

U42

A CASE STUDY
OF THE
MANAGEMENT INFORMATION SYSTEM
OF
BANGLADESH SUGAR AND FOOD INDUSTRIES CORPORATION

RAFIQUL ISLAM BHUIYA
AKM ENAMUL HAQUE

BANGLADESH PUBLIC ADMINISTRATION TRAINING CENTRE
SAVAR, DHAKA
JUNE 30, 1995

A CASE STUDY
OF THE
MANAGEMENT INFORMATION SYSTEM
OF
BANGLADESH SUGAR AND FOOD INDUSTRIES CORPORATION

RAFIQUL ISLAM BHUIYA
AKM ENAMUL HAQUE

BANGLADESH PUBLIC ADMINISTRATION TRAINING CENTRE
SAVAR, DHAKA
JUNE 30, 1995

ACKNOWLEDGEMENT

I express my deep sense of gratitude to Bangladesh Public Administration Training Centre (BPATC) for providing me with the opportunity to undertake this study.

I also sincerely offer my thanks to AKM Enamul Haque, Deputy Director (MIS), BPATC, and Research Associate of this study without whose help this work would not have been accomplished.

I am also thankful to Md Nazir Ahmed for wordprocessing of this report.

Rafiqul Islam Bhuiya

CONTENTS

<u>CHAPTER/ SECTION NUMBER</u>	<u>SUBJECT</u>	<u>PAGE</u>
ONE	INTRODUCTION	1
1.1	THE STUDY	1
1.2	OBJECTIVES OF THE STUDY	2
1.3	REVIEW OF LITERATURE	2
1.4	DATA SOURCES AND METHODOLOGY	3
TWO	THE CONCEPT OF USING COMPUTERS IN MANAGEMENT DECISION MAKING	4
2.1	Computer as a Decision Making Tool	4
2.2	Use of Computers in Decision Making	7
THREE	ANALYSIS OF THE MANAGEMENT INFORMATION SYSTEM OF BSEC	11
3.1	The BSEC	11
3.2	Hierarchic Position, Structure and Manpower of BSEC MIS	12
3.3	Hardware, Software, Systems and Structure of BSEC MIS	13
3.4	Uses of the BSEC MIS	16
3.5	Role of the Manual MIS Set-up	17
3.6	Conclusion	18
3.7	Recommendations	19
	ANNEXURE-1 (Questionnaire)	
	BIBLIOGRAPHY	

CHAPTER ONE

INTRODUCTION

1.1 THE STUDY

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 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 Systems (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 semi-structured 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 that will be an under-utilization 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 management effectiveness and efficiency.

Bangladesh Sugar and Food Industries Corporation (BSFIC) has a computer-based Management Information System or MIS. The MIS of this organization has been studied as a Case.

1.2 OBJECTIVES OF THE STUDY

The study has the following objectives:

- (1) Examine the composition and structure of the BSFIC MIS;
- (2) Analyze the functions and uses of the BSFIC MIS; and
- (3) Examine, how the problems of BSFIC MIS, if any, may be overcome.

1.3 REVIEW OF LITERATURE

No case study has yet been done on the MIS of BSFIC. This study is, therefore, the first of its kind. The study will reveal how computers are being used in management decision making by BSFIC and what are the problems involved in such use. This report may be used both by BSEC and BPATC. BSFIC may kindly consider the recommendations made in this report for development of their MIS

facilities. BPATC may use this report as a training material in the computer courses conducted here.

1.4 DATA SOURCES AND METHODOLOGY

The study was based on primary data. Primary data was collected from BSFIC. An appropriate questionnaire having both open-ended and closed questions was used to collect data from BSFIC. The study has also made use of relevant theories and models on MIS and DSS.

THE CONCEPT OF USING COMPUTERS IN MANAGEMENT DECISION MAKING

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 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 piecemeal 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 percent accuracy of the information that will be output if the data that was input is correct and 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 does 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 database 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 decision 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. Management 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 Function of MIS

The function of an MIS is to provide information to the administrators and managers for decision making. It does this by collecting and storing all kinds of management information in an organization in a computer database from which information reports may be printed and in which on-line queries may be made.

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 "... 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" (Hiks, 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 judgement 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 others 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.

