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MANAGEMENT INFORMATION SYSTEM IN
BANKS AND FINANCIAL INSTITUTIONS
OPERATING IN BANGLADESH

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AWARD OF THE DEGREE OF DOCTOR OF PHILOSOPHY

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This is to certify that the Ph.D. thesis entitled "Management Information System In Banks and Financial Institutions Operating In Bangladesh" is a bonafide record of the research work done by Mr. Md. Ashraful Islam, Manager, Bangladesh Shipla Bank, Head Office, Dhaka. The thesis represents an independent and original work on the part of the candidate. The research work has not previously formed the basis for the award of any degree, diploma, fellowship or any other similar title. The entire work has been planned and carried out by the candidate under my supervision and guidance.

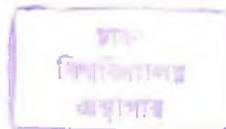
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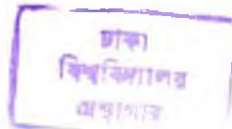
I hereby declare that the thesis entitled "Management Information System In Banks and Financial Institutions Operating In Bangladesh" for the award of the degree of Ph.D. is my original work and that it has not been previously formed the basis for the award of any degree, diploma, fellowship or any other similar title. The entire work has been planned and carried out under the supervision of Prof. Syed Masud Husain.



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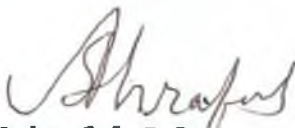
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Chapter III	Literature Survey	40-114
3.1.	Introduction	40
3.2.1.	Concepts of Information	40
3.2.2.	Information Theory	44
3.2.3.	Information Value	46
3.2.4.	Dimensionality of Information	52
3.3.1.	Origin, Discipline, Research Methods and Models of MIS	63
3.3.2.	MIS Definition	73
3.3.3.	Human Information Processing	80
3.3.4.	Computer Based Information Processing	87
3.4.	MIS Performance Measurement	94
3.5.	Attitude Towards CBMIS	105
3.6.	MIS Related Works in Bangladesh	106
Chapter IV	Methodology of The Study	115-160
4.	Introduction	115
4.1.	Methodology of The Exploratory Study	115
4.1.1.	Sample	116
4.1.2.	Procedure	118
4.1.3.	Search For MIS Structure	119
4.1.4.	Data Collection Tools and Instruments	120
4.1.5.	Data Presentation	121
4.2.	Methodology of The Survey Study	122
4.2.1.	Sampling	124
4.2.2.	Independent Criteria Variables	129
4.2.3.	Scale Construction	139
4.2.4.	Questionnaire	157
4.2.5.	Data Collection Procedure	158
4.2.6.	Nature of Data in The Survey	159
4.2.7.	Data Presentation and Analysis	159
4.2.8.	Hypotheses Testing	160
Chapter V	Findings I: Current MIS Administration	161-202
5.1.	Introduction	161
5.2.	Review of Documents, MIS Procedures	162
5.3.	Management of Banks	166
5.4.	Reporting Systems and Reports	167
5.5.	Information Personnel, Tools & Storage Media	180
5.6.	Information Processing Departments	186
5.7.	Findings of The Exploratory Study	197

Chapter VI	Findings II: MIS Performance And Executives' Attitude Towards CBMIS	203-235
6.1.1.	Introduction	203
6.1.2.	The Mean of Primary Elements of UIS, PFS and EAMIS	204
6.1.3.	The Inter Item Correlation Coefficients of Job Characters	205
6.1.4.	Reliability of The Scales	206
6.1.5.	Regression of Constructs	206
6.1.6.	The Correlation of Primary Elements of UIS and PFS	207
6.1.7.	Scores of UIS, PFS, MISP& EAMIS by Criteria	207
6.1.8.	Correlation Coefficients of Constructs	210
6.2.1.	Users' Information Satisfaction	210
6.2.2.	Analysis of Users' Information Satisfaction	211
6.2.3.	Analysis of UIS by Independent Criteria	213
6.3.1.	Preparers' Facilities Satisfaction	216
6.3.2.	Analysis of Preparers' Facilities Satisfaction	217
6.3.3.	Analysis of PFS by Independent Criteria	219
6.4.1.	Analysis of MIS Performance	223
6.5.1.	Executives' Attitude Towards MIS	225
6.5.2.	Analysis of Executives' Attitude Towards MIS	225
6.5.3.	Analysis of Executives' Attitude by Criteria	227
6.6.1.	Analysis Resistances and Suggestions	230
6.6.2.	Frequencies of Resistances	231
6.6.3.	The Chi-Square of Factors of Resistances by Criteria	232
6.6.4.	Frequencies of Suggestions	234
Chapter VII	Interpretation of Results	236-259
7.1.	Introduction	236
7.2.	Interpretation of UIS Results	239
7.3.	Interpretation of PFS Results	247
7.4.	Interpretation of EAMIS Results	251
7.5.	General Interpretation	254
Chapter VIII	Summary of Findings and Conclusions	260-277
8.1.	Introduction	260
8.2.	Findings of The Study	263
8.3.	Conclusions Reached	272
8.4.	Areas For Further Research	274
8.5.	Policy Recommendations	275
Appendices		278-359
Bibliography		360-401

(Books: p.360; Foreign Papers & Articles: p.373; Local Papers & Articles: p.399)

LIST OF TABLES

Table	Title	Page
1.1	MIS Performance Variables	16
1.2	Executives' Attitude Towards CBMIS Variables	17
2.1	Distribution of Banks and Branches As on 31 st March, 1947	26
2.2	Trend of Banks and Branches in Pakistan by Nationality	32
2.3	Banks and Financial Institutions Originating During Pakistan Period and Functioning After Independence of Bangladesh	34
2.4	Capital Assets, Credit Deposit and Investment Deposit Ratios Among Group of Banks	36
2.5	Deposit Classified by Group of Banks	37
2.6	Advances Classified by Group of Banks	38
2.7	Advances by Economic Purposes	39
3.1	Gorry and Scott Morton's MIS Framework	55
3.2	Lucas's MIS Framework	56
4.1.1	Organisations Covered in Exploratory Study	116
4.1.2	Departments Selected For Exploratory Study	117
4.2.1	Distribution of Executives by Group of Banks and Levels of Management to Show Population Size	126
4.2.2	Number of Officers and Executives by Group of Banks and Levels of Management as Samples	129
4.2.3	Group of Banks	131
4.2.4	Designation Wise Executives in Re-Test Phase	152
4.2.5	Classification of Data	159
5.1	Major Source Wise Classification of Reports	171
5.2	Reproducing Source Wise Classification of Reports	172
5.3	Destination Wise Classification of Reports	173
5.4	Group of Banks Wise Average Number of Reports	179
5.5	Frequency Wise Classification of Reports	180
5.6	Designation Wise Number of Information Personnel	181
5.7	Comparison of Information Personnel Among The Group of Banks	181
5.8	Frequency of Tools Used in A Quarter	182
5.9	Group of Banks Wise Frequency of Tools Used	183
5.10	Information Storage Media Among Group of Banks	185
5.11	Age of Information Processing Departments	187

5.12	Group of Banks Wise Objectives of Computer Departments and EDP Units	188
5.13	Designation of Head Of Information Processing Departments	190
5.14	Personnel in Computer Departments and EDP Units	191
5.15	Computer Installed in Group of Banks	192
5.16	Total Business Units Computerized by Group of Banks	193
5.17	NetWork Installed in Group of Banks	194
5.18	Group of Banks Wise MIS Computerised	196
6.1	Scores of UIS, PFS, MISP & EAMIS by Criteria	208
6.2	Significance of UIS Mean Difference Among The Executives	212
6.3	Null Hypotheses Relating To UIS	214
6.4	Analysis of Variances of Users' Information Satisfaction	215
6.5	Significance of PFS Mean Difference Among The Executives	218
6.6	Null Hypotheses Relating To PFS	220
6.7	Analysis of variances of Preparers' Facilities Satisfaction	221
6.8	Significance of EAMIS Mean Difference Among The Executives	226
6.9	Null Hypotheses Relating To EAMIS	227
6.10	Analysis of Variances of Executives' Attitude Towards Computer Based Management Information Systems	228
6.11	Frequencies of Factors of Resistances	231
6.12	Chi-Square Test Results For Factors of CBMIS Resistances	232
6.13	Frequencies of Factors of Suggestions	235
7.1	Summary of Null Hypotheses Test	237

LIST OF APPENDICES

Appendix	Title	Page
1.	List of Hypotheses	278
3.	List of Journal in Alphabetical Sequence	282
4.1.1	Observation Schedule-A	283
4.1.2	Observation Schedule-B	285
4.2.1	Inter Item Correlation of Job Character in Re-Test	286
4.2.2	T-test of Independent Sample of High and Low Groups for Each Item of UIS	286
4.2.3	T-test of Independent Sample of High and Low Groups for Each Item of PFS	287
4.2.4	T-test of Independent Sample of High and Low Groups for Each Item of EAMIS	288
4.2.5	Cronbach's Alpha of Test One & Test Two	289
4.2.6	Split Half Reliability of Test One & Two	289
4.2.7	Item Wise t-test of Paired Sample (Test One & Two)	290
4.2.8	Construct Wise t-test for Paired Sample (Test One & Two)	293
4.2.9	Regression of Constructs	293
4.2.10	Inter Item Correlation Coefficients in Test Two of Primary Variables	294
4.2.11	Correlation Coefficients of Constructs UIS PFS & EAMIS	298
4.2.12	Survey Questionnaire	299
6.1	Mean, SE Mean, & SD of Primary Variables	313
6.2	Inter Item Correlation of Job Characters	315
6.3	Cronbach's Alpha of Scales in Final Survey	316
6.4	Split Half Reliability in Final Survey	316
6.5	Regression of Constructs in Final Survey	316
6.6	Inter Item Correlation Coefficients of Primary Variables in Final Survey	317
6.7	Correlation Coefficients of Constructs UIS, PFS & EAMIS	319
6.8	Mean, Standard Deviation and Variance of Constructs	319
6.9	Analysis of Variance of UIS by Criteria	320
6.9	Analysis of Variance of PFS by Criteria	329
6.9	Analysis of Variance of EAMIS by Criteria	340
6.10	Analysis of Variance of MISP by Criteria	350

ACRONYMS USED IN THE THESIS

Acronym	Full Words
AB	Agrani Bank
ABBBL	Al-Baraka Bank Bangladesh Limited
ABBL	Arab Bangladesh Bank Limited
ABP	Agricultural Bank of Pakistan
ACA	Associate Chartered Accountant
ACMA	Associate Cost and Management Accountant
ADBP	Agricultural Development Bank of Pakistan
ADFC	Agricultural Development Finance Corporation
AGM	Assistant General Manager
ANOVA	Analysis of Variance
ANZ	ANZ Grindlays Bank Limited
AVP	Assistant Vice President
BASIC	Bank of Small Industries and Commerce Bangladesh Ltd
BB	Bangladesh Bank
BI	Banque Indosuez
BIBM	Bangladesh Institute of Bank Management
BKB	Bangladesh Krishi Bank
BPS	Bank Performance Statements
BSB	Bangladesh Shilpa Bank
BSRS	Bangladesh Shilpa Rin Sangstha
CBL	The City Bank Limited
CBMIS	Computer Based Management Information System
CDF	Computer Disk File
CD	Computer Department
CIB	Credit Information Bureau
DFIs	Development Financing Institutions
DGM	Deputy General Manager
DMD	Deputy Managing Director
DNPCBs	Denationalized Private Commercial Banks
EAMIS	Executives' Attitude Towards MIS
EBL	Eastern Bank Limited
EDP	Electronic Data Processing
ECNEC	Executive Committee For National Economic Council
EVP	Executive Vice President
FBBs	Foreign Bank Branches
FCA	Fellow Chartered Accountant
FCMA	Fellow Cost and Management Accountant
Fis	Financial Institutions
FSRP	Financial Sector Reform Program
GB	Grameen Bank
GM	General Manager
GOB	Government of Bangladesh
HSC	Higher Secondary School Certificate
IBA	Institute of Business Administration
IBBL	Islami Bank Bangladesh Limited
ICB	Investment Corporation of Bangladesh
IFIC	International Finance Investment and Commerce Bank Ltd
IPCBS	Indigenous Private Commercial Banks
IPD	Information Processing Department
IQ	Information Quality

IS	Information System
ISQ	Information System Quality
IT	Information Technology
JB	Janata Bank
LLM	Loan Ledger Manual
LRA	Lending Risk Analysis
M.Phil	Master of Philosophy
MD	Managing Director
MIS	Management Information System
MISD	Management Information Service Department
MISP	Management Information System Performance
MOF	Ministry of Finance
MS	Master of Science
NBL	National Bank Limited
NCBs	Nationalized Commercial Banks
PBL	Pubali Bank Limited
PCBs	Private Commercial Banks
PFS	Preparers' Facilities Satisfaction
PMIS	Personnel Management Information System
PO	Principal Officer
Ph.D.	Doctor of Philosophy
PICIC	Pakistan Industrial Credit Investment Corporation
PIFCO	Pakistan Industrial Finance Corporation
PPS	Performance Planning System
RB	Rupali Bank
RBI	Reserve Bank of India
RKUB	Rajshahi Krishi Unnayan Bank
RQ	Report Quality
RSD	Research and Statistics Department
SABRE	System for Autonomous Bodies Reporting and Evaluation
SAVP	Senior Assistant Vice President
SB	Sonali Bank
SBI	State Bank of India
SBP	State Bank of Pakistan
SBS	Scheduled Banks Statistics
SC	Standard Chartered Bank
SD	Standard Deviation
SE	Standard Error of Mean
SM	Senior Manager
SO	Senior Officer
SPBs	Specialized Banks
SPO	Senior Principal Officer
SPSS	Statistical Package for Social Sciences
SSC	Secondary School Certificate
SVP	Senior Vice President
UBL	Uttara Bank Limited
UCBL	United Commercial Banks Limited
UIS	Users' Information Satisfaction
VP	Vice President

List of Defined Variables

Variables	Labels
<u>Personal Information</u>	
ORGAN	Organisation
GBANK	Group of Banks
DEPT	Department Groups
DESIG	Designation
MGTLEV	Management Level
AGE	Age of Executive
AGEGRP	Age Groups
SEREXP	Service Experience
EXPLEV	Experience Level
GENDER	Gender
EDUFAC	Education Faculty
EDULEV	Education level
EDUGRP	Education Groups
JOBAC	Job Character: Accountable*
JOBF	Job Character: Formulatory*
JOBJ	Job Character: Judgement*
JOBP	Job Character: Predictive*
JOBA	Job Character: Analytical
JOBI	Job Character: Implement
JOBR	Job Character: Routine
JOBU	Job Character: Uncertainty
JOBN	Job Character: Negotiating
JOBS	Job Character: Staffing
MISI	MIS Involvement
FLO	Functional Management: Operational
FLM	Functional Management: Control
FLS	Functional Management: Strategic
COMKNO	Computer Knowledge
COMEXP	Computer Experience
<u>MIS Variables</u>	
IATIME	Timeliness
IACUR	Currency
IAFRE	Frequency
IAACC	Accuracy
IACOM	Completeness
IAREL	Relevance
IACON	Conciseness
IANEU	Neutrality
IASPR	Sufficiently Processed
IASCO	Scope*
QRPRE	Presentation Quality
QRPME	Measure Performance
QRCLA	Clarity
QRVOL	Volume acceptable
QRORD	Order
QRDES	Descriptive
QRNUM	Quantitative
QRGRA	Graphic
QRMEA	Meaningful
QRTIT	Title
QRACT	Reflects Activities*
QIPRO	Projected Information
QITIM	Time context
QISPA	Space context
QIVAL	Add value
QIIDE	Improve Decision
QIPRE	Regularity of Regular Reports

QISRT	Special Reports in Reasonable Time
QICLE	Clear Context
QIFDB	Management Control Feedback
QIFDF	Management Control Feed-forward
QICSF	Critical Success Factors
QIMEA	Measurement*
QIOVE	Information Overload*
QIREC	Proper Recording*

PFS Variables

PFCOF	Computer Facilities
PFCOU	Computer Use
PFCAL	Calculator Use
PFTYP	Typewriter
PFPCO	Copier
PFMAN	Procedure Manual
PFCIR	Procedure Circular
PFPPS	Forms Pre-specified
PFVAN	Forms Adequate for Need
PFDDN	Forms Adequate for Data & Narration
PFASD	Accessibility of Supporting Documents
PFACO	Accessibility - Colleagues
PFAES	Accessibility of External Sources
PFACF	Accessibility in Computer Files
PFRSY	Recording- Systematic in Ledger
PFPIN	Preserving- Indexed
PFPDW	Preserving- Date Wise
PFPSW	Preserving- Subject Wise
PFOEE	Preservation- Organisation of Documents
PFORG	Preservation- Organisation of Ledger
PFDDI	No Disturbance by Colleagues
PFDCR	No Disturbance by Crowd
PFCOP	Computer Operators
PFIFE	Assistance from Expert
PFMAL	Mail
PFLOG	Logistics
PFAVA	Accessibility - Availability*
PFMAX	Facimile Terminal*
PFODE	Accessibility To Other Departments*
PFOLA	Office Layout*
PFOOO	Preserving- Organization*
PFPOS	Preserving - Possession*
PFPOW	Power Supply*
PF PUB	Preserving - Update*
PFTLX	Telephone*
PFTLX	Telex*

EAMIS Variables

AFSRK	Systematic Record Keeping
AFSDP	Speedy Processing
AFSTI	Save Time
AUTRM	Traditional Record Keeping is Manual
AUCMI	Conversant With Manual Data Handling
AUCOS	Cost Involvement
AULFA	Lack Faith
AFCLE	Create Learning Environment
AFTIN	Timely Information
AUSPA	Shortage of Programmer & Analyst
AUADR	Absence of Data Protection Rules
AUEID	Executive Idleness
AFEFF	Efficient Management
AFDDB	Feedback
AUFHQ	Fail to Hold Qualitative Data

AUTO	Threat to Organisational Communication
AUTC	Threat to Organisational Culture
AFIO	Improve Operations
AFIM	Improve Management Control
AFIS	Improve Strategic Planning
AFISQ	Ensure IS Quality
AUTTP	Threat to Thought Process
AUDTP	Dominance of Technical Personnel
AFODS	Organised Data Storage
AFMOD	Software Model
AFDIN	Direct Interaction
AURPE	Reduction of Personnel
AUIPE	Isolation of Personnel
INFSAT	Information Satisfaction
PFACIL	Facilities Satisfaction
AFAVOR	Attitude Favourable
AUFAVOR	Attitude Unfavourable
AFDPE	Develop Personnel*
AFINT	Internet*
AFMIS	Management of IS - Regular*
AFSSP	Save Space*
AFUDT	Upgrade of Tele Communication*
AFURN	Urgent Need*
AUAMM	Acceptability of Manual MIS*
AUASE	Adverse Social Effect*
AUIDT	Training*
AULIA	Limited Information Accessibility*
AULIP	Lack of Information Privacy*
AUTEM	Threat To Employment*

Resistance

RENOR	No Resistance
REUCR	Unlikely to Confront Resistance
RELEK	Lack of Top Executives Knowledge
REFUE	Fear of Unemployment
REMPU	Mal-Practice of Users
RESFU	Shortage of Fund
RELPO	Lack of Policy
REDCP	Dissatisfaction of Computer Personnel
RELIP	Lack of Information Privacy
REASE	Adverse Social Effect

Suggestions

SUDBM	Computerisation by Use of DBMS
SUFAC	Functional Areas Computerisation
SUCOP	Computerised Operations
SUCMN	Central MIS by Network
SUIQP	Information Quality & Preservation
SUERR	Elimination of Redundant Reports
SUISC	FAX, Telex and Telephone
SUDIN	Departmental Initiative
SUMPP	MIS Plan, Policy
SUPAR	Participation
SUOUI	Objective Use of IT
SUINP	Appointment of IT Personnel
SUTRN	Training
SUCOM	Providing Adequate Computer
SUMSU	Maintenance-Support
SUUCK	Users Computer Knowledge
SUEFB	Extra Financial Benefits
SUSWD	Software Development

* Item dropped after re-test.

Chapter I

Introduction

1.1. Introduction

Information is vital for any organization. Management performance, to a large extent, depends on the adequacy of a Management Information System (MIS). A Management Information System provides information to management for planning, operations, and control. In the business world, it has got particular importance. The competitive business environment requires not only generating information but also utilizing it promptly and accurately, and putting it for relevant and strategic use. The strategic use of information determines who is going to survive in a competitive environment, especially under the condition of uncertainty. Business management today demands an awareness of the strategic implication of information and information systems. The strategic impact of MIS has got a new dimension in the recent literature [Robson 1994, p.iii; Ciborra and Jelassi 1994, p.xi]. A well-developed and well-maintained MIS is needed for organizational growth. Restructuring MIS may cause a change in organizational structure to fit the organization to face challenges [Robson, 1994, p.77].

MIS function involves gathering, processing, storing and disseminating information. It may encompass manuals, handbooks, procedures, and computer hardware and software to best satisfy the information requirements of the organization. The MIS is a

human-created, technology-driven, procedure-based synthesized management tool. Many of its contents and elements are, however, social, psychological and behavioral. The procedure based phenomenon of MIS belong to methods and procedures originated and practiced for centuries in many disciplines. Organizations are striving to apply various methods, and procedures in order to be more efficient and more goal-oriented and to fit themselves more efficiently in the social system. The proponents of MIS incorporate system concepts to bind the methods, procedures, tools, techniques, functions, operations, and people together. The technology driven phenomenon of MIS got more attention in recent information literature than other phenomena. The technology driven MIS has now found its place in deep-rooted social settings. This attracted serious attention on the part of academics, practitioners, and management scientists to look at the management information system (MIS) as a social, psychological, behavioral and organizational process.

The concept of MIS includes knowledge and skill. MIS as a body of knowledge covers fields such as Information Analysis, Information Theory, Information Economics, Cybernetics, System Theory, Communication Theory, Human Information Processing, and Business Communication, and is associated with sub-branches of Management and Accounting. MIS as a body of skill covers methods, procedures, analysis, application of computers etc. Human beings are important component of the system.

The MIS acts both as a means and an end. As a means to an end, it states the conditions of available facilities for information handling and use. As an end to a means, it abstracts output from the means required for operations and decision making.

The management of MIS is a continuous process. It needs planning, designing, developing, implementing, researching and continuous adjustments. Different persons are involved in different aspects of MIS, such as users and preparers of reports. The report preparers prepare reports to be used by end users. If the preparers know the factors having impact on satisfaction of users, the preparers may try to improve the quality of those factors. If the users can identify which factors make them satisfied and which factors make them dissatisfied, they can point out why the MIS reports are not being useful in decision making. If the users know the lack in facilities for the preparers, they perceive the limitations of the reports and suggest improvements in logistic support.

The satisfaction of executives about information and facilities indicate MIS performance. Unless the executives are satisfied with the information, operations and decision making will not be properly aided by the system. Again, if the executives are not satisfied with the facilities, the activities will not be properly supported. The executives' attitude is very important for adaptation and implementation of computerized MIS.

1.2. Background of The Problem

The concept of a management information system is not very old. Although, inquiries into MIS field have got attention in recent years, the broader spectrum where it belongs to, i.e. information system (IS) dates back to old ages. The data handling grew as a separate specialized work, the history of which goes back much early [Anthony 1965]. The concept of data handling and computerized processing started in 1950s and 1960s [Vazsoni (1973, p.43); King (1973, p.5); O'Brien (1985, p.508); Lyttinen (1987); Award (1988, p.4)]. This conceptual development of the field has been labeled as management information system (MIS). The MIS from its very rudimentary stage corresponds to the development of computer technology. Gradually its usage spread over and caught the eye of management specialists for practical reasons. The adaptation of computer by organizations for different functional areas have revolutionized the entire business gamut. At the moment, nobody is going to accept any MIS without having some linkage with the computer vis-à-vis its network operating in the organization. 21/2/21 (21)

A sudden increase in the availability and use of information technology has raised some fundamental questions on the guiding of technological innovation, measuring of organizational and managerial productivity, augmenting of human intelligence, ensuring data integrity, and establishing strategic 21/2/21

advantage. An expanded use of information systems also raises some major challenges to the traditional forms of administration and authority, the right to privacy, the nature and form of work, and the limits of calculative rationality in modern organizations and society [Boland and Hirschheim, 1987, p.vii].

The information system research in recent years has confronted with a number of theoretical and methodological issues. Researches on information system to facilitate managerial decision making are limited and basically have a distinctly idiosyncratic orientation [Larcker 1981, p.519]. Many aspects of an information system are still unknown. Many authors and academics suggested to pursue more researches on information system and management information system on different aspects using different methodologies [Mumford 1991, p.24-5]. The objective of such suggestions is to understand the information system in-order to construct theories. Basically, theories in the MIS field are poorly developed [Keen (1991), p.28]. Whatever are there need further testing and replication.

The issues of management information system performance have been of interest to many researchers [Henrion et al. (1986); Mansour and Watson (1980); Uecker (1978); Andrus (1971); Watson et al. (1977); Kim (1988); Ein-Dor and Segev (1978); Narasimhan (1978); Payne et al. (1973); Cooper and Mukhopadhyay (1990); Hussain and Hussain (1992); Lewis (1994); Garland (1986); Dickson and Wetherbe (1985); Thierauf (1983); Hamilton and Chervany

(1981); Sloma (1980); Zmud (1978)]. But there remain problems in approach, procedures and factors considered [Lord (1984), p.12]. Factors considered in previous researches are partial. One group of researchers had adopted Information Analysis, Information Attributes, Value of Information, Quality of Outputs, and Quality of Information Systems. Other group (mostly management audit oriented) had considered facilities such as Physical, Procedural, Accessibility, Keeping, and Environmental. Most of the studies addressed in the context of computerized information systems. Again, studies on executives' attitude towards information systems have been of interest to some researchers [Adams and Schroeder (1973); Wheelen (1975); Lucas (1975); Robey (1978); Barnett (1978)], but, executives' attitude towards computer based information system has not been adequately investigated. The context for this research has not been previously searched for. Particularly, MIS issues in the banks and financial institutions of Bangladesh has never been taken up as a subject of research.

There remains controversy in almost every aspects of MIS. Many of the literature reviewed are empirical, others are prognosticated. The views and empirical findings are divergent in nature. Along with a detailed literature review of the various aspects of MIS, the controversial research findings and issues have been separately mentioned in the literature review section of the thesis.

1.3. Statement of The Problem

Banks and financial institutions are basically service oriented. Their success largely depends on management competence. Success of all organizations in general and banks and financial institutions in particular depends on efficiency and effectiveness of management information systems. Banks and financial institutions demand an improved provision of information that may be achieved by adaptation to computer-based MIS. The computer-based MIS calls for specialists know-how and executives' knowledge of computer. It is a common uttering that technology develops faster but management competence in adapting to the technology lag-behind. It is not exceptional in case of banks and financial institutions operating in Bangladesh.

Traditional manual MIS takes the form of a reporting system. It incorporates returns, statements, memos, files, notes etc. The introduction of computer in banks and financial institutions is a recent phenomenon. Three driving forces played prominent role in the process of introducing computer-based MIS in banks and financial institutions in Bangladesh. These are: (1) application of computer in banking operations, (2) replacing clerical work by computer, and (3) desire of management for having more information. Whatever driving forces are prominent, it is a fact that computer-based MIS has found its place in the management systems of banks and financial institutions. Under this situation, MIS got a mixed shape of traditional manual and

computerized reporting system. But its uses, dimensions, aspects, and implied impacts are unknown to us. The nature of MIS, even after the adaptation of computer technology has not been well reported. This means that we simply do not have a complete knowledge about the existing MIS in banks and financial institutions.

A review of the available literature on MIS in banks and financial institutions in Bangladesh reveal some problem areas. The identified problems of MIS in banks are: heaps of information in the form of statements, MIS is not planned nor consistently persist to form a system, system approach is not well conceived, the departments are weakly associated, top and middle management tend to be fixed in conventional system and procedures [Khaled 1981, p.19-24]. In nationalized commercial banks, statements and reports do not have logical appropriateness and many of these are never consulted by the management for any definite purpose. That is, essential qualifications of the Management Information System are ignored [Habibullah 1982,p.24]. The other demerits identified were: information and data are not entirely accurate, many reports are duplicated, data are not timely supplied, lack of feedback information and follow up action, a large number of forms and returns which contain excessive details unnecessarily increasing the load of work, most importantly the existing information system does not fulfil its stated objectives [Habibullah 1982, p.24]. Objectives and data requirements are not

also clearly stated and known to the data suppliers in general [Habibullah 1982, p.24]. In the face of present context of changed objectives and social goals, new and revised information are needed in accordance with the nature of function. The criteria of evaluation of performance are not available in our banks and financial institutions [Habibullah 1982, p.24]. The deficiencies such as: lack of proper MIS, lack of relevant information, lack of proper dissemination of information between branch/zonal office and head office also exist [Shahid 1982, p.60-63]. MIS of our banks and financial institutions are not supported by computerized database [Hossain 1985, p.84]. A survey on computer use in banks in Bangladesh found, among others, that executives have positive attitudes for computerization of banking activities [Shahid 1991, p.114-128]. MIS related studies in Bangladesh were not rigorous, lacking in depth and breadth. These were, however mostly guess works, and belief of authors acquired through personal experiences. The studies neither followed adequate methodologies nor could cover the MIS scope in general. However, these provided some indication of problems of MIS in our banks and financial institutions. A detailed list of MIS related works in Bangladesh has been given in the last section of Literature Survey chapter in the thesis.

With the above problem and context in mind, several areas in MIS seems to be open for study. The problem area selected in this research has been kept limited to the MIS performance and

executives' attitudes towards MIS in our banks and financial institutions. This would entail giving answers to the major questions such as: is there any difference in perceived MIS performance and executives' attitude towards computer based MIS? Do the perceived MIS performance and executives' attitude towards computer based MIS vary for different group of banks, functional departments, management levels, age groups, service experiences, genders, education faculties, education levels, job characters, MIS involvement, functional management, knowledge of and experiences with computer? What resistances and problems they confront in the adaptation of computer based MIS? The objectives, methodology and hypotheses for the research have been developed keeping the particular problem area in mind.

1.4. Statement of Objectives

This research study has been undertaken to explore MIS in banks and financial institutions operating in Bangladesh. The search begins through an effort to know the nature of MIS and then to the areas of performance and attitude. The exploration process involves finding various aspects of MIS. Relating to this issue, the **first objective** was to undertake an exploratory study directed to find the dimension of the MIS, identify components and general principles of its operations. A descriptive study of the existing system was required to find out the nature of present practices.

The **second objective** was to measure the performance of MIS. The performance denotes effectiveness to show appropriateness of MIS in the organizational setting.

The **third objective** was to analyze the executives' attitude towards computer based MIS. The executives' attitude study was to identify criteria responsible for favorable and unfavorable attitude.

The **fourth and final objective** was to analyze the resistances and problems confronted by executives in computer application and their suggestions for reorganizing MIS. ✓

1.5. Rationale of The Study

The status of MIS in banks and financial institutions of Bangladesh is unknown. To organize the study and carry on to its particular direction, it was urgently necessary to know the nature, to measure performance of existing MIS, and to bring to light the executives' attitude towards MIS. The attitude of MIS stakeholders such as designer, developer, analyst, and users at different management levels is also important.

This study intended to reduce the knowledge gap relating to MIS in our banks and financial institutions. The management of banks have applied interest in the reorganization process of MIS. Due to the introduction of information technology, the transition phase of MIS emerged and the applied interest has become more practical. This study will definitely have important bearing in

the formulation of policies in the banks and financial institutions of Bangladesh.

1.6. The Conceptual Model of The Study

It was necessary in the study to develop a procedure for achieving the objectives. A conceptual model has to be developed with appropriate methodology. There is no generally accepted guideline for measuring the performance of MIS. Many researchers have applied users' information satisfaction as the measure [Kim (1988); Seward (1975); Cheney and Dickson (1982); McFarlan (1971); Luacs, Jr. (1978); Cheney and Fuerst (1978); Narasimhan (1978)]. A number of researchers have used or suggested to use facilities satisfaction concepts [Thierauf (1983); Hussain (1972); Andrus (1971); McFarlan (1971); McLean (1973); Mansour and Watson (1980); Sloma (1980); Hamilton and Chervany (1981); O'Reilly, III (1982)].

Some academics [Goodman et al. (1977); Szilagyi (1981)] view efficiency and effectiveness as two sub components of performance. In the context of MIS performance, the efficiency and effectiveness concepts have been suggested by a number of authors such as Wetherbe and Davis (1982), Dickson and Wetherbe (1985), Hussain and Hussain (1992), and Lewis (1994). Lord (1984) stated that, in information system performance measurement, the linear information attributes model provides a good basis and respondents assignment of score values against

performance measuring variables may serve the purpose [p.12-15]

The exposition of this research model is that MIS performance is better constituted by two constructs. These are: (i) the users' information satisfaction (UIS) and (ii) the preparers' facilities satisfaction (PFS). But, earlier works have considered only one concept in measuring performance.

The information satisfaction is classified into sub-constructs such as information quality, reports quality and information systems quality. The facilities satisfaction is classified into sub-constructs such as physical, procedural, accessibility, record keeping, and environmental facilities. Each sub construct consists of several primary elements.

An additional work encompassing the research has been the unearthing of the executives' attitude towards the computer based management information system.

The model is encircled by several criteria (independent variables) such as group of banks, executives' functional areas (department), executives' positions (designation), executives' age, executives experience, sex, education faculty, education level, computer knowledge, computer experience, executives' job characteristics, executives' MIS involvement, and executives' functional levels of management. The model does not incorporate any intervening, extraneous variable. Two major concepts of the model are executives' information satisfaction and executives' facilities satisfaction. The attitude towards computer based MIS

is to reflect the executives psychological and behavioral aspects towards the modern computer based MIS. The variables, sub-constructs and constructs used are placed in Table#1.1 and Table#1.2 (pp.16-17).

1.6.1. MIS Performance

The information processing system falls within the purview of functional areas of management. Information processing systems are mechanistic, composite and complex. The human use of information is basically a psychological phenomenon popularly known as Human Information Processing (HIP) [Adams and Swanson (1976); Taggart and Valenzi (1990)]. The report users' information satisfaction in the context of organisation falls within the purview of organisational psychology. The interest in Information Satisfaction has been developed for the purpose of information system evaluation [Lucas, (1978); Zmud (1978); Narasimhan (1978); Cheney and Fuerst (1978); Mansour and Watson (1980); Cheney and Dickson (1982); O'Reilly, III (1982); Kim (1988); Leonard-Barton and Sinha (1993); Molloy and Schwenk (1995)]. The users' information satisfaction may reveal the extent of information quality derived from the existing information systems. The preparers' opinion on the extent of facilities available i.e. their perceived facilities satisfaction deriving from the existing information systems may also reflect the performance of management information systems. The

information satisfaction view has been followed by many researchers [Lucas, (1978); Zmud (1978); Narasimhan (1978); O'Reilly, III (1980); Cheney and Dickson (1982); Kim (1988); Leonard-Barton and Sinha (1993); Molloy and Schwenk (1995)]. The facilities satisfaction view also has been followed by many researchers [Moan (1973); Adams and Swanson (1976); Mansour and Watson (1980); O'Reilly, III (1982); Thomas and Trevino (1993)]. Mansour and Watson (1980) have evaluated computer based information system performance in-terms of CPU capability, memory, storage, and output capabilities [p.84-107]. The MIS performance model presented here is in line with the context of organizational settings and practice. The model is developed to help understand and communicate the MIS in Banks and Financial Institutions in Bangladesh. The model holds that UIS alone is not capable of reflecting MIS Performance. It also needs to consider facilities available in handling information. The facilities are elements of information systems. The model strongly holds that both UIS and PFS together are required to determine the MIS Performance. The PFS reflects the perceived facilities satisfaction derived from the input elements of the systems and UIS reflects the perceived information satisfaction derived from the output of the systems. The Users' Information Satisfaction (UIS) is the sum of scores of a number of factors pertaining to information quality, report quality and information system quality. Preparers' Facilities Satisfaction (PFS) is the sum of

3/3/2008

scores of a number of factors relating to physical, procedural, accessibility, keeping and environmental facilities (Table#1.1). Lord, (1984) reports that King had found linear information attribute models provide good basis for comparing information systems [p.15]. In this study, we have followed the additive functional patterns like Lord, (1984). The relationship in our linear model may thus be represented as follows:

$$UIS = f \text{ (Information Qualities, Report Qualities \& IS Qualities Elements)}$$

$$Y = (X_1 + X_2 + \dots + X_{30})$$

$$PFS = f \text{ (Physical, Procedural, Accessibility, Keeping \& Environmental Elements)}$$

$$Y = (X_1 + X_2 + \dots + X_{26})$$

$$MISP = (UIS + PFS)$$

Table # 1.1

MIS Performance Variables

UIS			PFS				
Information Quality	Report Quality	IS Quality	Physical	Procedural	Accessibility	Keeping	Environment
Timeliness Currency Frequency Accuracy Completeness Relevance Conciseness Neutrality Processing	Presentation Measuring performance Clarity Volume Order Description Quantitative Graphic Meaningful Title	Projected Time context Space context Add value Improve decision Regularity Reasonable time Clear context Feedback Feedforward Critical success factor	Type Writer Calculator Computer Computer Use Copier	Manual Circular Forms Pre-specified Forms adequate to need Forms adequate for data & narration	Supporting documents Colleagues External sources Computer files	Recording Index Date wise subject wise Organisation of documents Organisation of ledger	Disturbance by colleagues Disturbance by crowd Computer operators Assistance form computer personnel Mail Logistics

1.6.2. Executives' Attitude Towards CBMIS

The EAMIS is to reflect the executives' favorable and unfavorable attitude to computer based MIS. The greater favorable attitude for CBMIS means acceptability of the system. Otherwise, special learning, motivation treatment may be required to move towards CBMIS. The executives' attitude towards MIS has been studied by a number of researchers [Robey (1978); Lucas (1975); King and Rodring [in McCosh et al. (1984), p.265]; Adams (1975); Dickson and Simmons (1970); Barnett (1978); Wheelen (1975)]. The executives' attitude (EAMIS) is a composite concept. The executives' attitude towards computer based MIS is the sum of scores of a number of items pertaining to information, IS characteristics, psychological, behavioral, cultural, communication, organizational-structure and cost (Table#1.2). The executives' attitude (EAMIS) may be expressed by the equation:

$$EAMIS = f (\text{Information, Information System, Facilities, Psychological, Behavioral, Cultural, Communication, Structure, and Cost related elements}).$$

$$Y = (X_1 + X_2 + \dots + X_{28})$$

Table # 1.2
Executives' Attitude Towards CBMIS Variables

Information, IS Characters	Facilities	Psychological, Behavioural, Cultural	Communication, Structure, Cost
Timely Information Saves Time Creates Learning Environment Creates Efficient Management Feedback Improves Operations Improves Management Control Improves Strategic Planning Ensures IS Quality Speedy Processing	Software Model Data Protection Rules* Interaction with Computer Systematic Recording Traditional Recording* Qualitative Data* Organised Data Storage Shortage of Programmer*	Lack of Faith* Threat to Thought Process* Executive Idle* Dominance of Technical Men* Convexment with Manual Data Handling* Threat to Organisational Structure*	Threat to Organisational Communication* Isolation of Personnel* Reduction of Personnel* Cost Involvement*

*Item was unfavorably stated.

1.7. Hypotheses

The banks and financial institutions differ in respect of origin, objectives, business coverage, performance, MIS orientation etc. All organizations use computer but computer uses in functional areas are not given same importance. Some organizations do have MIS departments but they are not adequately supported by sufficient computers, software and information personnel. Few organizations have computerized their accounting system. The reporting system practices are different among organizations. Therefore, the dis-similarities are expected in MIS performance and executives' attitude. More clearly, the executives' information satisfaction, facilities satisfaction and attitude towards MIS may differ for executives' belonging to different Group of Banks, Functional Departments, Management Levels, Age Groups, Service Experiences, Gender, Education Faculties, Education Levels, Job Characters, MIS involvement, Functional Management, Knowledge of and Experiences with computer. Accordingly, research hypotheses were formulated stating that users' information satisfaction, preparers' facilities satisfaction and executives' attitude towards CBMIS were assumed to be dissimilar among the executives. Alternative test hypotheses developed for the study have been listed in **Appendix#1**. The null hypotheses are presented in the relevant sections of chapter six along with test results and analysis.

1.8. Limitations of The Study

The limitations of the study are given below:

- (1) Articles from reputed journals and books on related fields were consulted. Even after a through search, a full coverage could not be made.
- (3) This study did not consider any extraneous or confounding variables.
- (8) The study basically depended on selected primary elements and some might have still been left.

McCosh et al. (1984) made a criticism on user information satisfaction by survey questionnaire. The approach of user information satisfaction is a delicate exercise as: (1) Users may be unaware about their true attitude to the MIS and response may demonstrate superficial reaction. (2) Users may have clear perception but may reply differently. (3) Questionnaire survey being indirect survey may disguise the true nature of the inquiry. (4) Evaluator may apply normative comparisons. (5) Users standards of satisfaction may be influenced by previous MIS experience. (6) Subjective statements may be present. (7) Less constrained opinion may have influenced results [p.273].

The above mentioned limitations were always in the mind of the researcher and hence adequate guard has always been taken wherever possible. A sincere effort has been made in the research to maintain its quality despite all odds faced.

1.9. Chapter Design

The thesis has been arranged in eight chapters. This study has addressed the nature of MIS, users' information satisfaction, preparers' facilities satisfaction and executives' attitude towards the system. Through a detailed examination of factors relating to satisfaction, facilities, and attitude in twenty five major banks and financial institutions, the findings are reported.

Chapter One: This chapter begins stating background of the problem. This is followed by statement of the problem, objectives of the study, conceptual model of the study, hypotheses and limitation of the study. The null hypothesis are presented in the respective part of chapter six.

Chapter Two: The evolution of banks and financial institutions in Bangladesh showing origin, development and current status has been documented in this chapter.

Chapter Three: Literature survey covers a wide area of literature ranging from informational concepts to MIS performance and Attitude. These are presented in different sections in sequence. The main objective of literature survey is to highlight that MIS covers a wide area of informational concepts and the various approaches, methods followed or suggested by researchers for MIS performance.

Chapter Four: How the study has been conducted and proceeded are presented in this chapter. It contains methodology of the

study. The methodology of the exploratory study contains scope and coverage, sample, search for MIS structure, variables, data collection tools and patterns of analysis to uncover the nature of MIS. The methodology of survey study contains sampling, independent criteria variables, scale construction, reliability and validity of the scales, questionnaire, and data collection procedure. In addition, explanation of various terms and concepts are also presented in this chapter.

Chapter Five: The results of exploratory study are described in this chapter. It highlights the nature of MIS in banks and financial institutions in Bangladesh. This contains a review of documents; reports and reporting systems; computer persons, tools used, data storage media; MIS department, computer department and EDP unit; opinion on MIS aspects etc.

Chapter Six: This chapter contains results of the survey study in several sections. Section one contains the mean and correlation of primary elements. Section two contains the analysis and test of hypotheses relating to UIS. Section three contain analysis and test of hypotheses relating to PFS. Section four contain analysis of MIS performance. Section five contain the analysis and test of hypotheses relating to EAMIS. Section six presents the resistances and suggestions.

Chapter Seven: The findings are interpreted in this chapter.

Chapter Eight: Finally, the findings, recommendations and conclusions have been presented in summary form in this chapter.

Chapter II

Evolution of Banks and Financial Institutions In Bangladesh

2.1. Introduction

Banks and other financial institutions play a vital role in fostering the economic and social condition of a country. They help to develop a conducive climate for capital formation. Capital formation requires three stages such as savings, financing and investment. Through these stages banks facilitate and accelerate growth of an economy. Banks and financial institutions provide infra-structural facilities to all economic activities. In Bangladesh too, banks constitute the core of organized financial system of the country. They mobilize the savings of people and channelize the resources towards different sector of the economy. The planned allocation of resources among sectors and regions from time to time is determined by bankers committee organized by Bangladesh Bank. The objective of such planned allocation is balanced regional and sectoral development. (Commercial banks provide advances in the form of short term loan and long term loan. Commercial banks constitute the heart of the financial structure of our country because of the fact that the whole money supply process is undertaken by them and thus has the scope for creating additional purchasing power.) The commercial banks, specially nationalized commercial banks (NCBs) form the core of the organized banking system in Bangladesh. After 1983, a number of private commercial banks are playing an active role.

Foreign commercial banks with a number of branches share a remarkable portion of banking business in Bangladesh.)

Specialized banks and financial institutions have their special purposes. The roles and functions often overlap among the banks and financial institutions. Bangladesh Shilpa Bank (BSB), Bangladesh Shilpa Rin Sangtha (BSRS) and Bank of Small Industries and Commerce Bangladesh Limited work for industrial financing. Investment Corporation of Bangladesh (ICB) has been functioning in capital market, Bangladesh Krishi Bank (BKB) and Rajshahi Krishi Unnayan Bank have been financing the agricultural sector. Grameen Bank (GB) helps the land-less poor for rural income generating activities. Bangladesh Bank (BB) is the central bank, empowered to control the monetary system of the economy.

This chapter highlights the evolution and progress of banks and financial institutions in Bangladesh up to date with a view to introduce this sector in totality. The evolution and progress of banking system in the British rule and the then East Pakistan are highlighted. This chapter also highlights the banking system from 1971 to 1997, especially, nationalization of banks, the emergence of private banks and current scenario in this sector.

2.2. Banking in British Era

The history of banking in the Indian subcontinent may be referred back to the period of British rule. Commercial banks in Bangladesh territory have been functioning for the last two

centuries. Under the British rule, commercial banks started functioning in this sub-continent. 'The Bank of Hindustan' was the first modern bank formed in 1770 [Guru Datta 1987, p.5, in Abrol, (1987)]. In the first quarter of the nineteenth century, the state aided bank seemed necessary to facilitate government borrowing and to help the trading class. In the year 1806 the first presidency bank, the Bank of Bengal was established, followed by the Bank of Bombay (1840) and the Bank of Madras (1843). In that period, joint stock banks were mostly established by the English agencies. Between 1861 and 1865 there was a mushroom growth of banking companies. Under the Indian management, the 'Oudh Commercial Bank' was first formed in 1880 followed by the Punjab National Bank and the Alliance Bank of Simla [Srinivasaraghavan, 1955, p.567].

Early in the twentieth century, the Swadeshi movement inspired the opening of important joint stock banks such as Indian Bank (Madras), the Central Bank of India, and the Bank of Baroda [Ibid, p.568]. The Imperial Bank of India Act was passed in 1920. The Imperial bank of India was the banker to the state which functioned as a semi-central bank and within five years of its operations it had opened 100 branches [Ibid, p.581]. In the year 1935 the Reserve Bank of India (RBI; central bank) was established. Before the establishment of RBI, the commercial banks were regulated by different acts. The establishment of RBI was the first organized initiative to bring banking and monetary

system of the sub-continent in a disciplined way.

The state regulation of banking companies started by the Indian Companies Act 1936 which prohibited banking companies from carrying on business other than banking. Several events were remarkable in the historical development of banking in India during the British rule such as: (a) the Imperial Bank of India Act 1920, (b) the Imperial Bank of India (amendment) Act 1934, (c) the Reserve Bank of India Act 1934, (d) the establishment of the Reserve Bank of India in 1935 [Ibid, p.570].

2.3. Banking in Pakistani Era

In undivided India, the areas that were covered by Pakistan had been fairly well provided with commercial banking facilities. In 1947, there were 46 scheduled banks in the Pakistan territory. Prior to independence in 1947, there were about an equal number of scheduled and non-scheduled bank branches in the subcontinent. In march 1947, number of Indian scheduled bank offices in undivided India were 3,496 of which 631 were in Pakistan. Of the total number of bank offices (631), 487 were in the West Pakistan (77%) and 144 were in the East Pakistan (33%). Banking facilities in East Pakistan were mainly provided by small and mostly non-scheduled banks. The importance of non-scheduled banks in Pakistan declined steadily over the years [Meenai, 1966, p.41]. The distribution of banks and branches among India and Pakistan as on 31st March, 1947 has been presented in Table#2.1.

Table # 2.1

Distribution of Banks and Branches As On 31st March, 1947

	Undivided India	East Pakistan	West Pakistan	India
Number of scheduled bank offices	3,496	144	487	2,865
Number of scheduled banks	68	(WP+EP)=13		55
Number of non-scheduled bank offices	3,498	500	204	2,794
Number of non-scheduled banks	603	(WP+EP)=148		455

Source: Andrus and Mohammed (1966), p.105.

After the announcement of independence of Pakistan in August 1947, the banking services in Pakistan was seriously hampered and the number of banks declined to 38 with 195 bank offices. Many funds and accounts were transferred to India.

The bank offices which belonged to India almost closed their business. Only a few remained in name but without business. This resulted in a sharp curtailment of banking business in Pakistan. The country had only two banks owned by Pakistani national. In East Pakistan, number of bank offices remained unchanged but banking functions reduced sharply due to the fact that non-muslims had withdrawn all their deposits and went to India. In June 1948, of the total bank offices (195) that remained in Pakistan, 81 were in the West Pakistan and 114 were in East Pakistan [Srinivasaraghavan, 1955, p.569]. At that time, Pakistan banking system consisted primarily of non-Indian foreign banks. The Australasia Bank had been functioning in Pakistan prior to June, 1947. Nineteen non-Indian foreign bank offices and a number

of Indian banks were in limited operation. Prior to June, 1947, only one muslim managed scheduled bank, Bank of Bahawalpur Limited, was functioning in the Pakistan territory. The Habib Bank Limited which was established in 1941 transferred its head office to Karachi after partition [Andrus and Mohammed 1966, p.105f]. The number of Pakistani banks on 30th June, 1948 were 4 with 23 branches. [Banking Statistics of Pakistan, 1960-61, 1964-65, Department of Statistics, State Bank of Pakistan].

Due to management inefficiency and unwise policies, the non-scheduled banks had been gradually weeded out over the years. In 1949, the number of non-scheduled bank offices were 704 in Pakistan. The number declined to thirty as on June 1966, of which thirteen were in West Pakistan and seventeen were in East Pakistan [Meenai 1966, p.16].

A negotiating agreement between the Government of India and Government of Pakistan was passed to serve the Reserve Bank of India as monetary authority in Pakistan from 30th September, 1947 to June 1948 [Meenai 1966, p.16]. The Reserve Bank of India discharged all central banking functions and operated in Pakistan.

To recover from the disrupted situation in banking system, the State Bank of Pakistan (SBP) order was promulgated on 12th May, 1948 by the Governor General of Pakistan. The SBP order has been amended from time to time and embodied in the State Bank of Pakistan Act 1956. The State Bank of Pakistan (central bank) was

opened on 1st July, 1948. The State Bank of Pakistan and Government encouraged Pakistani banks to open new branches. The State Bank of Pakistan took many initiative to foster the banking system. The State Bank of Pakistan held powers to issue notes, had influence on availability, cost and use of credit. Scheduled banks had to maintain 5% of their demand and 2% of their time liabilities to the State Bank of Pakistan as reserve. The State Bank could change bank rate, cost of credit and amount of credit supply.

The banking companies ordinance, 1962 was passed by replacing several related acts, empowering State Bank of Pakistan to control credit, to give direction to the scheduled banks regarding advances, margin and interest rate. It could inspect a bank, examine affairs, order to change bank management etc. The State Bank might also prescribe the banks to maintain within Pakistan a certain percentage of assets against their deposit to ensure that funds were not substantially used outside the country. The scheduled banks had to maintain 20% of their deposit in the form of liquid assets such as cash, gold and unencumbered approved securities to ensure a reasonable degree of liquidity.

