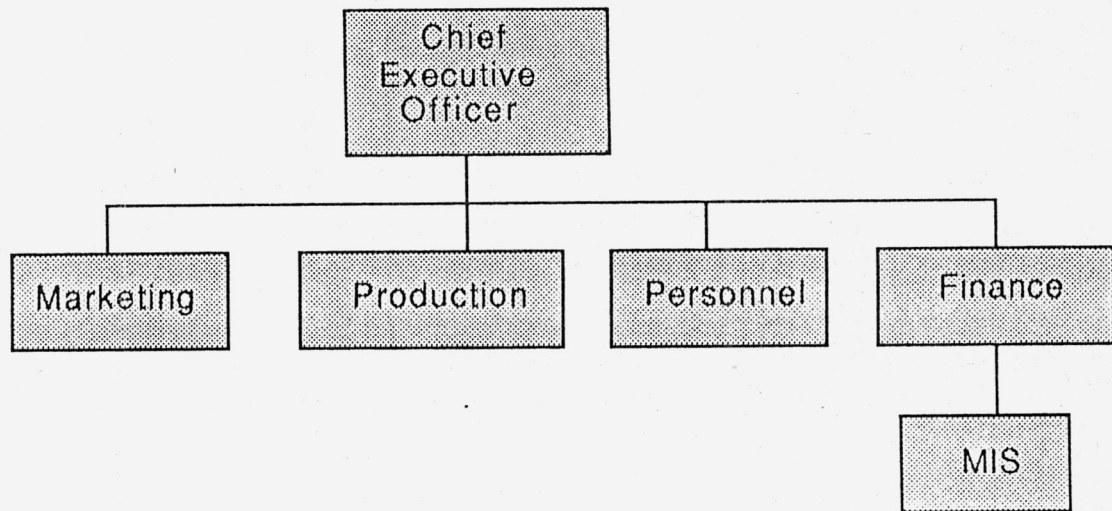
The Placement of the MIS Department

According to Goldstein (1986:422), there are two options for the placement of the MIS department. Make the MIS department subordinate to some other department or make the MIS department report directly to the chief executive officer. These options are shown in Figure 2.3.

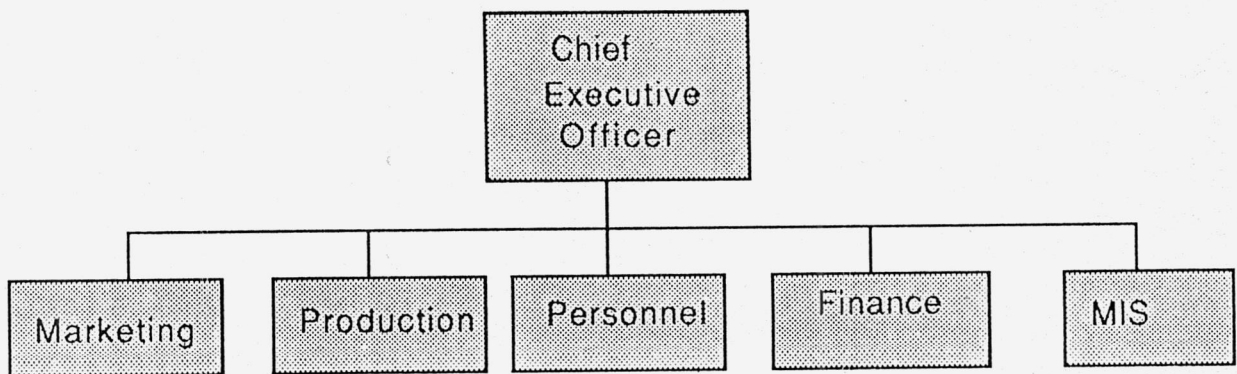
The earliest business computer applications were record- keeping and accounting systems for billing customers. Consequently, many MIS departments followed the first option and had the MIS manager report to the Finance or Accounting department.

As organizations have gotten more computer experience at all levels, they have found that more departments than simply accounting can be helped by an MIS. This presents political problems for an MIS department that reports to the accountants. when potential users from another area request new systems, the MIS department should be objective in evaluating the request.