CHAPTER THREE

Analysis of the Management Information System of BSFIC

3.1 The BSFIC

The BSFIC is one of the biggest corporations of the country and has seventeen subsidiaries or specialized enterprises at the moment. The subsidiaries include the following :

- (1) Panchagarh Sugar Mills Limited
- (2) Thakurgaon Sugar Mills Limited
- (3) Setabganj Sugar Mills Limited
- (4) Rangpur Sugar Mills Limited
- (5) Shampur Sugar Mills Limited
- (6) Rajshahi Sugar Mills Limited
- (7) North Bengal Sugar Mills Limited
- (8) Jaipurhat Sugar Mills Limited
- (9) Carew & Co. (Bangladesh) Limited
- (10) Kushtia Sugar Mills Limited
- (11) Mobarakganj Sugar Mills Limited
- (12) Zeal Bangla Sugar Mills Limited
- (13) Kaliachapra Sugar Mills Limited
- (14) Deshbandhu Sugar Mills Limited
- (15) Faridpur Sugar Mills Limited
- (16) Natore Sugar Mills Limited
- (17) Pabna Sugar Mills Limited
- (18) Renwick, Jajneswar & Co. Limited.

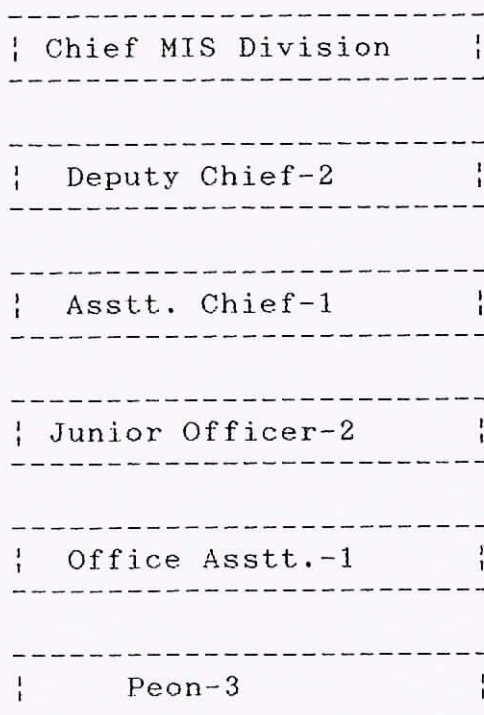
3.2 Hierarchic Position, Structure and Manpower of BSFIC MIS

The MIS Division of BSFIC manually collects information from the different divisions of BSFIC and from the subsidiaries or enterprises. A Computer Cell to provide computer support to the MIS department has been proposed for approval of the government. The proposed set up has the following posts :

- a. Systems Analyst-1
- b. Programmer-1
- c. Assistant Programmer-1
- d. Computer Operator-1
- e. Data Entry Operator-2
- f. MLSS-1

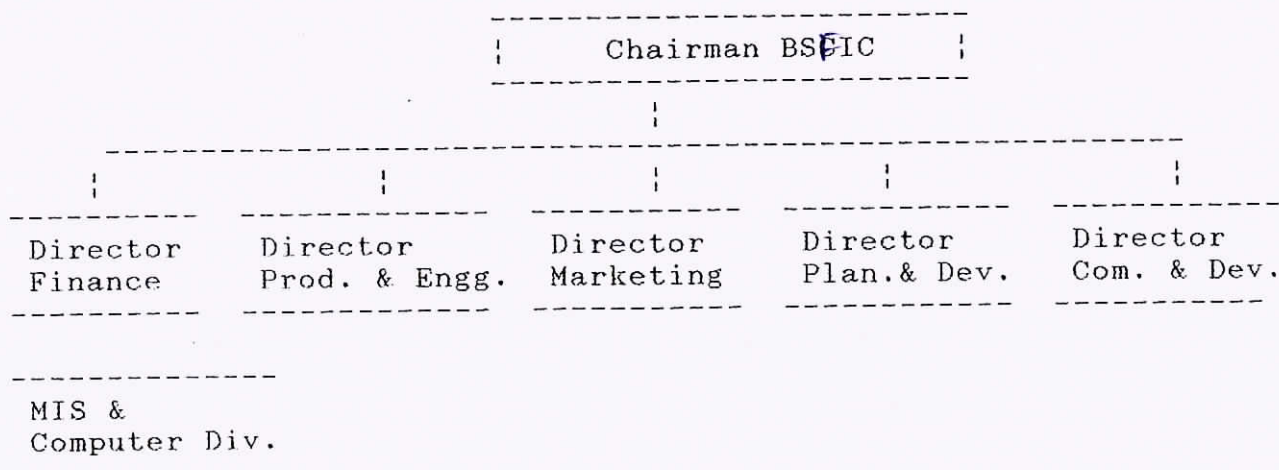
An organogram of MIS division appears below (Fig. 3.1)

Fig. 3.1



The BSFIC MIS enjoys a favourable position in the organizational hierarchy since its chief executive, chief, MIS division reports to the second line of top management (Fig. 3.2).