Under the guidance of State Bank of Pakistan, the Institute of Bankers was established in September, 1951 to facilitate studies in banking and to develop the banking profession. Under the guidance of State Bank of Pakistan, the National Bank of Pakistan was established (1949) as a quasi-public commercial bank

to take over agency functions of the SBP (1952) for transacting government businesses and managing currency chests at places where the SBP did not have an office of its own which were previously performed by the Imperial Bank of India [Andrus and Mohammed 1966, p.84-86]. The State Bank of Pakistan had undertaken promotional activities in establishing new institutions such as the Pakistan Industrial Credit Investment Corporation (PICIC), the Pakistan Industrial Finance Corporation (1949, PIFCO), the Agricultural Bank of Pakistan (1958-59, successor of ADBP), the Eastern Mercantile Bank etc.

The National Bank of Pakistan was established in 1949 with six offices in East Pakistan, located at Narayanganj, Mymensingh, Chandpur, Rangpur, Khulna and head office being at Karachi. In March 1950, it started commercial banking functions. The National Bank of Pakistan primarily continued financing in the trade in jute, cotton and other agricultural commodities. On 31st December, 1964, it had 443 branches in Pakistan and 7 abroad. The Habib Bank Limited was established in 1941. It was the only scheduled bank which had transferred its head office from India to Pakistan during partition. It started its function with two offices in Pakistan. By the end of 1964 it had 325 branches in Pakistan and 6 branches overseas. The National Bank of Pakistan (1949) and the Habib Bank Limited (1941) greatly contributed to the development of commercial banking system in Pakistan.

Another contributing event in the development of banking

system of Pakistan could be observed in 1959 when the appointment of Credit Inquiry Commission was made to examine the credit facilities to agriculture, business and industry. The commission identified problems and made recommendations for the development of credit activities in the country.

Pakistan Industrial Finance Corporation (PIFCO) was established in June, 1949 to finance exclusively the industrial concerns through grant of loans; underwriting stocks, bonds and debentures; and by raising loans inside and outside Pakistan. Between 1948 and 1965, about 27 banks were incorporated as scheduled banks of which the followings were remarkable: Muslim Commercial Bank Limited (1948), Bank of Bahawalpur Limited (1947), National Bank of Pakistan (1949), United Bank of India, State Bank of India, Punjab Provincial Cooperative Bank Ltd., National Commercial Bank Limited (1958), Agricultural Development Bank of Pakistan (1961), Standard Cooperative Bank Limited, Eastern Banking Corporation, United Bank Limited (1959), Eastern Mercantile Bank Limited (1959), Union Bank Limited (1959), Standard Bank Limited (1963), Premier Bank Limited (1963), Habib Bank (Overseas) Limited (1952) [Banking Statistics of Pakistan, 1960-61, 1964-65, Department of Statistics, State Bank of Pakistan].

Pakistani banks gradually opened and developed their businesses. By 1962, the Pakistani banks had developed considerably in terms of number of branches, deposits, and

advances. The number of Pakistani scheduled banks and their branches rose to 16 and 1521 respectively in 1965. [Banking Statistics of Pakistan, 1960-61, 1964-65, Department of Statistics, State Bank of Pakistan.] The population per bank offices in 1948 were 3,88,308 which became 58,957 in 1966 [Meenai 1966, p.27].

Scheduled banks incorporated in Pakistan which had offices in East Pakistan with their number of branches (in bracket) as on 30th June, 1965 were: Australasia Bank Limited (7), Bank of Bahawalpur Limited (2), Habib Bank Limited (103), Muslim Commercial Bank Limited (50), National Bank of Pakistan Limited (152), Agricultural Development Bank of Pakistan (49), Eastern Mercantile Bank Limited (33), United Bank Limited (111), Union Bank Limited (3), Industrial Development Bank of Pakistan (3), Standard Bank Limited (7), Commerce Bank Limited (13), and Eastern Banking Corporation Limited (2) [Banking Statistics of Pakistan, 1964-65, Department of Statistics, State Bank of Pakistan]. Among the banks, Eastern Mercantile Bank Limited and Union Bank Limited had head offices in the then East Pakistan and both were located at Chittagong. The head offices of other banks were in West Pakistan and mainly at Karachi and Lahore.

A brief review of scheduled banks offices by nationality since 1948 show a gradual increase in the number of Pakistani banks and their branches whereas a gradual decrease in the number of foreign banks and their branches (see Table # 2.2).

Table # 2.2

Trend of Banks and Branches in Pakistan by Nationality

June each year	Pakistani banks		Foreign banks		Total	
	Banks	Branches	Banks	Branches	Banks	Branches
1948	4	23	34	172	38	195
1950	5	81	31	121	36	202
1955	5	163	27	88	32	251
1960	10	358	19	72	29	430
1965	16	1521	20	70	36	1591
1970	18	3247	18	65	36	3312

Source: Banking Statistics of Pakistan, 1964-65, Department of Statistics, State Bank of Pakistan; and Pakistan Economic Survey, 1970-71, MOF, GOP, Islamabad, p.60.

The location analysis of bank branches in the East Pakistan show that banking activities were concentrated at Dhaka, Chittagong, Narayangonj, Khulna, Rajshahi, Rangpur, and Kushtia [Banking Statistics of Pakistan, 1964-65]. During the year 1968-69, the scheduled banks opened 260 new branches of which 64 were in the then East Pakistan and 196 were in the West Pakistan. [Annual Reports, 1968-69, State Bank of Pakistan, p.35].

In the year 1970 two new banks named Sarhad Bank Limited and Premier Bank Limited were opened. In the year 1970, 271 branches were opened bringing the total to 3,312. Of the new branches, 69 were in East Pakistan and 202 in West Pakistan. In addition, 62 branches were set up abroad by the end of 1970. During January - March 1971, there was an addition of 36 new branches, of them 12 in East Pakistan and 24 in West Pakistan. The total number of

scheduled bank branches in the country (EP+WP) thus rose to 3,348 by March 1971. The branch expansion program was mainly initiated by the State Bank of Pakistan [Pakistan Economic Survey 1970-71, MOF, GOP, Islamabad, p.60].

2.4. Banking In Bangladesh

Banking system, after independence of Bangladesh in 1971, have been more dynamic. Attempts have been made towards attaining economic growth. The scheduled banks have been striving to allocate mopped up resources among different sectors. They have been following a policy of giving preferential treatment to sectors like industry, agriculture, export, self employment etc. After independence of Bangladesh, banks and financial institutions operating here (except those incorporated abroad) were nationalized by the Banks Nationalization Order 1972 (Also by a separate order for financial institutions). By these orders six nationalized commercial banks (NCBs), one industrial bank (BSB), one agricultural bank (BKB), and one industrial development financial institution (BSRS) were created.

The banks and financial institutions which originated during Pakistan period and merged, renamed and continued their functioning after independence of Bangladesh has been presented in Table # 2.3.

Table # 2.3

Banks and Financial Institutions Originating During Pakistan Period And Functioning After Independence of Bangladesh

Banks	Predecessors	Branch (1971)
1. Agrani Bank	a) Habib Bank Ltd b) Commerce Bank Ltd	218 29
2. Janata Bank	a) United Bank Ltd b) Union Bank Ltd	243 6
3. Rupali Bank	a) Muslim Commercial Bank Ltd b) Standard Bank Ltd	143 16
4. Sonali Bank	a) National Bank of Pakistan b) Bank of Bahawalpur Ltd c) Premier Bank Ltd	265 1 1
5. Pubali Bank	a) Australasia Bank Ltd b) Eastern Merchantile Bank Ltd	26 81
6. Uttara Bank	a) Eastern Banking Corporation	57
7. Bangladesh Shilpa Bank	a) Industrial Development Bank of Pakistan (predecessor PIFCO) b) Equity Participation Fund	6 1
8. Bangladesh Krishi Bank	a) Agricultural Development Bank of Pakistan (Predecessor ADFC, ABP)	70
9. Bangladesh Shilpa Rin Shangasta	a) Pakistan Industrial Credit Investment Corporation (PICIC) b) National Investment Trust	3 1

Sources: Resume of Activities of the Financial Institutions of Bangladesh (Various Issues).

After independence in 1971, the nationalized banks and foreign banks constituted the total banking system of Bangladesh. The State Bank of India opened one branch during July - September, 1975. In 1975, the four foreign banks operating in Bangladesh, were: (a) American Express International Banking Corporation, (b) Grindlays Bank Ltd, (c) The Chartered Bank Ltd, and (d) State Bank of India. Now, there are twelve foreign banks i.e. American Express Bank Ltd., ANZ Grindlays Bank Ltd.,

Standard Chartered Bank , State Bank of India, Habib Bank Ltd, Citibank N.A., Banque Indosuez, National Bank of Pakistan, Muslim Commercial Bank Ltd., Societe General Bank, Hanil Bank, and Hongkong Bank [Scheduled Banks Statistics, September-December,1997]. Investment Corporation of Bangladesh was established in 1976 and Grameen Bank in 1983. In the year 1983 the Government allowed private sector to participate in the banking business. The Pubali Bank and the Uttara Bank have been transferred to private sector with effect from January 1985. This action reduced the number of NCBs to four. Rupali Bank has been reorganized as a public limited company from 14th December, 1986. Rajshahi Krishi Unnayan Bank was established in 1987 through a bifurcation of the offices of Bangladesh Krishi Bank of Rajshahi division. Bank of Small Industries and Commerce Bangladesh Ltd. was established in 1993.

Emergence of private banks:

Taking advantage of the liberalization policy of government regarding participation of private sector in the banking business, a number of private sector banks were established from the year 1983. With the emergence of private banks in Bangladesh, a competitive situation in the sector has been created to a great extent. The private banks in Bangladesh up to date are: The City Bank Ltd (1983), National Bank Ltd (1983), Islami Bank Bangladesh Ltd (1983), United Commercial Bank Ltd (1983), International

Finance Investment and Commerce Bank Ltd (1983), Arab Bangladesh Bank Ltd (1986), Al-Baraka Bank Bangladesh Ltd (1987), Eastern Bank Ltd (1992), National Credit and Commerce Bank Ltd (1995), Prime Bank Ltd (1995), South East Bank Ltd (1995) Dhaka Bank Ltd (1996), Dutch Bangla Bank Ltd (1996), Al-Arafa Islami Bank Ltd. (1996), Social Investment Bank Ltd. (1996). [Scheduled Banks Statistics, Statistics Department, Bangladesh Bank, related issues]. The emergence of private banks has added a new dimension in the banking system in Bangladesh.

Performance of Banks:

The performance of various group of banks now operating in Bangladesh has been presented in the following paragraphs.

The Capital Assets, Credit Deposit, and Investment Deposit ratios of group of banks from the year 1975 to 1997 has been presented in Table # 2.4.

Table # 2.4

Capital Assets (CA), Credit Deposit (CD), and Investment Deposit (ID)
Among Group of Banks

Year	NCBs			PCBs			SPBs			Overall		
	CA%	CD%	ID%	CA%	CD%	ID%	CA%	CD%	ID%	CA%	CD%	ID%
1975	1.06	67.0	23.3	-	-	-	7.0	629	28.9	1.55	85.42	23.58
1980	0.67	95.9	20.3	-	-	-	11.1	342	16.4	1.57	99.64	18.60
1985	0.32	78.3	19.7	-	-	-	4.2	1022	5.0	1.19	101.97	19.12
1990	0.56	83.9	11.9	2.0	87.5	11.3	5.2	481	2.0	1.55	102.46	11.86
1995	0.87	60.3	25.4	1.7	68.60	11.66	3.42	175	20.7	1.81	91.09	27.08
1996	0.80	66.3	22.8	2.1	73.8	12.4	3.1	235	13.5	1.22	77.79	18.96
1997	0.78	65.0	20.7	1.9	70.1	11.6	3.0	240	13.2	1.17	75.08	17.77

Sources: Bangladesh Bank Bulletin (related issues) & Bangladesh Economic Survey, 1975-76.

In all the years, the Capital Assets ratios are inadequate. Only the specialized banks maintained about 4% to 11% of Capital Assets ratio. But neither NCBs nor PCBs could maintain adequate Capital Assets ratio. The Investment to Deposit ratio fluctuated from year to year. All banks, have a tendency of maintaining a higher Investment Deposit ratio.

The deposit classified by group of banks from 1975 to 1997 are presented in Table # 2.5.

Table # 2.5

Deposit Classified by Group of Banks (Taka in Crore)

June each year	Group of Banks				All Banks
	NCBs	PCBs	SPBs	FBBs	
1975	879.28 (90%)	--	28.52 (3%)	73.44 (4%)	981.24
1980	2055.98 (73%)	--	132.89 (5%)	183.38 (6%)	2821.65
1985	6165.14 (69%)	1594.81 (18%)	472.42 (5%)	677.60 (8%)	8909.97
1990	11900.96 (62%)	4894.86 (26%)	920.64 (5%)	1392.88 (8%)	19109.34
1995	25038.95 (62%)	10854.08 (27%)	2428.76 (6%)	1755.31 (4%)	40077.10
1996	26949.30 (63%)	11543.68 (27%)	2196.85 (5%)	2201.26 (5%)	42891.09
1997	29105.64 (62%)	13387.59 (28%)	2189.16 (5%)	2606.45 (5%)	47288.84

Sources: Bangladesh Bank Bulletin related issues.

The share of deposit of FBBs & SPBs were more or less stable all through the years from 1975 to 1997. Exchange of share in deposit has been taking place between NCBs and PCBs where NCBs' share decreased and that of PCBs has increased.

The advances classified by group of banks from the year 1975 to 1997 has been presented in Table # 2.6.

Table # 2.6
Advances Classified by Group of Banks (Taka in crore)

June each year	Group Banks				All Banks
	NCBs	PCBs	SPBs	FBBs	
1975	591.68 (73%)	-	182.50 (22%)	38.13 (5%)	812.30
1980	1972.76 (78%)	-	454.06 (18%)	115.26 (5%)	2542.08
1985	5090.12 (57%)	1098.37 (12%)	2290.61 (26%)	454.09 (5%)	8933.19
1990	10359.85 (52%)	4063.34 (20%)	4284.18 (18%)	1202.06 (6%)	19909.43
1995	15096.53 (53%)	7446.18 (26%)	4254.08 (15%)	1427.40 (5%)	28225.19
1996	17852.88 (53%)	8514.84 (26%)	5155.78 (15%)	1843.54 (5%)	33367.04
1997	18911.66 (53%)	9378.85 (26%)	5261.38 (15%)	1950.57 (5%)	35502.46

Sources: Bangladesh Bank Bulletin related issues.

Foreign banks maintained a constant share in advances. Here exchange has been taking place between NCBs, PCBs and SPBs. Both NCBs' and SPBs' share of advances are decreasing whereas PCBs' share of advances has been increasing gradually.

Table#2.7 in the following page shows the scheduled banks advances by economic purpose from 1975 to 1997 (as expressed in percentage). From table#2.7 it is clear that the share of trade has been increasing while share of industrial sector has been decreasing gradually. The construction sector is rising while the gradual increase in miscellaneous meant an increase in the diversified credit program of the banks.

Table # 2.7
Advances by Economic Purpose

Year	Economic Purpose					Total
	Agriculture	Industry	Trade	Const.	Misc.	
1975	10%	53%	24%	1%	12%	100%
1980	19%	41%	26%	1%	13%	100%
1985	31%	21%	34%	1%	13%	100%
1990	23%	27%	31%	4%	15%	100%
1995	19%	28%	31%	6%	17%	100%
1996	17%	37%	30%	6%	10%	100%
1997	17%	39%	29%	6%	10%	100%

Source: Bangladesh Bank Bulletin, (related issues).

Banks and financial institutions in Bangladesh faces problems: (1) non-existence of modern monetary policy instruments, (2) inadequate bank supervision, (3) inadequate mobilization of savings, (4) widespread loan defaults and delinquencies, and (5) inefficient credit delivery [Hassan, 1995].

2.5. Summary

Banking in this sub-continent started functioning with the establishment of "The Bank of Hindustan" in 1770. During partition of India and Pakistan, banking in Bangladesh was mainly provided by small and non-scheduled banks. The State Bank of Pakistan was formed in 1948. After independence of Bangladesh, banks and financial institutions operating here were nationalized. From 1983 a number of private banks have been established. A number of FBBs and PCBs now share a remarkable portion of banking business. However, banking facilities are still mainly provided by NCBs and SPBs in Bangladesh.

Chapter III

Literature Survey

3.1. Introduction

The literature survey contains review of literature on definition of information, information theory, information value, dimensionality of information, human information processing, MIS performance, executives' attitude towards the system, and MIS related works in Bangladesh. While making the review of the existing literature, the context of banks and financial institutions and constructs developed in the study were kept in mind. About twenty journals on business, management, accounting, information science, information systems, business communications of international reputation published since 1949 (and available) were thoroughly consulted. All available books of renowned authors on information system, management information system were collected from different sources. Many of the articles and books are not referenced in this study. Appendix # 3.1 shows the listing of time and quantity dimension of materials covered. To accommodate the review in the study, only selected authoritative writings, findings have been included.

3.2.1. Concepts of Information

The terms data and information are used interchangeably, though they have distinct meanings. Data relates to facts, events, and transactions. When data are processed in-order to be

meaningful to the receiving person become information. There remains different views on information, which are discussed in this section.

Fuchs (1971) says that one of the function of language is information [p.142].

Drucker (1974) commented that communication is perception, and information is logic. Information is purely formal and has no meaning. It is impersonal rather than interpersonal [p.487].

Small and Lee (1975) says that data are raw facts in isolation and these are not information until someone needs to know and utilize the data to become informed [p.50].

Davis and Olson (1985) defined information as data that has been processed into a form that is meaningful to the recipient and is of real perceived value in current or prospective decisions. [p.6].

Stamper (1987) comments that 'information' is a vague word. The word 'data' is items of information relative to some problem. The word 'sign' is a far better word one to use than the vague one of 'information'. Anything can function as a 'sign' and be used to convey information [p.45].

Boland (1987) says that information is the inward-forming of a person that results from an engagement with data [p.363]. Boland (1987) says that there are five misguided fantasies about information which are "information is structured data", "an organization is information", "information is power",

"information is intelligence", and "information is perfectible". He further concluded that this misguided fantasies lead us to ignore the fundamental nature of interpersonal dialogue in the achievement of meaning, and reduce our ability to design humanly satisfying systems [p.363].

Mansfield (1987) says that in cybernetic principles, the information is the basis upon which negative feedback can be given in order to keep the organization on course for the achievement of strategic objectives [p.66].

Curtis (1989) defined Information as data processed for a purpose [p.3-4].

Lucas, (1990) defined information as some tangible or intangible entity that reduces our uncertainty about some state or event [p.28].

Provan (1991) views information as a source of power. He remarks that though there has been a substantial lack of empirical research on the topic, the work of Bacharach and Lawler (1980), Kanter (1979), Mechanic (1962), and Pittigrew (1972), suggests that the importance of receipt of information can be considered as a source of power [p.294]. He conducted a study on receipt of reports (internal administrative information) which influences over decisions and organizational characteristics. Provan's (1991) study on relation of power and information found that out of three power group CEOs were found to receive the greatest amount of information and had highest influence.

Glazer (1991) says that the term information (knowledge) is considered as both asset to be managed and a variable to be researched. It is an asset to gain competitive advantage. Information is generally viewed as facilitating exchange; to the economic users (firms) of information, it is related to the measure of its value (Cherry, 1966) [pp.2-3].

Flynn (1992) says that data only become information when it is given a meaning. According to him, there are two paradigms of information i.e. resource-driven paradigm and perception-driven paradigm [p.30].

Earl (1994) says that knowledge is potentially an even more comple phenomenon than information [p.56]. He holds events towards conceptualizing knowledge as: representation, collection and processing of 'events' become 'data'; manipulation, presentation and interpretation of 'data' become 'information'; testing, validating and codification of 'information' become knowledge [p.59].

BPP Publishing (1995) notes that in everyday speech, data and information are used interchangeably. However, data relates to facts, events whereas, information is data that has been processed and become meaningful to the person receiving it [p.101].

O'Brien (1995) says that information is not like economic resources (land, labor, capital) and seems to be a resource in a poetic, impressionistic sense and not in useful sense [p.26].

Vickery (1997) considers information only in the context of human communication and says that the term information has become an all-purpose word, used in a variety of contexts, and often discussion do not clearly distinguish between information concepts that belong in different contexts. It should be stressed that discussion of "what information is" are misguided. We are concerned with is a consideration of what particular phenomena are to be called information, and different areas of study may choose different phenomena to which the term is applied [p.458].

There are different conceptual development relating to information. These concepts are invaluable in the discussion of information systems. The concepts are discussed in three major groups such as "Information Theory", "Information Value", and "Dimensionality of Information".

3.2.2. Information Theory

Bello (1953) summarizes the information theory from the work of Norbert Wiener and Claude Shannon. The theory involves measuring the quantity and efficiency of information transmission in a generalized communication system. Wiener first grasped that communication of information is a problem of statistics and Shannon wrote a mathematical theory of communication. It is the foundation for the development of computers and information system. Wiener's (1948) cybernetics holds that "...any organism is held together by the possession of means for the acquisition,

use, retention, and transmission of information." [Bello 1953, p.24]. The cybernetics concept has been applied in many fields such as Psychology, Neurophysiology, Linguistics, Management etc. Bello (1953) views information as news and man as a message source or channel. The essential feature of human life is the ability to communicate information [p.32].

McDonough (1963) remarked on the elements of information theory as "(1) It treats communication as a problem in statistics. (2) It focuses attention on the large scale, or gross, aspects of communication. (3) It provides units of measurement for the amount of information in broad class of messages. (4) It shows how the maximum rate of transmitting error free information over any system can be computed." [p.45]. Human channel reporting system is complex and information theory have no direct application to management reporting [p.48]. McDonough's (1963) discussion blends channels of business information and chains of command. The information economics and information management were his main focus. The discussion on information economics considered value, cost, demand, and supply of information. The author holds that computers resulted increased consciousness of the information needs of management [pp.vii, & 273].

Mee (1963) found that organizational theory is influenced by channels of information, system theory is dependent on management information subsystem, control rest on concept of information

feedback and managerial planning may be facilitated by use of information economics [p.62].

Lee and Bedford (1969) presents an information theory analysis considering general accounting as a means of achieving the decision making end of an accounting information user. The contribution of the analysis is that the accounting classification and measurement function is the information formation process that determines the effect of an economic event on financial state [pp.256-275].

Lord (1984) uses concepts of Information Theory for Information Requirements Analysis [p.7].

Duffy (1984) says that Information Theory and Cybernetics are directly connected and are interwoven [p.33-41].

3.2.3. Information Value

According to Feltham (1968) the information system should be methodologically developed to feed information in decision making. In designing information system the best criteria is the value of information system should exceed the cost. The desirable attributes of information are relevance, timeliness, and accuracy. The decision maker is the key element in the information system [p.684].

Hirsch (1968) says, any information is needed only when, in the absence of it, the decision would be different. The information has value when it influences decisions [p.34].

Crandall (1969) theoretically discusses the information economics model towards developing accounting theory. The purpose is construction and evaluation of information systems for maximizing the utility of users [pp.457-66].

Mock (1971) presents empirically derived hypothesis which are founded on the objective of extending information economics framework. Mock's main proposition is that information has at least three value potentialities such as decision, model, and feedback (action effectiveness) and each should be considered in evaluating information system [pp.765-78]. Information value include its contribution in learning, appreciation and demonstrating difference between expected and estimated value of information. Information may be useful in problem identification and memory reinforcement.

Andrus (1971) suggests utility theory to evaluate information. Utility, besides accuracy of the information, may facilitate or retard its use and value. Form, time, place, and possession utilities are useful concepts for understanding the value of information. Form utility denotes form of information more closely matches the users requirements. Time utility denotes information must be provided before the decision is made. Place utility (physical accessibility) denotes information storage for easy access and delivery. Possession utility (organization location) denotes physical location of information in organizational structure. The author holds that possessors of

information have more power [pp.40-6].

Lea (1973) criticized the Mock's (1971) concepts of information value stating that he has failed to make a clear distinction between the realized value of an existing system and the expected value of some future system. His proposed historical measures of information value are of limited usefulness in information system design [p.393].

Ahituv et al. (1981) says that there are three common approaches to assess the value of information: realistic i.e. change in actual performance caused by introducing system; normative i.e. modeling, simulative, information economics approach (combination of decision theory and information utility theory); and subjective i.e. the expertise and heuristic understanding of the users, implicitly incorporating human factors [p.145-6; also see Lord, 1984, p.14].

Collingridge (1982) says any decision making model, whether it is Welfare Economics, Bayesian Decision theory or Critical model recognizes the utility of information; they only differ in terms of utility measures. Welfare Economics requires only ordinal utility measures [p.7]. Bayesianian decision theory requires cardinal utility measures and ordinal utility measures do not work. The value of an option depends on expected utility and decision maker operating under risk who tries to maximize his expected utility [p.7].

Davis and Olson (1985) says that the concept of value of

information arises from the following context: (1) Decision: It adds in decision making, the value of which is the value of the change in decision behavior caused by the information less cost of processing the information [p.216]. This involves the calculation of probability and drawing payoff matrix. (2) Motivation: Information provide option to review how well the user are doing i.e. feedback. (3) Model building: It adds in decision maker's mental model building. (4) Background building: It adds in the process of the accumulation of knowledge of the decision maker [pp.221-3].

Emery (1987) suggested three value adding steps: (1) What additional surprises result from immediate updating? (2) What decisions will be altered if a surprise occur? (3) What is the effect on pay off of an altered decision? Combining three value adding steps will give value of information [p.217]. The characteristics of MIS that affects the value and cost of its outputs are: (1) availability of relevant outputs, (2) selective information, (3) the variety of transaction, (4) the degree of information, (5) the timeliness of the database, (6) the response time of the system, (7) accuracy, (8) generality, (9) flexibility, (10) reliability, (11) security, (12) backup, (13) user friendliness, (14) robustness [p.209].

Glazer (1991) presents the measuring the value of information and IT as in the following types: (1) At the macro level: The portion of gross national products (GNP) devoted to

information or knowledge as compared to other sectors. [Machlup 1962; Porat 1974]. This is an economy wide approach. (2) At the firm level: It considers investment in information technology, to identify the improvements in performance. [Parker and Benson 1988]. (3) Value of information itself: This approach consider the output of information technology i.e. information itself as an important variable for analysis. Here IT is mechanism behind (enabler) the phenomenal growth in the production and distribution of information. The theory of value consider attributes of information as a commodity. The properties of economic goods and that of information differs [p.3]. Measuring the value of information is problematic due to the construct is context dependent and multidimensional [p.3]. Quantitative measurement of information (of Shannon and Weaver, 1949) has not provided the foundation for a practical measurement system in most application [p.3]. The mathematical definition of information does not consider content and thus the same amount of information may have vastly different meanings (Arrow 1974, Garner 1962). The Mathematical Communication Theory is straightforward and of limited use in measuring meaning of information [p.3]. Glazer (1991) considers value added chain as information communication channel. The advancement of information technology significantly expanded the capacity of the channel to store, process, and transmit information [p.2]. Glazer (1991) develops the value of information measurement model in marketing

context in order to use in describing enterprises of their relative levels of information intensity [pp.1-19].

Flynn (1992) says that the value of information is perhaps as subjective as its meaning. The valuing of information is problematic, relative to changing circumstances. The normative value of information is based on decision theory i.e. the benefits be realized by possession of the information and realistic value be obtained by estimating the difference in organizational performance based on the absence or presence of the information [p.32].

Chong and Chong (1997) reports the role of management accounting systems (MAS) showing relationship between: (1) strategic business unit (SBU) strategy and SBU performance, and (2) perceived environmental uncertainty (PEU) on SBU performance. They suggest that SBU strategy and PEU are important antecedents of MAS design, and broad scope MAS information is an important antecedent of SBU performance [p.268].

Pratt and Storrar (1997) examined rights of UK shareholders to inspect account and report that current levels of disclosure is less than optimal in-spite of developments in IT and changes in the operating environment. The databases could help to improve disclosure, but are not initiated by the preparers [pp.205-218].

3.2.4. Dimensionality of Information

Thomas (1951) says management decision largely depend on information included in the reports, the extent of detail or condensation, the form and arrangement of information, and terminology used. The problem of reports for management always remain because the nature of management information is dynamic [p.395].

Lindsay (1962) says planning information is most important. There are three categories of planning information: (a) Self-Analytic: That show company's strengths and weakness. It directs management to follow a right path to succeed. (b) Competitive: It covers data on competing company's function, profitability, return on investment, share market. It include such elements, new product introduced, management changes, price strategy, acquisition, facility plan etc. (c) Circumambient: It cover political, sociological and economic conditions for all areas that have business potential. It includes information that affect entire economy. It deals with current levels of population, growth trends, age, unemployment, price level, government price regulation, transportation etc. Author says that control information tells whether the action is being taken according to plan [pp.53-60].

Anthony (1965) presents three types of information (data): (1) quantitative monetary; (2) quantitative non-monetary e.g. enrolment, grades, market share, yields, productivity measures,

tonnage of output; (3) non-quantitative i.e. quality, ability, cooperation [p.27]. The monetary information be reconcilable in the aggregate. In a management control system, non-monetary information should be reconcilable with monetary information. The strategic planning relies more heavily on external information [p.43].

Tricker (1967) views information as a deceptive and ambiguous concept: (1) information is the potential message in an entity, event, or in report about it. The idea is information is in the content of. If viewed in this it refers to source only, in accounting, statistics etc. (2) information refers to the transmission of message i.e. function as a source and also as a means of conveyance in communication theory (information theory). (3) information refers to the meaning gained by the recipient to reduce uncertainty and accrue knowledge. So, information is a function of source, communication channel and knowledge of recipient. Data has a cost, information has a value [p.4].

Wachter (1968) examined problems of implementing MIS at strategic planning, management control and operational control and described the characteristics of the information requirements of different levels [p.850].

Feltham's (1968) framework for evaluating information system conceives the following concepts: (1) The decision: to evaluate ongoing information system which provide information for a sequence of future decision. (2) The pay off function: to

evaluate the impact of information system changes, there must be a pay off function over the events those occur in a particular period. (3) The events: the characteristics of a variety of events to be considered, (4) the relationship between past and future events: There is a probabilistic relationship between the events prior to a period, the action taken at the start of that period and the events in that period, (5) the information system: the decision maker receives signals of past events. (6) The prediction of future events: the decision maker can develop a probability distribution over all possible events, (7) The expected pay-off: the decision maker may calculate the pay-off, based on past events and probability distribution. (8) the decision rules: the decision maker apply specific decision rules. (9) The value of information system change: an information system may be evaluated comparing alternative information systems [pp.684-90].

Gorry and Scott Morton (1971) proposed a framework to understand evolution and problems of MIS. The conceptual extension has made to highlight MIS. The framework tells us that information requirement for management activities vary widely as shown below:

Table # 3.1
Gorry and Scott Morton MIS Framework

Characteristics of information	Operational control	Management control	Strategic planning
Source	Largely internal	----->	External
Scope	Well defined	----->	Very wide
Level of aggregation	Detailed	----->	Aggregate
Time horizons	Historical	----->	Future
Currency	Highly current	----->	Quite old
Required accuracy	High	----->	Low
Frequency of use	Very Frequent	----->	Infrequent

Sources: Gorry and Scott Morton (1971), p.59.

They also noted that Simon (1960) categorizes decisions as programmed and non-programmed. The proposed framework renamed the decisions as structured and unstructured decision and inserted a term semi-structured decision which lie in between the two. Simon categorizes decision making process in the following phases: (1) Intelligence: searching the environment for conditions, (2) Design: inventing, developing, and analyzing possible course of action, (3) Choice: Selecting a course of action from those available [p.60]. Gorry and Scott Morton (1971) presents a framework of information system by combining Anthony's categorization of management activities and Simon's categorization of managers problems to examine the purpose and problems of information activity.

Mintzberg (1972) presents the characteristics of manager's information in its variety, covering wide range of issues and types. Mintzberg categorized manager's into five groups: (1) Internal Operations: operating reports, advise of events, active observation etc., (2) External events: environmental events,

actions of competitors etc., (3) Analysis: analytical reports on specific subjects, (4) Ideas and Trends: informers, periodicals, meetings, conferences etc., (5) Pressure: clients complain, owners demand, lobby, persuasion etc. [p.92]. Mintzberg (1972) presents the characteristics of manager's information as (1) Current, (2) Trigger, and (3) Verbal [p.97].

Adams and Schroeder (1973) reports information systems for middle management users. The study reveals a weak relationship between information characteristics, and managers in different functional areas, managers performing different activities, and managers in different environmental conditions. The Managers dissatisfaction of IS was due to conflict between users and designers. The other responsible factors were: (1) lack of input during design, (2) systems do not meet needs (output), (3) systems are not reliable [p.64].

Lucas (1974) presents a framework combining information dimension and management function as follows:

Table # 3.2
Lucas's MIS Framework

Information dimension	Operating control	Management control	Strategic control
Decision points	Subordinate and operating supervisors	—————>	Top management and board of directors
Data sources	Largely internal data generated at the level of operation	—————>	largely external data
Complexity	Simple to manipulate and use	—————>	Complex to manipulate and use
Aggregation	Detailed	—————>	Aggregated
Frequency	Very frequent	—————>	Not frequent

Sources: Lucas, H.C., "An Empirical Study of a Framework for Information System", *Decision Science*, vol. 5, 1974, pp.102-3. Also see McCosh et al. 1984, p.187.

Gallagher (1974) uses the following set of information dimension: (1) Quality: complete, sufficient, (2) Reliability: true, reliable, valid, accurate, (3) Timeliness: current, timely, (4) Format Quality: readable, orderly, logical, clear, simple.

Zmud (1978) presents an empirical study regarding the alternative ways of evaluating an MIS and then the dimensionality of the concept of information. The empirically derived dimensions are compared with the dimensions suggested in the existing literature and subjective evaluation of the three format are presented. The results were found in agreement with the existing literature about information structure. In addition graphical format was preferred by the subjects over a tabular and bar chart format [pp.187-195]. He presents the derived dimensions of information such as: (1) Quality of information: Relevant - applicable, helpful, needed, significant, useful. (2) Relevancy Components: Accurate - accurate, believable. Factual - factual, true. Quantity - complete, effective, material, sufficient. Reliable/ Timely - current, reliable, timely, valid. (3) Quality of Format: Arrangement - orderly, precise. Readable - clear, convenient, readable, simple. (4) Quality of meaning: Reasonable - logical, sensible [p.191].

Dale (1978) presents control of time in information processing. The direct relation of time spent and costs involved in completing jobs is well recognized. Speeding up the completion

of jobs can produce higher profits. There are various techniques for time management such as: (1) work sampling, (2) CPM and PERT, (3) line of balance technique, such as: (a) objective chart (O'Brien), (b) basic unit cycle network (US Navy), and (c) progress chart (O'Brein) [pp.370-1].

Montgomery and Weinberg (1979) report that evaluating data includes determining the pertinence, reliability, and validity (accuracy) of data obtained. Pertinence: evaluation of pertinence means determining pertinence of data to a number of people in the organization. Reliability: evaluation of reliability denotes evaluation of the sources by which the data are gathered or transmitted. Previous experience may help judging reliability. Validity: evaluation of validity means determining the probable truth of the data itself [p.49].

Rockart (1979) has identified the four primary sources of Critical Success Factors (CSF): (1) Industry based factors, (2) Competitive strategy, industry position, and geographical location, (3) Environmental factors, and (4) Temporal factors. The frameworks argues that information needs for top managers can be derived from critical success factors. These factors differ from industry to industry and among the firms [pp.81-93].

Sloma (1980) in the discussion of management performance standards emphasize in the establishment of performance standards. The end use of statements should be kept in mind and attention to be paid on the following information dimension:

timeliness, reliability, efficiency, responsibility, exception, compliance, comparative, unified database, performance, planning system, automated budget compilation, automated currency conversion, multiple company processing, flexible report format, account transaction data analysis, on-line processing, database management system [pp.61-4].

Szilagyi, (1981) summarizes the Barnard's (1938) work and reports, among other, that the nature of the communications system provided employees with the necessary information to evaluate the balance between inducements and contribution. Inducements cover the sum total of financial and non financial rewards available to employees in exchange for their efforts (i.e. contribution) [p.72].

Larcker (1981) presents information characteristics in a exploratory study which examines executives preferences of different type of information characteristic at different phases of decision making. The results suggest that (1) executives have similar preference for information, (2) the type of information they prefer depends on phases of decision making (identification, development of alternative, selection), (3) environmental and organizational structure variables have no association with preference of information [p.519].

Wilkinson (1982) presents a wide variety of properties of information and information systems as reflected in a list compiled by an authoritative group of accountants; which

includes: (1) Relevance, mutuality of objectives, (2) Accuracy, precision, reliability, (3) Consistency, comparability, uniformity, (4) Verifiability, objectivity, neutrality, (5) Aggregation, (6) Flexibility, adaptability, (7) Timeliness, and (8) Understandability, acceptability, motivation, fairness.

McCosh et al. (1984) presents the information dimension. The dimension of management control information may be decision makers level, sources of data, complexity of jobs, aggregation - detail of data inputs, frequency of monitoring and reporting [p.186]. They present an alternative purpose oriented dimension of information as: (1) Control Information Inputs: (a) internal information, (b) historical summaries, (c) goal performance summaries, (d) monetary reports, (e) rhythmic reports. (2) Decision Making Inputs: (a) past and future trends, (b) monetary and non-monetary reports, (c) special studies, (d) rhythmic studies, (e) product and market data, (f) market share, customer and product profile, (g) production efficiency [pp.187-8].

Vacca (1984) presents an Information Quality Analysis (IQA) which is a part of Business System Planning (BSP) of IMB. The techniques help to identify (1) essential versus non essential data, (2) automated versus non automated data sources, (3) complete versus incomplete data for a business process, (4) user satisfaction or dissatisfaction with data quality [in Garland (1986), pp.83-7].

Land (1987) classified information into four basic types

i.e. Descriptive, Probabilistic, Qualitative, and Others [pp.11-2]. He also says that all types of information possess context relating to space and time [p.20].

Mansfield (1987) identified four problem areas: (1) Data reduction: data are substantially greater. Senior manager need in summary form. (2) Aggregation: aggregation to be made considering all relevant type, product, location. (3) Units of analysis: The unit of analysis must be based on the nature of problem faced by the organization. (4) Extrapolation: extrapolation in future is most useful for policy decision making. Extrapolation for short periods provide fairly reliable base for forecasting [p.73].

Lanen and Verrechia (1987) found that outsiders become informed about the proprietary information i.e. information relating to the replacement of factors of production when they observe outcome of decision process. The inferred information may be used by outsiders for their internal production decision making [p.165]. The quality of operating decision deteriorate when it is based on private information [p.181].

Lucas (1990) expressed the relationship of users' and preparers' saying that there is a conflict between the designers of an information system and the users'. The reason is that users' do not consider those as information which the designers think to be information [p.28].

Cooper and Mukhopadhyay (1990) described characteristics of information, from empirical work (Zmud 1978, Swanson 1987,

Szewczak and King 1987), in terms of Veridicality, Physical Accessibility, and Cognitive Accessibility [p.38]. The above items are technical characteristics of MIS. There are another set of MIS capabilities characteristics such as modeling, record keeping, interpersonal communicating, and environmental scanning. An appropriate combination of these technical and capability characteristics represents useful, meaningful, valuable MIS [p.38].

Coult (1992) says management information add value to decision only when they posses quality of (attribute of) information i.e. when they are accurate, timely, appropriate and correctly interpreted [p.59]. Coult makes three categories of information i.e. (a) Must know - essential information, (b) Should know - important information, (c) Could know - interesting but relatively unimportant information [p.60].

Association of Accounting Technicians- AAT (1994) classify information considering the framework within which the information is used as International, National, Corporate, Departmental, and Individual [p.9].

Aulakh and Kotabe (1997) make study on channel integration in foreign markets. They report that organizational capability and strategic factors influence channel choices in foreign markets and although the degree of channel integration does not have influence on channel performance, the contextual factors and the actual channel choice is significantly related to performance

in foreign markets [p.145].

Zaheer and Zaheer (1997) examine the existence of country effects on information seeking and found significant differences across countries in banks' information seeking behavior in response to market volatility, influenced both by differences in national industry arrangements and by national culture. However, national industry arrangements and national culture influence bank's information seeking in distinct ways [p.77].

The conceptual development of informational concepts are numerous and it is quite hard to accommodate these in few pages. However, in the following sections, the various aspects of MIS are discussed, starting from origin and gradually covering the performance of the systems and users' attitude towards the systems.

3.3.1. Origin, Discipline, Research Methods and Models of MIS

Origin:

King (1973) says that the idea of MIS originated from the concept of data processing and in practice perform the function of providing managers with sophisticated information [p.5].

Vazsoni (1973) mentioned about the closest thing to a heritage for MIS being the integrated data processing of the 1950's and the total system's approach of the early 1960's [Vazsoni, 1973, pp.43-46, also see Federico et al. 1980, p.3].

O' Brien (1985) stated about the concept of management

information system (MIS) which originated in the 1960's and became a byword (and buzzword) for almost all attempts to relate computer technology and systems theory to data processing in business [p.508].

Lee (1988) says that the evolution of information systems would reveal that MIS is a transition stage between data processing and information resource management [p.17].

Lucas, (1990) agrees that information systems existed long before the development of electronic computers [p.16].

Saksena (1990) says that the concept of information system is not new but the sophisticated term MIS has been used only recently [p.2].

Discipline:

Management information systems are outgrowth of various disciplines to meet the efficient information need of management in an organized way [Awad, 1988, p.18; Lucey, 1991, p.4; Davis and Olson, 1985, p.13; Lucas, Jr., 1990, p.21].

Cooper (1948) made a study on the statistical use of accounting information for policy making and their limitations. It covers procedure to overcome the problems. It gave emphasis on developing new techniques, instruments by applying techniques of various disciplines (accounting, economics and statistics) for advancement of knowledge in information handling and use for managerial policy [p.244].

Brummet et al. (1959) says that management accounting is the

application of appropriate techniques and concepts in data processing to assist management in decision making for achieving objectives [p.210].

Kircher (1967) presented a framework for the classification and coding of accounting information [p.537].

Firmin and Linn (1968) tried to show interrelationship among information systems, management information systems and management accounting systems [p.75].

Small and Lee (1975) identified four directions of MIS that were emerging: (a) Database, (b) Functional design, (c) Modeling, and (d) Behavioral approaches [pp.53-4].

Federico et al. (1980) observed that there is no solid disciplinary foundation to which MIS can be traced [p.3].

Riley (1981) observed that MIS can be founded upon a variety of disciplines, such as engineering, economics, mathematics, management, and the social sciences [p.viii].

Cowton (1987) expressed the same view as of Davis (1980) that MIS and MAS are not the same and they are identical because of unique topic, educational, organizational and technical factors [p.119-120].

Boland and Hirschheim (1987) observes that about information system is basically a combination of two primary fields i.e. computer science and management, with a host of supporting disciplines, e.g. psychology, sociology, statistics, political science, economics, philosophy, and mathematics [p.vii].

Lucas (1990) says that several disciplines have contributed to the information system field in various dimension [p.21]. Lucas (1990) also hold the view that information system field is a study of extracting relevant component from many contributing fields, combining, synthesizing them for meaningful information processing for organization. The interdisciplinary nature increase richness and also increase complexity [p.22].

Keen (1991) says that there remains contradictions on reference disciplines of MIS [Keen 1991, p.39 in Nissen et al., 1991].

Research Methods

A number of authors questioned the appropriateness of scientific methods for IS research. They present powerful arguments for the limitation of the traditional scientific method in general, and in particular with reference to IS research.

Herschheim (1985) says IS epistemology draws heavily from the social sciences because information systems are, fundamentally, social rather than technical systems. Thus, the scientific paradigm adopted by the natural sciences is appropriate to information systems only insofar as it is appropriate for the social sciences. The present accepted research methods are no longer appropriate for the subject of study - indeed, they may never have been [p.13-4].

Nissen (1985) says that information systems research is

dominated by ideas largely fetched from Newtonian Physics. This leaves no room for human innovative action. To avoid the problems, new research methods conducive to the study of human action as such, have to be added to the traditional ones [p.39].

Cooper (1985) says that if research in information systems is to be socially useful and informing, then researchers in the subject will need to be more sensitive to the human and social context [p.93].

Boland and Hirschheim (1987) says that research into IS has failed to take into consideration the social and behavioral dimensions of IS. Much emphasis has been placed on their technical side [p.viii].

Galliers (1990) concluded that the survey, descriptive/interpretive and action research approach appear to have the widest applicability in information systems research [p.169].

A number of authors propose use of Activity Theory, Phenomenology, Hermeneutic Process for IS research [Vasala 1990; Kuutti 1990; Bodker 1990; Rathswohl 1990; Boland 1990].

Keen (1991) says that information system research has borrowed from other areas of intellectual discourse, and has used almost all methodologies that are considered to be the mainstream of any of other disciplines. He feels that Information system research is a self defined community, not a field or discipline. The author also observes that major weakness faced in IS research is the lack of theory [pp.28].

Mumford (1991) opines that there remain problems for researchers on how to do the information system research best. The author feels that methods should be available to IS research [pp.21-22].

Glazer (1991) emphasizes on systematic research efforts for understanding changes in business theory and practice coupled with a change in information and information technology [p.17].

MIS General Models

The model underlying the systems approach is a description of situation in systems terms and not for predicting anything. In IS, descriptive models almost exclusively describe and specify information systems [Flynn, 1992, p.56]. The systems based general MIS models have been presented by many authors [Lucas, (1974); Lucas, (1975); Lucas, (1990); Gorry and Scott Morton, (1971); Prakash and Rapaport, (1975); Land, (1987); Robson, (1994)]. These are basically general system theory based models and consider transaction processing, operational planning & control, management planning & control, and strategic planning.

Lucas (1975) presents a descriptive model of information systems in the context of organization. The model show that use of system has direct link with (a) user attitudes and perceptions, (b) technical quality of systems, (c) analysis, action, performance, (d) situational and personal factors, and (e) decision style [p.70-1].

Prakash and Rappaport (1975) proposed a frame of reference based on informational flows within firm and between firm and environment. The internal structure of a firm is composed of five information processes such as planning, decision making, implementation cum observation (data gathering), data structure (IS) and performance evaluation [p.723].

Land (1987) presents an information system model, the constituents of which are (1) Sources: Real world, Non-designed informal information system, Designed information system, (2) Cognitive filter of user, (3) Information User, and (4) Memory and Knowledge. The model viewed information system as a social system. The information system uses people, rules, norms and commands [p.12-20].

MIS Planning Models

The systematic approach of IS/IT aims to establish a set of guidelines for IS/IT strategy in order to support business competition, planning and implementation strategy. The guidelines, models and planning are required for an effective business strategy [Ciborra and Jelassi, 1994, p.3]. Some popular models dealt with IS strategy are: the strategic thrusts (Wiseman, 1988), the value chain (Porter and Miller, 1985), the customer service life cycle (Ives and Learmonth, 1984), the strategic grid (McFarlan, 1984), transaction costs (Ciborra, 1987; Malone, Yates and Benjamin, 1987), and electric integration

(Henderson and Venkatraman, 1989) [Ciborra and Jelassi, 1994, p.5] etc. The models noted below are not exhaustive, rather, represents a sample for developing an IS strategy. These models are diverse in nature and require refinement in practical application.

Gibson and Nolan (1974) developed six stage growth model to understand the factors influencing the IS strategy, where stages are: Initiation, Contagion, Control, Integration, Data Administration, and Maturity.

Rockart (1979) proposed Critical Success Factor (CSF) analysis as a way to deal with the problems of information requirement analysis.

Person (1983) in his generic IS strategy analysis summarised all possible IS strategies into six classification such as: Centrally planned, Leading edge, Free market, Monopoly, Scarce Resource and Necessary Evil [Robson, 1994, p.120f].

McFarlan, McKenney and Pyburn (1983) present strategic importance analysis in a four phased model of technology assimilation. The phases are: (a) Identification and Initial Investment, (b) Experimentation and Learning, (c) Management Control, and (d) Widespread Technology Transfer (p.148-9). They present a framework (strategic grid) which helps to determine the position of a firm appropriately.

Benjamin et al. (1984) derived a model on strategic opportunities which suggests that IS/IT may be significant in one

of four ways such as: (a) Internal: approach to operation, (b) External: approach to the competitive market place, (c) Improve traditional ways, and (d) Alter traditional ways.

Ward (1987) provided a classification set as opportunity areas such as (a) to use technology based systems to link the customers and suppliers, (b) to use technology based systems to make more effective the integrative use of information in the value adding process, (c) to develop, produce, market and deliver new products and services based on information, (d) to provide executive with information to support strategies [Robson, 1994, p.102].

Higgin (1985) in his business portfolio analysis considered an industry rather than product trends to be more useful to identify strategic IS opportunities. Any product or industry passes through stages such as development, growth, maturity & decline and the relationship between supply and demand differs in each stages. Boston Consulting Group developed a model classifying business, products according to the market share where segments are labeled as Wild Cat, Dog, Cash Cow, and Star [Robson, 1994, p.107].

Porter and Millar (1985) present a model of competitive five forces such as (a) Bargaining power of suppliers, (b) Bargaining power of buyers, (c) Threat of new entrants, (d) Threat of substitute products or services, and (e) Rivalry amongst existing competitors. This multipurpose model on competitive strategy

analysis can be used to assess: the current situation, the opportunities, and the threats.

Porter (1985) developed a generic business strategy which shows three possible ways to outperform competitive rivals: Product differentiation, Overall cost leadership and Focus/niche.

Rackoff et al. (1985) presents a strategic thrusts model that considered all possible activities into (a) Differentiation, (b) Cost, (c) Innovation, (d) Growth, and (e) Alliance. The model can be applied to three possible target categories: (a) Supplier, (b) Customer, and (c) Competitor.

Porter and Millar (1985) presents a information intensity matrix. The X-axis is a measure of the information about the product & service and Y-axis is a measure of cost of information exchange.

Porter (1985) in his value chain analysis suggests that organization has an internal value chain. The IS opportunities can be identified through value chain activities and linkage. The value chain activities are of two types: (1) Supporting activities such as Administrative and Infrastructure, Human Resource Management, Product/ Technology Development and Procurement, and (2) Primary Activities such as Inbound Logistics, Operations, Outbound Logistics, Sales & Marketing, and Services.

Shank and Boynton (1985) gave some guidelines on applying

CSFs analysis as a methodology for MIS planning.

Jenster (1987) explained planning approach based upon CSFs.

Silk (1991) discussed the efficiency, effectiveness and strategic advantage of IT planning.

Galliers (1991) further revised the stages of growth model by inclusion of Organizational Goals, Culture, Skill, and Structure.

Peppard (1993) has combined Porter's five forces model, Rockart's CSFs model and Porter's value chain model to identify IS/IT opportunities [p.91].

3.3.2. MIS Definition

Organizations require and obtain information both internal and external for interpretation and analysis to feed it back in the planning, controlling, and decision making process. Organization has an information processing entity i.e. MIS entity within the organizational framework. The dimension, scope, and activities of this entity vary from organization to organization and also at different time period within the same organization. It exists in every department, section, and branch of the organization.

Prince (1964) says that information systems for management control is an attempt to bridge the gap between the management science and management accounting. As a combined effort of management accounting and information systems, the approach

emphasizes on information flow and information network instead of traditional approach which gave emphasis on document flows [p.467].

Vergin and Grimes (1964) says that traditional manual data processing suffer from organizational and human limits. EDP is not limited by traditional human capabilities [p.63].

Anthony (1965) showed information handling as a separate process rather than as a subcategory under each of the process for which information is used [p.94].

Stern (1968) views MIS as a reflection of the real world which has to support two managerial activities i.e. goal formulation and goal control [pp.391-4].