Figure 2.3
The two Options for the Placement of
the MIS Department



(a) Reporting to the Financial Function



(b) Reporting Directly to the Chief Executive Officer

If the MIS department report to the financial department, all requests of accounting-related systems might be viewed more favorably than worthy requests for other types of systems. This is not desirable. For example, imagine an organization having difficulty keeping its best personnel. A human resource information system could provide better employee records and career planning services and might help reduce employee turnover. If the MIS department head's boss is the financial officer, most systems are accounting-related. It becomes very difficult to be convincing that this human-oriented, rather than financially oriented, system is valuable. Although the human resource system could be extremely important for the organization's future, the MIS department is bound by the financial department's goals. Making the MIS department separate would give it the freedom to address the needs of any other department objectively. Many organizations have done this in recent years.

2.2.3 Decision Support Systems (DSS)

Another of the two major ways of using computers in decision making is the Decision Support Systems (DSS). A DSS may be defined as "... as an integrated set of computer tools that allow a decision maker to interact directly with computers to create information useful in making semistructured and unstructured decisions" (Hicks, 1986: 524). The above definition necessitates some discussion about the kinds of decisions.

Structured Decisions

These largely involve situations where no choice, or very little choice or alternative, is possible. The decision situation here is largely self-evident, once the facts and number are known. Administrators make these decisions chiefly in areas of operations, rarely in cases of policy planning. It is in dealing with the more highly structured decisions where MIS has been used mostly in recent years.

Semi-structured Decisions

These involve both data and a manager's intuition and judgment and are most commonly faced by line managers. DSS can greatly assist line managers in making these kinds of decisions. MIS can help but little.

Unstructured Decisions

These involve no data reference source. They represent decision based entirely on an administrator's intuition and judgment. These kinds of decisions are involved mostly in the area of organizational policy planning, not often in areas of management operations and control. Line managers face unstructured decisions chiefly in dealing with people-workers, other managers, bosses and so on.

DSS helps administrators and managers in making semi- structured and unstructured decisions.

DSS and MIS

There is a basic difference between MIS and DSS. MIS provides information to the decision makers through generating and distributing different types of information reports and through providing database query facilities. The DSS on the other hand lets the user to interact directly with the computer to manipulate data and models and thereby allows him to generate decision alternatives from which the decision maker can make a choice. In other words, the MIS only outputs information to an user according to his specifications, but the DSS lets the user to interact with the computer to change or manipulate data and models to create information useful to him in making semi- structured and unstructured decisions. MIS and DSS can exist without one another. They can also exist together. When they exist together, the DSS can retrieve data from the MIS.

Functions of a DSS

Briggs (1982:31) has provided a summary of several functions and features that DSS applications should contain.

Model Building

The building of a model of the decision-making problem is a central purpose of most decision support systems. This model is often in the form of a two (or more)

dimensional table, such as the electronic spreadsheet. The first two dimensions of the table might contain an income statement, the third dimension could represent various products, and the fourth dimension could represent multiple retail outlets. In this case, model development involves specifying in mathematical terms the relationships among the various sales and expense variables. For example, in building this model, we may assume that sales is a function of advertising expense. In mathematical terms this function might be stated as $\text{sales} = 20 \times \text{advertising expense}$. This function indicates that for each dollar spent on advertising, sales will increase by twenty dollars.

Procedural and/or Nonprocedural Language

As discussed earlier, these languages allow the user to communicate with the DSS. Most users find nonprocedural languages more convenient to use.

What-if Analysis

The ability to show the impact of changes in data and assumptions is perhaps the most useful feature of a DSS. For example, a DSS could show the impact on profit if sales grew at a rate of 7 to 10 percent instead of 5 percent. Most DSS applications can show instantaneously the impact of such changes in assumptions. Electronic spreadsheets are especially good for **what-if analysis**.

Goal Seeking

A DSS should be able to show what value a particular independent variable would have to be in order to produce a certain target value for the dependent variable. Most electronic spreadsheets for personal computers do not have this capability. However, mainframe-based financial-modeling tools, such as the Integrated Financial Planning System, perform **goal seeking**.

Risk Analysis

A very useful piece of information for a decision maker is a probability distribution, which is obtained through **risk analysis**. This provides the probabilities that a particular

critical measure will reach a certain level. For example, it would be useful to know the probability that the population growth rate will be zero, the probability it will be 5 percent, and the probability it will be 10 percent. Such information can be generated using management-science techniques, provided that certain data are available. The necessary data are the probability distributions of the underlying independent variables, such as birth and death rates.

Statistical Analysis and Management Science Models

A good DSS will be able to provide several useful **management science models** such as regression and time-series analysis. These two models may be used to project historical data into the future.