Fig. 3.2



A high position of the MIS executive makes it easier to convince top management about MIS plans, projects and programmes and gain required allocations in the annual budgets to implement those plans, projects and programmes. Manpowerwise, they have the required number and types of posts in the manual MIS set-up (Fig.3.1).

3.3 Hardware, Software, Systems and Structure of BSFIC MIS

The Computer-based MIS system of BSFIC is supported by a multi-user system with a host computer and four dumb terminals and two other personal computers. The main computer is a Dell micro computer with 80486-33 MHz processor, 8-megabyte RAM, 360-megabyte hard disk, monochrome monitor, and is operated by the

SCO Unix operating system. There are 4 dumb terminals connected to this host. They also 2 personal computers (PC) which are not connected to the above multi-user system. They use these PCs for independent data processing jobs. The PCs are also Dell micro computers with 80286-12.5 MHz processor, 1 MB RAM, 40-megabyte hard disk and a VGA colour monitor. They have 4 printers. Hardwarewise, they have a good amount of processing and storage capacity which is at par with today's standards.

Among softwares, they have SCO Unix OS, DOS, Wordperfect, Lotus, dBase Fox Pro, ABAHA and ONIRBAAN. They also have a programming language compiler.

They have developed a Data Bank. They have also developed a payroll system, a Provident Fund management system and an Accounts management system. They are also planning to develop inventory management system and Personnel Management Information System (PMIS).

It appears from the above that although BSFIC does not have many computers and terminals, they have developed an MIS system. Many organizations have better hardware and software facilities than that of BSFIC yet do not have a computerized MIS. The strong need of such an organization to use updated information about production, marketing, inventory, etc. in accomplishing their day-to-day activities may have prompted this computerization. The favourable position of their MIS set-up in the management hierarchy may also have contributed to getting top management attention towards MIS.

In order to further expand and develop their MIS system they will have to develop other appropriate application Systems for different Divisions. Executive Information System (EIS) specifically for top and senior management and Decision Support System (DSS) for all managers. The DSS has been discussed in section 2.2.3 of the previous chapter.

The structure of the BSFIC MIS is largely centralized. The multi-user system they have has a host computer and four dumb terminals. All these terminals along with the host computer are installed in one room. In order for MIS to be organizationwide and more effective, the Chairman, all the Directors and all Division Chiefs should also have terminals, dumb or intelligent. In order to accomplish that BSFIC will have to go for a new multi-user system that would support 28 terminals. The 28 terminals may be distributed to the offices of the following officials.

- (1) Chairman, BSFIC (1)
- (2) Director, Finance (1)
- (3) Director, Production & Engineering (1)
- (4) Director, Marketing (1)
- (5) Director, Planning and Development (1)
- (6) Director, Cane Development and Research (1)
- (7) Secretariat Division (1)
- (8) Personnel Division (1)
- (9) Employees Relations division (1)
- (10) Vigilance and Inspection division (1)
- (11) Chief, MIS division (1)
- (12) MIS division (5)
- (13) Audit division (1)
- (14) Accounts division (1)
- (15) Finance division (1)
- (16) Company Affairs division (1)
- (17) Engineering division (1)
- (18) Production division (1)

- (19) Purchase division (1)
- (20) Sales division (1)
- (21) Shipping division (1)
- (22) Planning and development division (1)
- (23) Cane prod. & support services division (1)
- (24) Technical services division (1)

The host computer should be a Pentium machine with at least 64-megabyte RAM and 2-gigabyte hard disk and operated by a Unix operating system. They should also switch over to a larger relational database management framework. For this a standard software package such as Oracle may be installed.