Firmin and Linn (1968) defines management information system as a system for accepting data as raw material and, through one or more transmutation process, generating information as a product. Such a system may be formal or informal, planned or ad hoc, integrated or separate. Their totality still can be called a management information system [p.75-76].

Kennevan (1970) view MIS as an organized method of providing past, present and projection information relating to internal operations and external intelligence. It supports the planning, control and operational function of an organization by furnishing uniform information in the proper time frame to assist the decision making process [p.122f].

Murdic and Rose (1971) define MIS as a group of people, a

set of manual, data processing equipment (a set of elements) select, process, and retrieval of data (operate on data and matter) to reduce the uncertainty in decision making (seek a common goal) by yielding information for managers at the time they can most efficiently use it (yield information by a time reference) [p.9].

Neel (1971) said that an MIS should deal with the concepts of management (the means of accomplishing tasks through other people), information (the knowledge communicated between people), and system (the set of related elements or components held together by a common goal). [Neel 1971, pp.35-38, also see Federico et al. 1980, p.3]

Dearden (1972) remarks that MIS term is novel, far more global. He also remarked that MIS is a grandiose idea and any less global scope in MIS limit the functional MIS context rather than general MIS [p.122]. He said that the super-system type MIS is absurd. The coverage of formal MIS is so wide that it is impossible for a single specialist to comprehend all the details of every functional area. Even such super-system cannot be created by a group of system experts by following the MIS approach. The author recommends some steps for reorganizing the information system. It is absurd that a company may have a single integrated super-system type MIS that can be created by an expert or a group of expert [p.121].

Mason and Mittrof (1973) says that an information system

consists of at least, a person of certain psychological type who faces a problem within some organizational context for which he needs evidence to arrive at a solution and that the evidence is made available through some mode of presentation. [also see Vasarhelyi (1977), p.138].

Holland et al. (1974) view an MIS (Manual or computerized) as a communicative process in which data are accumulated, processed, stored and transmitted to appropriate organizational personnel for the purpose of providing information on which to base management decisions [p.14-16].

Small and Lee (1975) provided a simple and comprehensive definition of an MIS as a system for providing information to management [p.50].

Sprague and Watson (1975) view MIS as a combination of three major supporting sub-systems i.e. (a) the structured reporting sub system, (b) the data base sub system, and (c) the decision making sub system [Sprague and Watson, 1975, pp.34-37. also see Federico, 1980, p.4].

Thusman and Nadler (1978) defined information system as the gathering, interpreting, and synthesis of information in the context of organizational decision making [Thusman and Nadler, 1978, p.614, quoted in Ito and Peterson (1986), p.140].

Federico et al. (1980) defined MIS as a computerized procedure for providing managers with immediate access to the knowledge, information, and data they need to make decisions,

direct people, and regulate operations in order to better attain organizational goals [p.4-5]. Federico et al. (1980) commented that there exist little agreement among authors on MIS as the interpretation of it generally reflects the author's background and biases concerning information and its utilization [p.3].

Keen (1980) defines MIS as the effective design, delivery, and use of information systems in organization [Keen 1980].

Neumann and Hadass (1980) opines that MIS has two logical components, such as structured decision system (SDS) to deal structured decision and decision support system (DSS) to deal unstructured and semi-structured decision [p.79].

Tushman and Scanlan (1981) says that the formal reporting system sometimes fails to or is inadequate in providing up-to-date information to the decision makers. This calls for boundary spanning individuals to act as an alternative mechanisms of information import into organizations [p.289].

Szilagyi, (1981) defined MIS as a formalized and structured activity of individuals, machines, and methods for providing information to managers on a regular basis to assist in planning, allocating resources, controlling activities, and making decisions [p.610].

Lynch (1984) defines MIS as a computerized formal plan which creates, stores, and retrieve information, allow managers to control the amount and quality of information leading to decisions [p.19].

DeMaagd (1984) says a single comprehensive MIS, integrating both financial and other information required by management, is the best possible approach. The collection, recording, storage, and retrieval of financial data in computer data base (MIS) provides accurate and useful information to management. It enhances the report producing capability of the producers [p.10].

Nissen (1985) says an information system as generally comprising of both the use of information technology and the use of information channel free of such technology, e.g. face to face communication. The field of study has to cover the information system, the people informing and informed by it, as well as other channels and sources they use to keep themselves and each other informed [p.42].

Emery (1987) gives four statements of MIS i.e. (a) the MIS deals with only the management or decision oriented parts of an information system, (b) the MIS involves only the transaction processing part of the system, (c) the MIS combines both decision making and transaction processing components. (d) Lack of agreement on its meaning has rendered the term vacuum [p.22].

Piercy (1987) says that there is no universally accepted understanding of what is meant by the MIS [p.2].

Mansfield (1987) view information handling as a function like other support functions such as marketing quality control, and industrial engineering (for production and sales) and more general support functions such as personnel, accounting and

corporate planning. [Mansfield, 1987, p.62]

Land (1987) says that every information system is made up of a number of components, artifacts such as pencil and paper, word processors, computers, and communication networks, operating systems, procedure manuals and people who work and operate the artifacts [p.11]. He says a blend of formal and informal systems perform better than organizations in which the formal system becomes dominant [p.25].

Kroenke (1989) gave opinion that the subject of MIS is broader than the words management information systems imply. This subject include managers, but it also include all of the other people in an organization and the structure and design of the organization as well [p.6].

Koontz and Weihrich (1990) said that the management information system should be tailored to specific needs and may include routine information, information that points out exception, and also information necessary to predict the future [p.428]. Koontz and Weihrich (1990) defined MIS as a formal system to gather, integrate, compare, analyze, and dispense information internal and external to the enterprise in a timely, effective, and efficient manner [p.529].

McLead (1990) refers MIS to a computer based system which is build to provide management with information required in decision making, to solve problems [p.194]. According to him the concept of MIS may be divided into two i.e. (a) MIS as a

reporting system under manual system and (b) MIS as a computerized system [pp.196].

Lucas (1990) reported three major trends in information system field: (a) The use of information processing technology as a part of corporate strategy, (b) End user computing, and (c) The use of personnel computers as managerial work-stations [p.12].

Visala (1990) says that by an information system we mean a social and technical system that models and provides information about a universe of discourse [p.177].

Banville (1990) says that MIS is defined in a variety of ways and these definitions are dependent upon their proponent's view of organization and can be seen to vary along the lines of the centrality of technical aspects as opposed to the social aspects [p.62].

3.3.3. Human Information Processing

Dearborn and Simon (1958) showed that the same information was interpreted by decision makers differently depending on their position i.e. personal and situational factors influence the interpretation of information [Lucas, 1990, p.29].

Feltham (1968) identifies two positions of a decision maker. First, he may be the receiver. Second, he may be someone other than the receiver, such as the person in charge of producing the information or a superior to the decision maker. Such a person is referred to as an observer [p.684].

Beishon (1970) draws attention on social and psychological factors associated with MIS. The human aspect of MIS, role of the behavioral scientist specially in developing MIS are emphasized [pp.385-90].

Mintzberg (1972) thought managers as a sophisticated information systems. A manager receives information from a great many sources and have access to a wide variety of internal and external information. So, a manager emerges as a central nerve of a organization [pp.93-94].

Chervany and Dickson (1974) experimented the effects of information overload on decision making in a simulated, computer based environment. The two form of information systems (statistically summarized data, and detailed daily data) are used to experiment on two groups of decision makers (twenty two graduate business administration students). The group receiving statistically summarized data had higher quality decisions than the other group. The other group had less confidence in those decisions and also took longer time to make decisions. Using students as surrogate for managers is a limitation of the experiment [p.62].

McKenny and Keen (1974) presents a human information processing model. The thinking process and personality of management scientist (builder of the model) and manager (user of the model) differs. To better understand the cognitive aspect of the decision making process of both and to narrow the gap, a

model of cognitive style (which the authors has developed and tested) is discussed. The model has two dimension, information gathering (perceptual process by which mind organize stimuli i.e. perceptive and receptive) and information evaluation (the process individuals adopt in sequencing of analysis i.e. systematic and intuitive). The thinking process has implications for the implementation of analytical model [pp.152-163].

Taylor (1975a) comments on managerial information processing that the age of managers has an association with decision making performance. No evidence was found in support of the contention that older decision makers tend to be less facile information processor [p.74].

McGaffey and Christy (1975) comments about information processing capabilities of managers. The entrepreneurial effectiveness is judged in-terms of information processing capability of entrepreneurs using information processing attributes. Information processing capability among managers increased due to increased complexities in business [p.857].

Adams and Swanson (1976) reports the study on investigation estimation process to determine personal and situational factors that have influence on accuracy of estimates. The study show that: (a) Estimating accuracy has an association with information sought and processed; (b) Information sought and processed has an association with managerial talent; (c) Managers's perceived importance of accurate estimates is positively related to

information sought and processed. (d) Managers's perceived importance of accurate estimates has an association with managerial talent. The factors that influence estimating accuracy are controllable by estimator and by management [pp.98-110].

Kilmann and Mitroff (1976) on users' cognitive style says that different psychological types prefer different forms of information presentation. But determinants of cognitive style is not well understood [Kilmann and Mitroff, 1976; also see Land, 1987, p.20-1].

Vasarhelyi (1977) presents reports on cognitive characteristics of decision makers and factors of the decision making process such as information quantity, information utilization and subject background. The management information systems specially suitable for specific managers decision style are emphasized. Conclusion drawn in support of designing information system considering decision makers decision style [pp.138-53]. He also considered four behavioral factors in man machine interaction i.e. (1) cognitive characteristics (decision style, information utilization and processing); (2) communicational characteristics (perceptions, attitudes, inputs, and outputs); (3) emotional characteristics (frustration and fears); and (4) demographic characteristics (age, education, sex) [p.139].

McGhee et al. (1978) reports the experiment which assessed the importance of two personality variable, tolerance for

ambiguity and decision style, on a subject's information processing. The experiment shows that personality variables are not sufficient (useful) in describing, understanding, or predicting human information processing. Human information processing model need to take into account the human processor, the task and processor - task interaction [p.681].

O'Reilly, III, (1980) reports a study on information overload. The decision makers perceived information overload has an association with higher satisfaction and lower level performance. The perceived information under-load has an association with lower satisfaction and higher performance [pp.684-696].

O'Reilly, III (1982) reports about use of information sources and describes impact of quality and accessibility. Perceived quality as well as the accessibility of information sources appear to be potential determinant of information use by decision makers. The decision maker use frequently the sources which are more accessible as compared to quality of information [pp.756-771].

Malhotra et al. (1982) reports information overload as it leads to dysfunctional performance. The concept of information overload derives theoretical support from research in human information processing (Miller 1956, Quastler 1956), statistical prediction (Wherry 1931, 1940) and clinical prediction (Bartlett and Green 1966, Kelly and Fiske 1951) [pp.27-8].

Davis and Olson (1985) found that if the users conceptually understand the phenomena underlying their need for information and how these phenomena relate to information systems, then they can specify their requirement more correctly and can use the information system more effectively [p.161].

Land (1987) stated the factors which involve the use of information by a person i.e., (a) the cognitive style and preference of the user, (b) remembered knowledge, (c) language, and (d) environmental factors [p.21].

Hill (1987) says that there always remain a credibility gap, i.e. a gap between data collection and use of information in decision making [p.188]. He mentioned from their study on top management (Hill et al., 1984) that the major decisions were taken on an ad hoc pragmatic lines, with more concern for survival rather than with the search for long run optimal solutions [p.187].

Mansfield (1987) mentioned three main problems that the senior managers are left with (a) Inaccuracy: It is acute problem for senior manager as they are not aware about that or its extent, (b) Overload: Managers are provided with too much information, and (c) Lack of information: The MIS can not provide all information for senior managers that were possible in face to face or manual systems [p.74]. He also pointed out that managerial decision making is characterized by bounded rationality because of the incompleteness of information systems,

various social, political and psychological pressures. The senior managers will rarely have complete information because of (among others, mostly) (1) limits to scientific knowledge at any point in time, (2) cost of information gathering, and (3) problems of predicting the future. The information system development follow logical and rational approach whereas management decision making is characterized by bounded rationality. Thus, there may be disjunction between the nature of MIS and process of top management [p.75].

Lucas (1990) summarized the factors that have influence on the interpretation and use of information as: (1) decision problems, (2) personal factors, (3) situational factors, (4) cognitive style, and (5) organizational setting [p.28-30].

O'Conner and Barrett (1990) presents an experimental investigation. The study was made to show the influence of informational cue manipulation (of job enrichment) and individual differences (measures of individual characteristics) on subjective job perceptions (of incumbent). The results show that both these variables significantly contribute to the prediction of subjective job perceptions. The individual characteristics appears as additional significant variance in the prediction of subjective job perceptions [pp.42-79].

Tan and Mann (1993) presents reports on time pressure. The investigation of effects of perceived time pressure on human information processing reveals that it is not the actual time

available rather perception of time available (believe or feeling of insufficient time) which impair the information processing. Under time pressure, the decision maker results low level performance [p.197].

Thomas and Trevino (1993) says about impact of information processing on uncertainty that the organizations process information to reduce uncertainty (Galbraith, 1973). The underlying assumption is that more information serve to reduce uncertainty. Thus, an uncertain situation is dealt with by gathering more data to reduce the information gap. They also noted that authors (Cummings, 1984, Jemison and Sitkin, 1986) suggested that reduction of uncertainty through using data may not be sufficient for alliance success [p.781].

3.3.4. Computer Based Information Processing

King (1973) says the contemporary development in MIS takes new role of intelligent helper. The new intelligent role, in addition to responding to manager's requests for information, may aid in structuring problems and understanding the environment. That is, MIS may complement the manager. The developments in the field of artificial intelligence is directing the concept of intelligent MIS [p.5].

Luthans and Koester (1976) reports on impact of computer generated information on decision maker's choice. The study on impact of computer generated information on the choice activity

of managers show that: (1) Computer experienced managers are less influenced by computer generated information and they rely more on information presented in traditional format. (2) Computer non-experienced managers are more influenced by computer generated information than by information presented in traditional format. Managers with a great deal of computer knowledge, experience, and familiarity are more cautious, less confident on computer generated information due to their realization that computer generated information are not equal to or superior to information provided by traditional format [pp.328-32].

Bonini (1978) comments that the computer model or MIS is basically oriented towards lower or mid level management decisions making and had relatively little impact on top management decisions. The reasons for failure of computer model to aid top management decisions are (1) lack of communication, (2) lack of management initiative, (3) difference in cognitive styles, (4) perceived threat of OR/MS/MIS, (5) managers - analyst relation etc. [pp.47-55].

Turner (1980) conclude that computer based systems tend to make clerical jobs more demanding through increased work load and pace of work. He also studied clerical employees in banks and found that high productivity, mental strain symptoms, and job dissatisfaction were associated with the use of computers [Lucas, 1990, p.68].

Federico et al. (1980) reviewed about 260 literature most of

them are articles from journals. The review basically show the impact of MIS upon various aspect of management and organizational behavior as addressed, expected, found in the literatures. The work is presented in two parts: Part one is related to impact of CBMIS on managerial performance and decision making, and part two is related to the impact of CBMIS on organizational structure and process.

A study by Andersen and Pedersen (1980) supported that the introduction of a computer based system changes managerial roles and the organizational structure [Groves, 1987, p.103-4].

Robertson and Cooper (1983) reviewed a substantial amount of research which has been done showing relationship between technology and organizational structure (Woodward, 1965; Pugh and Hickson, 1976; Burns and Stalker, 1961; Lawrence and Lorsch, 1967; Filley et al., 1976; Weick, 1977). He found that no single, ideal structural form is applicable for all organizations [p.15].

Hampton (1985) found that fears of computer and the system is based on a misconception. This can make the system very ineffective until those fears has been removed [Groves 1987, p.105].

Ito and Peterson's (1986) research on information processing systems and boundary spanning activity focuses on analyze-ability of task uncertainty and more specifically the relationship between boundary spanning activity (mechanism that coordinate

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Ito and Peterson's (1986) research on information processing systems and boundary spanning activity focuses on analyze-ability of task uncertainty and more specifically the relationship between boundary spanning activity (mechanism that coordinate

relations between units) and elements of intra-unit structuring [p.139].

Mansfield (1987) reports the impact of IT driven MIS on the general management task, decision making and control. IT driven MIS present opportunities for augmenting managerial effectiveness and improving organizational efficiency and performance [p.59]. Mansfield (1987) remarks that information input for policy making requires creation of data through forecasting process of greater or lesser complexity. Forecasting through probability involves risk and lack of faith even when done by statistical technique and using computer. As a result, managers rely on personal judgement for making policy making decisions [p.65]. He also says that the CBMIS is a more satisfactory approach, but it can work satisfactorily only where the senior managers involved are exceedingly knowledgeable about the overall store of information held within the system and also understands its relevance, accuracy and the ways in which these can be retrieved [p.74].

Lyytinen (1987) pointed out on the increased computer application in administrative data processing since 1954 and has emphasized on the improvement of this key instrument [p.3 in Boland and Hirschheim (eds.) (1987)].

Kraut (1987) found that computers have reduced clerical employment in some industries and reduced the need to expand the clerical staff in others [Lucas, 1990, p.67].

Piercy (1987) says that there are diverging opinions on the impact of information technology on organizations. One group focus on the technical potential of information technology in operational and administrative systems. The other group have expressed reservations about the extent to which such a technical potential can sensibly be realized in the practical content of business organizations [p.1].

Boland (1987) says that Information technology is seen as an all-purpose technology; information is the common denominator that can bring matter, energy and time into a single, unified framework of analysis. We are fostering an image of the world in which the human meaning of knowledge and action are unproblematic, predefined, and prepackaged [p.365].

Davies (1987) says that the social system is built on the technical system, however, social system also has an independent life which in turn influences the operation of the technical system [p.87].

Davies (1987) illustrated managerial resistance in the introduction of computer technology from the works of Shaiken (1980) and concluded that resistance and sabotage reduce the effectiveness of information system. It is necessary to avoid resistance and maximize acceptance [p.80]. The interaction of organizational variables was presented in a model by Leavitt (1964) and cited in Davies (1987, p.81) which suggests that an organization comprises of four interacting variables such as

task, structure, people, and technology. Any change in technology influences, the task, structure and people elements within the organization [p.81].

Zeffane (1989) found a strong association between computer use and organizational structural characteristics as greater computer use has been found to be related to less centralization and greater formalization and departmentalization [p.621]. The author also discusses the impact of computer on organizational structure and has concluded that it added to new dimensions of controversy. Specially it is very difficult to identify its impact on organizations in general and structural control [p.622].

Lucas (1990) says that the first prediction about the impact of computer, was presented by Leavitt and Whisler (1958) that firms would re-centralize as a result of computer; the availability of more information would allow management to centralize. But little evidence support their prediction. Besides computer, there are many variables which affect the structure of an organization. Again, defining the variables such as centralization and decentralization is problematic [p.64]. Leavitt and Whisler (1958) predicted that middle managers would suffer the most from computer and there would be fewer middle managers.

Mumford (1991) says that information technology are affecting senior management. The networks and complex data bases

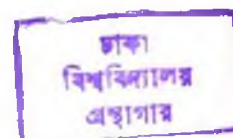
cause to change the organizational structure [p.21].

Glazer (1991) says computer and telecommunications involve speed of transition, amount of storage and process, and new patterns of information organization thus increases the importance of information and had impact on society and enterprises. The strategies and organizational structures are functions of information environment thus as environment changes so does the strategies and organizational structure [p.2]. He also observes that the management of IT itself can be considered an asset to gain competitive advantage. He identified two major trends i.e. recent development in IT in significantly expanding the capacity of the channel to store, process and transmit information and information as an asset having significant market place [p.3].

382509

Bloomfield and Coombs (1992) discussed early views where information was equated with power and the potent information processing capacity of computers was seen as an extension of managerial control but with the dissemination of computers, explicit emphasis has been shifted to the control over sub-systems. They summarize the traditional three approaches of relationship between computers and organizational power [p.461].

Molloy and Schwenk's (1995) study confirms the positive effects of IT on major phases of decision making at each stage of the strategic decision process [p.283].



3.4. MIS Performance Measurement

Kaufman (1959) felt that the MIS system effectiveness measurement be based upon a careful evaluation of what many users have accomplished [p.67].

Anthony (1965) uses the term effectiveness in the sense as Barnard used i.e., it has got relation with the accomplishment of the purpose and that a specific desire and has been attained. He used the term efficiency as the optimum relationship between input and output. The more outputs from a given input, the more efficient is the machine or process [pp.27-8].

Chervany and Dickson (1970), in evaluating MIS, examined the impact of information on effectiveness [Narasimhan (1978), pp.296-308].

Joslin (1971) presents an evaluation procedure while designing a new MIS. Author considers alternatives for evaluation are: (1) continuation with manual system, (2) partially computerized MIS, and (3) complete new MIS. His study followed a cost benefits approach.

McFarlan's (1971) measuring effectiveness of information system involves wide variety of context which is heavily subjective and complex. The factors of IS performance are: quality of applications, level of service and support furnished, innovative-ness of the application, and competence of professionals [p.134].

Feltham (1972) provides the criteria for evaluating

information applying mathematical approach in terms of (1) goals of the firm, (2) sub-optimization, and (3) cost and value of information [Murdic and Ross (1975), p.652].

McLean (1973) places importance about EDP appraisal. The appraisal may ensure enhancement in the decision making ability of management [pp.95-101].

Payne et al. (1973) present evaluation steps prior to implementation of an MIS as follows: (1) Identification of objectives of the organization for developing and utilizing an MIS. (2) Establishing criteria for comparing new MIS with existing MIS. (3) Comparison of new MIS and existing MIS on the basis of criteria. (4) Management selection.

King and Cleland (1973) describe that information system justification should be based on increased organizational effectiveness rather than cost efficiency [p.35].

Burch and Strater (1974) presents a cost-benefits approach where costs are: (1) Type: direct and indirect, (2) Behavior: variable and non-variable, (3) Function: development, operational, and maintenance, (4) Time: recurring and non-recurring. And benefits are: (1) Direct benefits (cost savings), (2) Indirect benefits such as estimated service improved, productivity improvement etc.

Murdic and Ross (1975) says that MIS evaluation is difficult because it is hard to measure 'Improved' decision making. Though the cost of hardware and software can be measured, the total

benefit cannot be measured [p.651].

Seward (1975) uses user information satisfaction methodology as a surrogate measure of MIS effectiveness [in McFarlan and Nolan (1975)]. McCosh et al. (1984) has summarized Seward's (1975) eight steps procedure of measuring MIS effectiveness.

Lucas (1975) presents an study on bank performance and information system. The study of information system of more than two hundred branches in a major California bank shows relationship among organizational performance, personal, situational, decision style, use of reports, action and attitude. The study uses regression analysis techniques. Major recommendations are on flexibility of information system and creating favorable user attitude towards information systems [p.735].

Goodman et al. (1977) views efficiency and effectiveness as two sub-components of performance.

Uecker (1978) presents a study on information system choice. The study (laboratory experiment) investigated the accountant's ability in applying normative theory of information evaluation in making choice of information systems alternatives. The study considers model of user decision making behavior. The finding shows the limited ability of accountant's and recommended further research on the topic [p.169].

Dale (1978) says about satisfaction as non-monetary personal satisfaction is also known as psychic income such as ego

aggrandizement [p.431].

Zmud (1978) summarizes from literature the following ways of an MIS evaluation: (1) The information economics approach: Action generated from information received could produce the estimated value of the service being produced. This concept is summarized from different writers (Feltham 1968, Feltham and Demski 1970, Marshack 1971, Mock 1971). (2) The economic value approach: The information users are asked to state their opinion about the economic value of the service being provided by the information system. This concept is summarized from different writers (Gallagher 1974, Senn 1974). (3) The utility value approach: The information users are asked to express their perceptions on the overall quality of service being provided by an information system. This concept is summarized from the writer (Swanson 1974). Swanson (1974) uses measure, averaging user's evaluation of information and means of providing information [pp.188-9].

Lucas (1978b) presents the results of a longitudinal field experiment to evaluate the implementation of an information system. The variables in the model are (1) quality of information processing service, (2) benefits of change, (3) costs of change to user, and (4) successful implementation. The users' satisfaction is measured using items fascinating, satisfying, good, creative, respected, pleasant, useful, challenging, and sense of accomplishment. The independent variables are perceived routine, and input form quality which are used to measure costs

of change; and for measuring benefits of change, the independent variables are order processing, customer service, and the order cycle. The results show the existence of a relationship between user information satisfaction, and costs and benefits of change that the users confronted due to the implementation of the new information system [pp.68-79].

Cheney and Fuerst (1978) presents a research project on user information satisfaction and users information utilization and describe investigating the following: (1) the characteristics of the decision maker's environment in relation to the degree the new information is accepted and utilized; and (2) the characteristics of decision makers in relation to the degree the new information is accepted and used. The dependent variables are users information satisfaction and user information utilization. The independent variables are: (1) Environmental: (a) stability of decision environment, (b) complexity of decision makers environment, (c) decision types, and (2) Decision makers characteristics: (a) decision maker's age, (b) educational level, (c) years of experience, (d) cognitive style, (e) managerial style. The decision effectiveness is designed to measure via the users information satisfaction and user's information utilization with regard to the new information. No findings were reported [pp.173-5].

Narasimhan (1978) in determining the performance of MIS, via a simulated model, examined interrelationships between (a)

timeliness, (b) accuracy of information used for planning, and (c) the responsiveness of the MIS i.e. ability of the system to adapt to changing conditions. Narasimhan (1978) made the following conclusions: (1) There is a need to examine the organizational system's stability, in addition to cost, time involved in making decisions, and use of information. (2) Timeliness, accuracy and responsiveness are important variables in determining the stability of the MIS. (3) Increased accuracy of information may prompt to changes in planning practices in order to make MIS more responsive. (4) The accuracy of information has a stabilizing effect on a given level of timeliness and responsiveness. (5) In the presence of 'noise' in the system, more timely and complete information tends to have a destabilizing effect by allowing the noise to filter through. (6) The accuracy and timeliness jointly to be taken, considering the context of MIS responsiveness and way of information use. The MIS improvement need to examine the trade-offs between quality of information, decision making practice and responsiveness in relation to the system's stability [p.144].

Matlin (1979) proposed an approach similar in philosophy to summing up the individual economic evaluation of information system to arrive overall value of total information systems [pp.5-34. also see Dickson and Wetherbe (1985), p.174].

Mansour and Watson (1980) presents a conceptual model employed to investigate the determinants of computer based

information system performance based on the assumption that an information system is a product of multiple factors. The test results high validity of the model. The private business model appears as a good predictor of CBIS performance. Organizational category rating shows manufacturing, service and governmental organizations were high in both CBIS performance, and computer hardware and software; whereas financial organizations rated high on behavioral and structural variables. Manufacturing had high scores on environmental variables [pp.521-533]. They used composite measure using indicators such as computer hardware and software, behavioral, structural, and environmental variables.

Sloma (1980) discusses the measure of MIS management performance. It is a professional style measure which covers the following: (1) background data for management, (2) ratios to measure MIS performance, (3) Ranking MIS reports, (4) MIS management criteria for control report design, (5) management control information, (6) measuring MIS performance to objectives [pp.220-8]. Sloma's (1980) MIS performance measure concentrate, among others, on the following: (1) on major aspect of company's operation, (2) increase in decision making facilities, (3) MIS auditing, (4) Value rating of reports, (5) adequacy of system as regards cost and economy, (6) Documentation, (7) Security etc. [pp.225-228].

Hamilton and Chervany (1981) describe the two views of MIS effectiveness: (1) Goal oriented and (2) System Resources. Both

views have place in evaluation process, but system resources view is most relied upon. MIS can be evaluated in two ways: (1) The efficiency with which MIS utilize resources to provide the information system to the users, and (2) The effectiveness to the users in using the information system in accomplishing their organizational goal [pp.55-69. also see Dickson and Wetherbe (1985), pp.167-9].

Cheney and Dickson (1982) had used job satisfaction as a measure of CBMIS performance. They reported that job satisfaction measure was suggested by Mumford (1973) and Sackman (1971). They present user satisfaction on computer based information system (CBIS) satisfaction. The introduction of a computer based information system has impact on job satisfaction, information satisfaction, the degree of programmed decision making, and the degree of information system utilization. User performance (information satisfaction, job satisfaction and system utility) is largely influenced by well management of MIS development and not much by technology sophistication [pp.170-184].

Thierauf (1983) reports a questionnaire approach for computer based information system evaluation. It is oriented towards information system manager and presents managerial guidelines following normative procedures.

McCosh et al. (1984) says that monitoring and measurement of MIS themselves is frequently inadequate [p.255]. McCosh et al. (1984) discusses the MIS performance evaluation. The performance

evaluation generally denotes measuring, appraising and improving management performance [p.185]. Evaluation of performance of an information system (IS) may be done in terms of the results [p.194-273].

King and Rodsiguez (1978) presents a broader view of system effectiveness. It covers four varieties of assessment which may be made before, during and after MIS design and development. These are attitudes, value perceptions, information usage behavior and decision performance [McCosh et al. (1984), p.265]. A discussion of King and Rodsiguez's MIS performance measurement as presented by McCosh et al. (1984) refer two ways i.e. firstly, changes in the four dimensions from the pre-system to the post-system period are to be compared and analyzed and secondly the behavior and benefits of system users are to be compared with those of non-users. Conventional statistical techniques are then used to explore and test any changes for significance [p.266].

Dickson and Wetherbe (1985) concludes that, effectiveness of information is based on what makes effectiveness for outputs and what information or feedback is required to evaluate the effectiveness. Efficiency of information is based upon what makes efficiency in an input and the transformation process and what information or feedback is required to the evaluate efficiency [p.134]. They conclude that effectiveness is the degree to which the management information system help to achieve the objectives [p.167]. They proposed a comprehensive framework which

encompasses economic factors, MIS internal performance factors, financial control factors, and other factors related to MIS performance. Authors view that management assessment philosophy should be predominant and preferred for the MIS evaluation. They re-framed a measure of MIS performance that a manager might employ. The approach follows the concept of Critical Success Factor (CSF) of Rockart (1979). They conclude that evaluation of MIS function is required because of the following issues: (1) money to be spent on MIS, (2) impact of such investment, (3) contribution of MIS function on organization, (4) vague feeling of benefits which are less than costs, (5) below standard MIS functioning, (6) failure of computing which have a great bearing on organizational risk, (7) basis of comparison - strength and weakness, and (8) dynamics of MIS function [p.164].

Podolsky (1985) says that users' satisfaction is an important measure of software quality.

Henrion et al. (1986) illustrated an economic model for evaluating a computer based information system. They hold the notion that evaluating an information system is intended to help users do job faster, more reliably and to qualitatively transform the way they (users) do it as well. An evaluation may have two goals: (1) Comparing alternative information systems to select best one, and (2) Identifying general deficiencies and opportunities in an information system to suggest refinement. The approaches used to evaluate IS model are: (1) Comparing IS

features with those of other IS in terms of availability, ease of use, and generality. (2) Examining users reaction in-terms of desire to use, users comments, formal evaluation questionnaire, and interviews. (3) Experimenting with users to examine aspect of IS. (4) Reviewing IS by expert [pp.319-330].

Kim (1988) uses users' information satisfaction (UIS). The UIS measure are also used by other researchers [Ives, Olson, and Baroudi, 1981; Jenkim and Ricketts 1979]. The UIS measure is also used by Cheney and Dickson (1982) as part of composite measure.

Cooper and Mukhopadhyay (1990) reported that Miller and Doley (1987), Bailey and Pearson (1983) used UIS satisfaction concept. He reports that Mann and Watson (1984) and Srinivasan (1985) had used system usage measures. He also reports that Gallagher (1974) had used the information value concept to measure MIS performance. Cooper and Mukhopadhyay (1990) used microeconomic production theory for MIS effectiveness. Cooper and Mukhopadhyay (1990) reports that Srinivasan (1985), Maish (1979), King and Rodsiguez (1978), Lucas (1975), and Swanson (1974) had used the system usage concepts for MIS performance. They identified three broad methods of MIS evaluation: (1) Economic effectiveness evaluation methods: that ranges from simple cost benefit analysis to more rigorous production function analysis. (2) MIS usage, and (3) MIS satisfaction [p.35].

Hussain and Hussain (1992) presents a performance evaluation approach of computer based information service department. It is

a comparison of actual performance with desired performance in areas of resource utilization, operation and service [pp.182-3]. Performance evaluation is a control mechanism leading to cost saving by identifying information system inefficiencies and adopting corrective measure. It is a sequential process consisting of nine steps [pp.182-5].

Lewis (1994) presents the idea of three types of measure of performance of a system: (1) Measure of Efficacy: The extent to which the system attains its intended transformation. (2) Measure of Efficiency: The extent to which the system attains its intended transformation with minimum resources. (3) Measure of Effectiveness: The extent to which the system contributes to the purpose of super system [p.60].

Molloy and Schwenk (1995) adopted "Users Satisfaction" with information technology systems as a measure of system performance. They identified user satisfaction as both a measurable and acceptable surrogate for utility in decision making [p.289].

3.5. Attitude Towards CBMIS

Robey (1978) presents about users attitude after examining the relationship between user's attitude towards an information system and their actual use of computer based information systems. The results show that the user's attitude are positively related to the actual use of the information system [pp.170-2].

This finding support that the measure of users' satisfaction is meaningful as a surrogate measure of MIS performance [Robey (1978), p.171, and Lucas (1978), p.173].

Groves (1987) identified that a system have effect on managerial attitudes. Again, managerial attitude may have effects on various aspects of management information systems. A Study of individual personalities, attitudes and desires upon the MIS found that the executives working may eradicate many embracing situation which may occur at any stage of MIS life cycle [p.106].

3.6. MIS Related Works In Bangladesh

Mohiuddin (1984) conducted a field study on communication methods where fifty top and middle executives of a financial institution were asked to indicate the most effective and least effective methods of communication. The results show that (1) combination methods are appropriate in situations requiring immediate actions, (2) Written methods are most effective [pp.27-37].

Hoque (1984) through observation and interviews made a field study on MIS in five enterprises of public sector corporations in Bangladesh. The problems and deficiencies identified were (1) basic objective is not reflected in MIS, (2) MIS fails to satisfy users information needs, (3) MIS fails to satisfy the reliability criteria, (4) reporting system incorporate overall economic activities only and there are improper arrangement of items, (5)

lack of prompt reporting, (6) inconsistency in reporting, and (7) reporting system fails to specify corrective actions [pp.29-46].

Logman (1985) conducted a study on management information and reporting system of five public sector corporations that are administering and controlling the affairs of manufacturing enterprises. The identified deficiencies of the system are ineffective feedback system, lack of objectivity, non-determination of responsibility center, incompleteness, poor variance analysis, low reliability, lack of trained personnel, insufficient computer services, ambiguousness, inconsistency, lack of knowledge, irrelevance, lack of co-ordination. He emphasized on restructuring the system to make it management goal oriented [pp.40-55].

Pramanik (1985) discussed the market hypothesis and the quality of accounting information. He emphasized on the improvement of the quality of accounting information that has to be reliable, relevant, adequate and timely [pp.22-24].

Parkinson (1987) suggested that computerization in third world countries to be justified in-terms of benefits to common man and should be technically and economically feasible. He discussed on calculating machines, record keeping, computer expertise, support services, system failure, methods, information overload, the cases of lesser developed countries, system development etc. Any deviation from economic and technical consideration may be a serious wastage of resources in less

developed countries [20-24].

Rab (1988) studied the problems and prospects of office automation in Bangladesh and found (1) office automation has not caused wide unemployment, (2) there remains shortage of skilled computer personnel, computer manager, reliable advisory service, (3) there remains conservative attitude of decision makers, (4) dissemination of knowledge, training facilities, government policy and absorbing executives (made redundant by automation in suitable jobs) are the serious problems [pp.233-260].

Mamun (1988) makes a note on the computer evolution and application in various organizations in Bangladesh. He identified problems such as (1) slow pace of computerization, top management is great barrier; lack of appreciation, accountability and political direction, (3) shortage of computer personnel, users, (4) unsatisfactory leadership training in educational institutions. He suggested for training, education and management awareness [pp.89-114].

Husain (1988) in the attachment report on MIS in "Bangladesh Jute Mills Corporation" discussed the organizational structure, practice, functions, formats and duties of MIS personnel. The Author identified problems of MIS such as: lack of knowledge in MIS, difficulty in integrating the old reporting system with the new system, attitude problem, shortage of personnel in reporting, duplication of reports, uncoordinated and unauthorized formats, ineffective feedback system, poor variance analysis, inadequate

computer facilities, irrelevant reports, delay in reporting, lack in coordination etc. He suggested among others for improving feedback system, cooperation of other departments/divisions with MIS division.

Gani and Osman (1989) examined the MIS of a public sector corporation through perusal of relevant manuals, formats, rules and regulations relating to MIS and interview of top executives. The study pointed the features of MIS in practice such as organizational placement of MIS department, staffing, equipment in use, process of MIS, data flow, and use of information. The study identified deficiencies of MIS reports such as delay, inaccurate data, mechanical trouble, extensive and clumsy presentation, insufficient information, lack in strategic analysis, inadequate analysis, and inadequate formats. He suggested for collection of external information, comparative analysis, powerful analysis for policy making, prompt reporting, information aligned to the needs of users, and installation of equipment. He also felt that information should be relevant, concise and analytical towards strategic needs [pp.35-40].

Saha (1989) emphasized on having MIS for better communication. The Author discussed the components of MIS, features of MIS, and identified problems such as lack of trained manpower, motivation, guidance etc. He also recommended for accurate information, proper feedback, and use of information for decision making [pp.41-46].

Shaheen (1989) through structured questionnaire compared the information management system and mode of service of national and multinational enterprises. He focused on procedures, forms, and communication which shape the systems and explained role and responsibility of MIS in nationals and multinational enterprises. He identified that multinationals are paying more attention than the nationals in the areas of profitability, cash forecasting, performance, sales forecasting, sales variance, and labor turnover reporting, while nationals stressed on financial statements, materials usage, purchase, and electricity breakdown reporting. In the national enterprises there are lack of communication strategy, and limited feedback of executive order which require more rational reorganization and remodeling [pp.47-54].

Hoque (1989) examined the communication methods of public sector enterprises and found that the organization of MIS, process, media and methods of communication and non-financial reporting systems had been poor, inadequate and inefficient as a result operational performance had been adversely affected. He identified the problems such as: poor organization of MIS, incomplete and ineffective feedback, inefficient communication, ignorance of data requirements, inadequate report quality etc. [pp.55-64].

Khan (1990) reviews literature on Decision Support System (DSS) and highlighted on cognitive style of decision makers; this

might be an aid for designer of the system [pp.47-58].

Bhattacharjee (1990) in his study on productivity measurement in the NCBs commented that the MIS and the accounting system needs to be modified in such a way that variables necessary for determination of productivity be there in the system of MIS. He considers this important in productivity measurement and planning at various levels [pp.25-44].

Khan and Abdullah (1992) in a case study on management information system of a commercial bank in Bangladesh highlighted on the nature and operations of MIS. The identified shortcomings were delays, excessive details, forms poorly designed, a large number of reports carry the same data, insufficient analysis, unnecessary data processing at branches, shortage of information handling personnel etc.[pp.16-20].

Habibullah (1992) discussed the various aspects of information management and emphasized on creating awareness about the benefits of information technology. He suggested that managers must develop an information system to generate and preserve data needed for decision making. He discussed on attributes of information such as co-related, consistent, current, complete, concise, use of non-technical language, meaningful, format, correct etc. His discussion covers information manager, information user, information categorization, information for planning and control, various information system for economic and social development [pp.7-9].

Hossain (1993) studied the business communication and found that our enterprises popularly use face to face conversation, interview, telephone, counseling, letters, reports, directives, bulletin boards, memos etc. And tables, graphs, maps etc. are used as visual aids. He identified barriers of communication such as: lack of sincerity in conveying message, personal conflicts, perceptual problems, fear of being deprived, faulty expression, poor attention in receiving information, excessive organizational hierarchy, misunderstanding, semantics problems, lack of proper planning, lack of trained and educated personnel, lack of proper feedback and noise [pp.111-127].

Muhiuddin (1993) discussed the regulation of accounting information and make reference to the practice in Bangladesh. He remarked that the lack of fair competition and an efficient information system has necessitated regulation of accounting information as essential in Bangladesh for fulfilling the user need and allocating scarce resources to productive use [pp.5-12].

Bhuiyan (1993) discussed the quantitative and qualitative expectation of the users i.e. decision makers. The author highlighted on the concept of feedback and information attributes.

Karim (1995) theoretically discussed the importance, media, form, content, and essentials of effective business communication. Effective business communication can help in achieving the business goals. The information theory and

information attributes such as clear, relevant, informative, accuracy, objectivity and brevity are the heart of communication [pp.17-21].

Shahid et al. (1994) report that banks use both written and oral media in information flow. The majority of banks expressed the inadequacy in information flow process. The written and oral media used by banks in information flow with customers is adequate. The study report identified problems of gathering information, sending information, and introducing information technology.

Chowdhury and Banu (1994) make a note on application of Geographical Information System (GIS) in Bangladesh. Their discussion contains hardware, software, application and concluded that implementation of GIS within a tight budget would remain difficult compared to that of a traditional Management Information System [pp.252-257].

Chowdhury (1995) emphasized on accountant's role in the information technology environment. The major points of discussion were timely MIS, accurate and timely information [pp.59-61].

Naim et al. (1995) on their study of examining the extent of involvement of the end-users of computer information system in the training and development activities found that the extent of involvement in training and development depends on a number of factors such as: hours spent on self-learning, perceived

usefulness of involvement, satisfaction with training and years of experience with computers. They also found that end users prefer peers as a mode of learning than manual/workbook [pp.101-111].

Salam (1996) discussed the role of auditors in the design and development of computer systems. The auditors' role in reviewing a new data processing system and modification should be (1) reviewing the adequacy of the information system for management policies, (2) examining approvals, documents, testing, costs and (3) examining the control function of the system [pp.69-74].

Razzaque's (1996) discussion contains the General System Theory (GST) i.e., various conceptual aspects of system formulations and explored the problems of adopting GST in marketing. The GST is a powerful paradigm for studying marketing [pp.9-40].

Chapter IV

Methodology of The Study

4. Introduction

The study of MIS may be done in several ways. Considering the context of banks and financial institutions in Bangladesh, the exploratory case study has been conducted, in the first phase. In the second phase, the main focus has been the MIS performance and executives' attitude towards CBMIS by analytical survey approach. An understanding of factors of MIS performance and executives' attitude towards CBMIS can contribute as background in the development of the MIS theory. This chapter contain the methodology of exploratory study and that of Survey.

4.1. Methodology of The Exploratory Study

The first phase of the study was conducted through an exploratory approach to achieve the first objective (see Statement of Objectives). Exploratory research work were also used to find various possibilities for forming the base for second phase of research especially, to find new lines of inquiry, to determine the relevance of data to be collected, to point-out issues to resolve the problems etc. There had been no in-depth previous study so far about management information system in banks and financial institutions in Bangladesh from where idea could be generated. Some articles in local journals gave few indications on the problematic situation of MIS in banks

and financial institutions. But the coverage, depth and rigor applied in writing those articles were not adequate. Under this situation it was neither possible to understand what is there in MIS in banks and financial institutions nor how MIS was functioning. Therefore, it was necessary to explore the MIS status and to understand the situation more intensively. It was urgently felt to identify the contents, variables, and issues of the MIS. Thus to unearth the present status of MIS, an in-depth qualitative exploratory study was accepted to be the best action to initiate the research. Methods and procedures adopted in the exploratory study has been elaborated in the following sections.

4.1.1. Sample

The first phase of study intended to cover all scheduled commercial banks and financial institutions. But some organizations did not respond positively. The exploratory study was conducted on the basis of convenience and relevance. The organizations covered in the exploratory study has been presented in table # 4.1.1.

Table # 4.1.1
Organizations Covered in Exploratory Study

Group of banks	Total banks and FIs *	Number Banks and FIs covered	Individual Banks and FIs covered
NCBs	4	4	AB, JB, SB, RB
PCBs	14	9	PBL, UBL, UCBL, NBL, CBL, ABBL, EBL, ABBBL, IBBL
SPBs	4	4	BASIC, BKB, BSB, GB
FBBs	9	Nil	Nil
Total	31	17	

*Source: Scheduled banks statistics, Statistics Department, Bangladesh Bank, September-December, 1995.

From each of the seventeen banks and financial institutions, the following five departments were selected for exploratory study (Table#4.1.2):

Table # 4.1.2

Departments Selected For Exploratory Study

Sl.	Name of Departments
01.	Management Information Service Department (MISD), Computer Department (CD), and Electronic Data Processing (EDP) Unit.
02.	Research, Planning, and Statistics Department
03.	Central Accounts Department (CAD)
04.	Human Resources Department (HRD)
05.	Financial Sector Reform Project (FSRP)

In the context of banking in Bangladesh, these departments have linkage with MIS and it has been found that these are considered as core of MIS. The selected departments, divisions, units either traditionally are engaged in manual data processing, manual record keeping, information handling, and presentation of reports to management and external agencies or are engaged in computer based MIS services. Others departments e.g. General Banking, Loan Operation, Establishment, Public Relation, International Division etc. are feeders and or users. The Human Resources Department (HRD) was inspected to collect some relevant documents. The study, however, was not limited to these departments only, whenever any reference was made to a particular unit or executive which could in some way be involved on the subject and practice was also approached.

4.1.2. Procedure

The Chairman, Department of Accounting, University of Dhaka had issued a letter to chief executive officers of all the banks and financial institutions requesting to help the researcher. The banks who had granted a letter of permission were considered for the study.

Prior to the start of the exploratory study, available local and foreign literature were consulted, and instruments prepared. The instruments were reviewed by academics. The Chief Executive Officers (CEO) also got the copies of various tools used for exploratory study. After getting the formal permission, the exploratory study began. The first phase of the study was unstructured to some extent.

The exploratory study covered a period of about three and a half months to move around different departments of seventeen banks and financial institutions. A wide range of discussion and interviews were made with the executives of different departments. The discussion points were immediately written. Various documents such as manual, hand book, instruction book, statements, circular, research papers, memos, reports and forms were collected. Then the formal observation schedules were handed over to the interviewees (APPENDIX#4.1.1 & APPENDIX#4.1.2). The schedules were explained to the interviewees.

The researcher observed the culture, dealing mode, organizational settings, organizational communication, mode of

information exchange, information processing, presentation, mode of information use from different sources etc. There was enough scope to observe during the exploratory study, moving around, meeting formally and informally with the executives and having discussion with them.

In addition to the instruments and techniques mentioned above, many other questions were raised during discussion. The subjects covered were mostly: contents of MIS, components of MIS, personnel involved in doing MIS work, channels involved, input/output, and problems of the MIS etc.

4.1.3. Search for MIS Structure

The MIS structure means diverse elements which make up the administrative fabric of the MIS and includes functional units, systems, procedures, process, tasks, media, internal communication, and resources. Attempts were made to uncover the structure of the MIS in the following ways:

- (1) Searching management related papers such as organizational chart, executives' job description, executives' power, executives' authority etc.
- (2) Searching the procedure, manual, hand book, forms, memos, circulars, and tools in use. Collecting MIS manual or performance planning manual or relevant forms, guidelines where these were supplied.
- (3) Searching for the MIS committee, MIS plan, Policy, Procedure

of Information System project selection etc.

- (4) Searching for data processing and data handling units and their objectives, establishment, designation of unit head, Number of personnel, information personnel etc.
- (5) Identifying the sources of information.
- (6) Identifying the information storage and processing activities in-terms of media, channel and technology.
- (7) Identifying the reports produced in-terms of volume, types, contents, users and frequency.
- (8) Identifying the computer based MIS activities in-terms of MIS application in use, information system coverage by CBMIS.
- (9) Identifying the computer use in-terms of location, Network, package, type of computer, data elements covered.
- (10) Open discussion with executives about the MIS practices in banks and financial institutions. This was basically unstructured discussion.

4.1.4. Data collection tools and Instruments

The following instruments were used in the exploratory study:

- (1) Observation Schedule-A: This consists of six parts such as Information Gathering from Internal Sources (Part I), Information Gathering from External Sources (Part II), Information Output for Internal Management (Part III),

Information Output for External Agencies (Part IV), Information Processing Tools Used (Part V), and Media of Information Storage (Part VI) (see APPENDIX#4.1.1).

- (2) Observation Schedule-B: This consists of ten items issues such as Establishment of CD, EDP & MISD (Item 1), Head of CD, EDP & MISD (Item 2), Personnel in CD & EDP (Item 3), Information Personnel in the Organization (Item 4), Procedure of IS Project Selection (Item 5), Business Units Computerized (Item 6), Network (Item 7), Type & Number of Computers installed (Item 8), Objectives of CD & EDP (Item 9), and Areas computerized (Item 10) (see APPENDIX#4.1.2).

4.1.5 Data Presentation

The management related papers, procedure manual, hand book, forms, memos, circular etc. have been reviewed and presented in summary form in sections 5.1 to 5.3 of Chapter V. The data collected through Schedule-A have been presented in sections 5.4.1 to 5.4.6, 5.5.2 & 5.5.3. Data collected through Schedule-B have been presented in sections 5.5.1, & 5.6.1 to 5.6.9.

A separate working sheet for each aspect of inquiry was prepared through extraction of data from the collected materials. The work sheets were labeled with separate heading according to the aspect of inquiry. From the work-sheet, the data were condensed and presented head wise in separate sheet for presentation and analysis. The reports, comments collected and

recorded after meetings were organized head wise for analysis.

Information Storage: For collecting data about the media of information storage, the observation schedule-A (Part VI) was used. The data about information storage were collected from only two departments i.e. CAD and MISD/RSD. The figures for each item of all banks have been summed and averaged, and tabulated individually on a work sheet. These were then grouped under NCBs, PCBs, SPBs and average for all banks. For analysis, only one figure for group of banks and overall average has been presented.

Computation of Tools Used in a Quarter: Also to collect data about tools used in information processing in different departments of banks, the observation schedule-A (Part-V) was used. The number of times the tools used in a day, week and month were converted to number of times these were used in a quarter (through multiplying by 90 days, 12 weeks, and 3 months respectively). Then the average number of times for each bank has been derived. From the average figures for each bank, the average for NCBs, PCBs, SPBs and overall averages were derived. The number of times tools were used in a quarter have been reported in descending order.

4.2. Methodology of The Survey Study

The conceptualization process involved survey of literature on management information system, information system, management, accounting, computer, database management system, etc. This was

followed by discussions with academics and bank executives; and, collection of data, documents from banks and financial institutions.

The first phase of the study helped understanding of the nature of MIS in banks and financial institutions. In the second phase of the study, the method of inquiry has been the survey of sample. The survey instrument was a questionnaire designed to explore data to measure MIS performance and executives' attitude towards computer based MIS. The perceived conceptual attitude of executives is the basis of both the measures.

The perceived conceptual attitude of executives towards MIS performance has been measured with the help of two constructs. These are Users' Information Satisfaction (UIS) and Preparers' Facilities Satisfaction (PFS). The MIS performance has been considered as the function of these two constructs i.e. MIS performance = f (UIS, PFS).

The executives attitude towards CBMIS (EAMIS) has been designed to explore the beliefs, desire, liking and disliking about computerized management information system. It reflects the extent of executives' perceived favorable /unfavorable attitude towards CBMIS.

A single, un-repeated cross sectional survey has been designed to collect data from the sample. The executives were asked to express the extent of their beliefs, desire, liking, disliking in favor of or against each item.

A planned collection of data through a questionnaire has been used. In addition to the computation of constructs, the use of questionnaire has also been to look at various attitudinal aspect of MIS in a general way. The items included in the questionnaire originated from broader areas relevant to our study. Due consideration was given to the following factors: (1) limited accessibility of records in banks and financial institutions, and (2) academic objectives of the researcher.