Financial Functions

Preprogrammed **financial functions** for commonly used calculations are usually included in DSS packages. These may include depreciation methods, net present value and return on investment.

Graphics

An extremely important feature in a decision support system is a graphics generator. The system should be able to depict any of the data contained in the system in various graphic forms, such as bar, line or pie graphs.

Hardware Capabilities

Decision support systems in one form or another can be implemented on machines as small as personal computers and as large as mainframes. When a DSS is installed on a PC, the PC should have a large amount of data storage. Mainframes usually have large data storage and processing capacity, so more complex models can be implemented on them. A current trend (which is expected to continue) is the use of PCs in combination with mainframes for decision support systems. The PC is linked to the mainframe to retrieve data for subsequent processing on the PC if the data volume and processing volumes are

relatively small. If, on the other hand, large amounts of data and processing are required, some parts of the DSS may be performed on the mainframe. Many of the DSS software tools, such as IFPS and FOCUS, can run on both PCs and mainframes.

Data Bases and External Files

It is crucial that a DSS be able to access data stored in the organization as files. Much of the knowledge-producing data that a DSS uses are stored in these files. This access can be done either through the data-base management system's capabilities or through the DSS's own capability to access external files. In addition, most DSS tools have the capability of maintaining their own internal files once the data are retrieved from sources.

The above was a discussion of how the computers can be used in decision making through decision-oriented data processing and through using MIS and DSS. In the next chapter, the status of various aspects computer use in the public sector will be examined that will indicate where these organizations stand in respect of using the computers in management decision making activities.

CHAPTER THREE

USE OF COMPUTERS IN MANAGEMENT DECISION MAKING IN THE PUBLIC SECTOR OF BANGLADESH

In the previous chapter we have discussed how the computers can be used in management decision making activities through decision-oriented data processing and through using MIS and DSS. In this chapter we shall examine the extents to which MIS and DSS are being used by the public sector organizations of our country in order to determine the degree to which computers are being used in management decision making activities.

3.1 Use of Computers in Decision Making through MIS and DSS

It appears from Table 3.1 and 3.2 that very few public sector organizations are using Management Information Systems (MIS) and Decision Support Systems (DSS). Only 14.29 per cent of the organizations are using MIS and only 25.71 per cent of them are using DSS. We have learnt from Chapter two that MIS and DSS are the two major ways of using computers in management decision making. It appears, therefore, that computers are not being used in any significant scale in management decision making activities in the public sector of Bangladesh.

The fact that computers are not being significantly used for decision making is also evident from the extent to which computer databases are used. It appears from Table 3.3 that all of the organizations studied maintain computer databases of varying sizes and numbers.

Table 3.1 Use Of Management Information Systems (MIS)

Organizations (%)	
Yes	14.29
No	85.71
Total	100.00

Table 3.2
Uses Of Decision Support Systems (DSS)

Organizations (%)	
Yes	25.71
No	74.29
Total	100.00

Table 3.3
Use of Computer Databases

Organizations (%)	
Yes	100.00
No	0.00
Total	100.00

Table 3.4 shows that about 17.14 per cent of the organizations do not generate any information reports from the database. Table 3.4 also shows that as many as 22.86 per cent of the organizations do not have officers making queries into the computer databases. The degree to which computers are being used in decision making in an organization is reflected in the number of reports generated from the organization's computer database and in the number of queries made into it.

Table 3.4
Reporting from and Quering into Computer Database

Organizations (%)	
Reporting	82.86
No Reporting	17.14
Quering	77.14
No Quering	22.86

Table 3.5
Use of Selected Models

Organizations (%)	
Correlation	34.29
Regression	46.88
Linear Programming	31.25
Standard Deviation	40.63
Variance	40.63
Others	18.75

Another indicator of the low use of computers in decision making, particularly DSS, is the low use of models like correlation, standard deviation and other models. Table 3.5 Shows that only 34.29 per cent have been using correlation model and only 18.75 per cent of them use other models.

Furthermore, Table 3.6 shows that popular applications systems such as, Personnel Management system, Accounting system, Payroll system, Inventory management system and other such systems are used by less than 61 per cent of the public sector organizations.

Table 3.6
Use Of Various Applications Systems

Organizations (%)	
Personnel Management Inf. System	51.43
Accounting System	57.14
Payroll System	45.71
Inventory Management System	34.29
Others	60.00

All these evidences represent that computers are not being significantly used in management decision making activities. Now, let's examine why computers are not being significantly used in decision making.