3.4 Uses of the BSFIC MIS

BSFIC has been making a good use of its MIS system. They generate daily, weekly and monthly information reports on periodic performance of BSFIC and its enterprises, including productions, local sales, exports, contributions to the national exchequer, available stock of finished products, available stock of raw materials, position of bank loans and repayments, manpower, pay and allowances, development programmes and expenditures therein, man-hour use efficiency, etc. The monthly reports are circulated to the relevant ministries, divisions, attached departments, autonomous bodies, libraries, training centres, etc. All levels of managers of BSFIC and its enterprises make use of these reports. However, the BSFIC MIS is playing its role largely through supplying information reports to management. As has been mentioned in para-3.3. BSFIC can make its MIS organizationwide and more effective if all members of top and senior management are given direct access to the MIS network. A

short training of these senior officials in the use of MIS and DSS will make them users of MIS and DSS.

3.5 Role of the Manual MIS Set-up

As has been mentioned in para 2.2.2 manual procedures are always a part of computer based MIS. The manual procedures may involve collection of data from different divisions or departments of an organization, preparation of data for entry into the computer system, etc. The manual MIS of BSFIC performs two major functions: (1) Preparing data for computerization by the Computer Cell; and (2) Preparing reports from data that are not computerized. However, it is possible nowadays to automatically collect data from the enterprises by having a computer in each enterprise and linking it with the central computer through normal telephone lines. Computer use in the enterprises would not only improve the information system of the enterprises but also minimize the data preparation works at the head office. Installation of an organization wide MIS network at the head office of BSFIC and computerization of the enterprises may minimize the activities of manual MIS department to such an extent that the present MIS department and the Computer Cell may be merged in the future to form a singular structure. This merger will make MIS management and MIS development efforts more convenient.

3.6 Conclusion

The BSFIC deserves appreciation for the fact that they are running a computer-based management information system although they do not yet have a set-up of computer professionals and hardware and software wise also they don't have a big organization wide MIS network. The strong need of such an organization to use updated information about production, marketing, inventory, etc. in accomplishing their day-to-day activities may have prompted this computerization. The structure of their MIS is largely centralized. The set-up, however, is favourably positioned in the organizational hierarchy. The major function of the MIS is to generate information reports of varying frequencies and also occasional and demand reports. The corporation is making considerable uses of these reports. A major tangible benefit, according to several of its officials, has been that they can generate their Monthly MIS Report within one-twelfth of the time that was necessary before computerization. Obviously, this has been a significant achievement. However, there is still scope of further time reductions through automation of some of the currently manual steps, such as, collection of data from the subsidiaries, input preparation, etc. However, on-line facilities for database access and DSS use by user managers is non-existent. Installation of an organizationwide MIS and DSS network would lead to greater use of MIS and DSS facilities in the organization resulting in further improvements in its management efficiency.

3.7 Recommendations

This study would like to make the following recommendations:

1. Install an organizationwide network having both MIS and DSS facilities and give all members of top and senior management terminals for accessing data and analytical facilities of MIS and DSS.
2. In order to accomplish the above, a larger multi-user system with pentium server, 28 intelligent or dumb terminals and served by Unix operating system may be installed.
3. A new MIS may be developed on a standard relational database management system software, such as, Oracle.
4. The top and senior management officials may trained in the use of MIS and DSS through a short in-house course.
5. Most of the enterprises may have computers. Data may then be collected form the enterprises through telephone lines.
6. BSFIC doesn't have a setup of computer personnel. Yet they have been using an MIS system for many years. The reason behind this is that they have got MIS people to maintain an MIS system. In order for BPATC to have an MIS system, there has to be some MIS people committed for that.

QUESTIONNAIRE

- | 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]

11. Data on database use

[illegible]

13. **Generation of information reports** - *Information reports* are generated by the system and are used to provide information to the user. The information reports are generated by the system and are used to provide information to the user.

[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 ***

BIBLIOGRAPHY

- Briggs, Warren G.
An Evaluation of DSS Packages, Computer World, Vol. XVI, No. 9, 1982, p.31.
- Davis, Gordon B. and Olson, Margrethe H.
Management Information Systems: Conceptual Foundations, Structure, and Development. New York: McGraw-Hill Book Company. 1985.
- Goldstein, Larry Joel
Computers and their Applications. Englewood Cliffs, New Jersey: Prentice-Hall, Inc. 1986.
- Hicks, James O.
Information Systems in Business: An Introduction. St. Paul, MN: West Publishing Company. 1986.