The survey using questionnaire has been expected to generate the results needed to describe the major phenomena such as: the MIS performance and the executives' attitude towards computer based MIS. In order to permit systematic comparison of the factors, sub-constructs and constructs derived from survey, the analysis has been made in-respect of various independent criteria variables. These are followed by inference, explanation and conclusion. In the following sections, the sampling, independent criteria variables, scale construction, explanation of terms, questionnaire, data collection procedure and hypotheses are discussed.

4.2.1. Sampling

The stratified (proportional) random sampling method was used in the survey study. The emphasis has been most on to representativeness of sample, reliability and validity of the scales and findings.

4.2.1.1. Definition of Population

The executives and officers at head offices of twenty banks and financial institutions and five foreign bank branches situated at Dhaka are the population of the study. The status of officers and executives from lowest level to highest level has been Officers, Senior Officers, Principal Officers, Senior Principal Officers, Assistant General Managers, Deputy General Managers, General Managers, Deputy Managing Directors and Managing Directors or of equivalent status. The executives were selected from different departments. This was to cover all functional management.

4.2.1.2. Sampling Frame

A sampling frame (source list) was prepared. All officers and executives were included in the list, irrespective of their age, sex, experience, education, designation etc. The size of population according to the group of banks and levels of management has been shown in the Table # 4.2.1 in the following page.

Table # 4.2.1

Distribution of Executives by Group of Banks and Levels of Management to Show Population Size (at Head Office)

Group of Banks	Levels of Management				Total
	Top	Middle (Upper)	Middle (Lower)	Bottom	
NCBs	34	408	1550	1928	3920
DNPCBs	11	104	268	177	560
IPCBS	45	197	317	386	945
SPBs	26	186	438	668	1318
FBBs	NA	NA	NA	NA	NA
Total:	116	895	2573	3159	6743

Note: Please see Management Levels section of this chapter.

4.2.1.3. Sample Size:

The aspect of representativeness has been considered while determining the size of the sample. The approach of precision of estimation was followed through a logical process. The sample size for survey has been ascertained by the following formula:

$$n = (z\sigma/e)^2 \quad [\text{Guilford and Fruchter 1978, p.183}]$$

Where,

n = Required sample size

z = Normal curve deviate corresponding to alpha that is derived from normal curve table at 95% confidence level which is 1.96 at 95% CI

σ = Standard deviation (SD) of the population estimated in test retest phase. [Guilford and Fruchter 1978, p.127]

e = Standard error (SE of mean, Precision)

In the test-one and test-two processes, we derived SE of

Mean and Standard Deviation (SD) of each primary factor. The different primary factors showed different SE of mean and SD ranging from 0.07 to 0.23 and 0.50 to 1.48 respectively. In the retest phase, the most occurring SE of mean was .12 ($e=0.12$) and most occurring SD was 1.00 ($\sigma=1.00$). The confidence level was determined at 95%. So, in two tail test the table value of z is 1.96.

The different combination of σ and e produced different sample size ranging from 180 to 764.

[$\sigma=1.10$, $e=.16$, $n=180$; $\sigma=0.99$, $e=.14$, $n=192$; $\sigma=0.87$, $e=.12$, $n=202$; $\sigma=0.94$, $e=.13$, $n=200$; $\sigma=0.58$, $e=.08$, $n=168$; $\sigma=1.10$, $e=.15$, $n=210$; $\sigma=1.20$, $e=.12$, $n=384$; $\sigma=1.41$, $e=.10$, $n=764$; $\sigma=1.41$, $e=.12$, $n=530$; $\sigma=1.41$, $e=.13$, $n=451$; $\sigma=1.41$, $e=.15$, $n=339$; $\sigma=1.00$, $e=.10$, $n=384$; $\sigma=1.00$, $e=.12$, $n=267$]

After consultation with the experts in the relevant area, a SE mean (e) of 0.12 and SD of 1.00 were finally settled for determining the sample size. Therefore,

$$\begin{aligned}
 n &= (z\sigma/e)^2 \\
 &= ((1.96*1.0)/0.12)^2 \\
 &= 266.77 \\
 &= 267
 \end{aligned}$$

4.2.1.4. Selection of Respondents

The sample size of each organization and at each level of management were determined from the source list. In determining the sample size of each organization and management level, the steps followed were: (1) calculation of number of respondents for each organization, which has been done by the following formula:

$$\frac{\text{Total officers and executives of an organization}}{\text{Total officers and executives of all organizations}} \times (\text{Sample size})$$

(2) number of respondents for each management level for an organization which has been calculated proportionately by the following formula:

$$\frac{\text{Size of population for each level in an organization}}{\text{Size of population of all levels in an organization}} \times (\text{Sample of organization})$$

The two way cross stratification i.e. organizations and levels of management, has ensured that the samples were well spread out among the institutions and levels of management. Sample size according to the group of banks and levels of management has been presented in the Table#4.2.2 in next page.

Table # 4.2.2

Number of Officers and Executives by Group of Banks and Levels of Management as Samples

Group of Banks	Levels of Management				Total
	Top	Middle (Upper)	Middle (Lower)	Bottom	
NCBs	8	14	67	51	140
DNPCBs	-	7	9	4	20
IPCBs	4	9	22	8	43
SPBs	2	10	21	14	47
FBBs	-	2	7	8	17
Total:	14	42	126	85	267

The serial number of all 6743 officers and executives with the name of organizations and designations were created in the SPSS data file as cases. In the SPSS, "Data - Select Cases for Random Sample" were run for each organization and each management level in-order to select the executives stratified randomly. The selected executives were marked on source list. A separate list was prepared containing name, designation, organization of respondents. The sample list was used for distribution of questionnaire. Some respondents either refused to respond or were not available. These were replaced by a fresh selection of respondents in the same way. Finally, a total number of 267 sets of questionnaire were collected.

4.2.2. Independent Criteria Variables

Analysis by independent criteria variables has been mostly a intellectual pursuit. Cheney and Fuerst (1978) had used among

others, complexity of decision makers environment, age, educational level, year of experience as independent criteria variables and information satisfaction as dependent variable. The analysis by criteria has been to distinguish precisely the derived opinion.

In this study, the criteria against which the construct has been analyzed i.e. independent criteria variables considered are group of banks, functional departments, management levels, age groups, service experiences, genders, education faculties, education levels, job characters, MIS involvement, functional management levels, computer knowledge and computer experiences. These sub categories have been discussed in the following sections.

4.2.2.1. Group of Banks

The banks and financial institutions were needed to be arranged into some broad homogeneous group so as to make the indices comparable both within the group and between the groups. Accordingly all the organizations were classified according to their nature of activity and ownership i.e. Nationalized Commercial Banks (NCBs), Denationalized Private Commercial Banks (DNPCBs), Indigenous Private Commercial Banks (IPCBS), Specialized Banks and Financial Institutions (SPBs), and Foreign Bank Branches (FBBs). The Group of Banks are shown in the Table#4.2.3. in next page.

Table # 4.2.3

Group of Banks

Group of banks	Individual Bank and Financial Institutions	Total
NCBs	AB, JB, SB, RB	4
DNPCBs	PBL, UBL	2
IPCBs	UCBL, NBL, CBL, ABBL, EBL, ABBBL, IBBL, IFIC	8
SPBs	BASIC, BKB, BSB, GB, ICB, BSRS	6
FBBs	SC, AE, ANZ, SBI, BI	5
Total:		25

4.2.2.2. Functional Department Groups

A categorization of departments has been made on the basis of nature of function into four "Functional Department Groups" such as: (a) Operations: Industrial Credit, General Credit, General Banking, International Division, local principal office; (b) Administration: Human Resources, Audit and Inspection, Logistics-Establishment, executives in charge of several functional areas or whole organization such as Managing Director, Deputy Managing Director, General manager etc; (c) Finance and Accounts: Finance Department, Central Accounts Department, Loan Accounts Department; (d) Development: Management Information, Data Processing, Methods, Systems, Statistics, Planning, Research, Economics etc.

4.2.2.3. Management Levels

The designations are the formal status of the executives in the organizational hierarchy. The designations in practice (in

NCBs, or equivalent designation in other banks and financial institutions) have been taken. The officers and executives were grouped into four management levels as follows: (1) Top Management: Managing Director, Deputy Managing Director, and General Manager, (2) Middle Upper: Deputy General Manager, Assistant General Manager, (3) Middle Lower: Senior Principal Officer, Principal Officer, (4) Bottom: Senior Officer, Officer. This was done according to their designation indicated in the questionnaire.

4.2.2.4. Age Groups, Experience Levels, and Gender

Respondents were classified into six age groups i.e. "Below 30", "30-35", "35-40", "40-45", "45-50", "50 and Above" years of age.

The Experience levels were operationalized by measuring years of service experience. The executives were categorized into six experience groups such as "Less than 5", "5-10", "10-15", "15-20", "20-25", "25 and Above" years of services experience levels.

The respondents were again categorized as Male and Female.

4.2.2.5. Education Faculty and Education Levels

Executives' educational faculty i.e. main educational discipline considered are "Arts" (including social sciences, Law), "Commerce/Business", and "Science" (including Engineering,

Agricultural Sciences). In case of multi disciplines, the last education faculty is considered e.g. B.Sc. & MBA is considered as Commerce/ Business.

Education levels were measured in terms of years of schooling. To operationalize the education levels, executives' academic education were assigned values in terms of years of schooling such as:

<u>Education Levels</u>	<u>Value Assigned</u>
SSC	10
HSC	12
Graduate (Pass)	14
Graduate (Hons.)	15
Graduate Engineer	16
Master	16
MS & M.Phil	18
Ph.D.	21

Additional academic, professional courses were assigned value and added to their basic educational weights such as diploma in banking were given a weight of one year; ACA, FCA, ACMA, and FCMA were given a weight of additional three years. The executives were categorized into six educational levels groups as "Less than 12", "14", "15", "16", "18", "19 and Above" years of schooling.

4.2.2.6. Job Characters

Some job requires more skill and entails greater responsibility. The amount of skill and ability needed differs widely among different jobs [Dale 1978, p.297]. Job factors or

characteristics are generally used in evaluating jobs. In the job evaluation process, some form of value is placed on jobs in-order to determine their relative worth [Bottomley, 1983, p.85]. The available methods of job evaluation are (1) Non-Analytical: job ranking; job classification; paired comparison. (2) Analytical: points rating. (3) New methods: guide chart profiles; the profile; direct consensus. (4) Other methods: time span of discretion; decision banding; analytical grading [Bottomley, 1983, p.76-86]. Motivation theories emphasize on needs, expectancies and situational factors such as job characteristics [Robertson and Cooper, 1983, p.86]. Dunnette (1963) suggests multiple criteria for job evaluation [Robertson and Cooper (1983), p.113]. Management scientists for the purpose of job evaluation try to find generic task characteristics attached with each job [Doulton and Hay, 1969; Robertson and Cooper, 1983; Bottomley, 1983].

In this study, the job character of executives were measured in-order to know the varieties of elements involved in the present assigned jobs and to show relationship between extent of presence of each job character with factors, sub-constructs and constructs. The extent of involvement in each job character was measured in five point scale such as Highest Involvement, High Involvement, Medium Involvement, Low Involvement, and Lowest Involvement were assigned value of 5, 4, 3, 2, and 1 respectively.

is that each job requires different information characteristics, reports quality and facilities. Job characters may also have relation with attitude. The purpose of determining extent of involvement in job characters was to identify the extent of his/her relation with information system.

From the pre-test questionnaire, four job characters were dropped to rearrange final questionnaire. The excluded job characters showed moderate correlation with other job characters. This was done to make a short list of job characters and selecting only distinct job characters.

The job characters dropped were accountable, formulatory, judgement and predictive. Accountable showed correlation coefficient of $r=0.5790$ ($p=0.000$), $r=0.1995$ ($p=0.169$), $r=0.2191$ ($p=0.130$), and $r=0.1358$ ($p=0.352$) with implement, negotiating, staffing and uncertainty respectively. Formulatory shown correlation coefficient $r=0.4711$ ($p=0.001$), and $r=0.3036$ ($p=0.034$) with analytical and uncertainty respectively. Judgement shown correlation coefficient $r=0.3602$ ($p=0.011$), and $r=0.2621$ ($p=0.069$) with analytical and uncertainty respectively. Predictive shown correlation coefficient $r=0.5092$ ($p=0.000$), and $r=0.3785$ ($p=0.007$) with analytical and negotiating respectively. The inter correlation of job characters derived in re-test phase are provided in APPENDIX# 4.2.1.

4.2.2.7. MIS involvement

Information handling has been seen as a separate, specialized work [Anthony, 1965]. The relationship of executives participation in the computer application with successful system implementation has been reported by many researchers [Land, 1987; Davies, 1987]. In general, high involvement of executives has a positive relation with successful system development, implementation and use [Davis and Olson, 1985, p.595].

The socio-technical approach of system analysis and design grew in the Tavistock Institute for Behavioral Research in 1950s. The assumption of socio-technical approach is that successful system implementation and functioning need to consider human needs such as job satisfaction. Mumford found users' participation is the best approach in the system development process [Curtis, 1989, p.519].

In this study, MIS involvement means involvement as preparer, user or both preparer & user of reports. Reports mean documents that are prepared and used by executives for exchange of business data and decision making. The reports are used to inform events, business transactions, forecast of business data, analysis, description, judgment or any combination of the above. The reports may refer statistical reports, research reports, management accounting reports, personnel reports, memo, letter, list, notes etc. These are used by internal management as well as are sent to regulatory agencies. In organizations, three groups

of executives may be found. Preparers of reports: executives responsible mostly to keep records and prepare reports. Information management and preparation of reports is their primary job. Users of reports: executives who primarily use reports as end-users, decision makers. Signing, sanctioning, approving are their basic job. Their job rarely require to prepare reports. At best, they pursue, instruct, advice others to prepare reports. Both Preparers and Users of reports: executives use reports prepared by others and at the same time have to prepare reports to be used by others.

4.2.2.8. Functional Management Levels

In this study, management functions /activities have been classified into three functional levels i.e. operational, management control, and strategic planning (As per classification supported by Anthony, 1965). The extent of executives involvement in each functional level varies. The extent of involvement of executives in each functional level was measured in five point interval scale such as Highest Involvement, High Involvement, Medium Involvement, Low Involvement, and Lowest Involvement, the values assigned were 5, 4, 3, 2, and 1 respectively. Operational level of management was defined as: Day-to-day operation; customer service; recording transactions; regular report preparation; inspection; routine job; short term planning & control etc. Management Control was defined as: Preparation and

monitoring of budgets; comparing actual results and budgets; classify, summarize events; exception reports preparation; Acquisition of resources; Developing operational policies & objectives. Strategic Planning was defined as: Setting long term objectives and goals; evolving strategies and policies; review of policies; planning; Large scale investment; ^{and} appointing staffs.

4.2.2.9. Knowledge of and Experience With Computer

The computer knowledge and experience of executives were measured by five point interval scale such as Expert, Almost Expert, Moderate, Lower, and Novice which were given values of 5, 4, 3, 2 and 1 respectively.

4.2.3. Scale Construction

The multiple items Likert scale has been applied by many researchers in resolving the similar type of problems. Moan (1973) in the study of the impact of computer on management practices and style had applied five point scale to rate the organizations [p.17]. Adams and Swanson (1976) in the study of information processing behavior (information sought and processed) asked the managers to rate on a scale from one to six to express respondents view of the importance of several job-related factors [p.105]. Lucas, Jr. (1978) to evaluate the implementation of a computer based system applied a seven point (agree - disagree) scale. The measured satisfaction was taken as

the indicator of successful implementation of a computer based system and it was found that measures of users satisfaction are more meaningful criteria for system success [p.71-73]. Zmud (1978) had used the semantic differential technique in determining subjects' evaluation of MIS report formats in-terms of quality of information [p.19.]. Narasimhan (1978) had applied dimensionality of information concept (timeliness, accuracy and responsiveness) in determining information system performance [p.143]. Robey (1978) had applied ten point scale to assess users attitudes toward the MIS [p.171]. Cheney and Fuerst (1978) had used the concepts of information satisfaction and information utilization in the context of decision making [p.173]. Mansour and Watson (1980) in the study of the determinants of computer based information system performance had used the ordinal scale - five ordinal answers [p.524]. O' Reilly, III (1980) in ascertaining decision makers' satisfaction with communication system had used a multiple-scale technique where respondents were asked to respond on a seven point scale [p.689]. Ghose et al. (1981) in measuring the satisfaction of bank executives, depositors and borrowers had used the five point scale [p.107-119]. Cheney and Dickson (1982) in the study of users information satisfaction and job satisfaction had focused on several attributes including user perceptions of report format quality, reliability of information, ease of use, and the value of information where the respondents were asked to respond on a

seven point scale [p.173]. O'Reilly, III (1982) in the study of decision makers' use of information sources (quality and accessibility of information) had applied seven point scales [p.760]. Khaleque (1984) reported that 'The Brayfield-Rothe Scale' for measuring job satisfaction incorporate multiple items and five point (agree - disagree) scale [p.111]. Ito and Peterson (1986) in the study of task difficulty and information processing had used multiple items where the items were measured on seven point Likert scale [p.143]. Kim (1988) in the study of the information system performance had used user information satisfaction (UIS) as a surrogate measure. The UIS were measured in-terms of seven attributes of information quality such as accuracy, amount of information, format, understandability, usefulness for identifying and resolving problems, and usefulness for selecting among alternatives. The respondents were asked to respond on a seven point scale with each item as a description of each information attribute (Cronbach alpha coefficient was 0.87) [p.479]. Taggart and Valenzi (1990) in the context of assessing human information processing style had applied six point Likert scale [p.162]. Leonard-Barton and Sinha (1993) in the study of user satisfaction with the newly developed software based information system had used Likert scale [p.1129]. Thomas (1993) in the study of information processing in strategic alliance building had used a multi-item scale survey questionnaire where variables were measured in seven point Likert

scale [p.785]. Molloy and Schwenk (1995) had used user satisfaction with information technology system as a measure of users' performance where items were measured in a five point scale [p.289].

In this study, three scales were constructed i.e. UIS scale, PFS scale, and EAMIS scale. The five point Likert's "Summated Rating Scale" technique has been followed in constructing the scales. Fourteen criteria suggested by Want (1932), Thurstone and Chave (1929), Likert (1932), Bird (1940), and Edwards and Kilpatrick (1942) which have been summarized by Bhatnagar (1981, pp.83-84) were applied in examining the items. To improve the validity and reliability of the scales, sufficient precautionary measures were taken [DeVellis 1991, Fowler 1995, Schuman and Presser 1996]. To test the validity of the scales the known group test, inter-item correlation coefficient, correlation coefficient for independent criteria variables, and dependent (constructs) variables were done. To test the reliability of the scales several techniques such as Cronbach's alpha, split half, t-test for paired samples (item wise test retest), t-test for paired samples (composite) were carried out. Moreover, item analysis of Guilford and Fruchter (1978, p.457) was carried out. The items were included in the final scale after calculating critical ratio "t" value of each item (high low group). The methods of scale construction along with the variables of scales are discussed in the following sections.

4.2.3.1. MIS Performance Scale

The concept of MIS performance is relatively new. There are several studies available on MIS performance measurement [Lucas, Jr. (1978); Zmud (1978); Narasimhan (1978); Mansour and Watson (1980); Kim (1988); Leonard-Barton and Sinha (1993); Molloy and Schwnk (1995)]. Mansour and Watson 1980 viewed Information Systems as a sum of multiple factors. In determining CBIS performance, the model they presented holds that CBIS performance is a function of (1) Computer hardware and Software, (2) Behavioral, (3) Structural, and (4) Environmental variables. This model is broad enough and fine in case of computerized settings. But, may not be workable in the context of information system of Banks and Financial Institutions in Bangladesh where information system is basically manual, haphazard and in transition phase towards computerization. Thierauf (1983) presents a questionnaire approach of evaluation of information systems. The questionnaire was drawn following the guidelines of the AICPA (American Institute of Certified Public Accountants). This questionnaire approach is also not applicable because of organizational settings, manual information handling etc.

Our interest is to measure the performance of existing information system on organizational effectiveness. The available methods of measuring system value are (1) significant task reference, (2) willingness to pay, (3) system usage, and (4) user information satisfaction. The UIS method has been applied by many

researchers where users are requested to express satisfaction on different aspects of information system, such as timeliness, support, accuracy, formats etc. [Davis and Olson 1985, p.614].

The measurement of information satisfaction is a substitute /surrogate measure of the utility of information [Davis and Olson 1985, p.215]. This is to reflect the extent of satisfaction of decision makers from the output of information system. The information satisfaction concept was originally provided by Cyert and March (1963, p.126) [also see Davis and Olson 1985, p.215]. Subsequently, many researchers have followed this concept in measuring utility of information and information system value. The conclusion is that, if the quality of information increases, the decision makers' satisfaction with information is reinforced. This conclusion has encouraged the adoption of information satisfaction as a substitute measure of information system evaluation. It is important to note that the information quality may not be directly measured. Rather, users' perception of information quality i.e. perceived information satisfaction of decision makers may be applied as substitute measure of information system performance.

Whatever literature we found on MIS performance measurement was basically relating to performance of information-technology-dependent MIS. Some measurement techniques were needed to cope with the context of MIS in banks and financial institutions operating in Bangladesh. Since no ready scale was found, it was

required to develop an objective scale to measure the MIS performance for this study.

It has already been elaborated that for our study MIS performance has been considered as the function of users' information satisfaction and preparers' facilities satisfaction. The MIS performance is viewed from two angles. One: Output concept i.e. satisfaction of users in using the reports and information systems. Two: Input concept i.e. facilities to the preparers' in preparing the reports. In practice, the same person may be involved in these two activities. As an user, an executive expects maximum satisfaction in using the reports. As a preparer, an executive needs maximum physical facilities in preparing the reports. So, two parts of MIS performance i.e. the Report Users' Information Satisfaction (UIS) and the Report Preparers' Facilities Satisfaction (PFS) are approached separately.

4.2.3.1.1. Users' Information Satisfaction Scale [UIS]

In output concept, the surrogate measure is user information satisfaction. The satisfaction generally refers to the state of being satisfied or the fulfillment of a desire while using the reports. The satisfaction or fulfillment of desire may be obtained when the rational quality of information characteristics are held within the reports. Besides, the report quality and the information systems quality characteristics also contribute to

information satisfaction. The information system quality characteristics, report quality and attributes of information pertaining to the reports act as a source of such fulfillment. Information satisfaction may be obtained from other sources such as meeting, discussion, telephone conversation etc. which are not considered here. The reports may refer to reports of various types such as: Regular reports, Irregular reports, internal and external reports, Memos, Letters, Statistical Reports, Research reports, Management Accounting Reports, Cost benefits analysis reports, analytical and projected reports etc. The information systems here means official formal information systems. The quality of information, reports and information system aid to develop the users mental construct. Again, users mental construct about the quality of information and information systems are the basis of satisfaction. The executives' attitude towards the information quality of the reports and information systems are used to reflect their information satisfaction. To what extent the information attributes of reports in practice and information system quality characteristics are able to satisfy the users information needs relative to their want, desire etc. are intended to be measured. Therefore, the subjective perception of the executives about the quality of information belonging to reports and quality of information systems relative to their information quality needs and information system quality needs is the user information satisfaction (UIS).

In this study, the report users' information satisfaction has been measured mostly on the same line as followed by previous researchers but using more items on dimensionality of information and information system. The UIS is a part measure of MIS performance. Another part measure of MIS performance is the PFS which is described elsewhere.

To measure the Users' Information Satisfaction (UIS), the domain of information attributes, report quality and IS quality were drawn containing a large number of items. A list of large number of items was prepared for inclusion in the questionnaire. Fourteen criteria suggested by Edwards were applied in examining the items (Bhatnagar 1981, p.84). These items were reviewed by reputed academics in the relevant field before the scales were put to test. In the final questionnaire, thirty items were taken. The variables of information satisfaction are the primary elements of information pertaining to the reports. The specific sub-constructs and elements of information satisfaction are:

- (1) Information Quality: Timeliness, Currency, Frequency, Accuracy, Completeness, Relevance, Conciseness, Neutrality, Processed sufficiently.
- (2) Report quality: Presentation, Measuring performance, Clarity, Volume, Order, Description, Quantitative, Graphic, Meaningful, Title.
- (3) IS quality: Projected, Time context, Space context, Add value, Improve decision, Regularity of periodic report,

Special reports are in reasonable time, Clear context, Feedback, Feedforward, Critical Success Factor.

4.2.3.1.2. Preparers' Facilities Satisfaction Scale [PFS]

In the input concept, the surrogate measure is the report preparers' facilities Satisfaction (PFS). The facilities refer to physical, procedural, accessibility, keeping and environmental facilities available and obtainable from material things, organizational, behavioral, and environmental settings. The facilities are both apparent and non-visible but conceivable, perceptible to the senses.

To measure the Preparers' Facilities Satisfaction (PFS), the domain of facilities that are available and may be used in handling information in banks and financial institutions in Bangladesh were identified through observation, discussion with executives and reviewing the relevant literature. A list of items were prepared. The report preparers' facilities Satisfaction indicators are availability of physical tools use, rules and procedures, accessibility of information, record keeping and environmental. Therefore, the subjective perception of the executives about these facilities that were available is the Preparers' Facilities Satisfaction (PFS). The specific sub constructs and elements of facilities are:

- (1) Physical: Computer Facilities, Computer Use, Calculator, Typewriter, Photocopier.

- (2) Procedural: Manual, Circular, Forms pre specified, Forms adequate to need, Forms adequate for data and narration.
- (3) Accessibility: Supporting documents, Colleagues, External sources, Computer Files.
- (4) Keeping: Recording systematically in ledger, Indexed, Date wise, Subject wise, Organization of documents, Organization of ledger.
- (5) Environmental: Disturbance by colleague, Disturbance by crowded, Computer operators, Assistance from information personnel, Mail, and Logistics.

4.2.3.2. Executives' Attitude Towards CBMIS Scale [EAMIS]

The computer based Management Information System revolves around the diffusion of information technology and broader information system in-order to improve the operational capability and aid in decision making. The executives' attitude towards CBMIS can be judged against their believes, desire, supports, liking, and disliking.

The concept of computer based MIS is new in banks and financial institutions operating in Bangladesh. There has been no study on this topic. So, the study of executives' attitude towards CBMIS (EAMIS) requires to develop a new scale. The EAMIS scale has been developed for this purpose. The specific sub-constructs and primary elements of attitude taken are:

- (1) Information, IS characteristics: Timely information, Saves time, Creates learning environment, Creates efficient management, Feedback, Improves operations, Improves management control, Improves strategic planning, Ensures IS quality, and Speedy processing.
- (2) Facilities: Software Model, Absence of data protection rules, Direct interaction with computer, Systematic record keeping, Traditional record keeping is manual, Fail to hold qualitative data, Organized data storage, Shortage of programmer and system analyst.
- (3) Psychological, Behavioral, Cultural: Lack of faith, Threat to thought process, Executives' idleness, Dominance of technical personnel, Personnel are conversant with manual data handling, and Threat to organizational culture.
- (4) Communication, Structure, and Cost: Threat to organizational communication, Isolation of personnel, Reduction of personnel, and Higher cost involvement.

There are both favorable and unfavorable items. The favorable attitude towards manual MIS is generally treated as unfavorable attitude towards CBMIS. Again, there are certain aspects which may directly show unfavorable attitude towards CBMIS. Here, an assumption is made that executives in general desire to have MIS. But they may either have liking, confidence in manual MIS (manual reporting system) or a desire to have modern technology based CBMIS. The various relevant issues have

brought in the questionnaire to reflect executives' attitude towards CBMIS. The Executives Attitude (EAMIS) is a composite measure of executives tendency towards or against computer based management information system. Therefore, the judgement, beliefs of the executives in-favor of or against issues relating to computer based MIS and or manual MIS is the executives' attitude towards computer based MIS (EAMIS).

Twenty eight items have been selected in such a manner that the respondents' selection of a number on the response options scale against an item will show the degree of favorable or unfavorable attitude towards CBMIS. The theme of the items were collected through literature survey keeping in mind the context of MIS in banks and financial institutions operating in Bangladesh. Each item reflects a different aspect of MIS. This is to bring into light the degree of respondents' psychological state such as beliefs, desires, supports, liking, disliking about computer based MIS.

4.2.3.3. Item Selection

It has been discussed earlier that indicators (factors) of the scales were generated mostly through literature survey and exploratory study. The factors were stated in sentences. These were reviewed by reputed academics. Then, after modifications and improvements, the preliminary questionnaire was prepared and again reviewed. The preliminary questionnaire was pre-tested

twice. The results of the test-retest referred earlier were applied in selecting items.

Fifty executives (for testing and validating the scale) were requested to express their opinion. Forty nine executives responded in test retest phase. The designation wise number of forty nine executives selected for item selection, testing reliability and validity of the scales has been shown in the table # 4.2.4.

Table # 4.2.4

Designation Wise Executives in Test Re-test Phase

Designation	Number of respondents	Designation wise Percentage	Management Level and Percentage	%
MD DMD GM	1	2.00%	Top Management	2%
DGM AGM	4 9	12.50% 18.75%	Middle Upper	27.08%
SPO/SM PO/MANAGER	9 14	18.75% 29.16%	Middle Lower	47.91%
SO OFFICER	11	22.91%	Bottom	22.91%
Total	49	100%		100%

The same sample was used in re-test phase with a time gap of two months. As the items in the UIS scale and PFS scale are all positive (favorable to UIS & PFS), Strongly Agree, Agree, Undecided, Disagree, and Strongly Disagree were assigned score value of 5, 4, 3, 2, & 1 respectively. The highest, high, medium, low, lowest involvement were assigned score value of 5, 4, 3, 2,

& 1 respectively. Similarly, always, most of the time, sometime, poorly and rarely were assigned score value of 5, 4, 3, 2, & 1 respectively. In the Attitude (EAMIS) scale, there are favorable and unfavorable items. In this case, Strongly Agree, Agree, Undecided, Disagree, and Strongly Disagree for both favorable and unfavorable items were assigned score value of 5, 4, 3, 2, & 1 respectively. As all the items in attitude scale were given scale value in the same order, the unfavorable items were separated from favorable items at the time of analysis (Retest).

The methods applied in selecting items for UIS, PFS and EAMIS scales are the same. The items were selected through calculating critical ratio "t" value of High & Low Groups. In the calculation of "t" values by arranging executives in high & low groups, the 25% of the executives (12) with the highest scores and 25% of the executives (12) with the lowest scores were considered. The "t"-test of independent sample of high and low groups for each item of UIS, PFS, and EAMIS were done and "t" values were compared with the values from the "t" distribution table. The items were arranged in rank order based on Critical Ratio 't' values. The items that showed non-significant critical ratio "t" values were rejected. The items those showed negative inter-item correlation were also excluded from the questionnaire. The items selected for final scales with the "t" values are shown in the Appendix # 4.2.2, Appendix # 4.2.3, and Appendix # 4.2.4.

After re-test some changes have been made in primary

variables. In the test re-test phases, UIS scale holds thirty four primary variables. In final survey, one new variable has been included (Sufficiently Processed: IASPR), and five variables were dropped (Scope: IASCO, Reflects Activities: QRACT, Measurement: QIMEA, Not Overloaded: QIOVL, Proper Recording: QIREC). Thus, total primary variables in UIS scale became thirty. In the test re-test phases, PFS scale holds thirty three primary variables. In final survey three new variables have been included (Typewriter: PFTYPE, Copier: PFPCO, Computer Facilities: PFCOF), and ten variables were dropped (see list of defined variables, p.xiv). Thus, total primary variables in PFS scale became twenty six. In the test re-test phases, EAMIS scale holds forty primary variables. In final survey, variables renamed after retest were "Large Storage of Data: AFLSD" as "Organized Data Storage: AFOSD"; and "Utility Speed: AFUTS" as "Speedy Processing: AFSDP". Twelve variables were dropped (see list of defined variables, p.x). Thus, total primary variables in EAMIS scale became twenty six. The respondents' knowledge of and experiences with computer were shown as two separate factors.

4.2.3.4. Reliability of The Scales

The reliability of the scales (UIS, PFS & EAMIS) has been tested by the following methods:

(1) Internal consistency reliability: This has been done through calculating constructs and sub-constructs wise Cronbach's

alpha (Appendix # 4.2.5); Split half for group items indicating correlation between forms, Gutman split half (r_{oe}), and Spearman Brown reliability coefficient (r_{tt}) (Appendix # 4.2.6).

(2) Test retest reliability: This has been done through calculating item wise "t"-value for paired sample (test-one and test-two; Appendix # 4.2.7) and construct wise (composite) "t"-value for paired sample (test-one and test-two; Appendix # 4.2.8) along with correlation coefficient of each item and correlation coefficient of composite items. Each item was considered as a subset of a large composite. Each item yielded a distribution of scores with a mean and a standard deviation. For each construct (UIS, PFS and EAMIS) the total scores of the test equals to sum of part scores. For each construct, The total scores for each executive on the scale were derived by summing scores of the items pertaining to the construct.

To fit the model best, the regression procedure (Method Entered) were run several times by including / excluding primary internal factors. The UIS and PFS were considered as dependent variables and the primary internal factors were considered as independent variables (Appendix # 4.2.9.)

4.2.3.5. Validity of The Scales

Users information satisfaction (UIS), facilities satisfaction (PFS) and executives' attitude (EAMIS) are complicated and abstract phenomena. These constructs have been built and designed considering the banking context of Bangladesh.

Efforts have been made to ensure that the measurement of the UIS, PFS & EAMIS are valid. Careful attention has been paid in defining the construct. The questionnaire was sent to reputed academics for review and comments.

Content validity: The method of collecting items within the universe of the constructs i.e. UIS, PFS and EAMIS were carefully followed. In the UIS scale, important qualities of information, quality of reports and information systems were considered. If the quality of information elements, quality of reports and information systems increase, the satisfaction of users is presumed to increase and vice versa. Similarly, the universe of facilities and executives attitude towards MIS was drawn. Three separate lists of indicators of constructs (UIS, PFS & EAMIS) were prepared. The items to measure UIS, PFS and EAMIS were identified from literature and exploratory study. From the list of indicators, relevant items have been taken for inclusion in the scale. Selected items have been provided in Table # 1.1 & Table # 1.2. To ensure the uni-dimensionality of constructs and sub-constructs, i.e. items adhere to one topic only, statistical relationship among items (sub construct wise) were carried out. The inter-item correlation coefficient has been calculated (Appendix # 4.2.10). The items which showed negative correlation coefficient were dropped from the scales. So, efforts were made concerning item sampling adequacy through inclusion of important items reflecting content domain of the constructs.

Construct convergent validity: The UIS and PFS are measuring the same phenomenon (MIS Performance) and showed (in retest) strong correlation ($r=0.6695$, $p=0.000$, $n=48$) [Appendix # 4.2.11] [Guilford and Frucnter, 1978, p.437; DeVellis, 1991, p.47; Fowler, 1995, p.140]. This shows convergent validity of the scales.

Construct discriminant validity: The UIS does not correlate with EAMIS (favorable: $r=0.0004$, $p=0.998$; unfavorable: $r=-0.0693$, $p=0.640$) and the PFS does not correlate with EAMIS (favorable: $r=0.0868$, $p=0.558$; unfavorable: $r=-0.1674$, $p=0.255$). These show discriminant validity of the scales [Appendix # 4.2.11].

4.2.4. Questionnaire

The survey instrument contains four parts. Part-A consists of a set of questions concerning personal information such as organization, department, designation, age, experience, gender etc. of the respondents. The respondents were requested to write their personal information in blank spaces, put tick mark on boxes and circle a number on the scales. Part-B and Part-C of the questionnaire contain various items. The respondents were allowed to express their opinion on a five point Likert scale. While Part-B consists of two sets of items relating to MIS performance (UIS, PFS), Part-C consisted of a set of items about the executives attitude towards computer based MIS. Part-D contained open end questions relating to problems, resistances and

suggestions for reorganizing MIS. The objective of the open end questions are to uncover beliefs, values, judgement, notion about these issues. The issues included in these questions were MIS policy, development approach, maintenance & supervision of information system, resistance encountered in adaptation of CBMIS and initiative required to reorganize MIS. All these issues appear important in the present and future context of MIS in Bangladesh. The responses collected in the test re-test phase (in Part-D), were categorized as "Resistances" and "Suggestions". In the final questionnaire, ten resistance related items and eighteen suggestions related items were put forward. The respondents were requested to tick on "Yes-No" box to express whether they have encountered the same resistances, or they believe that the listed resistances exist. Similarly, they were requested to tick on "Yes-No" box to express whether they suggest the listed suggestions to reorganize MIS, to improve the reporting system, and management information systems or not. The Survey Study questionnaire are in Appendix # 4.2.12.

4.2.5. Data Collection Procedure

The data were collected from primary sources. The questionnaires were distributed personally to the executives. The respondents were assigned an unique identification number to keep track. All efforts were made (such as personal contact and

telephone call) to make response rate high. In most cases, an introductory conversation explaining different parts of the questionnaire and the objectives of the research were made clear. The respondents were requested to read the questionnaire carefully before responding. In general the respondents showed cooperation.

4.2.6. Nature of Data in The Survey

The data and their characteristics are given in Table#4.2.5. This is to show the statistical approach to be followed in the tests and analysis.

Table # 4.2.5
Classification of Data

Item Number	Type	Purpose	Scale of Measurement
1-3, 6-7, 15	Attributes	Organization, Department, Designation, Gender, Education Faculty, MIS Involvement	Nominal
4, 5, 8	Continuous	Age, Experience, Education level	Ratio
9-14	Continuous	Job Characters	Interval
16-18, 19-20	Continuous	Functional management levels, Computer knowledge & experience	Interval
21-50, 51-76, 77-104	Continuous	UIS, PPS, EAMIS	Interval
105-114, 115-132	Bivariate	Resistances, Suggestions	Nominal

4.2.7. Data Presentation and Analysis

Many groups of data have been assembled from multi-group population in which contrasting variables were studied. The group of banks was a separate criterion against which the factors, sub-constructs & constructs were tested. There are multiple items in

each scale. So multivariate analysis techniques seemed appropriate. The data were of one time collection of facts and responses which have been presented, analyzed and classified by independent criteria variables.

4.2.8. Hypotheses Testing

The constructs developed, used and analyzed in this study with the objective of testing hypotheses set under the conditions required the following assumptions:

- (1) The sample data are assumed to be collected from the normal population and the sample statistics assumed to reflect the characteristics of the population;
- (2) The population from which the sample data were collected had identical means and variances.

The following statistical tests have been selected considering the hypotheses and the nature of data. Hypotheses have been grouped under three main constructs i.e. "Information Satisfaction", "Facilities Satisfaction", and "Attitude". The null hypotheses have been put forward for testing. The first hypothesis of each group, has been tested by applying 'Z' test; The other hypotheses were tested by ANOVA. The test results are presented in the chapter VI titled as Findings II: MIS Performance and Executives' Attitude.

Chapter V

Findings- I: Current MIS Administration

5.1. Introduction

An elaborate discussion relating to the need of having an exploratory study, coverage and methodology thereof has been made in Chapter-IV of the thesis. This chapter presents the findings in details of that study. The exploratory study had been conducted in the month of April, May and June of 1996 by use of observation schedules (Appendix#4.1.1 & Appendix#4.1.2). The data and observations reported are of that period. Management Information System (MIS) in banks and financial institutions of Bangladesh had been manual. It had been developed mostly as a reporting system. Reports were prepared both for internal management and external agencies. Information handling job had been done by functional departments. Central Accounts Department had been the primary information handling unit. Specialized information handling units such as Management Information Service Department (MISD), Computer Department (CD) and Electronic Data Processing (EDP) are of recent origin. These information handling units have not been properly organized. Rules and procedure have not been properly developed to guide information handling. A large number of reports were collected by head office from branches which were further processed at head office. Despite a huge number of regular reports produced and disseminated, management frequently asked for ad hoc reports. Recently, banks

and financial institutions have introduced computer in the operations of some branches. At head offices, computers have been installed to compile data and word processing. The introduction of computer provided for information storage, processing, and quick retrieval. The use of computer obviously indicates the advancement of MIS in our banks and financial institutions. How far existing MIS activities are to be considered as a sub-system of management and in line with management objectives remains to be assessed.

5.2. Review of Documents, MIS Procedures

During exploratory study, manuals, instruction books, hand books, information system related records, forms and formats were collected from banks and financial institutions. These are briefly discussed in the following sections.

Government initiative to standardize information system of autonomous bodies i.e. SABRE (1995) has resulted in a number of fixed forms and formats. The system incorporates information system required by Government central agencies for budgetary and financial control, economic planning, and performance evaluation following Government policy and periodical objectives. Public sector financial institutions are required to submit the reports under SABRE formats. The manual contains the report formats.

Banking Companies Act (1991) contains various articles on the power of information publication and submission of accounts,

reports to Bangladesh Bank, and Registrar of companies and also exchange of information between banking companies (Articles 37, 38, 40, 119).

Grameen Bank Ordinance (1983) contains provision of accounts, audit and returns of the bank. Forms and Formats (1990) of Grameen Bank presents the most commonly used forms and formats but no definition of items, explanation and narration are given.

Bangladesh Bank's "SBS (1989) guidelines" has been prepared to collect and present information to be required for policy making at macro economic level. This is to assist preparers in filling up the SBS returns. The guidelines contain format of returns, definition of items, codes and explanation.

CIB-01 (1995) of Bangladesh Bank has been compiled as a guide to preparers of reporting organizations in order to collect accurate and timely information. It deals with credit information of borrowers financed by banks and non-bank financial institutions. The guidelines contain instructions, explanations, definitions, economic purpose codes, sector codes, security codes, procedure of loan classification etc.

MIS Users Hand Book-FSRP (1995) is a conceptually developed manual. It divides MIS process into three steps: data gathering, data processing, and reporting. The manual contains format to show performance of branch, region, area office, division and bank as a whole. The format contains key performance measures.

PPS-FSRP (1993) manual has been prepared to help executives

in the operations of computerized Performance Planning System. The PPS (1995) is a conceptually developed manual containing target setting, identification of work plan, analysis of the progress, and implementation of performance planning system. Important parts of the system are writing goal setting, specifying action plan, and monitoring progress. It also contains Formats, Instructions, Action Verb, Methodology and Methods of reviewing progress.

Bank Performance Statements (1992-93) of Agrani Bank has been developed and implemented by FSRP implementation unit. The BPS computer program was developed by foreign consultant with active participation of banks' officers and programmers using FOXPRO language. Central Accounts Department collects data relating to assets, liabilities, income, and expenditure. Data were stored in the mini computer of Computer Department. Data were down loaded for use in FOXPRO in Personal Computer. The BPS program after processing produces BPS reports. It mainly reflects financial performance of branches, zonal offices, circle offices, and overall performance of the bank. The BPS also contains key performance measures such as (1) branch contribution to bank's profit, (2) return on assets plus liabilities, (3) contribution from assets, (4) contribution from liabilities, (5) yield on loan and advances, (6) fee income as percentage of operating expenses, and (7) branch efficiency for current and previous period.

LLM-FSRP (1993), a newly designed Loan Ledger System has

been implemented by the NCBs. It identifies sources, flow of information, recording and end uses of information. The newly designed loan ledger system contains: (1) formal record of all loan transactions, (2) legal document supporting bank's court claims, (3) source of general ledger, balance sheet, income and expenditure statement, (4) source of loan classification, (5) source of credit bureau reporting, (6) source of loan performance and recovery.

LRA (1993) is a conceptually developed manual on lending risk analysis of banks. The manual contains discussions of risks, forms required to analyze risks, examples, measures and instructions.

Bangladesh Krishi Bank's "Functions of Officers" (1993) manual contains functions of different divisions, departments, branches, regions, divisions, and zonal offices. It also contains organizational chart.

Statistical Book-Let (1994-95) of Bangladesh Krishi Bank specifies different reports containing data relating to loan disbursement, recovery, deposit, term loan, utilization of foreign credit, manpower position, training, liabilities and assets, urban and rural distribution of branches, budget and actual expenditure, balance sheet, profit and loss account etc.

Bangladesh Krishi Bank's "Statements and Returns" (1994) manual has been prepared after intensive investigation, examination of reports and returns. It contains 148 report

formats. These 148 report formats are included in the manual with sources of information, frequency of reports and destination of reports.

Operational Statistics (1971-96) of Bangladesh Shilpa Bank contains Operational data such as: loan application, loan sanctioned, investment approved, and economic impact, summary position of loans, particulars of projects , and cumulative Data such as: cumulative loans sanctioned, cumulative position of loans etc.

5.3. Management of Banks

Management Structure: Banks and financial institutions in Bangladesh have been following a traditional management structure. In many operational areas, there were no procedures manual. Functional areas were partly guided by circular and self initiative of the executives. Management structure had changed but the reflection had not been made in the documents. The changed management structure remained internal to the banks. Executives were unable to provide the existing management structure. Based on the information collected through discussion with the executives and the documents provided, the management structure might grossly be considered as: (1) head office management and (2) fields management. At head office, the Board of Directors, chaired by a Chairman, was the highest body followed by Managing Director (MD) i.e. chief executive officer.

Next to MD were Deputy Managing Director (DMD) and General Manager (GM). Deputy Managing Director and General Manager were head of divisions. Organization of banks and financial institutions at head office were divided into major functional divisions. There were several committees at head office to perform specific assignments.

Organizational Chart: Administrative divisions were requested to supply organizational chart. It was observed that charts were prepared four to ten years back but not updated to reflect changed structure.

Job Description: Most of the banks and financial institutions were unable to provide documents containing job description. In case of NCBs, the gazette notification of 1984 contains the job description of the top and middle executives. In most cases there were no job description for executives and job specification for work areas. What were going on might be termed informal in many respect. Generally, head of the departments allocate jobs among the officers. Jobs were, in rare cases, documented in a manual.

5.4. Reporting Systems and Reports

Generally, a large number of reports were required to be prepared by banks and financial institutions. For having a thorough grasp of the situation in this respect, a work sheet has been prepared containing the report title, sources, users,

frequency etc. The work sheet contained a comprehensive list of 421 reports that were prepared at branches and departments. Out of 421 reports, 91 were prepared mostly for Bangladesh Bank, 6 were prepared for MOF and the rest 324 for internal management. Reports to Ministry of Finance were mostly related to ECNEC, budget and resume of activities of banks and financial institutions. Total number of reports in the work sheet were so high because similar type of reports were assigned different names by different organizations. Some of the reports were, however, unique to certain organization. Naturally, a reduction and categorization process of reports were made for presentation and analysis. While categorizing, contents of reports were duly considered. Group labels have been assigned by the researcher to a group of similar reports. Some elements, however, appeared under multiple labels. This was unavoidable because of their dimensionality (time, location, sector etc). A more detailed and specific discussion relating to the reports has been made in the following paragraphs.

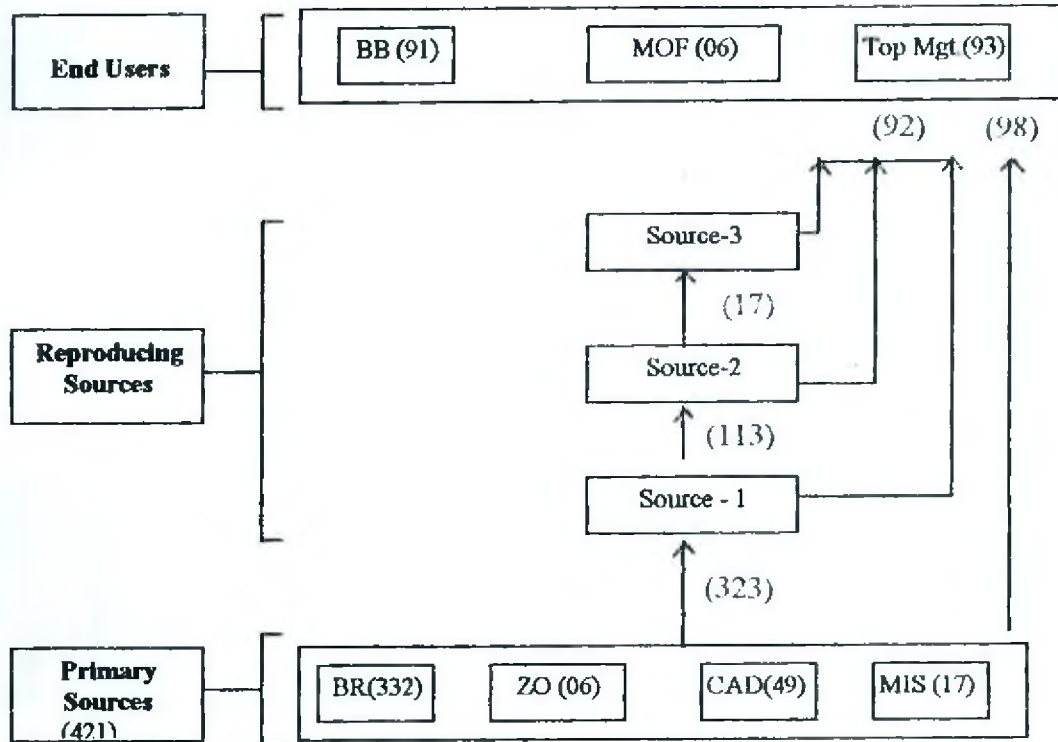
5.4.1. Source Wise Grouping of Reports

Reports at head office were received mainly from branches, and zonal offices. For classification purpose, the two terms i.e., "Primary Sources" and "Reproducing Sources" have been used by the researcher. Primary sources refer to those who produce the reports from the operational transactions and reproducing

sources refer to those who basically collect data from different business units, sometimes generate transactions, compile and produce reports. For a particular report, there was only one primary source but there might be multiple reproducing sources. Reproducing sources also generate original reports and thus act as primary sources in many cases. Some reports, after being generated from primary sources, passed through and were preserved by reproducing sources, before they were finally sent to users. Three reproducing sources have been identified, although in exceptional cases some reports passed through more than three business units. A flow chart has been developed by the researcher which is shown in diagram # 5.1 in the following page.

Diagram # 5.1

Flow Chart Of Reports To End Users From Primary Sources Through Reproducing Units



The primary source wise classification of the 421 reports identify the following authorities as primary sources such as: Ministry of Finance (1), Bangladesh Bank (1), Branch Offices (332), Zonal Offices (6), Central Accounts (49), MIS & Planning (17), other departments (15). The branches were highest preparers of reports. About 78.86% of the reports were produced by branches. The relative percentages of primary sources has been presented in the table # 5.1. in the next page.

Table # 5.1

Major Source Wise Classification of Reports

	Primary sources	Number	Percentage
01.	Branches	332	78.86
02.	Central Accounts Department	49	11.64
03.	Management Information Service Department	17	3.33
04.	Zonal Offices	6	1.43
05.	Others	17	4.04
	Total:	421	100.00

Reproducing sources have been named as source-1, source-2, and source-3 considering the stages at which these reports were received for reproduction purposes. Primary sources also act as these three reproducing sources except branches. Branches were only primary sources (except in few cases where reports are sent back for necessary review). While passing through the reproducing sources, reports get processed i.e. aggregated, subtracted, compiled, consolidated and finally interpreted. The reproducing source wise classification of 421 reports has been presented in the table # 5.2. Reproducing source wise classification table shows that after preparation of reports, 77% of these reports (i.e. 323 reports) passed through source-1 and about 23% reports (i.e. 98 reports) had not passed through any reproducing sources (i.e. Sources 1, 2, or 3). Out of 323 reports, again 35% of the reports (i.e. 113 reports) passed through source-2 and about 65% reports (i.e. 310 reports) did not pass through further reproducing sources.