As far as the availability of computers and associated hardware are concerned, the situation is not bad. It has been estimated that each of the public sector organizations

studied has an average of more than 11 computers or computer terminals (Table 3.7). A computer terminal is an input/output device designed to receive data, and capable of transmitting entries to, and obtaining output from the mainframe system, or mini-computer system, or the micro-computer network of which it is a part (Sippl, 1985: 506). A terminal may be intelligent having some processing power in itself or may be dumb, in which case, it works only as an input-output device.

Table 3.7
Computers installed
(35 Organizations)

	Number	Per cent
Mainframe	7	2.57
Minicomputer	22	8.09
Micro-computer	243	89.34
Total	272	100.00

As can be seen in Table 3.7 micro-computers constitute 89.34 per cent of the computers being used followed by mini-computers (8.09 per cent) and mainframes (2.57 per cent). All of these types of computers are suitable for running MIS and DSS.

Table 3.8 shows that all of the organizations studied have one or more types of Printers. If we look at the Softwares being used, we can see from Table 3.9 that about 91.43 per cent of the organizations have softwares that can be used for data processing and decision making.

As far as the amounts of hardware and software are concerned, the public sector organizations have the necessary resources to use computers in decision making. We have to look for other explanations of the low use of computers in decision making.

Table 3.8
Other Hardware in Use

Organizations (%)	
Card Reader	5.71
Tape Drive	45.71
Scanner	8.57
Mouse	37.14
Digitizer	5.71
Light Pen	5.71
Magnetic Ink Reader	2.86
Optical Character Reader	2.86
Printer	100.00
Plotter	22.86
Data Show	5.71
Modem	2.86

Table 3.9
Softwares and Compilers in Use

Organizations (%)	
Word Processing	62.86
Data Processing & Decision Making	91.43
Compilers	65.71

3.2.1 Primary Reason: Lack of Growth of MIS and DSS Expertise

Lack of expert personnel is perhaps the primary reason behind the insignificant use of computers in management decision making. Table 3.10 shows that as many as 22.86 per cent of the organizations do not have any sanctioned posts for their computer section. Table 3.11 shows that as many as 28.15 per cent of the sanctioned posts of these organizations are lying vacant. Although in-house and in-country computer training arrangements for computer personnel are satisfactory, foreign training, however, is not

adequate. Eighty 80 per cent of the organizations organize in-house computer training programmes (Table 3.12) and about 91.43 per cent of the organizations send their computer personnel to undergo computer training in different training institutes of the country (Table 3.13). However, only about 28.57 per cent of organizations have officers pursuing computer training abroad and only 5.72 per cent of them are pursuing degree programmes in computer abroad (Table 3.14).

Table 3:10
Size of Computer Set-up

Size (Persons)	Organizations (%)
0-5	14.29
6-10	14.29
11-25	77.14
Above 25	22.86
No Posts	22.86
Total	151.43

Table 3.11
Proportion Of Vacant Posts

	Organizations (%)
Filled up	71.85
Vacant	28.15
Total	100.00

Table 3.12
In-House Computer Training Arrangements

	Organizations (%)
Yes	80.00
No	20.00
Total	100.00

Table 3.13
Organizations Sending Officers for Computer Training

Description of officers	Organizations (%)
Officers of Computer Set-up	91.43
Officers Outside Computer Set-up	65.71

Table 3.14
Officers Pursuing Computer Training/Degrees Abroad

Training/Degree	Organizations (%)
Training	22.86
M.S. Degree	2.86
Ph.D. Degree	2.86
Total	28.57

Thus because of non-availability of sanctioned posts, high vacancy rates, and poor foreign training opportunities development of computer expertise has been hampered in many public sector organizations. The kind of expertise that is necessary for running MIS and DSS does not generate overnight. Majority of the computer operators have experience only in doing word processing and routine data processing. The concepts of MIS and DSS are far more complex than the concepts of routine data processing. A word processing operator does not evolve into an MIS expert through a certain number of year's experience. To be an MIS or DSS expert one has to have sound academic background.

This is because of the fact that an MIS expert has to master the tactics of what has been called as Information Engineering. Thus non-availability of sanctioned posts, high vacancy rates, and poor foreign training opportunities have altogether jeopardized the growth of MIS and DSS expertise in the public sector organizations.