Table # 5.2

Reproducing Source Wise Classification of Reports

Sl. No.	Name of Reproducing Sources	Source-1		Source-2		Source-3	
		No.	%	No.	%	No.	%
1	Zonal & Regional Offices	80	19.00	3	0.92	1	0.89
2	Finance & Accounts	124	29.45	29	8.98	-	-
3	Operations	59	14.01	42	13.00	-	-
4	Administration	19	4.51	12	3.72	-	-
5	Development	20	4.75	13	4.02	13	11.50
6	Others	21	5.00	14	4.02	3	2.65
	Sub-Total	323	76.72	113	34.98	17	15.04
7	Reports not passing through reproducing sources	98	23.28	310	65.02	96	84.96
	Total:-	421	100	323	100	113	100

Out of 113 reports, again 15% of the reports (i.e. 17 reports) had passed through source-3 and about 85% reports (i.e. 96 reports) did not pass through further reproducing sources. The main business units acting as source-1 through which 77% reports had been passed were (a) Finance and Accounts (29.45%), (b) Zonal, Regional offices (19.00%), (c) Operations (14.01%), and (d) Development (4.75). The main business units acting as source-2 through which 35% reports had been passed were (a) Operations (13.00%), and (a) Finance and Accounts (8.98). The main business unit acting as source-3 was Development (11.50%).

5.4.2. Destination Wise Grouping of Reports

Executives use the reports at varying degrees for different purposes. Here destination denotes the users who make use of the reports for doing the jobs. The user groups include (a) External: Bangladesh Bank, and Ministry of Finance, and (b) Internal: internal management of the banks. Purposes of the two parties differ. The Bangladesh Bank and Ministry of Finance require reports for regulatory, policy making, economic planning, and publication. Whereas, internal management require reports for operations, strategic planning, management control, and operational planning and control. The destination wise classification of reports has been presented in the table # 5.3.

Table# 5.3

Destination Wise Classification of Reports

Sl.	Name of Users	No. of Reports	%
A:	Reports to Specific Users		
01.	Bangladesh Bank	91	19.40
02.	Ministry of Finance	6	1.28
03	Board of Directors, Chairman	14	2.98
04	Managing Director, EVP	43	9.17
05	General Manager, SVP, VP	36	7.68
	Sub-Total (A):	190	40.51
B:	Reports Not to Specific Users	279	59.49
	Total (A+B):	469	100.00

Generally, reports were verified and signed by either DGM or AGM or both. The total number of reports that had been received by specific users were 190. The number of reports that had not been received by any specific users were 279. The total number of

reports thus became 469. There arose a difference of 48 reports between sources and destination. This is because, sometimes the same report had been sent to multiple users.

The table#5.3 shows that out of 469 reports, 20.68% were used by external agencies (i.e. 19.40% by BB and 1.28% by MOF) and 19.83% were used by internal management. Out of 19.83% of internal use 2.98%, 9.17%, and 7.68% are used by "Chairman and Directors", "Managing Directors", and "General Managers" respectively. Approximately 59.49% of the reports were used by reproducing level officers.

5.4.3. Reports for Bangladesh Bank

Reports to Bangladesh Bank might broadly be categorized as follows:

- (1) Reports of liquidity which were named as weekly position, sector-wise deposit, investment and credit, denomination wise cash in till etc.
- (2) Reports of deposits, advances, investment, bills purchased and discounted etc.
- (3) Reports relating to scheduled banks statistics (SBS) e.g. SBS-1 (Liabilities and Assets), SBS-2 (Classification of Deposits) and SBS-3 (Classification of Advances).
- (4) Reports relating to credit information bureau (CIB) such as CIB-01: Segment 1, 2, 3, 4 & 5.
- (5) Report relating to off-site supervision.

- (6) Reports of deposits, advances of Government institutions, semi-autonomous bodies, non-financial public enterprises etc.
- (7) Reports relating to foreign exchange transactions (under ECD manual 1986).
- (8) Miscellaneous: large loan review, letter of guarantee etc.

5.4.4. Reports for Internal Management

Internal reports have been categorized into fifteen titles by the researcher. These reports were basically generated by following administrative circulars and accounting system. Few were related to management planning and control. Internal reports have been categorized as per their main contents as follows:

- (1) Daily resource position: cash, deposits, advances, investment, call money, remittance etc.
- (2) Comparative position: provisional income, provisional expenditure, provisional profit and loss account, consolidated statement of affairs, ratios etc.
- (3) Operational statistics-I: sector wise deposits, sector wise advances, sector wise amount not-due, amount overdue, status of projects, sector wise disbursement of loan, sector wise recovery of loan.
- (4) Operational statistics-II: statistical reports, performance of bank, review of the bank, statistical book-let etc.
- (5) Operational statistics-III: current maturity of long term

- debt, loan outstanding, amount overdue, disbursement of loan, equity investment, guarantee issued, commitment made, trustee, securities, recovery of loan etc.
- (6) Operational statistics-IV: amount of loan sanctioned, disbursement of loan, investment, cost & employment generation under small and cottage industries (SCI) program, rural credit, long term borrowing and disbursement, general credit, industrial credit, recovery of industrial loan, non-agricultural credit, non-classified loan, small credit, special loan program (tea, shrimp, cold storage, rural women), agricultural loan, rural housing loan, staff house building loan, flat purchase loan, transport loan (the dimension may be: public, private, industrial sector) etc.
- (7) Operational statistics-V: deposits, advances, investments, bills purchased & discounted [the dimension may be public, private, securities, type of deposits (i.e. term, call, current, savings), type of advances, branch wise, zone wise].
- (8) Review and analysis: monthly review, progress report, analysis of activities of the bank.
- (9) Budget, performance budget, performance planning, monitoring: expenditure control for branches, variances of income and expenditure, MIS-target monitoring reports of branches, business budget vis-a-vis achievement (branch wise target and actual of deposits, advances & profit); business

budget, business budget achievement; performance budget for capital expenditure, manpower, revenue, investment, revenue income, deposit, profit, deposit planning, profit planning, comparative performance to committed budget; proposed budget for next year and revised budget for current year, credit budgeting (top down and bottom up).

- (10) Reports relating to litigation: loan cases under litigation, reports of robbery and dacoity to branches of bank, report of theft-fraud etc.
- (11) Reports relating to inspection: reports of inspection, stock inspection on cash credit (CC), project inspection report etc.
- (12) Reports relating to staff strength and promotion: reports of staff movement, staff strength, promotion etc.
- (13) Foreign exchange transactions: import, export handled by branches (target & achievement), foreign exchange control reports etc.
- (14) Reports relating to accounts: cash expenditure (administrative expenditure), cash expenditure (expenditure on borrowing), salary, assets account, sundry deposit account, suspense account, loan account, employee advances, data for annual report preparation, reconciliation debit credit report, staff's loan, staff provident fund (PF), loan against PF, interest realized, realized income, personnel expenditure for officers, excise duty, deduction of tax at

sources, money at call and short notice, treasury account, balance certificate and adjustment, accounts payable, cash reserve, accounts receivable, pay order issued, drafts payable (DD payable), employee security deposit, account balance with other banks and adjustment, account balance with Bangladesh Bank and adjustment, depreciation charged on assets, statement of affairs (general ledger accounts), bank contribution to employees' superannuation fund, resource transferred to head office, benevolent fund, remittance made through Bangladesh Bank (BB) and Sonali Bank (SB), remittance received through BB & SB, analysis of charges account, trustee loan realized, interest on head office account, cash foreign exchange, stationary, general reserve account, deposit pension scheme (DPS), defense savings certificate, prize-bond, inter branch transaction position etc.

- (15) Miscellaneous: particulars of loan liquidated projects, sale proceeds of bank financed projects, report of unclaimed accounts, reports of loan application and sanctioned, particulars of projects which has gone into production during current year, particulars of projects for which local currency loan has been disbursed, particulars of projects for which letter of credit/guarantee has been established, loan wise summary of foreign loan utilized & outstanding, report of overdue loan to MPs, report of excess loan

drawing, report of loan to bank's directors, report of interest subsidy (export credit) scheme of the bank, report of bank guarantee etc.

5.4.5. Group of Bank Wise Reports

Different banks and financial institutions produce different number of reports. However, some reports were common in them. There were certain reports unique to a particular institution. Group of bank wise average number of reports has been presented in the table # 5.4.

Table # 5.4

Group of Banks Wise Average Number of Reports

Sl.	Group of Banks	Average number
01.	NCBs	203
02.	PCBs	147
03.	SPBs	143

5.4.6. Frequency of Reports

Banks and financial institutions are required to produce reports at different frequencies. The frequency depends on nature of operational work that were being reported and need of the operational information at head office. For reporting to Bangladesh Bank and Ministry of Finance, frequencies are set by them. Frequencies of internal reports are settled by internal management of the banks and financial institutions. The same report might be required to be produced at different frequencies. The frequency wise classification of the 421 reports has been

presented in the table # 5.5.

Table # 5.5

Frequency Wise Classification of Reports

Frequency name	Number of Reports	Percentage
(a) Daily reports(D)	5	1.14
(b) Weekly reports(W)	25	5.70
(c) Monthly reports(M)	147	33.56
(d) Quarterly reports(Q)	109	25.00
(e) Half Yearly reports(H)	45	10.32
(f) Yearly reports(Y)	107	24.28
Total:-	438	100.00

Note: Total number of reports in the frequency column was greater than 421 because some reports were produced at different frequencies.

In descending order, the frequencies appeared as monthly (147), quarterly (109), yearly (107), half yearly (45), weekly (25), and daily (5).

5.5. Information personnel, Tools and Storage Media

Information personnel, tools and data storage media has been presented in the following sections.

5.5.1. Information Personnel

Information personnel includes (1) system analyst i.e. person who conduct system study or is involved in some way in the system study, (2) programmer, (3) system manager, (4) data base administrator, (5) computer operation manager, (6) system support personnel, (8) regular and casual computer user, and (9) data entry operator. In the banks and financial institutions under

study, the designations were traditional. Generally there was no computer oriented designation. The designation wise information personnel in the group of banks has been presented in the table # 5.6.

Table # 5.6

Designation Wise Number of Information Personnel

Group of banks	Designation with number of information personnel								
	DGM	AGM	SPO	PO	SO	Officer	Others	Total	Average
NCBs (4)	4	7	17	46	117	57	120	368	92
PCBs (9)	3	3	4	35	76	117	47	285	32
SPBs (4)	1	1	4	7	17	14	16	60	15

The average number of information personnel in NCBs was higher i.e. almost triple than that of PCBs. The average number of information personnel in NCBs and PCBs were about 6 times and 2 times more respectively than that of SPBs. Information personnel compared to total employee has been presented in the table # 5.7.

Table # 5.7

Comparison of Information Personnel Among The Group of Banks

Particulars	Group of Banks		
	NCBs	PCBs	SPBs
Total Employees	64492	18176	16774
Total Information Personnel	368	285	60
Percentage of Information Personnel to Total Employees	0.57%	1.42%	0.36%

The table#5.7 shows that percentage of information personnel to total employees for PCBs were almost triple than that of NCBs.

Information personnel in SPBs show a low proportion as compared with NCBs and PCBs. Number of information personnel compared to total employees was however, very low (i.e. range between 0.36% to 1.42%) in all categories.

5.5.2. Tools And Techniques Used

The personnel uses different tools and techniques for information processing. Frequency of different tools and techniques in a quarter were collected. Number of times tools used in a quarter has been presented in the table # 5.8.

Table # 5.8

Frequency of Tools Used in A Quarter

Sl. No.	Tools used	Frequency
1.	Hand calculator	975
02.	Boss's advice	524
03.	Own analysis (judgement, choice)	488
04.	Peer's advice	231
05.	Computer program, package	291
06.	Computer spread sheet	206
07.	Printed format	38
08.	Procedure delineated in circular	30
09.	Manual, Hand Book	9
10.	Accounting and management accounting techniques	7
11.	Statistical techniques	3

Hand calculator showed the highest frequency and was a dominating tool. Among the three subjective tools i.e. Boss's advice, Own analysis (judgement, choice), and Peer's advice, the Boss's advice ranked highest. This means information processing

officials frequently seek advice from bosses. The frequency of Boss's advice was greater than the frequency of their own analysis (judgement, choice) or peer's advice.

Computer program and computer spread sheet tools combined scored 497. Usually when one use a computer, it involves several computation, storage and printing work. Theoretical tools i.e. (1) accounting and management accounting techniques and (2) statistical techniques ranked almost lowest. Respondents had ranked these two tools lowest. Therefore, they prepare reports rarely using management accounting and statistical tools. There was no specific computer model in use. Group of banks wise frequency of use of tools used in a quarter has been presented in table # 5.9.

Table # 5.9
Group of Banks Wise Frequency of Tools Used

Sl. No.	Tools	Average frequency of tools used in a quarter		
		NCBs	PCBs	SPBs
01.	Printed format	49	36	30
02.	Hand calculator	1020	1120	885
03.	Computer spread sheet	270	257	90
04.	Computer program, package	600	207	66
05.	Computer model	0	0	0
06.	Manual, Hand Book	14	8	4
07.	Procedure delineated in circular	31	21	39
08.	Own analysis, judgement, choice	513	561	390
09.	Boss's advice	488	663	420
10.	Peer's advice	288	194	210
11.	Accounting, MA techniques	12	3	7
12.	Statistical techniques	4	2	3

The table # 5.9 shows that NCBs were in highest position in respect of using printed format, computer tools, manual, circular containing rules & procedures, and Management accounting techniques and statistical techniques. Whereas PCBs were in highest position in respect of own analysis (judgement, choice), boss's advice.

5.5.3. Media of Information Storage

Traditionally banks and financial institutions in Bangladesh had been using register, ledger, "kucha register", "khata" for recording information. Letters, reports, notes were stored as files. These were generally classified subject wise and date wise. Classification of files and preserving information sheet in files chronologically helps one to find the required information.

Data about media of information storage in central accounts department (CAD), management information service department (MISD) and research and statistics department (RSD) were collected. The average figure of information storage media of CAD and MISD/RSD has been considered to represent each bank. The media of information storage for group of banks has been presented in the table # 5.10. in next page.

Table # 5.10

Information Storage Media Among Group of Banks

Sl. No.	Media of Storage	Units applicable	Average number of media among group of banks			Average
			NCBs	PCBs	SPBs	
01.	Register, Ledger	Number	50	56	46	51
02.	Kucha Register/Khata	Number	50	25	50	42
03.	Files: Classified	Subject Title	26	23	36	28
04.	Files: unclassified	Subject Title	162	96	79	112
05.	Word processor	Computer file	40	24	30	31
06.	Data base	Computer file	34	18	33	28
07.	Spread sheet	Computer file	43	49	23	38

The table#5.10 shows that the organizations were using computer disk files. They were also using register, ledger, kucha register, khata simultaneously. Another observable point is that all organizations had been suffering from a large number of subject unclassified files compared to subject classified files. The ratio of unclassified files to classified files is very high (i.e. 4:1). Among the computer disk files, the database files might be considered as the most systematic way of storing information. Group of banks comparison showed that NCBs were in highest position followed by SPBs. PCBs were in lowest position. Physical observation by the researcher also confirmed that NCBs and SPBs showed more organized storage than PCBs. And PCBs were more dependent on spread sheet packages.

5.6. Information Processing Departments

Information processing departments have undergone changes in the recent years. Various facts relating to information service departments such as age of departments, objectives, head of departments, personnel, projects selection, computer installed, Net-work, computerized MIS etc. has been presented in the following sections.

5.6.1. Establishment of Units

The year of establishment of the management information service departments (MISDs), computer departments and EDP units in banks and financial institutions were recorded. From the data, age of these departments were calculated (as of 1997). Where the institution had more than one such units, the oldest one was considered in calculating the age. The age of information processing departments has been presented in the Table # 5.11. in next page.

The table#5.11 shows that information service departments were established after 1984 (except CD of AB). The IPD in Agrani Bank has the highest age. Out of thirteen banks and financial institutions, all had Computer Department (and or EDP) and five had MISD in conjunction with CD. This shows parallel development of MISD and CD. Computer departments were developed as more important units than MISDs. Observation and discussion with

executives revealed that many of the task of MIS in nature were being done by CD or EDP. Again, many of the functions of MIS were being done by respective functional units.

Table # 5.11

Age of Information Processing Departments

Group of Banks	Age of the bank (Years)	Age of IPD (Years)	Average age of IPD in group of banks
A. NCBs			13.75
AB	57	29	
JB	39	5	
SB	49	8	
RB	48	13	
B. PCBs			5.86
PBL	39	9	
UBL	39	2	
NBL	15	2	
CBL	15	8	
ABBL	15	13	
EBL	5	5	
IBBL	15	2	
C. SPBs			9.5
BKB	40	10	
BSB	49	9	

Note: Out of 17 banks taken as sample for exploratory study, 4 banks did not have any IPD.

5.6.2. Objectives of Computer Department and EDP unit

Objectives of information processing departments have been collected. The group of banks wise summarized objectives of computer department and electronic data processing unit have been presented in the table # 5.12. in next page.

Table # 5.12
Group of Banks Wise Objectives of Computer Department and EDP

Group of banks	Description of objectives
NCBs	(1) to conduct system study, (2) to develop (in house) software, (3) to implement the information system, (4) to computerize the different departments of head office, (5) to computerize the branches for customer services, (6) to gather, process, store and processing of data, (7) providing information to internal management and external agencies, (8) to detect fraud, forgery, errors etc.
PCBs	(1) to make arrangement for developing program, (2) to provide assistance in developing MIS, (3) to provide logistic support in-terms of system support, system analysis, programming, hardware and software purchase, negotiating vendors, (4) to provide computer support to branches and departments, (5) to provide information for internal management and external agencies, (6) improve quality and accuracy of information, (7) speedy processing of information, (8) to streamline inflow and outflow of information, (9) to bring qualitative changes in decision making, (10) to bring change in organizational behavior, (11) to bring efficiency and improvement in customer services.
SPBs	(1) to conduct system study, programming and implementation, (2) to computerize different departments and bank branches, (3) to computerize banking system such as reconciliation, accounting system, personnel management information system (PMIS), (4) to improve monitoring and evaluation, (5) to provide information services.

Objectives of IPDs among group of banks did not differ significantly. Differing points had been that NCBs were conducting system study, developing in-house software and PCBs were making arrangement for system study and programming from software houses on contract basis. In case of SPBs, this distinction was not so clear. NCBs were dedicated to develop their computer units as software development and data management houses as well as providing system support in computerization of departments and branches. But PCBs were not so dedicated in developing their computer departments as software-houses. Rather,

PCBs were providing system support by making arrangement with software vendors and computer firms.

5.6.3. The Head of Information Service Departments

Designation of the official who represent information service department is considered important. Higher position in a information service unit is required. This is due to many reasons, such as: the volume of work, work involves coordination & integration of functions among different departments, selecting information system projects, conducting system study, procuring computer equipment, developing software, negotiating management of software consulting firms and software system analyst/ programmer, purchasing software application etc. This position requires all the good traits of mid and top management in addition to an adequate computer software and hardware knowledge. In banks and financial institutions, heads of CD and EDP units were the persons who had been traditionally doing banking, started their job as an officer in general banking and promoted to the present position (AGM, DGM). They did not posses required knowledge in computer and in MIS. They had enough practical knowledge and experience but were not an expertise in the area of IS and IT. The positions were also frequently replaced by other AGMs, DGMS who might had been previously posted to other business units. Exception was found in one member bank of NCBs whose head of computer department had been working in that department from

the very beginning of his joining in the bank since 1960s. In some private banks, such positions were held by persons who had experience with computer. Group of banks wise designations of these officials has been presented in the table # 5.13.

Table # 5.13

Designation of Head of Information Processing Departments		
Group bank	Designation	No. of position
NCBs	DGM	4
PCBs	DGM or equivalent	3
	AGM or equivalent	3
	SPO or equivalent	1
SPBs	DGM	1
	AGM	1
Total:-		13

The above table shows that the banks and financial institutions who have information processing units have assigned DGM or AGM or equivalent rank (except in one member bank of PCBs). However, placement of DGM, AGM in information processing units do not mean that such position has been represented by an official of required expertise. While visiting and meeting with the departmental heads and other officials of information processing units, it was found that only five of such departmental heads possessed required software and hardware expertise. Organizations did not place emphasis for developing human resources in information processing, information system and information technology.

5.6.4. Personnel in Computer Department and EDP units

Although, personnel had been doing the job of system manager, system analyst, programmer, data entry operator, but no computer oriented designations were found to be there. Traditional designations such as DGM, AGM, SPO, PO, SO, Officer or equivalent positions were prevailing. The designation wise number of personnel in computer departments and EDP units of group of banks has been presented in the table # 5.14.

Table # 5.14

Personnel in Computer Departments and EDP Units

Group of banks	Designation and number of Personnel in CD and EDP									Total employees	Relative Position (Percentage of CD, EDP personnel to total employees)
	DGM	AGM	SPO	PO	SO	O	Others	Total	Average		
NCBs	4	7	17	35	62	45	82	252	63	64,492	0.39
PCBs	3	3	4	7	10	14	23	64	9	18,176	0.35
SPBs	1	1	4	7	6	7	8	34	17	16,774	0.20

The average number of personnel in computer departments and EDP units of NCBs was much higher than PCBs and SPBs. This shows a larger size of computer department of NCBs for obvious reason of being larger organizations. PCBs were seen employing less people in computer departments than NCBs and SPBs for obvious reason of being small organizations. However, relative position shows that NCBs, PCBs and SPBs were employing 0.39%, 0.35% and 0.20% of their total employees in the computer departments (including EDP units) respectively.

5.6.5. Procedure of Information System Project Selection

Officials of the computer departments were asked about the procedure of IS project selection. But, the responses were not clear. The common responses were that computer department make selection or top management give decision. Only one of the member of NCBS and one of the member of PCBs reported that user departments or management initiate the issue. The computer department arrange for system analysis, designing, programming, appointment of computer firm, purchase of software, and implementation of the project. The identification and selection of IS project, as responded by executives, seemed to be isolated and piecemeal. In banks and financial institutions, there remained procedural gap in the selection of IS projects.

5.6.6. Type and Number of Computer Installed

The type and number of computers installed in different departments, branches of group of banks has been presented in the table # 5.15.

Table # 5.15

Computer Installed in Group of Banks

Group of banks	PCs	Mini	Total	Average per bank	Total number of branches	Computer installed per branches
NCBs	497	4	501	125	3619	0.1384
PCBs	456	5	461	51	1000	0.4610
SPBs	140	1	141	35	1168	0.1207

Notes: There is no Medium, large or Super computer installed in the banks and financial institutions under study.

The banks were mostly PC users. Average use of computer in absolute terms in NCBs is much higher than that of PCBs and SPBs. However, in relative terms, the ratios of computer installed per branches in NCBs, PCBs and SPBs are 0.1384, 0.4610 and 0.1207 respectively. This means that NCBs, PCBs and SPBs have installed one computer for every 7.22, 2.17 and 8.29 branches respectively.

5.6.7. Location of Computer Installed

An analysis of location of computer installation on the basis of available figures has been made to better understand the information system of banks and financial institutions. Here, the business units of banks and financial institutions have been identified as office of MD & GM, Departments, and Branches. The total number of business units of the group of banks which were provided with computer has been presented in the table # 5.16.

Table # 5.16

Total Business Units Computerized by Group of Banks

Name of Business Units	No. of Units Computerized		
	NCBs	PCBs	SPBs
Office of Managing Director and General Manager	2	2	1
Departments of head office	19	51	17
Branches	101	131	34
Total number of branches*	3,619	1,000	1,168
Percentage of branch computerization	2.79%	13.10%	2.91%

*Sources: Economic Trends, Statistics Department, Bangladesh Bank, Vol.XXII, No.6, July 1996, p.58-61.

The above table shows that PCBs were far ahead than NCBs and

SPBs in terms of computerization of branches. NCBs and SPBs were almost running at equal pace. This reveals that PCBs had a tendency to be less dependent on human element in their organizations. This possibly had arisen out of a desire to save recurring costs on personnel and also for being efficient in business handling. This was substantiated by the fact that out of 1000 branches of PCBs, 131 branches had been computerized. While, out of 3619 branches of NCBs, only 101 branches had been computerized so far. SPBs stand in the same rank as with NCBs.

5.6.8. Network in Use

Network installation indicates the degree of advancement of computer technology used in the banks and financial institutions. It also indicates the achievement in computerization vis-a-vis MIS. Observation results of the network installation has been presented in the table # 5.17.

Table # 5.17

Network Installation in Group of Banks

Group of banks	Number of Banks where network installed or not installed		Description of network installed
	Installed	Not Installed	
NCBs	3	1	AS/400; system support program; NOVEL Network; LAN server with UNIX
PCBs	3	6	NOVEL Network; Kapiti Equation; Kapiti International Banking System; UNIX
SPBs	2	2	NOVEL Network
Total	8	9	

Out of seventeen banks, eight had been provided with network. The use of network was in its early stage. However, NCBS and PCBs had same number of network installation, though their relative position in business greatly varied.

5.6.9. Computer-based MIS in Banks and Financial Institutions

Banks and financial institutions have been developing and using the computer programs for various functions. Major areas covered under computer programs has been presented in the table # 5.18. in next page.

The table shows that some application areas were common in group of banks. The NCBS had developed some application program more or less uniformly. This characteristics was not clear in PCBs or SPBs. In PCBs, only one application area was covered by four banks and one application area was covered by three banks. Six application areas were covered by different combinations of two member banks and other seven banks were not using computer application programs in these areas. They were still in manual processing in these areas. Some application areas were covered by single member bank. In SPBs, all application areas (except pay roll) were covered only by a single member bank. So, less uniformity existed among members of SPBs in-terms of areas covered under computer application.

Table # 5.18

Group of Banks Wise MIS Computerized

Group of banks	Description of areas covered by computer based MIS	Specific bank
NCBs	(1) Statement of affairs (2) Branch performance reports (3) Bank's performance report (4) Performance planning (5) Reconciliation of inter branch transactions (6) Gradation of branches (7) Pay Roll/salary (8) Loan and advance system (9) Personnel MIS (10) Provident fund (11) SBS 1,2,3 (12) Non-resident taka account (13) Legal affairs of advances (14) Inventory management (15) Government transactions	AB, JB, SB, RB AB, JB, SB, RB AB, JB, SB, RB AB, JB, SB, RB AB, JB, SB, RB AB, JB, SB, RB AB, SB AB, SB SB RB RB AB AB SB
PCBs	(1) Statement of affairs (2) Income & expenditure (3) MIS report (4) Reconciliation of inter branch transaction (5) Pay Roll (6) Loan and advance systems (7) Personnel MIS (PMIS) (8) Provident Fund (9) SBS 1,2,3 (10) Budget monitoring (11) CIB01-1,2,3,4 & 5 (12) Share management system	UBL, EBL PBL, UBL, NBL, IBBL UCBL PBL, IBBL IBBL PBL NBL, ABBL PBL, ABBL, IBBL PBL, UBL NBL, IBBL UBL, NBL ABBL
SPBs	(1) Statement of affairs (2) Monthly MIS report (3) Budgeting (4) Reconciliation of inter branch transactions (5) Pay Roll (6) PMIS (7) Operational statistics (8) Provident fund (9) Accounting system (10) Loan accounting system (11) SBS 1,2,3 (12) CIB01-1,2,3,4 & 5	GB GB GB BKB BKB, BSB BKB BSB BKB GB BSB BSB BSB

5.7. Findings of The Exploratory Study

The findings of the exploratory study has been grouped under sections: documentation of procedures, reports, files, computer application, MIS in transition, MIS re-organization, and MIS for strategic management. These are discussed in the following sections.

5.7.1. Documentation of Procedure

Rules and procedures have not been properly identified and formulated. Documentation of procedures was a serious problem in the banks and financial institutions. Rules and procedures were basically in memos (administrative circular) which have been subject to change in totality on and often. Different memos are kept in memo files. There were many such memos on a single or multiple issues. Day by day, it gets piled-up and another memo file was needed to be opened. In that situation, searching for a particular memo become difficult. In many cases, documentation were not done at all. It remained only in the personal knowledge of a particular officer. When that officer was moved to another unit and replaced by a new officer, the new officer had to develop again his knowledge of the existence of memos through his personal efforts. This was how procedures evolved and lost in the banks and financial institutions. No systematic record being kept as to their list and contents.

5.7.2. Reports

Various reports were prepared at branch offices and different departments of head office on the basis of administrative circular. There had been no MIS manual. Different departments produce respective functional reports. MIS activities were not organized to serve as a sub-system of management. MIS were not properly identified, formulated and systematically developed to serve the objectives of the organizations. Some functional departments produce reports as per provision of the respective departmental manual e.g. accounting system produce reports as per accounting manual. Reports were also produced on an ad hoc basis for inquiries from management and external agencies. Regulated reporting had been found to dominate non-regulated reporting. Regulated reports are: (1) reports to Bangladesh Bank, (2) reports to Ministry of Finance, (3) reports needed by management for accounting purposes etc. Regulated reports preparation function gets more attention than non-regulated reports. Non-regulated reports are (1) ad hoc inquiries of management, (2) reports required by top and mid management for operations, planning and controlling. Every organization was required to prepare many reports for internal management. The name, content, and format of such reports varied from organization to organization. The quality and content of these management reports also varied among banks and financial institutions. The banks and financial institutions collect very

few information from outside environment within which they operate. The practice of collection of multidimensional environmental data and use thereof had been quite inadequate. Whatever MIS was in practice, they were mostly internal and financial in nature.

5.7.3. Files

Reports were not the only means or container of information in the banks and financial institutions. Traditional files appeared to be most frequently used and rich sources of information. These were storage media, container, vehicles to transmit information or container of paper that disseminate information. These contain data, analysis, decisions, predictions, judgement, thought, argument etc. The files were broadly of two types: (1) Note files i.e. in which the officials record data, compare, present facts and context, give judgment, decision and knowledge. (2) Loose leaf holder files i.e. in which letters, memos, loose papers, reports etc. are kept.

5.7.4. Computer Application

Two banks had been using computer at head office since 1960s. These two banks had basically employed computers for accounts and reconciliation purposes. The banks and financial institutions in general, had introduced computer technology since late 1980s. The introduction of computer initiated a transition

process in MIS. The transition however, had not been planned to reach at a desired level. The introduction of computer obviously had replaced some manual record keeping, and clerical computation. This introduction, however, was not deep rooted in the organizational structure. In many cases, these were piecemeal initiatives and segregated adaptation in the organization. Impact of computer technology obviously had initiated a transition process in the methods and procedures. Traditional methods of work had been changed. Information processing departments had been established. New job titles had been introduced in the designation list. The application of computer technology, however were limited to selected areas only.

5.7.5. Transition of MIS

Introduction of computer in the banks and financial institutions had initiated a shift from manual data processing to electronic data processing. It had been breaking the traditional organizational culture. Computer had been used basically for operational purposes and not really for MIS. This changes involved costly resources employment and skill up-gradation. It had impact on management practices and organizational structure. It urgently requires systematic plan and compatible approach. Every step towards modernization, however, needs a higher degree of development approach, equipment, skill and procedure in order to move towards a pre-specified goal.

5.7.6. Re-organization of MIS

The banks and financial institutions are information intensive organizations. Whereas, MIS had been prevailing in various disguised forms. There had been little initiative to reorganize MIS in our banks and financial institutions. Management was interested in introducing computer technology, especially for operational purposes. Little effort had been given for MIS reorganization. Most of the executives in banks and financial institutions felt that an improved MIS might be helpful for operations, planning and control. Information handling had been a regular problem. Absence of systematic management of information had been a crucial problem affecting organizational efficiency. The introduction of computer technology in the banks and financial institutions was expected to yield a good result. For this a proper and systematic approach to the adaptation of computer technology and computer-based MIS was needed. The banks and financial institutions had not followed the approach of MIS development considering the existing cultural context vis-a-vis the attitudinal aspects and related issues. System study had been made in selected areas only. The concepts of adequacy and contents of MIS varies significantly among the executives. A significant number of executives opinion had revealed the inadequate MIS conceptual development amongst them. Expectation about probable reorganization of MIS was not clear. Some of these

executives were involved in the formulation of IT/MIS policies, monitoring MIS development and also implementation thereof. They also lacked necessary vision for reorganizing MIS.

5.7.7. MIS for Strategic Management

The MIS had not been viewed as an important tool for strategic management. Importance of MIS had not been recognized because its opportunities had not been specified in the business objectives. The existing MIS cover a part of financial arena only but other important areas such as marketing, personnel management, portfolio management etc. had been neglected or poorly covered. In fact, the concept of strategic management has not been well practiced in banks and financial institutions in Bangladesh. Nationalized and specialized banks were mostly run by bureaucrats and cadre service officers of the government. With the growing competition from the private sector, it is expected that the management of banks and financial institutions will increasingly understand the importance of strategic management vis-a-vis MIS.

Chapter VI

Findings- II: MIS Performance And Executives' Attitude Towards CBMIS

6.1.1. Introduction

This chapter presents the result of survey study in details. The methodology of survey study of which the result is being presented now has been enumerated in Chapter-IV. Constructs, sub-constructs, independent criteria variables, primary elements etc. have also been discussed there in details. The results are tabulated and analyzed in several sections: Users' Information Satisfaction, Preparers' Facilities Satisfaction, Analysis of MIS performance, Executives' Attitude Towards Management Information System, Resistances, and Suggestions. The constructs i.e. UIS, PFS, & EAMIS have been statistically analyzed. The data have been analyzed with the help of Z-Test, ANOVA, and Chi - Square Test. The Z-test has been used to analyze whether the constructs (UIS, PFS, EAMIS) differ among the executives or not. Again, the analysis has been done to see whether the constructs differ for the independent criteria. The ANOVA has been used to analyze the design statistically. The question has been whether independent criteria variables differentially affect the constructs. If the statistical tests indicated that the constructs differ reliably, it might be concluded that this difference has been due to the variations in the independent criteria variables; and the different values of the independent criteria variables were thus effective in producing the differences in the constructs. For

data regarding resistances and suggestions, calculation of frequency and chi-square test has been done.

In the final survey, to reinforce the reliability and validity of the design, various statistical tests which had been applied earlier in the test re-test phase were carried out again and results thereof has been presented in appendices. Relevant appendices are: Mean, Standard Deviation, SE of Mean of primary variables (Appendix#6.1); Inter Item Correlation of Job Characters (Appendix#6.2); Cronbach's Alpha of scales in the survey (Appendix#6.3); Split Half Reliability in the survey (Appendix#6.4); Regression of Constructs in the survey (Appendix#6.5); Inter - Item Correlation Coefficients of primary variables in the survey (Appendix#6.6); Correlation Coefficients of Constructs i.e. UIS, PFS & EAMIS (Appendix#6.7); Mean, Standard Deviation and Variance of constructs (Appendix#6.8); ANOVA of UIS, PFS & EAMIS by Criteria (Appendix#6.9); and ANOVA of MISP by Criteria (Appendix#6.10). The final results in a segregated form and analysis thereof have been presented in the following sections.

6.1.2. The Mean of Primary Elements of UIS, PFS and EAMIS

The mean, standard deviation and SE of Mean for all the primary elements has been presented in APPENDIX#6.1. The main points are noted below:

- (1) Twenty nine primary elements of UIS showed mean greater

than 3.0 (standard scale mean being 3.0), except the item "Graphic", of which mean was 2.67 with a standard deviation of 1.31. This low score was due to the fact that graphic was rarely in use.

(2) Twenty three primary elements of PFS showed mean greater than 3.0 and three primary elements of PFS showed mean less than 3.0 (standard scale mean being 3.0). These three items were Accessibility of Computer Files (2.99), Computer Operator (2.89) and Computer Use (2.62). These low scores were due to the fact that all the departments were not equally provided with computer facilities and all executives were not trained in computer handling.

(3) Primary elements of EAMIS (after reversely assigning score with the unfavorable items) basically showed satisfactory scores. The exception was found in the item "Reduction of Personnel" of which mean was 2.70 with a standard deviation of 1.32.

6.1.3 The Inter Item Correlation Coefficients of Job Characters

(1) Job Character Analytical showed significant correlation coefficient with Implement (.41, $p < .01$) and Routine (-.18, $p < .01$). Analytical showed insignificant correlation with Negotiating, Staffing and Uncertainty (Appendix # 6.2).

(2) Job Character Implement showed significant correlation coefficient with Routine (-.12, $p < .05$), Staffing (.23,

$p < .01$) and Uncertainty (.15, $p < .05$). Implement showed insignificant correlation with Negotiating.

(3) Job Character Negotiating showed significant correlation coefficient with Staffing (.19, $p < .01$). But it showed insignificant correlation with Routine and Uncertainty.

(4) Job Character Routine show insignificant correlation with Staffing and Uncertainty. Job Character Staffing show insignificant correlation with Uncertainty.

6.1.4. Reliability of The Scales

(1) Cronbach's Alphas for all scales (UIS, PFS & EAMIS) were greater than 0.81 (Appendix # 6.3).

(2) Correlation Between Forms for both UIS and PFS scales were greater than 0.54 which was 0.20 for EAMIS scale (Appendix # 6.4).

(3) The Split Half Gutman Correlation and Spearman Brown Correlation for both UIS and PFS were greater than 0.70. For EAMIS scales the Split Half Gutman Correlation and Spearman Brown Correlation were 0.31 and 0.34 respectively.

6.1.5. Regression of Constructs

(1) The regression results showed multiple R greater than 0.573 both for UIS and PFS the (Appendix # 6.5).

(2) The F ratios both for UIS and PFS scales were significant at $p < 0.002$.

6.1.6. The Correlation of Primary Elements of UIS and PFS

The correlation coefficients of primary elements of UIS and PFS have been presented in Appendix # 6.6. The main points are given below:

(1) All primary elements of information quality, report quality and information system quality showed significant correlation coefficients (Appendix#6.6, Table # 1,2,&3).

(2) Primary elements of facilities also show significant correlation coefficients except in few cases (Appendix#6.6, Table#4).

The significant correlation coefficients re-enforced the reliability of the scales and whatever exceptions found were due to only five primary elements of PFS scale (type writer with accessibility to computer files $r=-.4468$; calculator with accessibility to colleagues $r=-.1675$, calculator with accessibility to external sources $r=-.1732$, calculator with accessibility to supporting documents $r=-.1517$; format pre-specified with logistics $r=-.1229$) and may be ignored.

6.1.7. Scores of UIS, PFS, MISP & EAMIS by Criteria

The composite scores of UIS, PFS, MISP and EAMIS for independent criteria variables has been presented in the table#6.1 in the next page.

Table # 6.1

Scores of UIS, PFS, MISP & EAMIS by Criteria

Criteria	UIS	PFS	MISP	EAMIS
Group of Banks:	114	95	209	110
NCBs	113	93	206	108
DNPCBs	112	91	203	107
1PCBs	113	102	215	114
SPBs	113	94	206	113
FBs	131	104	235	116
Functional Departments:	114	95	209	110
Operations	117	98	215	111
Administration	106	89	195	108
Finance & Accounts	116	93	209	111
Development	113	97	210	113
Management Levels:	114	95	209	110
Top	111	95	206	111
Middle Upper	111	94	205	112
Middle Lower	116	96	212	111
Bottom	113	95	207	109
Age Group:	114	95	209	110
Below 30	116	97	213	110
30-35	117	99	216	114
35-40	114	96	210	110
40-45	114	95	209	109
45-50	112	93	204	111
50 & Above	108	91	199	108
Experience Levels:	114	95	209	110
Below 5	114	93	207	110
5-10	116	97	213	112
10-15	117	98	215	110
15-20	113	94	207	112
20-25	110	92	203	110
25 & Above	109	91	200	107
Gender:	114	95	209	110
Male	114	95	209	110
Female	111	98	209	115
Education Faculty:	114	95	209	110
Arts	108	93	201	111
Commerce/Business	116	96	212	113
Science	115	95	210	108
Education Levels:	114	95	209	110
Below 14	112	91	203	104
14-16	113	92	205	108
16-18	114	96	210	111
18 & Above	116	103	219	121
Job Character: Analytical	114	95	209	110
Lowest Involvement	113	97	209	110
Low Involvement	111	90	201	110
Medium Involvement	112	95	207	108
High Involvement	114	95	210	112
Highest Involvement	117	97	213	112
Job Character: Implement	114	95	209	110
Lowest Involvement	112	92	203	114
Low Involvement	113	95	208	109
Medium Involvement	112	96	209	111
High Involvement	113	95	208	110
Highest Involvement	123	98	221	108

Job Character: Negotiating	114	95	209	110
Lowest Involvement	112	92	204	110
Low Involvement	113	92	202	110
Medium Involvement	114	98	212	110
High Involvement	115	96	228	111
Highest Involvement	125	103	209	111
Job Character: Routine	114	95	209	110
Lowest Involvement	115	95	210	115
Low Involvement	110	91	202	104
Medium Involvement	109	94	203	111
High Involvement	114	95	209	110
Highest Involvement	119	98	217	111
Job Character: Staffing	114	95	209	110
Lowest Involvement	115	94	209	111
Low Involvement	112	98	210	111
Medium Involvement	107	93	199	109
High Involvement	121	97	218	109
Highest Involvement	120	102	221	110
Job Character: Uncertainty	114	95	209	110
Lowest Involvement	115	93	208	112
Low Involvement	116	97	212	112
Medium Involvement	113	95	208	106
High Involvement	109	98	208	111
Highest Involvement	108	94	201	118
MIS Involvement	114	95	209	110
Preparer	116	94	209	111
User	110	91	201	111
Both User & Preparer	114	99	212	110
Functional Management:Operational	114	95	209	110
Lowest Involvement	110	96	206	115
Low Involvement	108	92	200	106
Medium Involvement	109	92	201	109
High Involvement	115	96	212	111
Highest Involvement	119	97	216	111
Functional Management:Control	114	95	209	110
Lowest Involvement	112	94	206	111
Low Involvement	119	97	216	108
Medium Involvement	114	96	209	111
High Involvement	112	91	203	110
Highest Involvement	109	102	212	114
Functional Management:Strategic	114	95	209	110
Lowest Involvement	114	95	209	112
Low Involvement	114	94	207	110
Medium Involvement	114	96	210	104
High Involvement	112	94	206	113
Highest Involvement	119	98	217	113
Computer Knowledge	114	95	209	110
Novice	108	86	194	109
Lower	112	94	207	109
Moderate	117	100	217	112
Almost Expert	121	98	219	111
Expert	107	99	205	119
Computer Experience	114	95	209	110
Novice	109	89	198	110
Lower	117	97	214	108
Moderate	115	100	215	112
Almost Expert	122	98	220	112
Expert	109	100	209	126

Note: Details in Appendix # 6.9. & Appendix # 6.10. Also see section 6.4.1. for analysis of MISP.

6.1.8. Correlation Coefficients of Constructs

The UIS and PFS showed significant correlation coefficients (0.516, $p < .01$). Although the EAMIS favorable items showed correlation coefficients of 0.32 ($p < .01$) and 0.47 ($p < .01$) with UIS and PFS respectively, the EAMIS unfavorable items show no correlation either with UIS or PFS (Appendix # 6.7).

6.2.1. Users' Information Satisfaction

In the measurement process of users' information satisfaction, no distinction has been made among the existing information systems. The study has been designed to evaluate the system and to ascertain the linkage between criteria and users' information satisfaction (UIS). The model of information satisfaction has been formulated considering various information and system related variables (please see Chapter I, Section 1.6.1). To evaluate the information satisfaction, thirty items were included in the questionnaire. The composite scores of nine factors (Timeliness, Currency, Frequency, Accuracy, Completeness, Relevance, Conciseness, Neutrality, and Processed Sufficiently) constitute the "Information Quality" sub-construct. The composite scores of ten factors (Presentation, Measuring Performance, Clarity, Volume, Order, Description, Quantitative, Graphic, Meaningful, and Title) constitute the "Report Quality" sub-construct. The composite scores of eleven factors (Projected Data, Time Context, Space Context, Add Value, Improve Decision,

Regularity, Reasonable Time, Clear Context, Feedback, Feedforward, and Critical Success Factors) constitute the "Information System Quality" sub-construct. All the factors contribute to the performance of information system and are desirable. The composite score of thirty factors mentioned above constitute the construct, UIS. The officers and executives were requested to express their perceived satisfaction on each item on a five point Likert scale (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree). UIS have been analyzed among executives and against criteria variables. In the following sections, tables have been provided showing the results of hypotheses testing.

6.2.2. Analysis of Users' Information Satisfaction

Users' Information Satisfaction is a function of the relationship between what executives perceived expectation from the information system and what they obtain from the information system. What they obtained from the system relative to their expectation has been expressed by how much importance or value the executives assigned to the primary factors. The practice of MIS in banks and financial institutions in Bangladesh differ. This was due to origin, ownership, organizational structure and culture. The executives' information satisfaction was expected to differ and hence the following null hypothesis was formulated from the alternative hypotheses (Appendix # 1.1):

Null Hypothesis

H₁ The information satisfaction among the executives indicated by UIS are assumed to be similar.

The level of significance of UIS among the executives has been calculated with the help of "Z" test using the following formula (Also see Appendix 6.8 for Mean, SD & Variance of the constructs):

$$Z = \frac{(\bar{X} - \mu)}{(\delta / \sqrt{n})}$$

Where, Z= Obtained Test Statistics, \bar{X} = Observed Mean, μ = Assumed Mean, δ = Sample Variance, and n= Cases.

The results have been presented in Table # 6.2.

Table # 6.2

Significance of UIS Mean Difference Among The Executives

Mean	Assumed Mean	STD	Sample Variance	Cases (n)	DF	Calculated Z	Tabulated Z (2.5%)
113.81	75	14.76	217.83	267	266	2.9112	1.960

The population mean for each item in the five point scale has been assumed to be 2.5 (Assumed mean of 2.5 represents a conservative estimate on the part of researcher) and hence for thirty UIS items, the assumed population mean become 75 (2.5*30). The observed UIS mean and variances were 113.81 and 217.83 respectively. The calculated Z value became 2.9112 which was greater than tabulated Z value (1.960) at 2.5% probability (at two tail test). Since the observed value of Z was 2.9112 and the

probability of observing a value of $Z=2.9112$ or larger was 0.00187 which was less than 0.025, hence we reject the null hypothesis. It is most probable that users' information satisfaction as indicated by UIS does differ. Whether, users' information satisfaction for various independent criteria variables differ or not has been analyzed in the following sections.

6.2.3. Analysis of UIS by Independent Criteria

The level of significance of Users' Information Satisfaction among the executives has been analyzed in-respect of twenty independent criteria variables. The detailed tables showing results of statistical test (ANOVA) are in Appendix 6.9 (Table # 1 to 20). This was done to test the null hypotheses shown in table # 6.3. in next page.

The summary of statistical test results has been presented in the table # 6.4. To determine the probability associated with each value of F, a level of 0.05 have been set for each F test. In case of null hypotheses $H_2, H_3, H_9, H_{11}, H_{12}, H_{14}, H_{15}, H_{17}, H_{18}, H_{20}$ and H_{21} the observed probability were less than 0.05 or observed F values were greater than tabulated F values. Hence, these null hypotheses have been rejected and probability of happening the occurrence stated in these null hypotheses are less than 5%. Thus it is probable that the independent criteria

Table 6.3

Null Hypotheses Relating to UIS

H ₀	Statement of Hypotheses	Independent Criteria
H ₂	The information satisfaction among the executives, indicated by UIS, are assumed to be similar	in different Group of Banks.
H ₃	-Do-	in different Functional Departments.
H ₄	-Do-	in different Management Levels.
H ₅	-Do-	in different Age Groups.
H ₆	-Do-	in different Experience Levels.
H ₇	-Do-	in different Genders.
H ₈	-Do-	for different Education Faculties.
H ₉	-Do-	for different Education Levels.
H ₁₀	-Do-	for different extent of involvement in Job Character: Analytical.
H ₁₁	-Do-	for different extent of involvement in Job Character: Implement.
H ₁₂	-Do-	for different extent of involvement in Job Character: Routine.
H ₁₃	-Do-	for different extent of involvement in Job Character: Uncertainty.
H ₁₄	-Do-	for different extent of involvement in Job Character: Negotiation.
H ₁₅	-Do-	for different extent of involvement in Job Character: Staffing.
H ₁₆	-Do-	for different types of MIS Involvement.
H ₁₇	-Do-	for different extent of involvement in Functional Management: Operational.
H ₁₈	-Do-	for different extent of involvement in Functional Management: Control.
H ₁₉	-Do-	for different extent of involvement in Functional Management: Strategic Planning.
H ₂₀	-Do-	for different extent of Computer Knowledge.
H ₂₁	-Do-	for different extent of Computer Experience.

variables such as: Group of Banks, Functional Departments, Education Faculty, Job Character Implement, Job Character Routine, Job Character Negotiating, Job Character Staffing, Functional Management: Operational, Functional Management: Control, Computer Knowledge and Computer Experience were more effective in discriminating the users' information satisfaction.

In other words, the users' information satisfaction differs for respondents belonging to these independent criteria variables.

Table # 6.4

Analysis of Variances of Users' Information Satisfaction

Sl.	Independent Criteria	F Ratio	F Probability	Tabulated F (5%)	Null Hypothesis (H ₀)	Rejected
1.	Group of Banks	6.7210	0.0000	2.37	H ₂	Yes
2.	Functional Departments	8.2252	0.0000	2.60	H ₃	Yes
3.	Management Levels	1.4548	0.2273	2.60	H ₄	No
4.	Age Groups	1.4945	0.1919	2.21	H ₅	No
5.	Experience Levels	1.9130	0.0925	2.21	H ₆	No
6.	Gender	0.5937	0.4417	3.84	H ₇	No
7.	Education Faculty	6.7586	0.0014	2.99	H ₈	Yes
8.	Education Levels	0.2164	0.8850	2.60	H ₉	No
9.	Job: Analytical	1.1516	0.3328	2.37	H ₁₀	No
10.	Job: Implement	3.2053	0.0136	2.37	H ₁₁	Yes
11.	Job: Routine	3.7075	0.0059	2.37	H ₁₂	Yes
12.	Job: Uncertainty	1.8006	0.1291	2.37	H ₁₃	No
13.	Job: Negotiating	4.1486	0.0028	2.37	H ₁₄	Yes
14.	Job: Staffing	4.2150	0.0025	2.37	H ₁₅	Yes
15.	MIS Involvement	2.8565	0.0592	2.99	H ₁₆	No
16.	Functional Management: Operational	5.2794	0.0004	2.37	H ₁₇	Yes
17.	Functional Management: Management Control	3.1541	0.0148	2.37	H ₁₈	Yes
18.	Functional Management: Strategic Planning	0.6739	0.6106	2.37	H ₁₉	No
19.	Computer Knowledge	6.6132	0.0000	2.37	H ₂₀	Yes
20.	Computer Experience	6.5948	0.0000	2.37	H ₂₁	Yes

In case of null hypotheses H_4 , H_5 , H_6 , H_7 , H_9 , H_{10} , H_{13} , H_{16} , and H_{19} , the observed probability were more than 0.05 or observed F values were less than tabulated F values. Hence, these null hypotheses could not be rejected and the probability of happening what have been stated in these null hypotheses are more than 5%. Thus it is probable that users' information satisfaction does not differ for their Management Levels, Age Groups, Experience Levels, Gender, Education Levels, Job Character Analytical, Job Character Uncertainty, MIS Involvement, and Functional Management: Strategic Planning.