3.2.2 Less Use of Local Area Networks

Another explanation of the little use of MIS and DSS comes from the low use of Local Area Networks (LAN). It appears from Table 3.15 that only 25.71 per cent of the organizations use local Area Networks.

Table 3.15
Use of Local Area Network

Organizations (%)	
Using	25.71
Not Using	74.29
Total	100.00

Networks are very useful in running MIS. Without networks MIS becomes a centralized processing function. Although there can be MIS without networks, the convenience of entering inputs into the database and making queries into it is greatly reduced in absense of a network. Also without networks, organization-wide sharing of data for DSS use is highly difficult. Islands of DSSs may exist, however, resulting in significant duplication of data. Among the users of LAN only 12.50 per cent of the organizations have networks that has integrated all of the three management levels, i.e. Top, Middle, and Low (Table 3.16). Integration of three levels through LAN means that information can easily flow from the lower management levels to the top level and vice versa.

Table 3.16
Patterns of Management Integration Caused By Networks

Organizations (%)	
Top, Middle & Low	12.50
Top & Low	25.00
Top & Middle	25.00
Middle & Low	37.50
Total	100.00

Table 3.17
Use of Computers in Data Processing by Departments having/not
having Computers

----- Organizations (%) -----	
Having computers	79.66
Not Having Computers	20.34

Total	100.00

It has been found that about 20.34 per cent of the organizations have departments using computers without having computers themselves (Table 3.17). Table 3.18 shows that about 77.42 per cent of organizations have computer users outside the computer set-up. Table 3.19 shows that 28.57 per cent of organizations have officers outside the computer set-up having received foreign training in the field of computer. These departments can be provided with computer facilities through LANs, which would be cheaper than providing with stand alone computers. Providing LAN facilities would also prompt the users to go for MIS and would also minimize data and programme duplication.

Table 3.18
Computer Users Outside Computer Set-up

----- Organizations (%) -----	
Exist	77.42
Does not exist	22.58

Total	100.00

Table 3.19
Computer Users Outside Computer Set-up having
Foreign Computer Training/Degrees

----- Organizations (%) -----	
Computer Training	28.57
M.S. Degree	8.57
Ph.D. Degree	2.86

Total	40.00

Table 3.20
Systems Installed after Systems Analysis

Organizations (%)	
Yes	65.71
No	34.29
Total	100.00

One reason for not installing LANs seems to be the fact that systems analysis was not done before buying the computers. Table 3.20 shows that more than 34.29 per cent of the organizations have bought computers without having done any systems analysis, although systems analysis is a must for buying computers. Systems analysis is a detailed examination of a job performed in an organization in order to determine a suitable hardware and software configuration for computerization of that job. Without doing systems analysis it is not possible to know what computer systems configuration is suitable for an organization.

3.2.3 Inadequate Top Management Support

A third reason behind lack of growth in computer-based MIS and DSS in organizations is lack of adequate top management support. It appears from Table 3.21 that only 32.35 per cent of the Heads of organizations have computers or computer terminals in their rooms. Out of them, only 17.14 per cent operate the computers themselves (Table 3.22).

Table 3.21
Computer in the Head of Organization's Room

Organizations (%)	
Yes	32.35
No	67.65
Total	100.00

Table 3.22
Organization Heads Operating Computers Themselves

Organizations (%)	
Yes	17.14
No	82.86
Total	100.00

It appears from Table 3.23 that only 62.86 per cent of the organizations have top level managers using computers in data processing and decision making. Table 3.24 shows that only 62.86 per cent of organizations have top level managers making queries into computer databases. Use of information reports is also not much significant. About 74 per cent of organizations have top level managers using information reports (Table 3.25).

All these evidences point to the fact that top managements of public sector organizations are yet to get generally involved in computer uses. MIS can not be successful without adequate support from top management, because, running MIS in an organization

Table 3.23
Uses of Computers in Data Processing by Levels of Management

Organizations (%)	
Top	62.86
Middle	91.43
Low	54.29

Table 3.24
Quering of Database by Management Levels

Organizations (%)	
Top	62.86
Middle	71.43
Low	40.00

Table 3.25
Users of Information Reports by Management Levels

Organizations (%)	
Top	74.29
Middle	88.57
Low	57.14

requires special computer hardware and software configuration and reporting and query provisions that have implications for management approaches and organizational expenditures. MIS expertise will also not develop in these organizations unless top managements send more computer personnel to undergo foreign training in the field of computer technology.