6.3.1. Preparers' Facilities Satisfaction

The construct, preparers' facilities satisfaction has been formulated considering various physical, procedural, accessibility, keeping, and environmental variables. To evaluate the facilities satisfaction, twenty six items were included in the questionnaire. The composite scores of five factors (Computer Facilities, Computer Use, Calculator, Typewriter, and Copier) constitute the "Physical Facilities" sub-construct. The composite scores of five factors (Manual, Circular, Forms pre-specified, Forms adequate to need, Forms adequate for data and narration) constitute the "Procedural" sub-construct. The composite scores of four factors (Supporting-Documents, Colleagues, External-Sources, Computer-Files) constitute the "Accessibility" sub-construct. The composite scores of six factors (Recording

Systematically in Ledger, Indexed, Date Wise, Subject Wise, Organization of Documents, Organization of Ledger) constitute the "Keeping" sub-construct. And, the composite scores of six factors (Disturbance by Colleague, Disturbance by Crowd, Computer Operators, Assistance from Information Personnel, Mail, and Logistics) constitute the "Environmental" sub-construct. All factors contribute to the performance of information system. The composite scores of twenty six factors mentioned above constitute the construct, PFS. The officers and executives were requested to express their perceived satisfaction on each item on a five point Likert scale (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree). PFS have been analyzed among executives and also against criteria variables. In the following sections, separate tables have been provided showing the results of related hypotheses testing.

6.3.2. Analysis of Preparers' Facilities Satisfaction

Preparers' Facilities Satisfaction is the relationship between executives perceived expectation from the organizational settings for the purpose of information handling and information use with what they obtain from the settings. What they obtain from the system relative to their expectation has actually been expressed by their perceived valuation of factors i.e. how much importance or value the executives assign to the factors. How much facilities the executives get in relation to various factors

are thus measured by the extent of the satisfaction expressed about the quality of facilities the executives think have been provided or existed. The executives have expressed this in a five point Likert scale. It is their mental state, feeling or judgement about facilities available relative to their expected facilities in the existing settings. The executives' facilities satisfaction was expected to differ and hence the following null hypothesis was formulated:

Null Hypothesis

H₂₂ The facilities satisfaction among the executives indicated by PFS are assumed to be similar.

The level of significance of PFS among the executives has been calculated with the help of "Z" test using the following formula:

$$Z = \frac{(\bar{X} - \mu)}{(\delta / \sqrt{n})}$$

Where, Z= Obtained Test Statistics, \bar{X} = Observed Mean, μ = Assumed Mean, δ = Sample Variance, and n= Cases.

The results have been presented in the Table # 6.5.

Table # 6.5
Significance of PFS Mean Difference Among The Executives

Mean	Assumed Mean	STD	Sample Variance	Cases	DF	Calculated Z	Tabulated Z (2.5%)
95.15	65	13.15	172.96	267	266	2.3238	1.960

Note: Appendix 6.8 shows the detailed results.

The population mean for each item in the five point scale has been assumed to be 2.5 (as stated earlier) and hence for twenty six PFS items, the assumed population mean become 65 (2.5×26). The observed PFS mean and variance were 95.15 and 172.96 respectively. The calculated Z become 2.3238 which was greater than tabulated Z value (1.960) at 2.5% probability (two tail test). Since the observed value of Z was 2.3238 and the probability of observing a value of $Z=2.3238$ or larger was 0.01072 which was less than 0.025, hence we reject the null hypothesis. Thus it is most probable that satisfaction of preparers' relating to facilities as indicated by PFS does differ. Whether, preparers' facilities satisfaction always differ or not has been analyzed in the following sections.

6.3.3. Analysis of PFS by Independent Criteria

The level of significance of Preparers' Facilities Satisfaction among the executives have been analyzed in-respect of independent criteria variables (Appendix 6.9: Table # 21 to 40). This was done to test the null hypotheses shown in table#6.6. in next page.

Table 6.6

Null Hypotheses Relating to PFS

H ₀	Statement of Hypotheses	Independent Criteria
H ₂₃	The information satisfaction among the executives, indicated by PFS are assumed to be similar	in different Group of Banks.
H ₂₄	-Do-	in different Functional Departments.
H ₂₅	-Do-	in different Management Levels.
H ₂₆	-Do-	in different Age Groups.
H ₂₇	-Do-	in different Experience Levels.
H ₂₈	-Do-	in different Genders.
H ₂₉	-Do-	for different Education Faculties.
H ₃₀	-Do-	for different Education Levels.
H ₃₁	-Do-	for different extent of involvement in Job Character: Analytical.
H ₃₂	-Do-	for different extent of involvement in Job Character: Implement.
H ₃₃	-Do-	for different extent of involvement in Job Character: Routine.
H ₃₄	-Do-	for different extent of involvement in Job Character: Uncertainty.
H ₃₅	-Do-	for different extent of involvement in Job Character: Negotiation.
H ₃₆	-Do-	for different extent of involvement in Job Character: Staffing.
H ₃₇	-Do-	for different types of MIS Involvement.
H ₃₈	-Do-	for different extent of involvement in Functional Management: Operational.
H ₃₉	-Do-	for different extent of involvement in Functional Management: Control.
H ₄₀	-Do-	for different extent of involvement in Functional Management: Strategic Planning.
H ₄₁	-Do-	for different extent of Computer Knowledge.
H ₄₂	-Do-	for different extent of Computer Experience.

The summary of statistical test results have been presented in the table # 6.7.

Table # 6.7

Analysis of Variances of Preparers' Facilities Satisfaction

Sl.	Independent Criteria	F Ratio	F Probability	Tabulated 5% F	Null Hypothesis (H_0)	Rejected
1.	Group of Banks	7.1718	0.0000	2.37	H_{23}	Yes
2.	Functional Departments	6.9932	0.0002	2.60	H_{24}	Yes
3.	Management Levels	0.2578	0.8557	2.60	H_{25}	No
4.	Age Groups	1.5753	0.1673	2.21	H_{26}	No
5.	Experience Levels	2.1019	0.0656	2.21	H_{27}	No
6.	Gender	0.6732	0.4127	3.84	H_{28}	No
7.	Education Faculty	1.1299	0.3246	2.99	H_{29}	No
8.	Education Levels	2.6212	0.0512	2.60	H_{30}	Yes
9.	Job: Analytical	0.9440	0.4390	2.37	H_{31}	No
10.	Job: Implement	1.1858	0.3174	2.37	H_{32}	No
11.	Job: Routine	1.4745	0.2103	2.37	H_{33}	No
12.	Job: Uncertainty	1.0130	0.4011	2.37	H_{34}	No
13.	Job: Negotiating	5.1699	0.0005	2.37	H_{35}	Yes
14.	Job: Staffing	1.9591	0.1011	2.37	H_{36}	No
15.	MIS Involvement	7.6894	0.0006	2.99	H_{37}	Yes
16.	Functional Management: Operational	1.6017	0.1742	2.37	H_{38}	No
17.	Functional Management: Management Control	3.1023	0.0161	2.37	H_{39}	Yes
18.	Functional Management: Strategic Planning	0.5174	0.7230	2.37	H_{40}	No
19.	Computer Knowledge	13.1570	0.0000	2.37	H_{41}	Yes
20.	Computer Experience	8.8752	0.0000	2.37	H_{42}	Yes

In case of null hypothesis H_{23} , H_{24} , H_{30} , H_{35} , H_{37} , H_{39} , H_{41} , and H_{42} the observed probability were less than 0.05 or observed F values were greater than tabulated F values. Hence, these null hypotheses have been rejected and probability of happening the occurrences stated in these null hypotheses are less than 5%. Thus it is probable that the independent criteria variables such as: Group of Banks, Functional Departments, Education Levels, Job Character Negotiating, MIS Involvement, Functional Management Control, Computer Knowledge and Computer Experience were more effective in discriminating the preparers' facilities satisfaction. In other words, the preparers' facilities satisfaction differs for respondent's attachment to these independent criteria variables.

In case of null hypotheses H_{25} , H_{26} , H_{27} , H_{28} , H_{29} , H_{31} , H_{32} , H_{33} , H_{34} , H_{36} , H_{38} , and H_{40} the observed probability were more than 0.05 or observed F values were less than tabulated F values. Hence, these null hypotheses could not be rejected and the probability of happening what have been stated in these null hypotheses are more than 5%. Thus it is probable that preparer' facilities satisfaction do not differ for their Management Levels, Age Groups, Experience Levels, Gender, Education Faculty, Job Character Analytical, Job Character Implement, Job character Routine, Job Character Uncertainty, Job character Staffing, Functional Management Operational, and Functional Management Strategic Planning.

6.4.1. Analysis of MIS Performance

The procedure of deriving the MIS performance has been stated earlier in details in the Methodology Chapter. The combined scores of UIS and PFS constitute the MIS performance (MISP). The analysis of variance of MISP with criteria has been presented in Appendix # 6.10. The findings are as follows:

(1) FBBs show highest MIS Performance (235.2941), followed by IPCBs (215.2326), SPBs (206.3191), NCBs (205.5929) and DNPCBs (202.9500). The obtained MIS performance significantly differ among the Group of Banks ($F=7.4818$; $df=4,262$; $p<.0000$).

(2) Department Groups: Operations show highest MIS performance (214.8594) followed by Development (210.1190), Finance & Accounts (209.0263) and Administration (195.3220). The MIS performance significantly differ among the Department Groups ($F=9.5773$; $df=3,263$; $p<.0000$).

(3) Among the Experience Levels, the 10-15 years of experience group show highest MIS performance and MIS performance significantly differ among the experience levels ($F=2.6421$; $df=5,261$; $p<.0237$).

(4) The Education Faculty: Commerce/Business shows highest MIS performance (212.4904) followed by Science (210.3505) and Arts (201.3788). The MIS performance shows significant difference for variation in the executives' education faculty ($F=4.5842$; $df=2,264$, $p<.0110$).

(5) Among the six job characters, MIS performance significantly differ for variation in level of involvement in Implement ($F=2.3796$; $df=4,262$; $p<.0522$), Negotiating ($F=5.9063$; $df=4,262$; $p<.0001$), Routine ($F=3.1708$; $df=4,262$; $p<.0144$), and Staffing ($F=3.1668$; $df=4,262$; $p<.0145$). The highest involvement in job characters show highest MIS performance such as: Analytical (213.6735), Implement (221.000), Negotiating (228.0476), Routine (217.1967), and Staffing (221.7857). But low involvement in Uncertainty show highest MIS performance (212.5263).

(6) Those who had exposed themselves as Both Preparer and User of reports show highest MIS performance (212.4107) followed by Preparer (209.3883) and User (200.7115). The MIS performance significantly differ for variation in MIS involvement ($F=4.2375$; $df=2,264$; $p<.0154$).

(7) MIS performance significantly differ for variation in the level of involvement in Functional Management - Control ($F=2.4231$; $df=4,262$; $p<.0487$) and Functional Management - Operational ($F=4.1379$; $df=4,262$; $p<.0029$) but does not differ for different levels of involvement in strategic planning.

(8) Computer Knowledge: Almost Expert group shows highest MIS performance (219.9259) and Novice shows lowest (198.2347). Similarly, the Computer Experience: Almost Expert group shows highest MIS performance (218.8214) and

Novice shows lowest (194.6324). The MIS performance significantly differ both for extent of executives' knowledge of ($F=11.9218$; $df=4,262$; $p<.0000$) and experience with computer ($F=8.8422$; $df=4,262$, $p<.0000$).

6.5.1. Executives' Attitude Towards MIS

To evaluate the executives attitude, twenty eight items were included in the questionnaire. In the attitude scale, two groups of items were selected, i.e. fourteen positively stated items and fourteen negatively worded items about computer-based MIS. To calculate the composite score of EAMIS, respondents' assigned scores in unfavorable items were arranged in reverse order i.e. 5, 4, 3, 2, & 1 were reverted as 1, 2, 3, 4, & 5. In the following sections, tables have been provided showing the results of related hypotheses testing.

6.5.2. Analysis of Executives' Attitude Towards MIS

The attitude of executives is a major factor in computerizing operations and Management Information Systems effectively. The executives' attitude towards computer based MIS (EAMIS) was expected to differ and hence the following null hypothesis has been formulated:

Null Hypothesis

H₄₃ The attitude towards computer based MIS among the executives indicated by EAMIS are assumed to be similar.

The Z test is appropriate to analyze the design statistically i.e. whether the construct EAMIS differ among the executives or not. The level of significance of EAMIS among the executives has been calculated with the help of "Z" test using the following formula:

$$Z = \frac{(\bar{X} - \mu)}{(\delta / \sqrt{n})}$$

Where, Z= Obtained Test Statistics, \bar{X} = Observed Mean, μ = Assumed Mean, δ = Sample Variance, and n= Cases.

The results have been presented in the Table # 6.8.

Table # 6.8

Significance of EAMIS Mean Difference Among The Executives

Mean	Assumed Mean	STD	Sample Variance	Cases	DF	Calculated Z	Tabulated Z (5%)
110.46	70	12.40	153.78	267	266	3.5074	1.960

Note: Also see Appendix 6.8 for detailed calculation.

The population mean for each item has been assumed to be 2.5 and hence for twenty eight items the assumed population mean become 70 (2.5*28). The Z value of 3.5074 shows that probability of happening the case of similar attitude is less than 0.001. Hence, the null hypothesis (H_{43}) has been rejected and we conclude, it is most probable that the attitude towards computer based MIS among the executives indicated by EAMIS are dissimilar.

6.5.3. Analysis of Executives' Attitude by Criteria

The level of significance of "Attitude towards computer based MIS" among the executives has been analyzed in-respect of independent criteria variables (Appendix # 6.9: Table#41 to 60). This was done to test the null hypotheses shown in table # 6.9.

Table 6.9

Null Hypotheses Relating to EAMIS

H ₀	Statement of Hypotheses	Independent Criteria
H ₄₄	The information satisfaction among the executives, indicated by EAMIS, are assumed to be similar	in different Group of Banks.
H ₄₅	-Do-	in different Functional Departments.
H ₄₆	-Do-	in different Management Levels.
H ₄₇	-Do-	in different Age Groups.
H ₄₈	-Do-	in different Experience Levels.
H ₄₉	-Do-	in different Genders.
H ₅₀	-Do-	for different Education Faculties.
H ₅₁	-Do-	for different Education Levels.
H ₅₂	-Do-	for different extent of involvement in Job Character: Analytical.
H ₅₃	-Do-	for different extent of involvement in Job Character: Implement.
H ₅₄	-Do-	for different extent of involvement in Job Character: Routine.
H ₅₅	-Do-	for different extent of involvement in Job Character: Uncertainty.
H ₅₆	-Do-	for different extent of involvement in Job Character: Negotiation.
H ₅₇	-Do-	for different extent of involvement in Job Character: Staffing.
H ₅₈	-Do-	for different types of MIS Involvement.
H ₅₉	-Do-	for different extent of involvement in Functional Management: Operational.
H ₆₀	-Do-	for different extent of involvement in Functional Management: Control.
H ₆₁	-Do-	for different extent of involvement in Functional Management: Strategic Planning.
H ₆₂	-Do-	for different extent of Computer Knowledge.
H ₆₃	-Do-	for different extent of Computer Experience.

The summary of statistical test results has been presented in the table # 6.10.

Table # 6.10

Analysis of Variances of Executives' Attitude Towards Computer Based Management Information Systems

Sl.	Independent Criteria	F Ratio	F Probability	Tabulated F (5%)	Null Hypothesis (H ₀)	Rejected
1.	Group of Banks	4.4493	0.0017	2.37	H ₄₄	Yes
2.	Functional Departments	1.9205	0.1266	2.60	H ₄₅	No
3.	Management Levels	1.1399	0.3334	2.60	H ₄₆	No
4.	Age Groups	1.1477	0.3356	2.21	H ₄₇	No
5.	Experience Levels	0.7168	0.6113	2.21	H ₄₈	No
6.	Gender	2.5974	0.1082	3.84	H ₄₉	No
7.	Education Faculty	3.3479	0.0367	2.99	H ₅₀	Yes
8.	Education Levels	4.2143	0.0062	2.60	H ₅₁	Yes
9.	Job: Analytical	0.9955	0.4105	2.37	H ₅₂	No
10.	Job: Implement	0.9488	0.4363	2.37	H ₅₃	No
11.	Job: Routine	2.0864	0.0829	2.37	H ₅₄	No
12.	Job: Uncertainty	4.2549	0.0024	2.37	H ₅₅	Yes
13.	Job: Negotiating	0.1888	0.9441	2.37	H ₅₆	No
14.	Job: Staffing	0.1886	0.9442	2.37	H ₅₇	No
15.	MIS Involvement	0.4079	0.6654	2.99	H ₅₈	No
16.	Functional Management: Operational	2.2943	0.0598	2.37	H ₅₉	No
17.	Functional Management: Management Control	1.2465	0.2916	2.37	H ₆₀	No
18.	Functional Management: Strategic Planning	4.0430	0.0034	2.37	H ₆₁	Yes
19.	Computer Knowledge	1.6441	0.1635	2.37	H ₆₂	No
20.	Computer Experience	2.7283	0.0297	2.37	H ₆₃	Yes

In case of null hypothesis H_{44} , H_{50} , H_{51} , H_{55} , H_{61} , and H_{63} the observed probability were less than 0.05 or observed F values were greater than tabulated F values. Hence, these null hypotheses have been rejected and probability of happening the occurrences stated in these null hypotheses are less than 5%. Thus, it is probable that the independent criteria variables such as: Group of Banks, Education Faculty, Education Levels, Job Character Uncertainty, Functional Management: Strategic Planning, and Computer Experience were more effective in discriminating the executives attitude. In other words, executives' attitude differs for independent criteria variables.

In case of null hypotheses H_{45} , H_{46} , H_{47} , H_{48} , H_{49} , H_{52} , H_{53} , H_{54} , H_{56} , H_{57} , H_{58} , H_{59} , H_{60} , and H_{62} the observed probability were more than 0.05 or observed F values were less than tabulated F values. Hence, these null hypotheses could not be rejected and the probability of happening what have been stated in these null hypotheses are more than 5%. Thus, it is probable that executives' attitude do not differ for their Functional Departments, Management Levels, Age Groups, Experience Levels, Gender, Job Character Analytical, Job Character Implement, Job character Routine, Job Character Negotiating, Job character Staffing, MIS Involvement, Functional Management: Operational, Functional Management: Control and Knowledge of Computer.

6.6.1. Analysis of Resistances and Suggestions

The purpose of this section is to focus on resistances that the executives confronted while computerizing the institutions they belong to. The listed resistances and suggestions were gathered in the test re-test phase. The final survey of this study was preceded by re-test of the survey questionnaire. In the re-test phase, the respondents were requested to list down the resistances to the adaptation of computer based MIS. The responses of the re-test were classified into a number of items for inclusion in the final survey questionnaire.

In the survey, the respondents were requested to tick on "Yes - No" box to express their opinion i.e. whether they have experienced the same problems, resistances or view the same problems, resistances existed and whether they support the same suggestions. The analysis of the above data and interpretation thereof have been made. No prior hypotheses were formulated for resistances and suggestions. However, to show significance, the test statistics (chi square) have been applied.

The respondents were also asked to tick on "Yes-No" boxes to express whether they had confronted the resistances in the adaptation of computer based MIS in their organizations and whether they support the listed suggestions. We can verify whether in these data, there is a genuine criteria difference in the factors of resistance and suggestions. The question might be, "Is the difference in "Yes-No" responses statistically

significant?". Whether the "Yes-No" responses differ significantly with the criteria or not, we proceeded with a null hypothesis that the two attributes (Resistances and Criteria) are independent. To test the null hypothesis that there is no criteria difference for all the frequencies taken together i.e. there is no correlation between resistances and criteria, the Chi Square test is appropriate to analyze the design statistically. In the following section, the overall frequencies of resistance have been presented followed by chi - square test results.

6.6.2. Frequencies of Resistances

The frequencies of "Yes-No" responses against factors of resistance has been presented in the table # 6.11.

Table # 6.11

Frequencies of Factors of Resistances

Sl. No.	Factors of Resistances	Yes		No		Cases (n)
		Frequency	Percent	Frequency	Percent	
01.	No Resistance	173	65	90	35	263
02.	Unlikely to confront resistance	142	53	120	46	262
03.	Fear of unemployment	105	39	162	61	267
04.	Lack of top executives knowledge	164	63	94	36	263
05.	Malpractice of users'	86	32	173	68	259
06.	Shortage of fund	131	49	133	51	264
07.	Lack of policy	143	54	122	46	165
08.	Dissatisfaction of computer personnel	71	27	191	73	262
09.	Lack of information privacy	69	26	195	74	264
10.	Adverse social effect	58	22	207	78	265

6.6.3. The Chi - Square of Factors of Resistances by Criteria

The chi square test was run for ten factors of resistances with twenty criteria. The results have been presented in table#6.12.

Table # 6.12

Chi - Square Test Results for Factors of CBMIS Resistance
(For significant items only)

Criteria	Factors	χ^2	df	p
Group of Banks	a) Fear of unemployment	19.14	4	.000
	b) Lack of top executives knowledge	33.17	8	.000
	c) Mal-practice of users	17.82	8	.022
	d) Dissatisfaction of computer personnel	21.83	8	.005
	e) Adverse social effect	28.92	8	.000
Functional Departments	a) Mal-practice of users	21.81	6	.001
	b) Shortage of fund	15.76	6	.015
	c) Dissatisfaction of computer personnel	16.45	6	.011
Age Groups	a) Fear of unemployment	17.53	5	.003
Experience Levels	a) Unlikely to confront resistance	18.62	10	.045
	b) Fear of unemployment	12.33	5	.030
	c) Dissatisfaction of computer personnel	28.65	10	.001
	d) Adverse social effect	19.47	10	.033
Education Faculty	a) Lack of top executives knowledge	12.54	4	.014
	b) Mal-practice of users	11.15	4	.021
	c) Shortage of fund	17.87	4	.001
Education Levels	a) Fear of unemployment	10.43	3	.015
	b) Shortage of fund	12.45	6	.052
	c) Lack of Policy	14.65	6	.023
Job Character Analytical	a) Fear of unemployment	11.97	4	.017
	b) Lack of top executives knowledge	16.89	8	.031
	c) Mal-practice of users	24.65	8	.002
	d) Shortage of fund	26.41	8	.000
Job Character Implement	a) No resistance	20.39	8	.009
	b) Lack of top executives knowledge	29.86	8	.000
	c) Mal-practice of users	27.40	8	.000
	d) Shortage of fund	26.44	8	.000
	e) Lack of Policy	20.36	8	.009
	f) Dissatisfaction of computer personnel	30.40	8	.000
Job Character Routine	a) Unlikely to confront resistance	15.21	8	.055
	b) Lack of information privacy	20.55	8	.008
Job Character Uncertainty	a) No resistance	33.08	8	.000
	b) Unlikely to confront resistance	18.74	8	.016
	c) Lack of top executives knowledge	18.81	8	.016
	d) Mal-practice of users	17.02	8	.029
	e) Lack of Policy	16.14	8	.040
	f) Dissatisfaction of computer personnel	25.41	8	.001
Job Character Negotiating	a) Unlikely to confront resistance	18.16	8	.020
	b) Fear of unemployment	17.91	4	.001
	c) Mal-practice of users	15.48	8	.050
	d) Shortage of fund	19.44	8	.013
	e) Lack of Policy	16.14	8	.040
	f) Dissatisfaction of computer personnel	20.24	8	.009
Job Character Staffing	a) Fear of unemployment	10.79	4	.029

MIS Involvement	a) No resistance	14.47	4	.006
	b) Unlikely to confront resistance	10.41	4	.034
	c) Dissatisfaction of computer personnel	15.94	4	.003
Functional Management: Operational	a) Lack of Policy	16.99	8	.030
Functional Management: Control	a) Fear of unemployment	11.16	4	.024
	b) Mal-practice of users	19.34	8	.013
	c) Shortage of fund	16.54	8	.035
	d) Lack of Policy	15.24	8	.054
Functional Management: Strategic	a) Fear of unemployment	16.23	4	.003
	b) Mal-practice of users	21.54	8	.006
	c) Shortage of fund	25.54	8	.001
	d) Dissatisfaction of computer personnel	16.40	8	.037
	e) Lack of information privacy	19.81	8	.011
	f) Adverse social effect	29.75	8	.000
Computer Knowledge	a) Fear of unemployment	18.44	4	.001
	b) Mal-practice of users	17.87	8	.022
Computer Experience	a) No resistance	19.79	8	.011

Note: Calculated through SPSS: $S/F/C/s/x^2$

The main points are listed below:

- (1) Responses against the assertion "No resistance encountered" significantly differ for criteria such as: Job Character-Implement, Job Character Uncertainty, MIS Involvement, and Computer Experience.
- (2) Assertion of computerization is unlikely to confront resistances significantly differ for variation in Experience Levels, Job Character- Negotiating, Job Character Routine, Job Character Uncertainty, and MIS Involvement.
- (3) Fear of unemployment significantly differ for Group of Banks, Age Groups, Experience Levels, Education Levels, Job Character-Analytical, Job Character- Negotiating, Job Character- Staffing, Functional Management: Control, Functional Management: Strategic Planning, and Computer Knowledge.
- (4) Responses on lack of top executives knowledge significantly differ for Group of Banks, Education Faculty, Job Character-Analytical, Job Character- Implement, Job Character- Routine, and Job Character- Uncertainty.
- (5) Responses on mal-practice of users significantly differ for Group of Banks, Department Groups, Education Faculty, Job Character- Analytical, Job Character- Implement, Job Character-

Negotiating, Job Character-Uncertainty, Functional Management: Control, Functional Management: Strategic Planning, and Computer Knowledge.

(6) Opinion of shortage of fund for computerization significantly differ for Department Groups, Education Faculty, Education Levels, Job Character - Analytical, Job Character - Implement, Job Character - Negotiating, Functional Management - Control, Functional Management- Strategic Planning.

(7) Opinion on lack of banks' policy on computerization significantly differ for variation in executives Education Levels, Job Character- Implement, Job Character- Negotiating, Job Character- Uncertainty, Functional Management - Control, Functional Management- Operational.

(8) Dissatisfaction of computer personnel significantly differ for Group of Banks, Department Groups, Experience Levels, Job Character- Implement, Job Character- Negotiating, Job Character- Uncertainty, MIS Involvement, and Functional Management- Strategic Planning.

(9) Responses on lack of information privacy significantly differ for Job Character - Routine and Functional Management: Strategic Planning.

(10) Proposition, computerization may have adverse social effect significantly differ for Group of Banks, Experience Levels, and Functional Management - Strategic Planning.

6.6.4. Frequencies of Suggestions

The frequencies of "Yes-No" responses against factors of suggestions has been presented in the table # 6.13. in next page.

Table # 6.13

Frequencies of Factors of Suggestions

Sl.	Factors of Suggestions	Yes		No		Cases (n)
		Frequency	%	Frequency	%	
01.	Computerization by use of DBMS	260	97	7	3	267
02.	Functional Areas Computerization	256	96	11	4	267
03.	Computerized operations	263	99	4	1	267
04.	Central MIS by Network	257	96	10	4	267
05.	Information quality and preservation	262	98	5	2	267
06.	Elimination of redundant reports	245	92	19	8	263
07.	Fax, Telephone, Telex, Telex to sources	254	95	13	5	267
08.	Departmental initiative	257	96	10	4	267
09.	MIS plan, policy	256	96	11	4	267
10.	Participation	254	95	13	5	267
11.	Objective use of IT	257	96	10	4	267
12.	Appointment of information personnel	260	97	7	3	267
13.	Training	266	100	1	-	267
14.	Providing adequate computer	264	99	3	1	267
15.	Maintenance & support	264	99	3	1	267
16.	Users knowledge	265	99	2	1	267
17.	Extra Financial benefits to computer personnel	214	80	52	20	267
18.	Software development	251	94	16	6	267

The table above shows that the listed suggestions were agreed upon by about 97% of the executives except in the item no. 17 where the support has been about 80%.

This chapter basically presents the test results. Interpretation of the results have been provided in the next chapter.

Chapter VII

Interpretation of Results

7.1. Introduction

The previous chapter consisted of the results of survey, where the UIS, PFS, and EAMIS were analyzed through various test of hypotheses. The Resistances confronted and relevant Suggestions by executives were also analyzed. In this chapter, an interpretation of the test results has been made. Obtained test statistics, literature and research context guided the interpretation. A summary of hypotheses test has been presented in Table # 7.1. to recapitulate the results.

Hypotheses were formulated to get an insight into the phenomena and resolve the problem. Out of 63 null hypotheses (H_0), 27 were rejected (12+8+7) and 36 were not rejected (9+13+14). Out of 63 null hypotheses, three (H_{11} , H_{22} , H_{43}) were tested by "Z" test and rest 60 were tested by "F" test.

Interpretation regarding the hypotheses rejected by "Z" test, in general, carry extensive meaning. Executives get different extent of information quality, report quality and information system quality (H_1); executives get different extent of Physical, Procedural, Accessibility, Keeping and Environmental Facilities (H_{22}); and executives possess different extent of beliefs, desire, liking in respect of information, facilities, behavior, and communication (H_{43}).

Table # 7.1
Summary of Null Hypotheses Test

Sl. No.	Criteria	Null Hypotheses (UIS)		Null Hypotheses (PF9)		Null Hypotheses (KAMIS)	
		H ₀	Rejected	H ₀	Rejected	H ₀	Rejected
01.	No criteria	H ₁	Yes	H ₂₂	Yes	H ₄₃	Yes
02.	Group of Banks	H ₂	Yes	H ₂₃	Yes	H ₄₄	Yes
03.	Functional Departments	H ₃	Yes	H ₂₄	Yes	H ₄₅	No
04.	Management Levels	H ₄	No	H ₂₅	No	H ₄₆	No
05.	Age Groups	H ₅	No	H ₂₆	No	H ₄₇	No
06.	Experience	H ₆	No	H ₂₇	No	H ₄₈	No
07.	Gender	H ₇	No	H ₂₈	No	H ₄₉	No
08.	Faculty	H ₈	Yes	H ₂₉	No	H ₅₀	Yes
09.	Education Levels	H ₉	No	H ₃₀	Yes	H ₅₁	Yes
10.	Job: Analytical	H ₁₀	No	H ₃₁	No	H ₅₂	No
11.	Job: Implement	H ₁₁	Yes	H ₃₂	No	H ₅₃	No
12.	Job: Routine	H ₁₂	Yes	H ₃₃	No	H ₅₄	No
13.	Job: Uncertainty	H ₁₃	No	H ₃₄	No	H ₅₅	Yes
14.	Job: Negotiating	H ₁₄	Yes	H ₃₅	No	H ₅₆	No
15.	Job: Staffing	H ₁₅	Yes	H ₃₆	No	H ₅₇	No
16.	MIS Involvement	H ₁₆	No	H ₃₇	Yes	H ₅₈	No
17.	Operational Management	H ₁₇	Yes	H ₃₈	No	H ₅₉	No
18.	Management Control	H ₁₈	Yes	H ₃₉	Yes	H ₆₀	No
19.	Strategic planning	H ₁₉	No	H ₄₀	No	H ₆₁	Yes
20.	Computer Knowledge	H ₂₀	Yes	H ₄₁	Yes	H ₆₂	No
21.	Computer Experience	H ₂₁	Yes	H ₄₂	Yes	H ₆₃	Yes

The availability of informational elements, real world situation, environment, behavioral setting and executives' perceptual judgement guided the executives to assign scores of varying degrees against the primary elements of the constructs that caused for such a significant difference in Z values. A wide range of officials of various ages, education, position etc., were denoted by the term executives. Hence, their information satisfaction, facilities satisfaction and attitude towards computer based MIS differ significantly.

A number of null hypotheses were rejected through F test. Null hypotheses were rejected as the obtained F values were greater than tabulated F values. The various subcategories of a criterion prompted the executives to assign scores of varying degrees. The desired impact of the subcategories were obviously influential. As there was significant difference among obtained scores against different subcategories, the subcategory which provided for such significant difference was found out through comparisons of subcategories by using the Independent Samples 't' Test for each of the hypothesis rejected.

In the interpretation of results, the following has been done: First, subcategory liable for the significant difference was found by pair wise comparisons of subcategories through 't' test. Second: Pair of subcategories where no significant difference was found, has been noted. Third, mean scores of the subcategories of the construct have been listed in descending order. Finally, based on the above, arguments have been made.

7.2. Interpretation of UIS Results

H₂: The 't' test shows that the UIS of FBBs differ significantly from that of NCBs ($t=5.54$, $p<.000$), DNPCBs ($t=4.86$, $p<.000$), IPCBs ($t=4.55$, $p<.000$) and SPBs ($t=4.15$, $p<.000$). It was also found that no significant difference between each of the other six comparisons such as NCBs & DNPCBs, NCBs & IPCBs, NCBs & SPBs, DNPCBs & IPCBs, DNPCBs & SPBs, and IPCBs & SPBs were there. Hence, it is evident that the significant difference in UIS among the subcategories of Group of Banks is found in FBBs only.

The UIS mean scores in descending order were FBBs (131.0000), IPCBs (113.0000), NCBs (112.6286), SPBs (112.5745) and DNPCBs (111.7500). Hence, the primary elements relating to UIS of NCBs, IPCBs, SPBs, and DNPCBs are of lower quality. The information management has not been given importance there. This is because of their manual information handling, insufficient and inefficient rules & procedures, excessive & disorganized report preparation, weak IS management and lagging behind in reorganization of MIS. It seems that IPCBs are trying to overcome the present problems in this regard.

H₃: The 't' test reveals that the UIS of Administration Department differs significantly from that of Operations ($t=4.88$, $p<.000$), Finance & Accounts ($t=2.86$, $p<.005$) and Development Department ($t=2.08$, $p<.040$). It was also found that there was no significant difference between each of the other three comparisons i.e. Operations and Finance & Accounts; Operations and Development; and Finance & Accounts and Development. Hence,

it is evident that the significant difference among the subcategories of Functional Department is found in Administration only.

The UIS mean scores in descending order were Operations (117.1016), Finance & Accounts (115.7632), Development (112.6667) and Administration (106.2373). Hence, Administration Departments were not well provided with IQ, RQ & ISQ. Information management in Administration Departments are insignificant and whatever information they receive from other departments are also not worth mentioning. The cause may be, share of renovation goes mainly to the Operations, Finance & Accounts, and Development Departments.

H₀: The 't' test reveals that the UIS of Arts Faculty differs significantly from Commerce/Business ($t=3.45$, $p<.001$), and Science ($t=2.90$, $p<.004$). There was no significant difference between Commerce/Business and Science. Hence, it is evident that the significant difference among the subcategories of Education Faculty is found in Arts only.

The UIS mean scores in descending order were Commerce/Business (116.2308), Science (115.0309), and Arts (108.2121). Hence, executives of Arts Faculty assigned lowest scores to the IQ, RQ, & ISQ. Probably, executives of Arts Faculty are more conservative in assigning scores against the items of UIS.

H₁₁: The 't' test reveals that the UIS against Highest Involvement in Job Character: Implement differs significantly

from that of Lowest ($t=3.38$, $p<.001$), Low ($t=2.29$, $p<.025$), Medium ($t=3.72$, $p<.000$), and High ($t=3.60$, $p<.000$). It was also found that there was no significant difference between each of the other six comparisons (Lowest & Low, Lowest & Medium, Lowest & High, Low & Medium, Low & High, and Medium & High). Hence, it is evident that the significant difference among the subcategories of Implement job for determination of IQ, RQ & ISQ is found in Highest Involvement only.

The descending order of UIS mean scores were Highest (122.7931), Low (113.4390), High (113.1053), Medium (112.4881) and Lowest (111.6486). Hence, executives of highest involvement in implement job, score higher than that of other subcategories. The areas which are in implementation phase or frequently requires implementation of plan, policy, project, program have been well provided with informational support. But almost equal scores of Low, High, Medium and Lowest give a cloudy picture as well. A trend could be there like higher involvement follows higher information satisfaction and vice-versa, but it could not be established. Almost equal value of Low and High Involvement may be that both have alike IQ, RQ, & ISQ. Statistics show that Low Involvement also may have higher information satisfaction.

H₁₂: The 't' test shows that the UIS against Highest Involvement in Job Character: Routine differs significantly from the Low ($t=2.05$, $p<.044$), and Medium ($t=3.71$, $p<.000$). The UIS against High Involvement in routine job also differs significantly from that of Medium Involvement ($t=2.08$, $p<.039$).

It was also found that there was no significant difference between each of the other seven pairs of subcategories. Hence, it is evident that the significant difference among the subcategories of routine job for determination of IQ, RQ & ISQ is found in Highest and High Involvement.

The descending order of UIS mean scores were Highest (118.9016), Lowest (114.7727), High (114.0505), Low (110.4211), and Medium (109.4091). Hence, executives of Highest Involvement in routine job, score higher than other subcategories. Executives having highest and high involvement in routine job areas are well provided with information quality, report quality and IS quality. But, Lowest and High involvement are of almost equal value. Probably, there are some areas where lowest involvement in routine job requires higher IQ, RQ, & ISQ. The Medium Involvement and Low Involvement show lower scores. In general, it may be said that gradual increase in involvement from lower to higher correspond with gradual increase in scores. Thinking on real job situation may reveal the same phenomena. Highly routine job generally requires greater presence of IQ, RQ & ISQ.

H₁₄: The 't' test shows that the UIS against Highest Involvement in Job Character: Negotiating differs significantly from that of Lowest ($t=3.49$, $p<.001$), Low ($t=3.96$, $p<.000$), Medium ($t=2.87$, $p<.005$) and High ($t=2.64$, $p<.010$). It was also found that there was no significant difference between each of the other six pairs of comparisons. Hence, it is evident that the significant difference among the subcategories of negotiation job

for determination of IQ, RQ & ISQ is found in highest involvement only.

The descending order of UIS mean scores were Highest (124.5230), High (115.4912), Medium (113.9048), Lowest (111.6173) and Low (110.5111). Hence, executives of highest involvement in negotiating job, score comparatively higher than other subcategories. This is because executives having higher negotiating functions are well provided with IQ, RQ, & ISQ. This is a good sign that executives having higher negotiating functions are also provided with IQ, RQ, & ISQ. But, higher negotiating function does not necessarily requires higher IQ, RQ & ISQ. Probably, higher negotiating functions were assigned to those executives who were also engaged in other functions which require to have higher IQ, RQ & ISQ.

H₁₅: The 't' test shows that the UIS against Low Involvement in Job Character: Staffing differs significantly from that of Medium ($t=2.14$, $p<.036$), High ($t=2.67$, $p<.010$), and Highest ($t=2.05$, $p<.045$). And the UIS against Medium Involvement in staffing job also differs significantly from that of Lowest ($t=2.96$, $p<.003$), High ($t=3.89$, $p<.000$), and Highest ($t=3.19$, $p<.002$). It was also found that there was no significant difference between each of the other four pairs of subcategories. Hence, it is evident that the significant difference among the subcategories of staffing job for determination of IQ, RQ & ISQ is found in Low and Medium Involvement.

The descending order of UIS mean scores were High (120.9333), Highest (120.1429), Lowest (114.6605), Low (112.2632) and Medium (106.6053). Hence, executives of Medium and Low Involvement in staffing job, score lower than other subcategories. The High staffing areas are well provided with informational support. In most of the organizations PMIS are there. Information regarding staff are very important in organizations. So, executives always try to keep it with highest IQ, RQ, & ISQ.

H₁₇: The 't' test shows that the UIS against Highest Involvement in Functional Management: Operational differs significantly from that of Lowest ($t=2.24$, $p<.027$), Low ($t=3.11$, $p<.002$), and Medium ($t=3.15$, $p<.002$). And the UIS against High Involvement in Operational Management also differs significantly from that of Low ($t=2.85$, $p<.005$), and Medium ($t=2.68$, $p<.008$). It was also found that there was no significant difference between each of the other five pairs of subcategories. Hence, it is evident that the significant difference among the subcategories of Operational Management for determination of IQ, RQ & ISQ is found in Highest and High Involvement.

The descending order of UIS mean scores were Highest (118.7164), High (115.2915), Lowest (110.2609), Low (107.5000) and Medium (109.0455). Hence, executives of Highest and High involvement in Operational Management, score higher than other subcategories. This is because High and Highest operational areas are well provided with IQ, RQ and ISQ. In banks and financial

institutions, higher operational areas require to collect information, keep record and disseminate information on regular basis and with higher quality.

H₁₈: The 't' test shows that the UIS against Low Involvement in Management Control differs significantly from that of Lowest (t=2.84, p<.005), Medium (t=2.11, p<.036), High (t=2.83, p<.005) and Highest (t=2.56, p<.012). It was also found that there was no significant difference between each of the other six pairs of subcategories. Hence, it is evident that the significant difference among the subcategories of Management Control for determination of IQ, RQ & ISQ is found in Low involvement only.

The descending order of UIS mean scores were Low (119.0462), Medium (113.5857), Lowest (111.8276), High (111.5091) and Highest (109.4737). Hence, executives of Low involvement in Management Control, score higher than other subcategories. This is because Low Management Control areas or executives whose involvement are low, are well provided with IQ, RQ and ISQ. Whereas, High and Highest Management Control areas are not adequately supported by IQ, RQ and ISQ. This is because, information management has not been designed to support Management Control functions.

H₂₀: The 't' test shows that the UIS against Moderate Computer Knowledge differs significantly from that of Novice (t=4.35, p<.000), Lower (t=2.38, p<.019), and Expert (t=1.96, p<.052). And, the UIS against Almost Expert differ significantly from that of Novice (t=3.59, p<.001) and Lower (t=2.51, p<.014). It was also found that there was no significant difference

between each of the other five pairs of subcategories. Hence, it is evident that the significant difference among the subcategories of Knowledge of Computer for determination of IQ, RQ & ISQ is found in Moderate and Almost Expert.

The descending order of UIS mean scores were Almost Expert (120.6429), Moderate (117.1942), Lower (112.2903), Novice (107.8971) and Expert (106.6667). Hence, executives of Moderate and Almost Expert in computer knowledge assigned comparatively higher score to the IQ, RQ and ISQ. Probably, executives of Moderate and Almost Expert computer knowledge are posted in those areas where the IQ, RQ and ISQ have been improved.

H₂₁: The 't' test shows that the UIS against Novice Computer Experience differs significantly from that of Lower ($t=3.46$, $p<.001$), Moderate ($t=2.89$, $p<.004$), and Almost Expert ($t=4.19$, $p<.000$). And, the UIS against Almost Expert differs significantly from that of Moderate ($t=2.69$, $p<.008$). It was also found that there was no significant difference between each of the other six pairs of subcategories. Hence, significant difference among the subcategories of Experience with Computer for determination of IQ, RQ & ISQ is found in Novice and Almost Expert.

The descending order of UIS mean scores were Almost Expert (122.3704), Lower (117.3051), Moderate (114.7564), Expert (109.4000) and Novice (108.8265). Hence, executives of Novice in computer experience assigned lower score and executives of Almost Expert in computer experience assigned comparatively higher score to the IQ, RQ and ISQ. Probably, executives of Almost Expert

computer experience are posted in those areas where the IQ, RQ and ISQ have been improved and Novice executives are posted in those areas where IQ, RQ and ISQ have been neglected.

7.3. Interpretation of PFS Results

H₂₃: The 't' test shows that the PFS of FBBs differs significantly from the PFS of NCBs ($t=3.47$, $p<.001$), DNPCBs ($t=3.20$, $p<.003$) and SPBs ($t=3.21$, $p<.002$). And, the PFS of IPCBs differs significantly from that of NCBs ($t=4.08$, $p<.000$), DNPCBs ($t=3.14$, $p<.003$), and SPBs ($t=3.25$, $p<.002$). It was also found that there was no significant difference between each of the other four comparisons such as NCBs & DNPCBs, NCBs & SPBs, DNPCBs & SPBs, and IPCBs & FBBs. Hence, it is evident that the significant difference among the subcategories of Group of Banks is found in FBBs and IPCBs.

The PFS mean scores in descending order were FBBs (104.2941), IPCBs (102.0465), SPBs (93.7447), NCBs (92.9643), and DNPCBs (91.2000). Hence, NCBs, SPBs, and DNPCBs give comparatively less importance to the Physical, Procedural, Accessibility, Keeping and Environmental Facilities. This is because of their lagging behind in reorganization of MIS. The IS management is weak in these organizations. It seems that IPCBs are better than that of NCBs, SPBs & DNPCBs.

H₂₄: The 't' test reveals that the PFS of Administration Department differs significantly from the PFS of Operations ($t=4.37$, $p<.000$), and Development Department ($t=2.91$, $p<.004$).

And, PFS of Operations Department differs significantly from that of Finance & Accounts Department ($t=2.08$, $p<0.040$). It was also found that there was no significant difference between each of the other comparisons (Operations and Development; Administration and Finance & Accounts, Finance & Accounts and Development). Hence, it is evident that the significant difference among the subcategories of Functional Departments is found in Administration and Operations.

The PFS mean scores for the executives of Administration is the lowest (89.0847). The PFS scores, in descending order, were Operations (97.7578), Development (97.4524), Finance & Accounts (93.2632) and Administration (89.0847). Hence, Administration Departments were not well provided with the Physical, Procedural, Accessibility, Keeping and Environmental Facilities. This is because, modernization goes to Operations, and Development Departments. The reorganization of information management in Administration Departments and Finance & Accounts Departments are not given importance.

H₃₀: The 't' test reveals that executives, having education of "18 & Above" years of schooling differ significantly from the executives of "Below 14" years of schooling ($t=2.88$, $p<.011$) and "14-16" years of schooling ($t=2.60$, $p<.011$). It was also found that there was no significant difference between each of the other three comparisons. Hence, it is evident that the significant difference among the Education Levels found in "18 & Above" years of schooling only.

The PFS mean scores in descending order were "18 & Above" (103.1000), "16-18" (95.8235), "14-16" (92.4127) and "Below 14" (90.5714). Hence, executives of "18 & Above" years of schooling score higher and "Below 14" years of schooling score lower in facilities satisfaction. The highly educated executives are well provided with better information facilities and their perceived facilities satisfaction is higher.

H₃₇: The 't' test reveals that the PFS of "Both Preparer and User" differs significantly from that of "Preparer" ($t=2.99$, $p<.003$) and "User" ($t=3.39$, $p<.001$). It was also found that there was no significant difference between "Preparer" and "User". Hence, it is evident that the significant difference among MIS Involvement is found in "Both Preparer and User" only.

The PFS mean scores in descending order were "Both Preparer and User" (98.5893), "Preparer" (93.5825), and "User" (90.8654). Hence, the executives of "Both Preparer and User" scored highest but "User" scored lowest. This seems to be natural that "Users" are less satisfied.

H₃₉: The 't' test reveals that the PFS against Highest Involvement in Management Control differs significantly from that of Lowest ($t=2.68$, $p<.009$), Medium ($t=2.20$, $p<.030$), and High ($t=2.88$, $p<.005$). And, the PFS against High Involvement in Management Control also differs significantly from that of Low ($t=2.07$), $p<.041$). It was also found that there was no significant difference between other comparisons. Hence, it is evident that the significant difference among Management Control

is found in Highest and High Involvement.

The PFS mean scores in descending order were Highest (102.5789), Low (96.5231), Medium (95.5857), Lowest (94.4310) and High (91.1818). The number of respondents in High and Highest are 55 & 19 respectively. Executives of High Involvement scored lowest. This means, the executives who are Highly involved in Management Control functions, are least satisfied with the facilities provided to them. A segment of executives who have highest involvement in Management Control are well provided with facilities.

H₄₁: The 't' test reveals that the PFS against Novice computer knowledge differs significantly from that of Lower (t=3.31, p<.001), Moderate (t=6.74, p<.000), Almost Expert (t=3.81, p<.000). And the PFS against Lower also differs significantly from that of Moderate (t=3.05, p<.003). It was also found that there was no significant difference between other comparisons. Hence, it is evident that the significant difference among Computer Knowledge is found in Novice and Lower.

The PFS mean scores in descending order were Moderate (100.0971), Expert (98.6667), Almost Expert (98.1786), Lower (94.4677), and Novice (86.7353). The Novice and Lower perceived that they are not well provided with informational facilities as compared to the executives of other subcategories.

H₄₂: The 't' test reveals that the PFS against Novice Computer Experience differs significantly from that of Lower (t=3.15, p<.002), Moderate (t=5.65, p<.000), and Almost Expert

($t=2.73$, $p<.007$). It was also found that there was no significant difference between other comparisons. Hence, it is evident that the significant difference among Computer Experience is found in Novice only.

The PFS mean scores in descending order were Moderate (100.0000), Expert (99.8000), Almost Expert (97.5556), Lower (96.7966), and Novice (89.4082). The executives Novice in computer experience perceived that they are provided with least informational facilities. And executives of Moderate computer experience perceived that the facilities provided to them are higher than that of other subcategories. This is in line with the reality i.e. the moderate experience executives are posted in such functional areas where modern computer facilities are there for information processing.

7.4. Interpretation of EAMIS Results

H₄₄: The EAMIS of NCBs differs significantly from that of IPCBs ($t=3.04$, $p<.003$), SPBs ($t=2.79$, $p<.006$), and FBBs ($t=2.80$, $p<.006$). It was also found that there was no significant difference between each of the other seven comparisons. Hence, it is evident that the significant difference among Group of Banks is found in NCBs only.

The EAMIS mean scores in descending order were FBBs (116.2941), IPCBs (114.2791), SPBs (113.3617), NCBs (108.0500), and DNPCBs (107.4000). The NCBs and DNPCBs show lower attitude towards CBMIS than other Group of Banks.

H₅₀: The EAMIS of Commerce/Business Faculty differs significantly from the executives of Science Faculty ($t=2.65$, $p<.009$). It was also found that there was no significant difference between each of the other two comparisons. Hence, it is evident that the significant difference among Education Faculty is found in Commerce/ Business only.

The EAMIS mean scores in descending order were Commerce/Business (112.5385), Arts (110.7273), and Science (108.0619). The executives of Science Faculty show lower favorable attitude towards computer based MIS. This is somewhat surprising that science oriented executives are not well groomed for organizational change process.

H₅₁: The EAMIS of executives having education of "18 & Above" years of schooling differs significantly from that of executives having "Below 14" years of schooling ($t=2.12$, $p<.051$), "14-16" years of schooling ($t=3.36$, $p<.001$), and "16-18" years of schooling ($t=2.64$, $p<.009$). It was also found that there was no significant difference between each of the other three comparisons. Hence, it is evident that the significant difference among Education Levels is found in "18 & Above" years of schooling only.

The EAMIS mean scores in descending order were "18 & Above" (121.1000), "16-18" (110.9947), "14-16" (107.9048) and "Below 14" (104.1429). Hence, executives of higher grade of education show higher favorable attitude towards computer based management information system.

H₅₅: The EAMIS of Medium Involvement in Job Character: Uncertainty differs significantly from that of Lowest ($t=2.71$, $p<.008$), Low ($t=2.91$, $p<.004$), and Highest ($t=3.30$, $p<.001$). And, the EAMIS of Highest Involvement also differs significantly from that of Low ($t=2.16$, $p<.033$). It was also found that there was no significant difference between each of the other five comparisons. Hence, it is evident that the significant difference among Job Character: Uncertainty is found in Medium and Highest Involvement.

The EAMIS mean scores in descending order were Highest (117.9333), Lowest (111.7927), Low (111.5526), High (110.8400) and Medium (105.9275). Hence, executives of Medium Involvement in Job Character: Uncertainty give least score and Highest Involvement show higher score than other subcategories.

H₆₁: The EAMIS of Medium Involvement in Strategic Planning differs significantly from that of Lowest ($t=3.59$, $p<.000$), Low ($t=2.34$, $p<.021$), High ($t=3.09$, $p<.003$), and Highest ($t=2.72$, $p<.008$). It was also found that there was no significant difference between each of the other six comparisons. Hence, it is evident that the significant difference among Strategic Management is found in Medium Involvement only.

The EAMIS mean scores in descending order were Highest (112.8889), High (112.5714), Lowest (112.1852), Low (110.1475) and Medium (104.1556). Hence, executives of Medium Involvement in strategic planning show lower favorable attitude towards CBMIS. As the number of cases is highest in Lowest Involvement (being

108), it may be said that the Lowest, High & Highest Involvement in strategic planning shows highest EAMIS.

H₆₃: The EAMIS of executives having Expert Computer Experience differs significantly from that of Novice ($t=2.59$, $p<.011$), Lower ($t=3.35$, $p<.001$), Medium ($t=3.02$, $p<.003$), and Almost Expert ($t=2.11$, $p<.043$). It was also found that there was no significant difference between other comparisons. Hence, it is evident that the significant difference among Computer Experience is found in Expert only.

The EAMIS mean scores in descending order were Expert (125.6000), Almost Expert (111.8889), Medium (111.6410), Novice (109.6224), and Lower (108.3729). Executives having Expert Experience with Computer show highest attitude. Those who have higher experience with computer will show higher EAMIS.

7.5 General Interpretation

Perceived information satisfaction, facilities satisfaction and attitude towards computerized MIS among the executives differ significantly. This means, executives are not identical in respect of the phenomena under study.

Perceived information satisfaction, facilities satisfaction of executives belonging to foreign bank branches are significantly higher than those of the other bank groups. This means methods, procedures, computer application for information management and information management decisions of foreign bank branches are modern and well organized. The foreign bank branches

use latest information technology for all sorts of management functions. Hence, FBBs' information satisfaction and facilities satisfaction are significantly higher than those of NCBs, IPCBs, DNPCBs, and SPBs. Their attitude towards computerized MIS is highest as well. The IPCBs are trying to modernize their information systems as well as installation of CBMIS. It has been observed that executives' attitude towards computerized MIS in NCBs and DNPCBs are significantly lower than that of other bank groups. The NCBs and DNPCBs are largest bank groups in Bangladesh; other bank groups are much smaller. This establishes the fact that smaller organizations are more formalized, more technology driven than bigger organizations. Other researchers had also found same kind of phenomena.

The information satisfaction and facilities satisfaction of executives belonging to Administration Departments are significantly lower than those of other functional departments. The executives of operations departments show highest information and facilities satisfaction. A wide range of officials are grouped under the heading "Administration" (see methodology). Whatever informational activities, practices, methods, procedures are there, the executives dealing with administrative functions are significantly less satisfied than executives associated with other functional departments. This means informational supports are not well organized to assist administrative functions and the information management are not management oriented. This is a major shortcoming in our banking sector in general. If the

informational management is not management oriented, then the management losses in terms of its mission and vision.

The perceived information satisfaction of executives having education from the Arts Faculty is significantly lower than that of Business/Commerce and Science background-executives. Probably, executives educated from Arts Faculty had been more conservative about assigning scores to the items representing information quality, report quality and information system quality. It may be that, executives educated from Arts Faculty are generally posted in such areas where the IQ, RQ, and ISQ are really poor. The EAMIS of executives belonging to Commerce/ Business Faculty is significantly favorable than that of executives of Science Faculty. Executives of Science Faculty show a lower level of favorable attitude. Executives educated from Science Faculty are not well groomed for organizational change process.

The perceived facilities satisfaction and attitude towards CBMIS of executives having education of "18 & Above" years of schooling are significantly higher. Generally, less educated executives show lower facilities satisfaction and lower favorable attitude towards CBMIS. Probably, executives having lower education are not provided with sufficient facilities. This means that facilities are dis-proportionately distributed among the executives. The less educated executives need to be motivated to change their attitude in-favor of computerized MIS. Undergraduate executives may be a problem for smooth computerization of banking operations.

The perceived information satisfaction of executives having Highest Involvement in each of the three job characters i.e. Implement, Routine, Negotiating are significantly higher than those of other subcategories. Those who have Lowest, Low and Medium Involvement in these job characters show lower information satisfaction. This means that executives who have Highest Involvement in these job characters are better provided with IQ, RQ and ISQ; or Highest Involvement in these job characters requires higher IQ, RQ and ISQ and vice-versa. Out of the six job characters considered in the study, five job character (Analytical, Implement, Negotiating, Routine and Staffing) show that Highest Involvement have higher information satisfaction and Lowest Involvement has lower information satisfaction. The relationship is clear. The degrees of information satisfaction gradually increase parallel with the progression from Lowest Involvement through Highest Involvement in each of the four job characters (Implement, Negotiating, Routine and Staffing). The exception was found in Uncertainty, where highest involvement shows lowest information satisfaction. Again, Medium Involvement in Job Character: Uncertainty shows significantly lower favorable attitude towards CBMIS.

The executive who basically acts as a user of reports shows significantly lower information and facilities satisfaction, than a preparer, and Both Preparer & User. Users are less satisfied than preparers and Both Preparer & User. Exclusive Users are least satisfied but show slightly higher attitude. The

information satisfaction of executives involved in both preparation and use of reports are significantly higher than that of executives who are engaged exclusively in preparation or exclusively in use of reports.

High and Highest Involvement in operational functions show higher information and facilities satisfaction. The Low and Medium Involvement in operational functions show lower satisfaction and lower attitude as well. But, Lowest Involvement in operational functions shows higher attitude which may be considered as an exception. However, the High Involvement in operational functions shows moderate attitude. Hence, the degrees of satisfaction and attitude gradually increases parallel with progression from Lowest through Highest Involvement in operational functions. Executives who are highly involved in operational functions try to maintain the primary elements of information satisfaction and facilities satisfaction. But, for those whose involvements are Low and Medium in operational functions expressed least information satisfaction and facilities satisfaction.

The Low Involvement in Management Control shows highest information satisfaction. The Low Involvement in Management Control stands in the second place in facilities satisfaction. So, it may be said that the Low Involvement in Management Control shows higher information and facilities satisfaction. But, High Involvement in Management Control shows lower information and facilities satisfaction. This inverse relationship seems to be

present there. Highest Involvement in Management Control shows highest attitude; as they possess highly ambitious view in organizational context. Executives highly involved in management control demand more IQ, RQ, ISQ as well as more Physical, Procedural, Accessibility, Keeping and Environmental Facilities than those available in the existing setting.

The Medium Involvement in strategic planning shows significantly lower attitude. Statistics about strategic planning are not distinct and no particular trend is found in information satisfaction, facilities satisfaction and attitude. Basically, information processing for strategic planning has not been properly organized in banks and financial institutions in Bangladesh. Their need and required setting has not been identified and planned. Executives engaged in strategic planning receive information and facilities as other executives receive in traditional way. So, neither UIS nor PFS are distinctive for various degrees of involvement in strategic planning.

Moderate knowledge of computer shows significantly higher information satisfaction and facilities satisfaction. Both Novice and Expert show least satisfaction. In many functional areas, information processing has not been upgraded, computers have not been installed, executives have not been trained and that is why they remained Novice. This caused the IQ, RQ, ISQ and facilities obtaining least scores. This has been expressed by both Novice and Expert. Expert shows highest attitude. Similar results have been found for having experience with computer.

Chapter VIII

Summary of Findings and Conclusions

8.1 Introduction

The ancestry of the problem selected for the study warrant both pragmatic evidence and theoretical foundation. There has been little knowledge about MIS in banks and financial institutions in Bangladesh. Due to application of computer, MIS are now in transition phase. Technology transformed organizational work and character relating to management information system. The management information system performance and executives' attitude towards computer based MIS in Banks and financial institutions require elaborate comprehension. Theoretical tools are evasive for measuring such concepts. In this study, the thesis topic has been addressed from an all pervasive angle.

The methodology of the study was carefully chosen. The study concerned multiple organizations. The method of inquiry i.e. qualitative exploratory study followed by analytical survey provided means to collect a rich set of quantitative and qualitative data from the field. The exploratory study acquired the pattern of an in-depth field work where researcher's observation, interviews and document analysis were prominent. The research context, its focus, the role of researcher, outcome and an intention to recapitulate theories required such a research design. The exploration unearthed evidence of practices. The

survey afterwards aimed at more positivistic approach, applied statistical techniques using a set of variables. The variables have been defined and tools were developed and tested. In the survey a combination of presentation style i.e. descriptive, analytical and interpretive style has been followed. The similarity and difference in concepts has been searched.

With the stated problem in mind, it was mainly hypothesised that each of the constructs i.e. the Users' Information Satisfaction (UIS), Preparers' Facilities Satisfaction (PFS) and Executives' Attitude Towards Computer Based MIS are dissimilar among the executives and this dissimilarity persisted amongst executives' belonging to subcategories of a criterion.

The introduction of computer changed the practice of MIS in banks and financial institutions in Bangladesh. But such changes in MIS may be questioned. Exploration shows that the information management decisions and practices are not properly managed. The survey reflects the phenomena in an in-depth way. Three main null hypotheses (H_{11} , H_{22} , H_{43}) were rejected. This means, UIS among the executives were dissimilar. The same results occurred in PFS and EAMIS. The other hypotheses intended to check whether the nature of dissimilarity in a construct (UIS or PFS or EAMIS) remained for various subcategories of a criterion or not. If a construct got different values for various subcategories of a criterion, then it was tested, whether the variation was significant or not. It was found that, in a number of criteria, a construct got

different values (significantly) for various subcategories of a criterion.

The research has been undertaken basically to know nature of MIS, MIS performance, executives' attitude towards computer based MIS, resistance confronted in computerizing MIS and executives' suggestions for MIS reorganization. The contribution of the study, among others, can be judged from a number of perspectives. First, the study demonstrated the application of qualitative methodology in-order to explore MIS as well as application of quantitative - analytical survey methodology to gain new knowledge. The justification of methodology has been made elsewhere. So far, survey study is concerned, the study satisfies the having canon of reproducibility and generalizability. Second, the survey questionnaire has been developed, reviewed, tested, retested, and then administered. Development of the questionnaire has been one of the fundamental task of the research. This has been an original work as, there were no such existing instruments to measure the constructs. Third, the study had generated/ applied new constructs such as UIS, PFS, MISP and EAMIS; and these have been integrated in a conclusive framework. The primary elements of each construct had been thoughtfully selected. The primary elements have been drawn from a number of disciplines and on the other hand, the research context has been duly considered. Fourth, the results of the survey offered some new knowledge. The dissimilarity in a construct (UIS or PFS or EAMIS) in general,

and dissimilarity of a construct (UIS or PFS or EAMIS) for associated subcategories of a criterion, offers an insight into the conceptual schema of stakeholders regarding MIS reorganization. The findings will have significance to the academics in the recapitulation of existing MIS theories, especially in the context of financial institutions. Finally, as the methodology and framework of the research has been applied successfully in the context of Bangladesh, it can also be applied to other countries in similar organizational context.

8.2. Findings of The Study

8.2.1 Mean Scores: MIS Performance

The management information system performance (MISP) was planned to be studied against subcategories of criteria in-order to compare obtained values. The objective was to find the similarities and differences in the phenomena under study. The outcome of the survey shows that in many criteria, there remained considerable differences in obtained MIS performance against subcategories. The obtained MISP against subcategories of criteria are noted below:

- (1) Among the sub-categories of Group of Banks, Foreign Bank Branches (FBBs) show highest MIS performance followed by IPCBs, NCBs, SPBs, and DNPCBs.
- (2) Among the sub-categories of Functional Departments i.e. Operations, Administration, Finance & Accounts, and

Development; the Operations Department shows highest MIS performance followed by Development, Finance & Accounts, and Administration.

- (3) The subcategories of Management Levels are Top, Middle Upper, Middle Lower, and Bottom. The Middle Lower (SPO, PO) scored highest MIS performance.
- (4) The respondents were classified into Age Groups of "Below-30", "30-35", "35-40", "40-45", "45-50" & "50 & Above" years of age. The Age Group "30-35" years of age shows highest MIS performance. The higher Age Groups (e.g. "35-40", "40-45" and "50 & Above") gradually show lower scores.
- (5) Out of six Experience Levels such as "Below 5", "5-10", "10-15", "15-20", "20-25" and "25 & Above" years of service experience, the subcategory "25 & Above" shows lowest MIS performance, whereas Experience Group "10-15" shows highest MIS performance.
- (6) The MIS performance for Male and Female respondents were of equal value. However, The UIS of male is higher than that of female and PFS of female is higher than that of male.
- (7) The respondents were classified into three Education Faculties based on their main education disciplines such as Arts, Commerce/Business and Science. The Commerce/ Business shows highest MIS performance

followed by Science and Arts.

- (8) The subcategories of Education Levels are "Below 14", "14-16", "16-18", and "18 & Above" years of schooling. The executives having education of "18 & Above" years of schooling show highest MIS performance. Executives of lower years of schooling show lower MIS performance.
- (9) In the survey study, six Job Characters pertaining to present assignment of executives were incorporated as criteria. These characters are Analytical, Implement, Negotiating, Routine, Staffing, and Uncertainty. The extent of presence of each Job Character was measured in five point scale i.e. Highest Involvement, High Involvement, Medium Involvement, Low Involvement and Lowest Involvement. In each Job Character, Highest Involvement shows highest MIS performance (except Uncertainty).
- (10) The executives involvement in MIS activities was operationalised by classifying executives into three sub-categories such as (a) Preparer of reports, (b) User of reports, and (c) Both Preparer and User of reports. Those who had exposed themselves as "Both Preparer and User of reports" show highest MIS performance, followed by Preparer. The User scored lowest MIS performance.
- (11) Three Functional Management Levels such as Operational,

Management Control and Strategic Planning were also considered as criteria. The extent of presence of such functional management elements in the present position (assignment) of executives were measured in five point scale such as Highest Involvement, High Involvement, Medium Involvement, Low Involvement and Lowest Involvement. The executives who fall in the category Highest Involvement of criteria Functional Management: Operational and Functional Management: Strategic Planning, scored highest MIS performance. The exception was found in Functional Management: Control where Low Involvement show highest MIS performance.

- (12) The two criteria Executives' Knowledge of and Experience with computer were also measured in five point scale such as Expert, Almost Expert, Moderate, Lower and Novice. In both the criteria, the Almost Expert sub-category shows highest MIS performance and Novice shows lowest MIS performance.

8.2.2 Mean Scores: Executives Attitude Towards CBMIS

- (1) Executives of Foreign Bank Branches (FBBs) show highest favorable attitude towards CBMIS among the sub-categories NCBs, DNPCBs, IPCBs, SPBs and FBBs of Group of Banks.
- (2) Among the sub-categories of Functional Department, the

executives of Development Department show highest favourable attitude towards CBMIS. Whereas, the executives of Administration Department scored lowest.

- (3) Executives' attitude among the sub-categories such as Top, Middle Upper, Middle Lower and Bottom Management Levels are not in much variation. However, executives of Middle Upper position (DGM, AGM) show highest favourable attitude and executives of "Bottom" level show lowest attitude.
- (4) The criterion, Age Group was categorized as "Below-30", "30-35", "35-40", "40-45", "45-50" & "50 & Above" years of age. The Age Groups of "30-35" years of age shows highest favourable attitude.
- (5) The subcategory "25 & Above" years of Experience Levels shows lowest favourable attitude as compared to other Experience Levels.
- (6) Female executives show higher favourable attitude as compared to male executives.
- (7) Executives belonging to "Commerce/Business" subcategory of Education Faculty show highest favourable attitude.
- (8) The subcategory "18 & Above" years of schooling shows highest favourable attitude as compared to other Education Levels.
- (9) The subcategory Highest Involvement of three Job Characters i.e. Analytical, Negotiating, and

Uncertainty shows highest favourable attitude. Whereas, subcategory Lowest Involvement of other three Job Characters i.e. Implement, Routine and Staffing shows highest attitude.

- (10) The subcategory "Highest Involvement" of criteria, Functional Management: Control and Functional Management: Strategic Planning shows highest favorable attitude. Whereas, sub-category "Lowest Involvement" of criterion, Functional Management: Operational shows highest attitude.
- (11) The subcategory Expert of criteria Computer Knowledge and Computer Experience shows highest favorable attitude towards Computer Based MIS.

8.2.3 "Z" Test: Three Main Hypotheses

"Z" test was conducted on three main null hypotheses (H_1 , H_{22} , H_{43}) of three constructs i.e. UIS, PFS and EAMIS. These three main null hypotheses were rejected. Three main hypotheses may be re-asserted as: the UIS among the executives are dissimilar; the PFS among the executives are dissimilar; and the EAMIS among the executives are also dissimilar.

8.2.4 ANOVA: Users' Information Satisfaction

The "Z" test shows that UIS among the executives are dissimilar. The ANOVA shows that, the dissimilarity in Users'

Information Satisfaction hold good for executives' belonging to various subcategories of a number of criteria e.g. Group of Banks, Functional Departments, Education Faculty, Job Character: Implement, Job Character: Routine, Job Character: Negotiating, Job Character: Staffing, Functional Management - Operational, Functional Management - Control, Computer Knowledge and Computer Experience.

But, Users' Information Satisfaction among the executives are most probably identical for executives belonging to various subcategories of a number of criteria e.g. Management Levels, Age Groups, Experience Levels, Gender, Education Levels, Job Character: Analytical, Job Character: Uncertainty, MIS Involvement and Functional Management- Strategic Planning.

8.2.5 ANOVA: Preparers' Facilities Satisfaction

The "Z" test shows that PFS among the executives are dissimilar. The ANOVA shows that the proposition, dissimilarity in preparers' facilities satisfaction remains there for executives belonging to different Group of Banks, Functional Department, Education Levels, Job Character: Negotiating, Computer Knowledge and Computer Experience.

But, facilities satisfaction among the executives are probably similar for various sub-categories of a number of criteria such as Management Levels, Age Groups, Experience Levels, Gender, Education Faculty, Job Character: Analytical, Job

Character: Implement, Job Character: Routine, Job Character: Uncertainty, Job Character: Staffing, Functional Management: Operational and Functional Management: Strategic Planning.

8.2.6 Pair Wise UIS and PFS Hypotheses Rejection

Pair wise null hypotheses of Users' Information Satisfaction and Preparers' Facilities Satisfaction are rejected for several criteria and these criteria are Group of Banks, Functional Departments, Functional Management - Control, Knowledge of Computer and Experience with Computer. These criteria may be considered most effective for appraising both users' information satisfaction, and preparers' facilities satisfaction.

But, a number of criteria are unable to influence both the hypotheses (UIS & PFS hypotheses in pair) and these criteria are Management Levels, Age Groups, Experience Levels, Gender, Job Character - Analytical, Job Character Uncertainty, and Functional Management: Strategic Planning.

8.2.7 ANOVA: MIS Performance

MIS performance significantly differs for subcategories of a number of criteria such as Group of Banks ($F=7.4818$, $p<0.0000$), Functional Departments ($F=9.5773$, $p<0.000$), Experience Levels ($F=2.6421$, $p<0.0237$), Education Faculty ($F=4.5842$, $p<0.0110$), Job Character: Negotiating ($F=5.9063$, $p<0.0001$), Job Character: Routine ($F=3.1708$, $p<0.0144$), Job Character: Staffing (

F=3.1668, $p<0.0145$), MIS Involvement (F=4.2375, $p<0.0154$), Functional Management: Operational (F=4.1379, $p<0.0029$), Functional Management: Control (F=2.4231, $p<0.0487$), Computer Knowledge (F=11.9218, $p<0.000$) and Computer Experience (F=8.8422, $p<0.0000$).

8.2.8 ANOVA: Attitude Towards Computer Based MIS

The "Z" test shows that EAMIS among the executives are dissimilar. The ANOVA shows that the dissimilarity in attitude remains there for executives' belonging to various subcategories of Group of Banks, Education Faculty, Education Levels, Job Character: Uncertainty, Functional Management: Strategic Planning and Computer Experience. But, attitude seemed to be similar for different subcategories of a number of criteria such as Functional Departments, Management Levels, Age Groups, Experience Levels, Gender, Job Character: Analytical, Job Character: Implement, Job Character: Routine, Job Character: Negotiating, Job Character: Staffing, MIS Involvement, Functional Management: Operational, Functional Management: Control, and Computer Knowledge.

8.2.9 Frequency of Resistances

Ten items of resistances were listed in the questionnaire. Executives were requested to tick on Yes/No box against each item to express whether they believe that computerization of MIS has

confronted such resistances or not. Frequency table has been prepared to summarize the data. The frequency table shows that, among the items of resistances listed in the questionnaire, lack of top executives knowledge, shortage of fund and lack of information system policy are the common problems in banks and financial institutions in Bangladesh.

8.2.10 Frequency of Suggestions

Eighteen items of suggestions were recorded in the questionnaire for respondents verification on Yes/No box against each item. This was to exhibit, whether the executives agree with these suggestions or not. More than 90% of executives expressed inclination in favour of seventeen items of suggestions; and only one item (Extra financial benefits to computer personnel) was favored by 80% of executives.

8.3 Conclusions Reached

The main thrust of the survey has been to examine, whether the independent criteria variables are likely to predict the MIS performance and executives' attitude towards computer based MIS. This was based on the assumption that criteria are likely to influence over activities of banks and financial institutions. Because of the substantial lack of empirical research on MIS in banks and financial institutions, it was hard to refer directly to the findings of any previous study. The present study relied

on empirical evidences and ventured to fulfill the gap in this area. Similar type of researches in future are needed to compare and validate the conclusions made in this study. Based on the strength of the results of this research, several conclusions are made.

As, each of the constructs, i.e. the Users' Information Satisfaction, Preparers' Facilities Satisfaction and Executives' Attitude Towards Computer Based Management Information System are dissimilar among the executives, executives' informational requirements may also be dissimilar. Thus, different types of information input, facilities and motivational treatments are required for improvement of the system and bringing the MIS transition process in line with management objectives.

The criteria which are proved effective in influencing Users' Information Satisfaction, Preparers' Facilities Satisfaction and Executives' Attitude Towards Computer Based Management Information System may be considered most dependable basis for many aspects of information system development including information requirement analysis, system analysis, design and implementation.

The problem mentioned, framework designed, methodology applied, literature reviewed, results and findings noted in this thesis can provide a useful foundation and guide for the researchers and practitioners in this field. Especially, this account for understanding MIS nature, MIS performance, and

executives' attitude towards CBMIS in the banks and financial institutions in Bangladesh.

8.4 Areas for Further Research

There remains a wide range of areas of management information system for investigation. A short list of such areas have been mentioned below:

- (1) This study did not venture to quantify existing facilities relating to MIS nor does it quantify the expected need of the facilities as perceived by the executives. There might have been a big gap between these two. Our study did not make any needs analysis of this sort. Information need analysis is an important issue.
- (2) An inquiry into the safety precaution employed and experience of computer service i.e. back up routines, safety precautions against power failures, safety precautions against unauthorized access, encryption of passwords, firewalls, protection against virus infection, etc. may be launched. The quality and maintenance of IS and IS equipment may be searched.
- (3) In the exploratory study, it was found that there remained a procedural gap in the selection of information system projects. Again, absence of systematic management of information system remained a

problem. There are problems in IS project development. The information system development approach and IS project as adopted by banks and financial institutions may be evaluated.

- (4) The fear of dominance of technical personnel, feeling of reduction and redundancy of personnel may be a hindrance in the computerization process. There remains fear of unemployment (29%), lack of top executives knowledge in computer (65%), mal-practice of users (22%), dis-satisfaction of computer personnel (27%). An appropriate strategy can be formulated to address the situation only after a detailed study is made.

8.5 Policy Recommendations

Organization can benefit by adopting appropriate measures for improving MIS performance and improving executives attitude towards computer based MIS. The following measures can be undertaken to remove or at least mitigate the shortcomings so as to improve the management information system in banks and financial institutions in Bangladesh:

- (1) MIS in banks and financial institutions has undergone through a process of change due to introduction of computer technology in recent years. But, this change process has not been properly managed in the organizations. Overall information management experienced a management gap. This gap is perhaps a

common phenomenon in all least developed countries. More dynamic management is required to overcome this problem. Top management need to be thoroughly abreast of the changes in information management field.

(2) The MIS procedure manual remains an important issue. Financial organizations should have MIS Procedure manual. This can be developed by organizing all the reports produced/used and related circulars/memos. Proper thought should be given in compiling the procedure manual. This also needs to be reviewed from time to time.

(3) Besides MIS procedure manual, job description manual and functional departmental manual should also be there in each organization.

(4) MIS in banks and financial institutions, basically takes the form of reports. The number, contents, and frequency of reporting is to be re-viewed to justify their purpose and appropriateness.

(5) Organizations should immediately initiate program to develop information processing skill among the staff, officers and executives. Executives should be properly trained in using modern information processing tools and techniques.

(6) The information storage media such as register, files, computer disk files to be properly maintained. The storage media and location may be re-allocated. Many manual information processing may be replaced by computerized processing.

(7) Each organization should have an information processing

department with computer skilled personnel. Each IP department should have adequate number of trained information personnel.

(8) Each IP department should be developed as a software house.

(9) Head of IP department must have expertise in computer handling and related technologies.

(10) Each organization should have a IT committee headed by Managing Director or General Manager to guide IP activities.

(11) The computer use need to be encouraged. Each department should have computer facilities. A network is to be installed to inter-link those computers.

(12) The computer application areas need to be expanded.

(13) While re-designing MIS activities, the strategic use of information and IT is to be considered. The strategic planning is to be fully supported by management information system.

(14) The suggestions listed in the questionnaire were mostly supported by executives and hence may be considered for implementation.

The study has provided an insight into the selected aspects of MIS in banks and financial institutions of Bangladesh. Examination of MIS performance and executives' attitude towards computer based MIS have further extended the knowledge. It is expected that the outcome of the present research would tremendously benefit the banks and financial institutions of Bangladesh, planners, decision making authorities in this sector, academics and researchers in this area.

APPENDIX # 1

List of Hypotheses

- H₁ The information satisfaction among the executives, indicated by UIS, are assumed to be dissimilar.
- H₂ The information satisfaction among the executives, indicated by UIS, are assumed to be dissimilar in different Group of Banks.
- H₃ The information satisfaction among the executives, indicated by UIS, are assumed to be dissimilar in different Functional Departments.
- H₄ The information satisfaction among the executives, indicated by UIS, are assumed to be dissimilar in different Management Levels.
- H₅ The information satisfaction among the executives, indicated by UIS, are assumed to be dissimilar in different Age Groups.
- H₆ The information satisfaction among the executives, indicated by UIS, are assumed to be dissimilar in different Experience Levels.
- H₇ The information satisfaction among the executives, indicated by UIS, are assumed to be dissimilar in different Genders.
- H₈ The information satisfaction among the executives, indicated by UIS, are assumed to be dissimilar for different Education Faculties.
- H₉ The information satisfaction among the executives, indicated by UIS, are assumed to be dissimilar for different Education Levels.
- H₁₀ The information satisfaction among the executives, indicated by UIS, are assumed to be dissimilar for different extent of involvement in Job Character: Analytical.
- H₁₁ The information satisfaction among the executives, indicated by UIS, are assumed to be dissimilar for different extent of involvement in Job Character: Implement.
- H₁₂ The information satisfaction among the executives, indicated by UIS, are assumed to be dissimilar for different extent of involvement in Job Character: Routine.
- H₁₃ The information satisfaction among the executives, indicated by UIS, are assumed to be dissimilar for different extent of involvement in Job Character: Uncertainty.
- H₁₄ The information satisfaction among the executives, indicated by UIS, are assumed to be dissimilar for different extent of involvement in Job Character: Negotiation.
- H₁₅ The information satisfaction among the executives, indicated by UIS, are assumed to be dissimilar for different extent of involvement in Job Character: Staffing.
- H₁₆ The information satisfaction among the executives, indicated by UIS, are assumed to be dissimilar for different types of MIS Involvement.
- H₁₇ The information satisfaction among the executives, indicated by UIS, are assumed to be dissimilar for different extent of involvement in Functional Management: Operational.
- H₁₈ The information satisfaction among the executives, indicated by UIS, are assumed to be

- dissimilar for different extent of involvement in Functional Management: Control.
- H₁₉ The information satisfaction among the executives, indicated by UIS, are assumed to be dissimilar for different extent of involvement in Functional Management: Strategic Planning.
- H₂₀ The information satisfaction among the executives, indicated by UIS, are assumed to be dissimilar for different extent of Computer Knowledge.
- H₂₁ The information satisfaction among the executives, indicated by UIS, are assumed to be dissimilar for different extent of Computer Experience.
- H₂₂ The facilities satisfaction among the executives, indicated by PFS, are assumed to be dissimilar.
- H₂₃ The facilities satisfaction among the executives, indicated by PFS, are assumed to be dissimilar in different Group of Banks.
- H₂₄ The facilities satisfaction among the executives, indicated by PFS, are assumed to be dissimilar in different Functional Departments.
- H₂₅ The facilities satisfaction among the executives, indicated by PFS, are assumed to be dissimilar in different Management Levels.
- H₂₆ The facilities satisfaction among the executives, indicated by PFS, are assumed to be dissimilar in different Age Groups.
- H₂₇ The facilities satisfaction among the executives, indicated by PFS, are assumed to be dissimilar in different Experience Levels.
- H₂₈ The facilities satisfaction among the executives, indicated by PFS, are assumed to be dissimilar in different Genders.
- H₂₉ The facilities satisfaction among the executives, indicated by PFS, are assumed to be dissimilar for different Education Faculties.
- H₃₀ The facilities satisfaction among the executives, indicated by PFS, are assumed to be dissimilar for different Education Levels.
- H₃₁ The facilities satisfaction among the executives, indicated by PFS, are assumed to be dissimilar for different extent of involvement in Job Character: Analytical.
- H₃₂ The facilities satisfaction among the executives, indicated by PFS, are assumed to be dissimilar for different extent of involvement in Job Character: Implement.
- H₃₃ The facilities satisfaction among the executives, indicated by PFS, are assumed to be dissimilar for different extent of involvement in Job Character: Routine.
- H₃₄ The facilities satisfaction among the executives, indicated by PFS, are assumed to be dissimilar for different extent of involvement in Job Character: Uncertainty.
- H₃₅ The facilities satisfaction among the executives, indicated by PFS, are assumed to be dissimilar for different extent of involvement in Job Character: Negotiation.
- H₃₆ The facilities satisfaction among the executives, indicated by PFS, are assumed to be dissimilar for different extent of involvement in Job Character: Staffing.
- H₃₇ The facilities satisfaction among the executives, indicated by PFS, are assumed to be dissimilar for different types of MIS Involvement.

- H₃₈ The facilities satisfaction among the executives, indicated by PFS, are assumed to be dissimilar for extent of involvement in Functional Management: Operational.
- H₃₉ The facilities satisfaction among the executives, indicated by PFS, are assumed to be dissimilar for different extent of involvement in Functional Management: Control.
- H₄₀ The facilities satisfaction among the executives, indicated by PFS, are assumed to be dissimilar for different extent of involvement in Functional Management: Strategic Planning.
- H₄₁ The facilities satisfaction among the executives, indicated by PFS, are assumed to be dissimilar for different extent of Computer Knowledge.
- H₄₂ The facilities satisfaction among the executives, indicated by PFS, are assumed to be dissimilar for different extent of Computer Experience.
- H₄₃ The attitude towards computer based MIS among the executives, indicated by EAMIS, are assumed to be dissimilar.
- H₄₄ The attitude towards computer based MIS among the executives, indicated by EAMIS, are assumed to be dissimilar in different Group of Banks.
- H₄₅ The attitude towards computer based MIS among the executives, indicated by EAMIS, are assumed to be dissimilar in different Functional Departments.
- H₄₆ The attitude towards computer based MIS among the executives, indicated by EAMIS, are assumed to be dissimilar in different Management Levels.
- H₄₇ The attitude towards computer based MIS among the executives, indicated by EAMIS, are assumed to be dissimilar in different Age Groups.
- H₄₈ The attitude towards computer based MIS among the executives, indicated by EAMIS, are assumed to be dissimilar in different Experience Levels.
- H₄₉ The attitude towards computer based MIS among the executives, indicated by EAMIS, are assumed to be dissimilar in different Genders.
- H₅₀ The attitude towards computer based MIS among the executives, indicated by EAMIS, are assumed to be dissimilar for different Education Faculties.
- H₅₁ The attitude towards computer based MIS among the executives, indicated by EAMIS, are assumed to be dissimilar for different Education Levels.
- H₅₂ The attitude towards computer based MIS among the executives, indicated by EAMIS, are assumed to be dissimilar for different extent of involvement in Job Character: Analytical.
- H₅₃ The attitude towards computer based MIS among the executives, indicated by EAMIS, are assumed to be dissimilar for different extent of involvement in Job Character: Implement.
- H₅₄ The attitude towards computer based MIS among the executives, indicated by EAMIS, are assumed to be dissimilar for different extent of involvement in Job Character: Routine.
- H₅₅ The attitude towards computer based MIS among the executives, indicated by EAMIS, are assumed to be dissimilar for different extent of involvement in Job Character: Uncertainty.
- H₅₆ The attitude towards computer based MIS among the executives, indicated by EAMIS, are assumed to be dissimilar for different extent of involvement in Job Character: Negotiation.

- H₅₇ The attitude towards computer based MIS among the executives, indicated by EAMIS, are assumed to be dissimilar for different extent of involvement in Job Character: Staffing.
- H₅₈ The attitude towards computer based MIS among the executives, indicated by EAMIS, are assumed to be dissimilar for different types of MIS Involvement.
- H₅₉ The attitude towards computer based MIS among the executives, indicated by EAMIS, are assumed to be dissimilar for different extent of involvement in Functional Management: Operational.
- H₆₀ The attitude towards computer based MIS among the executives, indicated by EAMIS, are assumed to be dissimilar for different extent of involvement in Functional Management: Control.
- H₆₁ The attitude towards computer based MIS among the executives, indicated by EAMIS, are assumed to be dissimilar for different extent of involvement in Functional Management: Strategic Planning.
- H₆₂ The attitude towards computer based MIS among the executives, indicated by EAMIS, are assumed to be dissimilar for different extent of Computer Knowledge.
- H₆₃ The attitude towards computer based MIS among the executives, indicated by EAMIS, are assumed to be dissimilar for different extent of Computer Experience.

APPENDIX # 3

List of Journal in Alphabetical Sequence

Name of journal	1948- 1970	1971- 1980	1981- 1985	1986- 1990	1991- 1997	Total
American Society For Information Science	0	7	0	3	0	10
Academy of Management	0	8	3	2	2	15
Bangladesh Business Research Report	0	0	3	0	0	3
Banking	0	6	0	0	0	6
Business Horizons	7	4	2	0	0	13
California Management Review	8	12	2	1	0	23
Computer (IEEE)	0	3	0	0	0	3
Computer World	0	1	2	0	0	3
Data Management	0	4	0	0	0	4
Datamation	1	2	2	0	1	6
Decision Sciences	0	32	0	0	0	32
Expert Systems for Information Management	0	0	0	4	0	4
Harvard Business Review	43	35	22	14	0	114
IBM System Journal	0	3	0	0	0	3
Industrial Management Review	5	0	0	0	0	5
Interfaces	0	4	0	0	0	4
Journal of Accountancy	8	4	0	1	2	15
Journal of Accounting Research	0	2	1	3	0	6
Journal of General Management	0	0	0	5	0	5
Journal of Management Studies	0	0	0	3	5	8
Journal of Marketing	1	7	3	1	3	15
Journal of Systems Management	0	10	0	0	0	10
MIS Quarterly	0	5	1	0	0	6
MSU Business Topics	1	13	0	0	0	14
Management Accounting	12	13	23	10	1	59
Management Review	6	4	0	0	5	15
Management Science	8	10	0	0	0	18
Management Today	0	3	0	0	0	3
SAM Advanced Management Journal	0	0	0	4	3	7
Sloan Management Review	5	21	17	12	8	63
The Accountant	9	6	0	0	0	15
The Accounting Review	33	20	4	4	0	61
The Journal of Business	1	1	0	0	1	3
The Journal of Business Communication	0	0	30	0	0	30
Miscellaneous	17	56	7	34	86	200
Total:	165	293	122	104	117	801

APPENDIX # 4.1.1 (Cont.)**Part-V: Information Processing**

Information processing tools used in a day, week, month & quarter by respondent

Name of bank: _____

Name of department: _____

Sl. No.	Tools	Day	Week	Month	Quarter	Remark
01.	Printed format					
02.	Hand calculator					
03.	Computer spreadsheet					
04.	Computer program					
05.	Hand book					
06.	Procedure delineated in circular					
07.	Own analysis(Judgement)					
08.	Boss's advice					
09.	Peer's advice					
10.	Accounting and management accounting techniques					
11.	Statistical techniques					

Part-VI: Information Storage

Media of storage used in responding department

Name of bank: _____

Name of department: _____

Sl. No.	Media of Storage	Number / Units Applicable	Remark
01.	Register, Ledger		
02.	Kucha Register, Khata		
03.	Files: Classified by subjects		
04.	Files: Unclassified		
05.	Word Processor		
06.	Data Base		
07.	Spread Sheet		
08.	Others(please specify)		

APPENDIX # 4.1.2***Observation Schedule-B****Questionnaire Schedule For MISD, CD & EDP*

1. Please provide the date of establishment of the following units (if applicable) in your organisation: a)MISD:_____, b)Computer Department: _____, c) EDP Unit:_____.
2. Designation of departmental head of a)MISD:_____, b) Computer Department:_____, c)EDP:_____.
3. Provide designation wise number of personnel in CD & EDP stating number of personnel and designation.
4. Please provide the number of information specialists in your organisation stating designation & number.
5. Please specify the procedure of "information system projects" selection for development and implementation in your organisation.
6. Provide the number of location where the computers are installed (departments are assumed as separate location, location sheet is desired).
7. Whether computers are linked by Network? Yes [], No []. If yes, specify the type of network: _____.
8. Please specify the type and number of computers you have in your organisation:
9. Please specify the major objectives of CD and EDP:
10. Please specify the major areas covered under computer program:

End of observation schedule

APPENDIX 4.2.1

Inter Items Correlation Coefficients of Job Characters Derived in Re-test

	JOB A	JOB AC	JOB F	JOB I	JOB J	JOB N	JOB P	JOB R	JOB S
JOB AC	.04								
JOB F	.47**	-.01							
JOB I	-.18	.57**	.00						
JOB J	.36*	.15	.37**	-.11					
JOB N	.16	.19	.14	.34*	.08				
JOB P	.51**	.25	.49**	.10	.38**	.30**			
JOB R	.01	-.01	-.07	.05	-.26	-.27	.1069		
JOB S	-.04	.21	.07	.23	.12	.41**	.16	-.16	
JOB U	.01	.13	.30*	.07	.26	.29*	.23	-.20	.29*

* - Signif. LE .05 ** - Signif. LE .01 (2-tailed)

"." is printed if a coefficient cannot be computed. Variables JOBAC, JOBF, JOBI, & JOBP have been dropped after retest.

APPENDIX # 4.2.2

T-Test of Independent Sample of High and Low Groups for each Item of UIS in Test One and Test Two

Variables	Test One t-value	Test Two t-value
IAACC	14.34	14.76
IACOM	14.39	10.55
IACON	16.47	9.30
IACUR	21.29	19.62
IAFRE	14.92	10.30
IANEU	10.30	12.85
IAREL	11.73	10.79
IASCO*	12.81	8.99
IATIME	19.89	14.44
ORACT*	24.44	8.99
ORCLA	18.72	7.66
ORDES	9.12	4.07
ORGRA	13.37	14.18
ORMEA	10.24	10.94
ORNUM	10.96	5.97
ORORD	18.21	10.55
ORPME	13.93	11.10
ORPRE	14.07	9.30
ORTIT	10.09	8.85
ORVOL	13.89	7.30
QICLE	17.55	8.49
QICSF	11.44	8.09
QIFDB	13.09	10.05
QIFDF	17.53	14.18
QIIDE	9.01	7.66
QIMEA*	15.67	9.62
QIOVE*	12.69	11.00
QIPRE	20.00	12.64
QIPRO	16.20	14.20
QIREC*	10.21	11.99
QISPA	8.56	7.33
QISRT	9.34	13.53
QITIM	10.67	9.41
QIVAL	8.32	7.92

Note: * Denotes items rejected after re-test.

APPENDIX # 4.2.3

T-Test of Independent Sample of High and Low Groups for each Item of PFS in Test One and Test Two

Variables	Test One t-value	Test Two t-value
PFACO	7.77	7.82
PFADO	9.52	8.94 (Renamed as AFASD in survey)
PFAES	10.11	10.56
PFAVA*	17.12	10.38
PFCAL	12.00	11.86
PFCFA	14.24	15.20
PFCIR	9.56	8.38
PFCOM	40.00	47.00 (Renamed as PFCOU in survey)
PFCOP	13.58	13.78
PFDCR	11.72	10.38
PFDDI	10.24	9.95
PFFAN	11.25	10.75
PFFAX*	26.57	17.90
PFFDN	10.11	9.04
PFFPS	10.67	10.64
PFIFE	14.39	13.37
PFLOG	14.56	14.92
PFMAL	7.54	5.92
PFMAN	14.32	13.00
PFODE*	17.89	10.56
PFOEE	13.01	12.54
PFOLA*	19.36	13.67
PFOOO*	17.79	10.75
PFORG	9.21	8.98
PFPDW	8.74	8.40
PFPIN	13.52	12.02
PFPPOS*	6.78	5.86
PFPPOW*	8.87	7.96
PFPSPW	10.41	9.71
PFPUB*	8.94	7.01
PFRSY	11.56	10.90
PFTTEL*	12.35	11.91
PFTLX*	15.95	15.98

Note: * Denotes items rejected after re-test.

APPENDIX # 4.2.4

T-Test of Independent Sample of High and Low Groups for each Item of EAMIS in Test One and Test Two

Variables	Test One t-value	Test Two t-value
AFCLE	9.23	7.09
AFDIN	7.41	9.57
AFDPE*	9.23	-
AFFEF	14.21	13.00
AFFDB	15.61	15.64
AFIMC	17.51	16.52
AFINT*	12.37	11.49
AFIOP	13.87	15.32
AFISP	14.75	13.00
AFISQ	9.78	9.57
AFLSD	4.78	5.00 (Renamed as AFODS in survey)
AFMIS*	14.14	10.38
AFMOD	13.69	13.00
AFSRK	8.97	7.00
AFSSP*	8.45	7.42
AFSTI	7.16	7.29
AFTIN	9.49	7.09
AFUDT*	19.21	12.41
AFURN*	15.68	13.00
AFUTS	7.48	5.61 (Renamed as AFSDP in survey)
AUADR	9.12	10.95
AUAMM*	11.24	14.76
AUASE*	10.56	9.10
AUCMI	15.69	14.67
AUCOS	14.23	10.78
AUDTP	15.45	14.03
AUEID	8.72	7.39
AUFHQ	14.69	13.39
AUIDT*	15.58	13.67
AUIPE	14.74	13.99
AULFA	13.97	12.41
AULIA*	15.51	14.03
AULIP*	11.83	10.55
AURPE	15.37	14.67
AUSPA	18.36	17.44
AUTCU	11.19	10.38
AUTEM*	19.29	16.26
AUTOC	10.18	9.53
AUTRM	16.94	17.00
AUTTP	10.37	9.33

Note: *Denotes items rejected after re-test.

APPENDIX # 4.2.5***Cronbach's Alpha of Test One***

Sub-constructs/Constructs	Cases	Items	Alpha
UIS:Information Quality Items	49	9	.8781
UIS:Report Quality	49	11	.9024
UIS:IS Quality	49	14	.9070
PFS Items	49	33	.9068
EAMIS:Favourable Items	49	20	.9007
EAMIS:Un-Favourable Items	49	20	.8740

Cronbach's Alpha of Test Two

Sub-constructs/Constructs	Cases	Items	Alpha
UIS:Information Quality Items	49	9	.9363
UIS:Report Quality	49	11	.8896
UIS:IS Quality	49	14	.8378
PFS Items	49	33	.8831
EAMIS:Favourable Items	49	20	.9095
EAMIS:Un-Favourable Items	49	20	.8765

APPENDIX # 4.2.6***Split Half Reliability of Scales in Test One***

Sub-constructs/ Constructs	n	Items	Correlation Between Forms	Gutman Split Half	Spearman Brown Correlation
UIS:IQ Items	49	9	.84	.91	.91
UIS:RQ Items	49	11	.82	.89	.90
UIS:ISQ Items	49	14	.80	.88	.89
PFS Items	49	33	.77	.87	.87
EAMIS:F Items	49	20	.87	.93	.93
EAMIS:U Items	49	20	.80	.89	.89

Split Half Reliability of Scales in Test Two

Sub-constructs/ Constructs	n	Items	Correlation Between Forms	Gutman Split Half	Spearman Brown Correlation
UIS:IQ Items	49	9	.91	.93	.95
UIS:RQ Items	49	11	.88	.93	.94
UIS:ISQ Items	49	14	.74	.83	.85
PFS Items	49	33	.74	.85	.86
EAMIS:F Items	49	20	.82	.90	.90
EAMIS:U Items	49	20	.81	.89	.89

APPENDIX # 4.2.7

Item Wise t-test for paired sample (Test One & Two)

Variables	Correlation		2-tail sig.	T-value	df	2-tail sig.
	Pair	r				
IAACC	48	.492	.000	0.77	47	.444
IACOM	48	.611	.000	1.95	47	.057
IACON	48	.416	.003	1.27	47	.789
IACUR	48	.424	.003	1.74	47	.088
IAFRE	46	.431	.003	0.55	45	.585
IANEU	33	.554	.000	0.59	32	.550
IAREL	48	.472	.001	1.18	47	.242
IASCO*	46	.631	.000	1.23	45	.227
IATIME	33	.681	.000	1.10	32	.280
QRACT*	48	.605	.000	2.34	47	.024
QRCLA	48	.699	.000	2.37	47	.022
QRDES	48	.437	.002	0.30	47	.767
QRGRA	47	.552	.000	2.78	46	.008
QRMEA	47	.636	.000	0.55	46	.583
QRNUM	48	.544	.000	0.55	47	.583
QRORD	48	.482	.001	0.38	47	.705
QRPME	47	.493	.000	1.32	46	.192
QRPRE	33	.532	.000	1.49	32	.147
QRTIT	48	.321	.026	0.76	47	.452
QRVOL	48	.615	.000	2.19	47	.033
QICLE	48	.546	.000	1.21	47	.232
QICSF	41	.568	.000	0.18	40	.855
QIFDB	44	.638	.000	1.06	43	.294
QIFDF	44	.476	.001	1.81	43	.077
QIIDE	48	.575	.000	0.61	47	.543
QIMEA*	46	.573	.000	0.74	45	.462
QIOVE*	47	.257	.081	0.84	47	.403
QIPRE	48	.608	.000	1.49	47	.142
QIPRO	48	.493	.000	0.77	47	.444
QIREC*	48	.633	.000	0.66	47	.511
QISPA	48	.523	.000	0.30	47	.767
QISRT	48	.638	.000	0.15	47	.878
QITIM	48	.574	.000	0.76	47	.452
QIVAL	48	.458	.001	0.43	47	.666

Note: * Denotes items rejected after re-test.

(Cont.)

APPENDIX # 4.2.7 (Cont.)

Item Wise t-test for paired sample (Test One & Two)

Variables	Correlation		2-tail sig.	T-value	df	2-tail sig.
	Pair	r				
PFACO	48	.565	.000	1.03	47	.308
PFADO	48	.453	.001	2.03	47	.044 (AFASD in survey)
PFAES	47	.365	.012	0.70	46	.490
PFAVA*	48	.512	.000	0.76	47	.452
PFCAL	47	.451	.001	0.55	46	.584
PFCFA	48	.492	.000	1.78	47	.081
PFCIR	48	.290	.046	1.19	47	.244
PFCOM	48	.536	.000	1.01	47	.317 (PFCOU in survey)
PFCOP	48	.463	.001	1.33	47	.188
PFDCR	48	.653	.000	1.35	47	.182
PFDDI	48	.336	.020	0.34	47	.736
PFFAN	47	.603	.000	1.43	46	.160
PFFAX*	48	.466	.001	0.44	47	.663
PFFDN	46	.570	.000	1.60	45	.117
PFFPS	48	.536	.000	0.00	47	.999
PFIPE	48	.463	.001	0.98	47	.330
PFLOG	48	.629	.000	0.14	47	.888
PFMAL	48	.800	.000	0.23	47	.821
PFMAN	47	.506	.000	1.37	46	.177
PFODE*	48	.291	.044	0.75	47	.459
PFOEE	48	.510	.000	1.63	47	.109
PFOLA*	48	.719	.000	1.03	47	.308
PFOOO*	48	.498	.000	1.61	47	.113
PFORG	48	.646	.000	1.12	47	.267
PFFDW	48	.208	.155	0.44	47	.663
PFFIN	48	.371	.009	1.91	47	.063
PFFOS*	48	.135	.361	2.14	47	.037
PFFOW*	48	.671	.000	0.35	47	.728
PFFSW	48	.067	.653	0.39	47	.702
PFPUB*	48	.077	.605	0.88	47	.385
PFRSY	48	.389	.006	1.89	47	.065
PFTL*	48	.639	.000	0.15	47	.883
PFTLX*	48	.549	.000	1.20	47	.236

Note: * Denotes items rejected after re-test.

(Cont.)

APPENDIX # 4.2.7 (Concl.)

Item Wise t-test for paired sample (Test One & Two)

Variables	Correlation		2-tail sig.	T-value	df	2-tail sig.
	Pair	r				
AFCLE	47	.608	.000	0.24	46	.811
AFDIN	48	.445	.002	0.44	47	.659
AFDPE*	48	.465	.001	1.16	47	.252
AFEFF	48	.550	.000	1.07	47	.290
AFFDB	48	.191	.194	0.24	47	.811
AFIMC	33	.387	.007	2.27	32	.030
AFINT*	48	.325	.024	1.11	47	.272
AFIOP	47	.479	.001	2.00	46	.051
AFISP	48	.476	.001	1.30	47	.200
AFISQ	48	.367	.010	0.44	47	.659
AFLSD	48	.579	.000	0.44	47	.659 (AFODS IN SURVEY)
AFMIS*	33	.376	.008	1.50	32	.129
AFMOD	48	.340	.018	0.72	47	.473
AFSRK	48	.439	.002	1.52	47	.135
AFSSP*	48	.657	.000	0.44	47	.659
AFSTI	48	.469	.065	1.09	47	.280
AFTIN	48	.454	.001	0.23	47	.821
AFUDT*	48	.346	.016	0.14	47	.888
AFURN*	47	.481	.001	0.83	46	.411
AFUTS	48	.627	.000	1.53	47	.133 (AFSDP IN SURVEY)
AUADR	48	.596	.000	0.60	47	.552
AUAMM*	48	.264	.069	0.83	47	.412
AUASE*	47	.481	.001	2.79	46	.008
AUCHI	48	.312	.031	0.25	47	.806
AUCOS	48	.252	.084	1.39	47	.171
AUDTP	48	.365	.011	1.64	47	.108
AUEID	48	.496	.000	0.78	47	.441
AUFHQ	48	.123	.407	0.21	47	.832
AUIDT*	48	.623	.000	1.04	47	.302
AUIPE	47	.222	.134	0.63	46	.533
AULFA	47	.219	.139	0.26	46	.792
AULIA*	48	.605	.000	3.54	47	.001
AULIP*	47	.569	.000	0.74	46	.462
AURPE	47	.304	.038	0.12	46	.903
AUSPA	48	.566	.000	1.00	47	.322
AUTCU	48	.246	.092	0.96	47	.342
AUTEM*	48	.437	.002	0.31	47	.755
AUOC	48	.352	.014	0.42	47	.674
AUTRM	48	.413	.003	0.59	47	.558
AUTTP	47	.299	.041	2.25	46	.029

Note: * Denotes items rejected after re-test.