3.2.4 Placement of MIS Departments Lower in the Hierarchy

Another reason behind the insignificant use of MIS and DSS is the fact that very few organizations have their computer set- up directly controlled by the head of the organization. As Table 3.26 shows, only 27.27 per cent of organizations have placed the computer set-up directly under the control of the head of organization.

Table 3.26
Placement Of the Computer Set-up

Organizations (%)	
Directly Under the Head	27.27
Two Levels Lower	45.45
Three Levels Lower	27.27
Total	100.00

We have seen in chapter two that placing the computer set-up directly under the head of organization bears advantages over its placing lower in the hierarchy. The head of organization can see for himself the strengths and potentials of the computer cell and also understand its problems and constraints. He can make reasonable budget commitments for the computer functions. His constant interaction with computer professionals educates him in the concepts and tactics of MIS and DSS. It becomes easy for computer professionals working in the organization to persuade him to use MIS and DSS. The Computer set-ups being placed two or three levels lower in the hierarchy, the top managements of most public sector organizations have been left away from the computer functions and as a result development and use of MIS and DSS is not taking place.

3.3 Potentials for Future Uses of MIS and DSS are Great

Despite the current drawbacks the potentials of future development and use of MIS and DSS are great. This is evident from Table 3.27 that shows that in about 59 per cent of the organizations the general opinion of officers is that computers are 'Very Useful' for the organization. Also it is evident from the fact that in about 64 per cent of the organizations the top managements consider the computers to be 'very useful' for their organizations (Table 3.28).

Table 3.27
General Opinion about the Usefulness of Computers

Organizations (%)	
Very Useful	58.82
Useful	41.18
Not Useful	0.00
Other	0.00
Total	100.00

Table 3.28
Top Management's Perceptions about the Usefulness of Computers

Organizations (%)	
Very Useful	63.64
Useful	36.36
Not Useful	0.00
Others	0.00
Total	100.00

Tables 3.27 and 3.28 also shows that the general opinion as well as the top managements' opinion in all of the organizations are that computers are 'Useful'. This is a great potential for future development and use of MIS and DSS in these organizations.

3.4 Conclusion

It has become evident from this study that computers are not being significantly used in management decision making through using computer-based MIS and DSS. It has also become clear that the reasons behind this are, lack of growth of MIS expertise, less use of LANs, lack of adequate top management support, and placement of computer departments lower in the management hierarchy. However, there are potentials of future MIS and DSS uses in these organizations. The four reasons mentioned above may be considered as areas to be addressed in order to promote the use of computers in management decision making in the public sector organizations. However, the following

specific measures may be immediately undertaken in order to solve the problems mentioned above.

- (a) Ignorance of the top management about the benefits of use of computer is the number one obstacle in the way of use of computers in decision making. This ignorance should be removed by giving necessary training to them. Organizations like the BPATC, BCC, etc. can arrange appropriate training courses towards this end. Besides these two organizations, other training institutions of the government and autonomous bodies should be properly equipped with facilities to offer computer training.
- (b) Computerization of any organization should be done in a systematic manner. That is to say, before procuring computer system for an organization, proper Information Need Analysis should be done. Otherwise, it will be difficult to use the computer system for any fruitful purpose, not to speak of its use for decision making.
- (c) For computer of any organization to be used in decision making, there should be relevant data in adequate quantity and appropriate form for use in the computer. This is lacking in many of the public sector organizations under study. Lack of MIS and DSS expertise in the organizations may be a reason behind this. The organizations should try to design, build up and maintain appropriate data bases.
- (d) Since lack of MIS and DSS expertise is one of the reasons which holds back the use of computers in decision making, facilities for creating such professionals through appropriate training should be made. BCC has already proposed to the government for establishment of an apex training institute (Bangladesh Information Technology Institute) in the public sector. BPATC is going to submit a Project Proposal (PP) to establish the above-mentioned institute at the BPATC premises. The government should also put more emphasis on sending computer professionals working in the public sector to foreign countries to undergo training or degree programs in MIS.

Bangladesh Public Administration Training Centre
Savar, Dhaka.

"A STUDY OF COMPUTER USE IN MANAGEMENT DECISION MAKING
IN THE PUBLIC SECTOR OF BANGLADESH"

QUESTIONNAIRE

- 1.1 Name of organization: -----
- 1.2. Address: -----
- 1.3. Name of officer heading the computer section: -----

- 1.4. Designation: -----
- 1.5. Address: -----
- 1.6. Telephone Number: -----

2. Data on computers

Class (Micro/Mini/ Mainframe)	Manufacturer	Brand Name	Model	Operating System	Number
Total					

3.1 Was Systems Analysis Done before procuring the computer?

Yes

☐

No

☐

3.2 If done, by whom it was done?

4. Data on other hardware.

Which of the following hardware have you procured?

- 1) Card Reader
- 2) Tape Drive
- 3) Scanner
- 4) Mouse
- 5) Digitizer
- 6) Light Pen
- 7) Wand
- 8) Bar Code Scanner
- 9) Magnetic Ink Reader
- 10) Optical Character Reader (OCR)
- 11) Printer
- 12) Plotter
- 13) Speech Synthesizer
- 14) Data Show.
- 15) Others, Specify.

5. Data on use of Micro-computer Local Area Networks (LAN) and/or Mainframe and Mini-computer Systems.

5.1 Are you using Micro-computer Local Area Network?

Yes

☐

No

☐

5.2 Are you using Mainframe or Mini-computer System?

Yes		No		Go to question 6
-----	--	----	--	------------------

5.3 How many officers have terminals?

--

5.4 How many rooms have terminals?

--

5.5 Are the terminals intelligent or dumb?

--

5.6 Which management levels have been interconnected by the LAN or by the Mainframe or Mini-computer system?

Top, Middle and low	
---------------------	--

Top and Middle	
----------------	--

Top and low	
-------------	--

Middle and low	
----------------	--

No interconnection accomplished	
---------------------------------	--

6. Data on Software and compilers

[illegible]

7. Which of the following computer systems are you using?

Personnel Management	
----------------------	--

Accounting System	
-------------------	--

Payroll System	
----------------	--

Inventory Management System	
-----------------------------	--

8. Data on use of other applications systems.

[illegible]

9. Data on uses of the computers

[illegible]

10. Computer use by departments/Sections

[illegible]

11. Data on database use

[illegible]

12. Querying of database

[illegible]

13. Generation of information reports

[illegible]

14. Which of the following models are used in data processing in this office?

Correlation

Regression

Linear Programming

Standard Deviation

Variance

15. Please indicate the location of computer set-up in the organogramme of this office.

16. Data on manpower of the computer set-up

[illegible]

17. What is the total number of sanctioned posts for computer set-up of this office?

17.2 How many of the sanctioned posts are currently filled up?

17.3 Excepting the officers of the computer department how many other officers can operate computers?

17.4 How many of the officers mentioned in question 17.3 actually operates the computers?

17.5 How many of the officers mentioned in question 17.3 has received computer training from abroad?

17.6 How many of the officers mentioned in question 17.3 has M.S. degrees in computer from abroad?

17.7 How many of the officers mentioned in question 17.3 has Ph.D. degrees in computer from abroad?

18.1 Do you arrange in-house computer training programmes for your officers? ☐ Yes ☐ No ☐

18.2 Does your organization send officers of computer department to undergo computer training in different training institutions in the country? ☐ Yes ☐ No ☐

18.3 Does your organization send officers not working in the computer department to undergo training in different training institutions in the country? ☐ Yes ☐ No ☐

18.4 How many officers of this organization are currently undergoing computer training abroad?

18.5 How many officers of this organization are currently doing M.S. degrees in the field of computer abroad?

18.6 How many officers of this organization are currently doing Ph.D. in the field of computer abroad?

19.1 Is there a computer or computer terminal in the room of the head of this organization? ☐ Yes ☐ No ☐

19.2 Does he/she operate that computer himself/herself? ☐ Yes ☐ No ☐

19.3 Does he/she use that computer through someone else? ☐ Yes ☐ No ☐

20.1 Which of the following describes the general opinion of officers of this organization about the usefulness of computers in this office?

Very Useful		Useful		Not useful		Other	
-------------	--	--------	--	------------	--	-------	--

20.2 Which of the following describes the opinion of top management of this organization about the usefulness of computers in this office?

Very Useful		Useful		Not useful		Other	
-------------	--	--------	--	------------	--	-------	--

21.0 How many officers of the different management levels below use computer-based Decision Support Systems?

Top

Middle

Low

Total

*** Thank you for your cooperation***

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