APPENDIX # 4.2.8

Constructs Wise t-test for paired sample (Test One & Two)

Constructs	Correlation		2-tail sig.	T-value	df	2-tail sig.
	Pair	r				
UIS	49	.802	.000	1.83	48	.074
PFS	49	.623	.000	1.72	48	.092
EAMIS-F	49	.690	.000	2.13	48	.030
EAMIS-U	49	.639	.000	2.15	48	.037

APPENDIX # 4.2.9

Regression of Constructs

Constructs/Sub-Constructs	Items	Multiple R	R ²	Adj.R	F	df	Sig.F
Test One							
DEPENDENT UIS							
IQ Items	9	.917	.841	.800	20.56	9,35	.000
RQ Items	9	.962	.926	.901	38.43	11,34	.000
ISQ Items	14	.949	.900	.852	18.72	14,29	.000
DEPENDENT PFS							
Physical	3	.542	.293	.244	5.95	3,43	.002
Procedural	5	.724	.525	.464	8.61	5,39	.000
Accessibility	5	.872	.760	.731	25.99	5,41	.000
Keeping	9	.858	.736	.674	11.80	9,38	.000
Environmental	11	.922	.851	.805	18.69	11,36	.000
Test Two							
DEPENDENT UIS							
IQ Items	9	.748	.559	.455	5.36	9,38	.000
RQ Items	11	.798	.636	.528	5.89	11,37	.000
ISQ Items	14	.875	.765	.659	7.21	14,31	.000
DEPENDENT PFS							
Physical	3	.388	.150	.093	2.65	3,45	.060
Procedural	5	.744	.553	.500	10.38	5,42	.000
Accessibility	5	.841	.708	.674	20.81	5,43	.000
Keeping	9	.905	.820	.773	17.33	9,38	.000
Environmental	11	.913	.833	.783	16.76	11,37	.000

APPENDIX # 4.2.10

Inter Item Correlation Coefficients in Test Two of Primary Variables
 Information Quality Items

	IACC	IACON	IACUR	IAFRE	IANEU	IAREL	IASCO	IACOM
IACOM	.720**							
IACON	.386**	.552**						
IACUR	.684**	.835**	.509**					
IAFRE	.558**	.651**	.541**	.712**				
IANEU	.673**	.793**	.501**	.683**	.562**			
IAREL	.383**	.552**	.460**	.519**	.488**	.410**		
IASCO	.614**	.777**	.518**	.665**	.625**	.700**	.543**	
IATIME	.706**	.809**	.452**	.913**	.717**	.680**	.475**	.710**

* - Signif. LE .05 ** - Signif. LE .01 (2-tailed)

“ . ” is printed if a coefficient cannot be computed. Variable IASCO is dropped after re-test.

Report Quality Items

	QRACT	QRCLA	QRDES	QRGRA	QRMEA	QRNUM	QRORD	QRPME	QRPRE	QRTIT
QRCLA	.649**									
QRDES	.317*	.379**								
QRGRA	.332*	.282	.001							
QRMEA	.651**	.690**	.447**	.339*						
QRNUM	.525**	.678**	.470**	.247	.771**					
QRORD	.483**	.345*	.676**	.018	.245	.353*				
QRPME	.548**	.718**	.422**	.3248*	.697**	.708**	.400**			
QRPRE	.569**	.763**	.376**	.451**	.674**	.624**	.257	.735**		
QRTIT	.277	.476**	.060	.224	.570**	.523**	-.036	.376**	.428**	
QRVOL	.502**	.529**	.404**	.360*	.561**	.641**	.323*	.562**	.614**	.193

* - Signif. LE .05 ** - Signif. LE .01 (2-tailed)

“ . ” is printed if a coefficient cannot be computed. Variable QRACT is dropped after re-test.

Information System Quality Items

	QICLF	QICSF	QIFDB	QIFDF	QIIDE	QIMEA	QIOVE	QIPRE	QIPRO	QIREC	QISPA
QICSF	.49**										
QIFDB	.41**	.34*									
QIFDF	.24	.34*	.18								
QIIDE	.44**	.38**	.12	.14							
QIMEA	-.09	-.00	-.07	-.01	.40**						
QIOVE	-.26	-.22	-.13	.23	.16	.29*					
QIPRE	.72**	.47**	.35*	.23	.24	-.06	-.28*				
QIPRO	.15	.38**	.47**	.22	.18	.09	-.124	.23			
QIREC	.61**	.38**	.39**	.22	.34*	-.00	-.09	.54**	.27		
QISPA	.62**	.62**	.53**	.27	.45**	.10	-.12	.49**	.38**	.59**	
QISRT	.22	.44**	-.10	.36*	.23	.03	.239	.10	.06	.12	
QITIM	.58**	.29*	.40**	.36*	.29*	-.13	-.03	.39**	.23	.77**	.63**
QIVAL	.53**	.68**	.45**	.15	.44**	.08	-.00	.36**	.41**	.44**	.68**
	QISRT	QITIM									
QITIM	.084										
QIVAL	.097	.340*									

* - Signif. LE .05 ** - Signif. LE .01 (2-tailed) “ . ” is printed if a coefficient cannot be computed. Variables QIMEA, QIOVE, QIREC are dropped after re-test.

APPENDIX # 4.2.10

PFS Items

	PFACO	PFADO	PFAES	PFAVA	PFCAL	PFCFA	PFCIR	PFCOM	PFCOP	PFDCR	PFDDI
PFADO	.25										
PFAES	.38**	.22									
PFAVA	.43**	.39**	.53**								
PFCAL	-.20	-.22	-.41**	-.49**							
PFCFA	.32*	.27	.10	.44**	-.48**						
PFCIR	-.08	.20	-.25	-.15	.23	.02					
PFCOM	.38**	.11	.24	.38**	-.47**	.81**	-.07				
PFCOP	.37**	.28*	.42**	.42**	-.48**	.33*	-.11	.29*			
PFDCR	.08	.46**	.31*	.24	-.36*	.10	.05	.15	.47**		
PFDDI	.20	.34*	.21	.14	-.17	.01	.08	.15	.22	.34*	
PFFAN	.45**	.34*	.37**	.41**	-.18	.18	-.13	.27	.19	.23	.43**
PFFAX	.28*	.16	.52**	.33*	.01	-.06	-.08	-.03	.27	.21	.15
PFFDN	.32*	.33*	.40**	.42**	-.30*	.31*	-.12	.35*	.27	.30*	.35*
PFFPS	.44**	.19	.28	.49**	-.34*	.25	-.13	.28*	.28	.08	.42**
PFIFE	.55**	.49**	.55**	.60**	-.42**	.25	-.07	.27	.52**	.54**	.52**
PFLOG	.42**	.39**	.48**	.45**	-.32*	.11	-.15	.12	.42**	.57**	.38**
PFMAL	.11	-.17	.15	.00	.30*	-.03	-.14	-.05	.09	-.06	-.22
PFMAN	.04	.20	-.29*	-.22	.36*	-.01	.29*	-.02	-.34*	-.18	.04
PFODE	.10	.37**	.36**	.16	-.08	.15	.02	.11	.19	.32*	.26
PFOEE	.26	.42**	.13	.33*	-.25	.19	.17	.16	.51**	.46**	.25
PFOLA	.28*	.46**	.27	.29*	-.17	-.01	.06	.01	.41**	.64**	.28*
PFOOO	.09	-.01	.12	.32*	-.02	-.019	-.22	.04	.06	.00	.11
PFORG	.32*	.27	.33*	.41**	-.09	-.04	-.01	.06	.09	.23	.30*
PFPDW	.20	.34*	.33*	.46**	-.15	.01	-.04	.09	.24	.09	.14
PFPIN	.29*	.61**	.41**	.47**	-.38**	.25	-.11	.23	.36*	.33*	.28
PFPOS	.10	.15	.02	.19	-.07	.02	.20	.01	.21	.29*	-.06
PFPow	.34*	.19	.25	.14	-.04	-.14	-.03	-.01	.22	.45**	.25
PFPsw	.42**	.12	.07	.15	.07	-.06	-.11	.04	.18	.07	.19
PFPUB	.08	.19	.10	.30*	-.09	-.00	-.12	-.08	.33*	.26	-.06
PFRSY	.27	.45**	.34*	.64**	-.31*	.15	.04	.08	.40**	.33*	.19
PFTel	.16	.23	.36**	.31*	-.22	.03	-.19	.04	.48**	.44**	-.06
PFTLX	.16	.24	.42**	.30*	-.01	-.06	-.03	-.13	.28*	.25	.09

* - Signif. LE .05 ** - Signif. LE .01 (2-tailed)

“.” is printed if a coefficient cannot be computed. Variables PFAVA, PFFAX, PFODA, PFOLA, PFOOO, PFPPOS, PFPow, PFPUB, PFTel & PFTLX are dropped after re-test.

(Cont.)

Appendix # 4.2.10(CONT.)

PFS Items

	PFFAN	PFFAX	PFFDN	PFFPS	PFIPE	PFLOG	PFMAL	PFMAN	PFODE	PFOEE	PFOLA
PFFAX	.21										
PFFDN	.87**	.14									
PFFPS	.70**	.09	.62**								
PFIPE	.63**	.42**	.62**	.44**							
PFLOG	.53**	.44**	.57**	.37**	.77**						
PFMAL	.01	.25	-.00	-.06	.07	.11					
PFMAN	.05	-.25	.01	-.07	-.08	-.09	-.16				
PFODE	.13	-.00	.14	-.07	.31*	.18	.16	-.07			
PFOEE	.16	.06	.26	.19	.51**	.30*	-.11	.06	.29*		
PFOLA	.24	.38**	.24	.22	.55**	.56**	-.01	-.14	.23	.55**	
PFOOO	.29*	-.00	.26	.29*	.29*	.26	.08	.06	-.06	.13	.04
PFORG	.38**	.11	.31*	.32*	.52**	.35*	.05	-.04	.42**	.39**	.49**
PFPDW	.47**	.20	.43**	.29*	.38**	.32*	-.00	-.00	-.12	.04	.11
PFPIN	.50**	.17	.58**	.39**	.54**	.47**	-.00	.04	.17	.31*	.24
PFPIS	-.02	.11	.01	.00	.33*	.16	-.05	.09	.11	.71**	.50**
PFPOW	.21	.28*	.08	.07	.44**	.42**	.11	.02	.23	.46**	.70**
PFPISW	.45**	.14	.31*	.28	.28*	.37**	.15	.15	-.11	.04	.21
PFPUB	.46**	.18	.50**	.22	.27	.36*	-.00	-.11	-.16	.16	.18
PFRSY	.42**	.16	.52**	.47**	.54**	.56**	.03	.00	-.00	.39*	.37**
PFTLX	.24	.61**	.25	.15	.46**	.44**	.30*	-.28*	.01	.19	.44**
PFTLX	.15	.89**	.12	.04	.44**	.44**	.26	-.23	.01	.07	.35*

Appendix # 4.2.10 PFS Items (Concl'd.)

	PFOEE	PFOLA	PFOOO	PFORG	PFPDW	PFPIN	PFPIS	PFPOW	PFPISW	PFPUB	PFRSY
PFOEE	-.07										
PFOEE	.06	.29*									
PFOLA	-.14	.23	.55**								
PFOOO	.06	-.06	.12	.04							
PFORG	-.03	.42**	.39**	.49**							
PFPDW	-.00	-.12	.03	.10	.61**						
PFPIN	.04	.16	.30*	.23	.02	.08					
PFPIS	.08	.11	.71**	.50**	.03	-.00	.50**				
PFPOW	.02	.23	.45**	.70**	.03	-.00	.50**				
PFPISW	.15	-.11	.04	.21	.40**	.24	.13	.38**			
PFPUB	-.10	-.16	.16	.18	.46**	.28*	.19	.09	.54**		
PFRSY	.00	-.00	.39**	.37**	.51**	.64**	.13	.04	.24	.33*	
PFTLX	-.28*	.01	.19	.43**	.29*	.37**	.31*	.28*	.32*	.40**	.24
PFTLX	-.23	.01	.07	.35*	.29*	.30*	.17	.19	.15	.29*	.18

* - Signif. LE .05 ** - Signif. LE .01 (2-tailed)

Appendix # 4.2.10(CONT.)

EAMIS Items: Favourable

	AFCLE	AFDIN	AFDPE	AFEFF	AFFDB	AFIMC	AFINT	AFIOP	AFISP	AFISQ	AFLSD
AFDIN	.43**										
AFDPE	.53**	.44**									
AFEFF	.24	.47**	.49**								
AFFDB	.33*	.44**	.35*	.66**							
AFIMC	.42**	.53**	.49**	.54**	.40**						
AFINT	.35*	.29*	.17	.30*	.22	.22					
AFIOP	.51**	.52**	.45**	.49**	.54**	.84**	.20				
AFISP	.38**	.41**	.49**	.45**	.57**	.61**	.06	.67**			
AFISQ	.22	.38**	.27	.38**	.49**	.44**	.00	.61**	.64**		
AFLSD	.19	.33*	.23	.27	.30*	.26	.03	.29*	.17	.14	
AFMIS	.23	.54**	.47**	.50**	.39**	.56**	.21	.49**	.51**	.53**	.24
AFMOD	.34*	.54**	.50**	.46**	.42**	.52**	.17	.49**	.40**	.22	.36*
AFSRK	.38**	.32*	.33*	.30*	.41**	.31*	.12	.43**	.14	.35*	.30*
AFSSP	.49**	.38**	.29*	.17	.29*	.31*	.18	.49**	.41**	.31*	.23
AFSTI	.39**	.46**	.47**	.43**	.55**	.44**	.13	.50**	.26	.36*	.25
AFTIN	.62**	.40**	.57**	.46**	.44**	.59**	.22	.64**	.46**	.27	.32*
AFUDT	.41**	.19	.19	.21	.23	.23	.65**	.25	.27	.08	.01
AFURN	.40**	.46**	.44**	.40**	.35*	.57**	.20	.62**	.35*	.36*	.31*
AFUTS	.47**	.24	.29*	.26	.52**	.26	.08	.47**	.24	.39**	.18

Appendix # 4.2.10 EAMIS Items: Favourable (Cont.)

	AFMIS	AFMOD	AFSRK	AFSSP	AFSTI	AFTIN	AFUDT	AFURN
AFMOD	.58**							
AFSRK	.08	.15						
AFSSP	.23	.33*	.29*					
AFSTI	.28*	.42**	.63**	.39**				
AFTIN	.32*	.50**	.46**	.60**	.64**			
AFUDT	.12	.09	.12	.22	.05	.22		
AFURN	.49**	.43**	.40**	.40**	.54**	.68**	.23	
AFUTS	.00	.12	.77**	.37**	.79**	.54**	.09	.43**

Appendix # 4.2.10 EAMIS Items: Un-Favourable (Cont.)

	AUADR	AUAMM	AUASE	AUCMI	AUCOS	AUDTP	AUEID	AUFHQ	AUIDT	AUIPE	AULFA
AUAMM	.10										
AUASE	.47**	.37**									
AUCMI	.24	.43**	.25								
AUCOS	.51**	.32*	.56**	.41**							
AUDTP	.39**	.22	.41**	.18	.03						
AUEID	.24	.44**	.28*	.28*	.39**	.14					
AUFHQ	.09	-.24	.29*	.06	.20	.23	.00				
AUIDT	.60**	.13	.12	.15	.16	.44**	.23	-.03			
AUIPE	.23	.10	.26	.20	.26	.23	.42**	.17	.26		
AULFA	.40**	.30*	.41**	.38**	.60**	.15	.38**	.25	.37**	.53**	
AULIA	.32*	.41**	.28*	.07	.05	.64**	.32*	.00	.44**	.25	.35*
AULIP	.17	-.03	.32*	.14	.15	.04	.01	.31*	-.13	.05	.07
AURPE	.06	.29*	.31*	.24	.21	.40**	.24	.32*	.19	.38**	.47**
AUSPA	.56**	.19	.53**	.30*	.56**	.31*	.41**	.27	.37**	.45**	.59**
AUTCU	.18	.02	.33*	.24	.15	.23	.33*	.24	.32*	.44**	.31*
AUTEM	.18	.05	.38**	.27	.31*	.39**	.24	.45**	.09	.48**	.31*
AUTOC	.09	.23	.57**	.13	.32*	.20	.26	.20	.04	.46**	.36*
AUTRM	.17	.33*	.34*	.72**	.41**	.19	.32*	.11	.04	.22	.32*
AUTTP	.07	.16	.45**	.32*	.30*	.36**	.08	.44**	.1479	.16	.2750

Variables AFDEP, AFINT, AFMIS, AFSSP, AFUDT, AFURN, AUASE, AUIDT, AULIA, AULIP, & AUTEM are dropped after re-test.

(Cont.)

Appendix # 4.2.10(Concl.)

EAMIS Items: Un-Favourable

	AULIA	AULIP	AURPE	AUSPA	AUTCU	AUTEM	AUTOC	AUTRM
AULIP	.00							
AURPE	.38	.15						
AUSPA	.21	.13	.38**					
AUTCU	.12	.13	.17	.35*				
AUTEM	.19	.47**	.46**	.45**	.40**			
AUTOC	.19	.24	.32*	.27	.55**	.43**		
AUTRM	.13	.15	.10	.20	.12	.29*	.13	
AUTTP	.16	.24	.24	.17	.26	.50**	.43**	.39**

* - Signif. LE .05 ** - Signif. LE .01 (2-tailed)

" " is printed if a coefficient cannot be computed

APPENDIX # 4.2.11**Correlation Coefficients of Constructs UIS, PFS and EAMIS in Test One**

	INFSAT	PFACIL	AFAVOR
PFACIL	.6582**		
AFAVOR	-.0347	.0260	
AUFAVO	-.0014	-.0872	-.1465

* - Signif. LE .05 ** - Signif. LE .01 (2-tailed)

" " is printed if a coefficient cannot be computed

Correlation Coefficients of Constructs UIS, PFS and EAMIS in Test Two

	INFSAT	PFACIL	AFAVOR
PFACIL	.6570**		
AFAVOR	-.0920	.0977	
AUFAVO	.0676	-.0041	-.3670**

* - Signif. LE .05 ** - Signif. LE .01 (2-tailed)

" " is printed if a coefficient cannot be computed

APPENDIX # 4.2.12

Survey questionnaire

University of Dhaka

A doctoral research questionnaire on
Management Information System
in
Banks and Financial Institutions
operating in Bangladesh
A Study of Their Nature, Performance and
Executives' Attitude Towards The Systems

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University of Dhaka

Tel: 9002606 (Residence)
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Date:

To whom it may concern

Dear Respondents,

This survey is to identify the effectiveness of Management Information Systems and the attitude of the Executives towards the computerization of MIS in banks and financial institutions in Bangladesh. This is a pioneering research in Bangladesh in the concerned area.

Your proper and exact response will substantially affect the result of this research. The findings may be much helpful for your organization as well as for the whole banking sector and will motivate the future researchers to design their research project in this field.

It is assured that supplied information will be dealt with strict confidentiality. These will be used for research purpose only. And your identity will be kept hidden also. So, Please respond freely according to your own judgement in filling up the questionnaire before return.

Thank you very much in advance for your help.

Yours faithfully

(Md Ashraful Islam)

PART - A

This part is to reflect your personal information. Most questions are related to your office environment. Please read carefully the items and feel free to respond to items below.

(1) Name of the organization: _____

(2) Name of the department : _____

(3) Please state your designation/ equivalent designation (Please tick one):

- | | | | |
|------------------------------|--------------------------|-------------------------------|--------------------------|
| (1) Officer/ Senior Officer | <input type="checkbox"/> | (5) Principal Officer | <input type="checkbox"/> |
| (2) Senior Principal Officer | <input type="checkbox"/> | (6) Assistant General Manager | <input type="checkbox"/> |
| (3) Deputy General Manager | <input type="checkbox"/> | (7) General Manager | <input type="checkbox"/> |
| (4) Managing Director | <input type="checkbox"/> | (8) Other: _____ | |

(4) Please state your age (years): _____

(5) Please state length of service experience (years): _____

(6) Gender: Male Female

(7) Please state your main education faculty (Please tick one):

- | | | | |
|-------------|--------------------------|----------------------------------|--------------------------|
| (1) Arts | <input type="checkbox"/> | (2) Commerce/Business | <input type="checkbox"/> |
| (3) Science | <input type="checkbox"/> | (4) Other (Please specify) _____ | |

(8) Please indicate your education level (Please tick one):

- | | | | |
|-----------------------|--------------------------|---------------------------|--------------------------|
| (1) H.S.C | <input type="checkbox"/> | (2) Graduate (Pass) | <input type="checkbox"/> |
| (3) Graduate (Honors) | <input type="checkbox"/> | (4) Graduate (Eng.) | <input type="checkbox"/> |
| (5) Master | <input type="checkbox"/> | (6) M.S./ M.Phil. | <input type="checkbox"/> |
| (7) Ph.D. | <input type="checkbox"/> | (8) Other (Specify) _____ | |

Please read carefully the items below relating to job characteristics. Choose a number against each item on the scale by drawing a circle that best describe the extent of characteristics of your present assigned job, where

- 5 = Highest involvement,
 4 = High involvement,
 3 = Medium involvement,
 2 = Low involvement,
 1 = Lowest involvement.

Job characteristics	Scale
(9) Analytical: e.g. Performing analysis; to explain the meaning of reports; assessment of goals, executive functions; examining and analyzing forms, charts, documents, records to facilitate procedures; research etc.	5 4 3 2 1
(10) Implement: e.g. fulfillment; give effect; to perform task, plan, project, program etc.	5 4 3 2 1
(11) Routine: e.g. regular; repetitive action; signing; passing; record keeping in ledger; data collection; computer input; counting; writing notes;	5 4 3 2 1
(12) Uncertainty: e.g. the incoming jobs, situations are not definitely known; insufficiency of information; decisions are subject to question or doubt etc.	5 4 3 2 1
(13) Negotiating: e.g. contact with clients, agencies; fund mobilization; debt recovery etc.	5 4 3 2 1
(14) Staffing: e.g. appointing, posting, promoting, appraising personnel, training, motivating, rewarding, taking disciplinary actions.	5 4 3 2 1

(15) To which of the following groups do you belong ? (Please tick one).

- (a) Preparer of reports
- (b) User of reports
- (c) Both Preparer and User of reports

There are three functional levels of management: operational, management control, and strategic planning. You may be involved in one or more functional levels. Please circle a number in the table below to indicate your involvement against each functional level, where

- 5 = Highest involvement,
- 4 = High involvement,
- 3 = Medium involvement,
- 2 = Low involvement,
- 1 = Lowest involvement.

Functional Levels	Scale
(16) Operational (Day-to-day operation; customer service; recording transactions; regular report preparation; inspection; routine job; short term planning & control etc.)	5 4 3 2 1
(17) Management Control (Preparation and monitoring of budgets; comparing actual results and plan; classify, summarize events; exception reports preparation; Acquisition of resources; Developing operational policies & objectives)	5 4 3 2 1
(18) Strategic Planning (Setting long term objectives and goals; evolving strategies and policies; review of policies; planning; Large scale investment; appointing staff)	5 4 3 2 1

Please state your knowledge of and experience with computers in the following items by drawing a circle on the scale, where scores from the highest (five) to the lowest (one) refer the meaning stated below:

- 5 = Expert
- 4 = Almost expert
- 3 = Moderate
- 2 = Lower
- 1 = Novice

Items	Scales
(19) Knowledge	5 4 3 2 1
(20) Experience	5 4 3 2 1

PART - B

This part is related to characteristics (attributes) of information, quality of reports and management information systems (MIS). The extent of these characteristics and quality may vary. Here, information refers to the data in reports, returns, letters, notes etc. I request you to read each item carefully and then choose a number on the scale by drawing a circle against each item that best represent your opinion. Assigning scores is expected to be made only on those reports that come to you during the process of performing operations in the department you belong to. Here scores from the highest five to the lowest one refer to the meanings stated below.

- 5 = Strongly Agree,
 4 = Agree,
 3 = Neutral (Partly agree & partly disagree),
 2 = Disagree,
 1 = Strongly Disagree,

Items:	Scale
(21) The information is timely (Timeliness).	5 4 3 2 1
(22) The information contained in the reports is up to date (Currency).	5 4 3 2 1
(23) The time interval of periodic reports is adequate i.e. the periodic reports are provided as often as needed so that I never feel insufficiency of information (Frequency).	5 4 3 2 1
(24) The information contained in the reports is accurate (Accuracy/Precision).	5 4 3 2 1
(25) The information contained in the reports is in full set as needed for my task (Completeness).	5 4 3 2 1
(26) The information contained in the reports is relevant to my task (Relevance).	5 4 3 2 1
(27) The information contained in the reports is concise (Conciseness).	5 4 3 2 1
(28) The information contained in the reports is neutral and not biased (Neutrality)	5 4 3 2 1
(29) The figures are sufficiently processed, summarized, filtered, sorted, arranged with well thought before incorporating in the reports (Sufficiently Processed).	5 4 3 2 1

Words in bracket show key variables.

Items:	Scale
(30) The presentation quality of information in the reports is attractive and not hazy (Presentation quality).	5 4 3 2 1
(31) The information contained in the reports can measure the performance and progress of activities (Measure Performance).	5 4 3 2 1
(32) The reports are easily understandable (Clarity).	5 4 3 2 1
(33) The volume of reports is acceptable (Volume).	5 4 3 2 1
(34) The information items included in the reports are in logical sequence (Order).	5 4 3 2 1
(35) The reports contain proper description of facts and activities (Descriptive).	5 4 3 2 1
(36) The numeric figures are sufficiently included in the reports to reflect the events and activities (Quantitative).	5 4 3 2 1
(37) The presentation of information in the reports is in graphic form when it is needed (Graphic).	5 4 3 2 1
(38) The information appears meaningful to me (Meaningful).	5 4 3 2 1
(39) The title, caption, label of the reports are appropriate to the content of the reports (Title).	5 4 3 2 1

Words in bracket show key variables.

Items:	Scale
(40) The reports contain projected information as and when needed (Projected Information).	5 4 3 2 1
(41) The time of happening of an event or duration of happening events are clearly written with the data in the reports (Time Context).	5 4 3 2 1
(42) The project, business unit where the events belong to; the location, address of happening events are clearly identifiable from the reports (Space Context).	5 4 3 2 1
(43) The reports which I get, support me in preparing reports, letters, memos (Add Value).	5 4 3 2 1

(44)	The reports which I get, appears to me helpful in improving my decision (Improve Decision).	5 4 3 2 1
(45)	I receive weekly, monthly, quarterly reports just in next week following the reporting week, month, quarter (Regularity).	5 4 3 2 1
(46)	I receive ad hoc, casual, special, exceptional reports within reasonable time (Reasonable Time).	5 4 3 2 1
(47)	The context for which the data are included in the reports is clear (Clear Context).	5 4 3 2 1
(48)	I find the reports serve the purpose of management control i.e. identify whether operations proceed according to plan (Management Control Feedback).	5 4 3 2 1
(49)	I find the reports helps to identify problems at some early stage of happening critical situation, so that management intervention can correct the problem (Management Control Feedforward).	5 4 3 2 1
(50)	The reports contain a number of variables pertaining to important areas of business objectives that the management want to achieve within a particular time period for successful competitive performance or for potential business success (Critical Success Factors).	5 4 3 2 1

Words in bracket show key variables.

There are different facilities for data collection, record keeping, report preparation and report distribution. All the facilities may be grouped as physical, procedural, record keeping, files maintenance, accessibility of information and environment. In present office environment, the presence of these facilities may not be sufficient to a desirable extent. And hence your opinion is sought to reflect the extent of the presence of these facilities relative to the desirable extent. Please circle a number on the scale that best represent your opinion, where

- 5 = Always,
- 4 = Most of the time,
- 3 = Sometimes,
- 2 = Poorly,
- 1 = Rarely.

Items:	Scale
(51) Computer facilities are provided in my department for data processing and preparation of Reports (Computer Facilities).	5 4 3 2 1
(52) I use computer in preparing Reports (Computer Use).	5 4 3 2 1

(53)	Calculator is provided for doing my job (Calculator)	5 4 3 2 1
(54)	Typewriters are provided for report preparation (Typewriter).	5 4 3 2 1
(55)	Photocopier, Cyclo-style machines are provided (Copier).	5 4 3 2 1
(56)	I use manual, hand book (containing rules and procedures) in preparing Reports (Procedure-Manual).	5 4 3 2 1
(57)	I use circular (Rules and procedures) in preparing Reports (Circular).	5 4 3 2 1
(58)	When I prepare Reports, information presentation form is pre-specified (Forms-Pre-specified).	5 4 3 2 1
(59)	The report formats are time to time reviewed, modified, drawn in order to support changing management need (Forms-Adequate for need).	5 4 3 2 1
(60)	Existing report formats are adequate to contain data and narration (Forms-Adequate for data and narration).	5 4 3 2 1
(61)	In preparing Reports, I find that supporting documents are easily accessible (Accessibility of Supporting Documents).	5 4 3 2 1
(62)	In preparing Reports, colleagues of my own department are helping me (Accessibility-Colleagues).	5 4 3 2 1
(63)	While collecting information from other organizations, I do not find any difficulty in accessing and having information (Accessibility of External Sources).	5 4 3 2 1
(64)	While I prepare Reports, the computer files are made available for my use (Accessibility in computer files).	5 4 3 2 1
(65)	In preparing Reports, I get information that are systematically recorded in the ledger, register (Recording-Systematic in Ledger).	5 4 3 2 1
(66)	When I use files for getting information, I see that files are indexed systematically (Preserving-Indexed).	5 4 3 2 1
(67)	When I use files for getting information, I see that the contents (letter, memos) are arranged date wise (Preserving-Date wise).	5 4 3 2 1
(68)	When I use files for getting information, I see that the files are maintained subject wise (Preserving-Subject wise).	5 4 3 2 1

(69)	The supporting documents (voucher, memos) are well organized for easy data extraction and checking (Preservation-Organization of documents).	5 4 3 2 1
(70)	Officials do not find any difficulty in searching and having information from the ledger, khata because these are kept organized (Preservation-Organization of ledger).	5 4 3 2 1

Please circle a number on the scale that best represent your opinion, where

- 5 = Strongly Agree,
 4 = Agree,
 3 = Neutral (Partly agree & partly disagree)
 2 = Disagree,
 1 = Strongly Disagree,

(71)	While preparing reports, I am not disturbed by bosses or by colleagues (No-disturbance by colleagues).	5 4 3 2 1
(72)	My office environment is not so crowded that creates difficulty, while I prepare Reports (No-disturbance by crowd).	5 4 3 2 1
(73)	In my department, trained computer operators are provided for handling the data, preparation of letters, reports (Computer Operators).	5 4 3 2 1
(74)	I am well assisted by Information Personnel for any problems relating to preparation of the Reports, handling data and operating computer (Assistance from Information Personnel)	5 4 3 2 1
(75)	Mail services (Postal, courier) are available (Mail).	5 4 3 2 1
(76)	The supply of stationary and other logistics are adequate for preparation of the Reports (Logistics).	5 4 3 2 1

PART - C

Manual MIS generally means Manual Reporting System. Computer based MIS mean doing the same job by using computer. In CBMIS software models are used to support decisions. Please read each item carefully and then choose a number on the scale that best describe your opinion. Where,

- 5 = Strongly Agree,
- 4 = Agree,
- 3 = Undecided,
- 2 = Disagree,
- 1 = Strongly Disagree,

Items	Scale
(77) The computer based MIS will bring in practice the systematic record keeping system (Systematic Record Keeping).	5 4 3 2 1
(78) The computer based MIS may provide more utility because of high speed information processing capacity (Speedy processing).	5 4 3 2 1
(79) The computer based MIS saves time of Executives (Save Time).	5 4 3 2 1
(80) Manual MIS is better as traditional record keeping systems are manual (Traditional Record Keeping is Manual).	5 4 3 2 1
(81) Manual MIS is better as personnel are well conversant with manual information handling systems (Convergent with Manual data Handling).	5 4 3 2 1
(82) Manual MIS is better suited because over all computerization of MIS will involve huge amount of money (Cost).	5 4 3 2 1
(83) The computer based MIS may not be suitable for the executives because they lack faith in computer data processing (Lack Faith).	5 4 3 2 1
(84) The introduction of computer based MIS will create learning environment for the executives (Create Learning Environment).	5 4 3 2 1
(85) The computer based MIS make available information as and when required (Timely Information).	5 4 3 2 1
(86) The computerization of MIS is not possible in near future due to shortage of computer programmer and system analyst (Shortage of Programmer & Analyst).	5 4 3 2 1
(87) The computerization of MIS is not feasible due to absence of rules, regulations relating to computer data protection (Absence of Data Protection Rules).	5 4 3 2 1
(88) The computer based MIS will make the executive idle (Executive Idle).	5 4 3 2 1

(89)	The computer based MIS will develop more efficient management (Efficient management).	5 4 3 2 1
(90)	The computer based MIS will have better feedback capability than that of existing manual MIS (Feedback).	5 4 3 2 1
(91)	The computer based MIS may fail to hold many qualitative (narrative, descriptive) information (Fail to hold qualitative data).	5 4 3 2 1
(92)	The computer based MIS may be a threat to organizational communication (Threat to Organizational Communication).	5 4 3 2 1
(93)	The organizational culture will be badly affected by the computer based MIS (Threat to Organizational Culture).	5 4 3 2 1
(94)	The computer based MIS will improve the quality of operational activities (Improve Operations).	5 4 3 2 1
(95)	The computer based MIS will improve the quality of management control (Improve Management Control).	5 4 3 2 1
(96)	The computer based MIS will improve the quality of strategic planning (Improve Strategic Planning).	5 4 3 2 1
(97)	Information system quality control may be ensured through computer based MIS (Ensure Information System Quality).	5 4 3 2 1
(98)	The thought process of executive will be badly affected with the adaptation of the computer based MIS (Threat to Thought Process).	5 4 3 2 1
(99)	In the computer based MIS organizational environment, there is every possibility of dominance of technical personnel (Dominance of Technical Personnel).	5 4 3 2 1
(100)	The computer based MIS is suitable because of capability to hold large volume of information in an organized way (Organized data storage).	5 4 3 2 1
(101)	The computer based MIS is acceptable because, different software models (IFPS, Spread Sheet) may be used to develop decision alternatives (Software Model).	5 4 3 2 1
(102)	In computer based MIS environment, executives have the opportunity to interact directly with the information system for having data and analysis (Direct Interaction).	5 4 3 2 1
(103)	In the computer based MIS environment, there is possibility of reducing executives and staff in the organization (Reduction of Personnel).	5 4 3 2 1
(104)	In the computer based MIS environment, the executives and staff will be isolated (Isolation of Personnel).	5 4 3 2 1

PART - D

This part is to give your valued opinion about some issues on Management Information System. In the following items, please tick in appropriate "Yes - No" box against each item to express resistance confronted in the adaptation of computer based MIS in your organization:

105. [Yes] [No] **No resistance** encountered.
106. [Yes] [No] It is my firm belief that the adaptation of computer based MIS is **unlikely to confront any sort of resistance**.
107. [Yes] [No] **Lack of top executives knowledge** in computer. Mostly ignorance of top management is the problem in adaptation of computer based MIS.
108. [Yes] [No] Fear of **unemployment**.
109. [Yes] [No] **Mal-practice** of users.
110. [Yes] [No] Shortage of **fund**.
111. [Yes] [No] Lack of Government, Bank **policy**.
112. [Yes] [No] **Dissatisfaction** of computer personnel.
113. [Yes] [No] Lack of **information privacy**.
114. [Yes] [No] Adverse **social effect**.

The following are the probable suggestions for improving quality of information, reports and management information systems. Please tick on appropriate "Yes - No" box against each item to express your suggestions.

115. [Yes] [No] MIS to be computerized by using Database Management Systems (Use of DBMS).
116. [Yes] [No] It is required to computerize the departments to collect, store and process information (Functional areas Computerization).
117. [Yes] [No] Computerization of general banking is required to improve customer services (Computerized Operations).
118. [Yes] [No] Establishing a central MIS, Data bank for storing data centrally; collection and dissemination of information through network system (Central MIS by Network).
119. [Yes] [No] To improve the quality of reports and MIS it is required to collect timely, accurate and relevant data and storing them subject and date wise (Information quality & preservation).
120. [Yes] [No] Elimination of duplicate/redundant statements and returns (Elimination of redundant reports).

121. [Yes] [No] Information sources i.e. branches/ zonal offices should have adequate FAX, Telex and Telephone (FAX, Telex and Telephone).
122. [Yes] [No] Each department and business unit should take initiative to reorganize MIS; This is to be planned and supervised by central MIS department (Departmental initiative).
123. [Yes] [No] Top management should prepare information system policy, plan and make provision of fund for MIS design, development and maintenance; Top management first gear up its initiative to reorganize MIS. (MIS plan, policy).
124. [Yes] [No] To reorganize MIS, active participation of all employees specially top and mid executives is required (Participation).
125. [Yes] [No] Productive and objective use of information and computers to be encouraged among the executives. (Objective use of IT).
126. [Yes] [No] Qualified operators, officers, programmers, system analysts to be appointed in MIS (Information personnel).
127. [Yes] [No] Training on computer operations, Database management system, MIS and programming have to be arranged (Training).
128. [Yes] [No] Adequate number of modern computers and utilities have to be provided (Computer).
129. [Yes] [No] Maintenance quality of computers and MIS to be improved; Sufficient support is required for the users (Maintenance-support).
130. [Yes] [No] Executives should have knowledge in MIS and computers (Users knowledge).
131. [Yes] [No] Management should consider extra financial benefits for MIS personnel, System Analysts and programmers (Financial benefits).
132. [Yes] [No] In-house software development to be encouraged (Software development).

Name :

Address :

Telephone:

Thank you very much for your kind cooperation and contribution.

APPENDIX # 6.1

Mean, SE Mean and Standard Deviation of Primary Variables

TABLE # 1: Mean of primary variables (30)of UIS

	Mean	SE Mean	SD	n	Label
IAACC	3.90	.05	.78	267	Accuracy
IACOM	3.83	.05	.84	267	Completeness
IACON	3.69	.05	.87	265	Conciseness
IACUR	3.91	.06	.93	267	Currency
IAFRE	3.72	.05	.88	264	Frequency
IANEU	3.99	.06	.90	267	Neutrality
IAREL	4.06	.05	.76	266	Relevance
IASPR	3.90	.06	.90	265	Sufficiently Processed*
IATIME	3.88	.05	.83	267	Timeliness
QRCLA	4.17	.04	.72	267	Clarity
QRDES	3.89	.04	.70	267	Descriptive
QRGRA	2.67	.08	1.31	263	Graphic
QRMEA	4.02	.04	.73	267	Meaningful
QRNUM	3.98	.04	.71	266	Quantitative
QRORD	3.83	.05	.82	265	Order
QRPME	3.96	.05	.77	262	Measure Performance
QRPRE	3.85	.04	.72	266	Presentation Quality
QRTIT	4.05	.05	.77	266	Title
QRVOL	3.94	.04	.71	264	Volume acceptable
QICLE	3.94	.04	.70	267	Clear context
QICSF	3.48	.06	.96	263	Critical Success Factors
QIFDB	3.76	.05	.87	266	Management Control Feedback
QIFDF	3.70	.05	.89	267	Management Control Feed-forward
QIIDE	4.01	.05	.80	266	Improve Decision
QIPRE	3.52	.06	.91	264	Regularity of Regular Reports
QIPRO	3.42	.06	.98	262	Projected Information
QISPA	3.90	.06	.90	264	Space context
QISRT	3.59	.05	.83	266	Special Reports in Reasonable Time
QITIM	3.81	.05	.85	265	Time context
QIVAL	4.06	.05	.74	267	Add value

* New item was included in the survey.

(Contd.)

Appendix # 6.1 (Cont.)

TABLE # 2: Mean of primary variables (26) of PFS

	Mean	SE Mean	SD	n	Label
PFACF	2.99	.09	1.48	267	Accessibility in Computer Files
PFACO	4.14	.05	.83	267	Accessibility - Colleagues
PFAES	3.01	.07	1.08	267	Accessibility of External Source
PFASD	3.77	.05	.87	267	Accessibility of Supporting Documents
PFCAL	4.09	.08	1.24	267	Calculator Use
PFCIR	4.19	.07	1.11	267	Procedure Circular
PFCOF	3.26	.09	1.52	267	Computer Facilities*
PFCOP	2.89	.09	1.50	265	Computer Operators
PFCOU	2.62	.10	1.62	267	Computer Use(PFCOM in Test Retest)
PFCR	3.63	.07	1.11	267	No Disturbance by Crowd
PFCDDI	3.73	.06	1.03	267	No Disturbance by Colleagues
PFFAN	3.74	.06	.92	267	Forms Adequate for Need
PFFDN	3.63	.06	.90	267	Forms Adequate for Data & Narration
PFFPS	3.82	.07	1.07	267	Forms Pre-specified
PFIPE	3.27	.07	1.22	266	Assistance from Expert
PFLOG	4.21	.05	.84	267	Logistics
PFMAL	4.34	.05	.87	267	Mail
PFCMAN	3.59	.08	1.24	267	Procedure Manual
PFOEE	3.76	.07	1.13	267	Preservation- Organization of Documents
PFORG	3.75	.06	1.02	267	Preservation- Organization of Ledger
PFCO	4.04	.07	1.08	267	Copier*
PFCPW	3.70	.07	1.18	267	Preserving- Date Wise
PFCIN	3.61	.07	1.19	267	Preserving- Indexed
PFCPSW	3.72	.07	1.12	267	Preserving- Subject Wise
PFCRSY	3.79	.06	1.04	267	Recording- Systematic in Ledger
PFTYP	3.89	.09	1.43	267	Typewriter*

* included after re-test.

(Contd.)

Appendix # 6.1 (Concl.)

TABLE # 3: Mean of primary variables (28) of EAMIS

	Mean	SEM	SD	n	Label
AURPE	2.70	.08	1.32	267	Reduction of Personnel
AUDTP	3.15	.08	1.23	267	Dominance of Technical Personnel
AUTRM	3.46	.08	1.35	267	Traditional Record Keeping is Manual
AUSPA	3.61	.08	1.26	266	Shortage of Programmer & Analyst
AUCOS	3.64	.08	1.28	267	Cost Involvement
AUCMI	3.68	.07	1.14	265	Conversant With Manual Data Handle
AUADR	3.70	.07	1.17	263	Absence of Data Protection Rule
AUFHQ	3.82	.06	1.05	265	Fail to Hold Qualitative Data
AULFA	3.91	.07	1.13	267	Lack Faith
AUIPE	3.97	.06	.93	267	Isolation of Personnel
AUTTP	3.97	.07	1.08	267	Threat to Thought Process
AUEID	4.04	.07	1.13	265	Executive Idleness
AUTCU	4.08	.06	1.00	267	Threat to Organizational Culture
AFDIN	4.15	.04	.71	266	Direct Interaction
AUTOC	4.16	.05	.82	267	Threat to Organizational Communication
AFCLE	4.18	.05	.82	267	Create Learning Environment
AFISQ	4.24	.04	.69	267	Ensure IS Quality
AFMOD	4.26	.04	.59	266	Software Model
AFODS	4.31	.04	.65	265	Organized Data Storage
AFEDB	4.34	.05	.77	267	Feedback
AFEFF	4.37	.05	.80	267	Efficient Management
AFISP	4.38	.04	.62	267	Improve Strategic Planning
AFIMC	4.39	.04	.68	267	Improve Management Control
AFIOP	4.42	.04	.62	267	Improve Operations
AFTIN	4.54	.04	.67	267	Timely Information
AFSRK	4.61	.04	.66	267	Systematic Record Keeping
AFSTI	4.64	.04	.67	267	Save time
AFSDP	4.65	.04	.62	267	Speedy Processing

APPENDIX # 6.2**Inter Item Correlation Coefficients of Job Characters**

	JOBA	JOBI	JOEN	JOBR	JOBS
JOBA	1.0000				
JOBI	.4061**	1.0000			
JOEN	-.0300	.1157	1.0000		
JOBR	-.1810**	-.1230*	.0537	1.0000	
JOBS	.0713	.2348**	.1934**	.0185	1.0000
JOBU	.0529	.1490*	.0565	.0543	.0542

* - Signif. LE .05 ** - Signif. LE .01 (2-tailed)

" ." is printed if a coefficient cannot be computed

APPENDIX # 6.3***Cronbach's Alpha of Scales in the Final Survey***

<i>Sub-constructs/Constructs</i>	<i>Cases</i>	<i>Items</i>	<i>Alpha</i>
UIS:Information Quality Items	267	9	.8453
UIS:Report Quality Items	267	10	.8126
UIS:IS Quality Items	267	11	.8544
PFS Items	267	26	.8311
EAMIS Items	267	28	.8764

APPENDIX # 6.4***Split Half Reliability of Scales in Final Survey***

<i>Sub-constructs/ Constructs</i>	<i>n</i>	<i>Items</i>	<i>Correlation Between Forms</i>	<i>Split Half Gutman r</i>	<i>Spearman Brown Correlation</i>
UIS:IQ Items	267	9	.79	.85	.88
UIS:RQ Items	267	10	.69	.82	.82
UIS:ISQ Items	267	11	.65	.78	.79
PFS Items	267	26	.54	.70	.70
EAMIS Items	267	28	.20	.31	.34

APPENDIX # 6.5***Regression of Constructs in Final Survey***

<i>Constructs/Sub- Constructs</i>	<i>Items</i>	<i>Multiple R</i>	<i>R²</i>	<i>Adj.R</i>	<i>F</i>	<i>df</i>	<i>Sig.F</i>
DEPENDENT UIS							
IQ Items	9	.866	.749	.740	82.72	9,249	.000
RQ Items	10	.912	.832	.826	120.25	10,242	.000
ISQ Items	11	.919	.846	.839	121.67	11,243	.000
DEPENDENT PFS							
Physical	5	.684	.468	.457	45.94	5,261	.002
Procedural	5	.573	.328	.315	25.49	5,261	.000
Accessibility	4	.736	.541	.533	77.20	4,262	.000
Keeping	6	.828	.687	.680	95.06	6,260	.000
Environmental	6	.746	.557	.547	53.83	6,257	.000

APPENDIX # 6.6

Inter Item Correlation Coefficients of Primary Variables in Final Survey

TABLE # 1: Correlation Coefficients of Information Quality Primary Elements (UIS)

	IAACC	IACOM	IACON	IACUR	IAFRE	IANEU	IAREL	IASPR
IACOM	.63**							
IACON	.35**	.41**						
IACUR	.43**	.46**	.21**					
IAFRE	.40**	.54**	.24**	.50**				
IANEU	.43**	.42**	.36**	.33**	.24**			
IAREL	.43**	.54**	.31**	.21**	.32**	.27**		
IASPR	.46**	.40**	.34**	.34**	.36**	.40**	.26**	
IATIME	.48**	.41**	.12*	.70**	.55**	.18**	.10	.30**

* - Signif. LE .05 ** - Signif. LE .01 (2-tailed)

TABLE # 2: Correlation Coefficient of Report Quality Primary Elements (UIS)

	QRCLA	QRDES	QRGRA	QRMEA	QRNUM	QRORD	QRPME	QRPRE	QRTIT
QRDES	.54**								
QRGRA	.23**	.21**							
QRMEA	.37**	.30**	.27**						
QRNUM	.45**	.51**	.16*	.43**					
QRORD	.49**	.42**	.07	.25**	.34**				
QRPME	.58**	.40**	.23**	.33**	.44**	.38**			
QRPRE	.54**	.40**	.22**	.27**	.39**	.34**	.56**		
QRTIT	.40**	.31**	.20**	.47**	.43**	.33**	.29**	.32**	
QRVOL	.55**	.44**	.22**	.36**	.28**	.36**	.37**	.44**	.22**

* - Signif. LE .05 ** - Signif. LE .01 (2-tailed)

" . " is printed if a coefficient cannot be computed

APPENDIX # 6.6 (Cont.)

TABLE # 3: Correlation Coefficient of IS Quality Primary Elements (UIS)

	QICLE	QICSF	QIFDB	QIFDF	QIIDE	QIPRE	QIPRO	QISPA	QISRT	QITIM
QICSF	.26**									
QIFDB	.42**	.52**								
QIFDF	.39**	.58**	.69**							
QIIDE	.36**	.21**	.41**	.41**						
QIPRE	.48**	.29**	.26**	.31**	.29**					
QIPRO	.28**	.16**	.24**	.20**	.21**	.15*				
QISPA	.46**	.30**	.24**	.27**	.47**	.25**	.35**			
QISRT	.46**	.35**	.47**	.35**	.39**	.59**	.18**	.33**		
QITIM	.45**	.26**	.20**	.20**	.26**	.45**	.45**	.62**	.31**	
QIVAL	.40**	.21**	.40**	.32**	.57**	.42**	.27**	.45**	.35**	.46**

* - Signif. LE .05 ** - Signif. LE .01 (2-tailed)

" . " is printed if a coefficient cannot be computed

TABLE # 4: Correlation Coefficient of PFS Primary Elements

	PFACF	PFACO	PFAES	PFASD	PFCAL	PFCIR	PFCOF	PFCOP	PFCOU	PFDCR
PFACO	.23**									
PFAES	.16**	.16*								
PFASD	.07	.40**	.13*							
PFCAL	-.00	.01	.07	.03						
PFCIR	.00	.07	.00	.19**	.32**					
PFCOF	.64**	.19**	.19**	.13*	-.09	.00				
PFCOP	.50**	.02	.08	.11	-.17**	-.07	.69**			
PFCOU	.65**	.21**	.06	.04	-.17**	-.09	.67**	.57**		
PFDCR	.28**	.04	.16**	.08	-.15*	.00	.31**	.44**	.34**	
PFDDI	.08	.09	.09	.25**	-.09	.05	.19**	.25**	.09	.52**
PFFAN	.21**	.10	.09	.21**	-.02	.13*	.13*	.20**	.04	.05
FFFDN	.20**	.23**	.02	.44**	-.06	.09	.16**	.12*	.21**	.08
PFFPS	.05	.27**	.02	.40**	.03	.23**	.12	.00	-.02	-.07
PFIPE	.46**	.06	.12	.24**	-.08	-.06	.49**	.62**	.45**	.39**
PFLOG	.02	-.04	.11	.09	.17**	.05	.14*	.20**	.09	.28**
PFMAL	.00	-.08	.08	.12*	.21**	.07	.05	.11	.06	.21**
PFFAN	.02	.01	.08	.05	.26**	.40**	.01	.05	-.06	.07
PFOEE	.25**	.20**	.12*	.32**	.08	.19**	.24**	.29**	.25**	.28**
PFORG	.20**	.22**	.21**	.36**	.01	.17**	.33**	.38**	.28**	.29**
PFFCO	-.03	.15*	.12	.11	.39**	.24**	-.02	-.06	-.12	-.07
PFPDW	.20**	.24**	.14*	.45**	.00	.08	.19**	.19**	.22**	.32**
PFFIN	.32**	.15*	.16**	.38**	-.11	.03	.27**	.20**	.34**	.38**
PFFSW	.13*	.19**	.11	.29**	-.02	.05	.13*	.19**	.17**	.21**
PFRSY	.30**	.17**	.33**	.37**	.14*	.08	.31**	.29**	.24**	.31**
PFTYP	-.45**	-.09	-.00	-.03	.39**	.25**	-.52**	-.49**	-.58**	-.28**

APPENDIX # 6.6 (Cont.)

TABLE # 4: Correlation Coefficient of PFS Primary Elements (Cont.)

	PFDDI	PFFAN	PFFDN	PFFPS	PFIPE	PFLOG	PFMAL	PFFAN
PFFDN	.14*	.51**						
PFFPS	.01	.33**	.40**					
PFIPE	.29**	.17**	.24**	.12*				
PFLOG	.29**	.01	.08	-.12*	.25**			
PFMAL	.24**	.05	.11	-.03	.29**	.52**		
PFFAN	-.02	.13*	.03	.19**	.00	.09	.16**	
PFOEE	.18**	.17**	.19**	.03	.43**	.20**	.21**	.14*
PFORG	.23**	.18**	.32**	.07	.41**	.21**	.13*	.14*
PFFCO	-.06	.02	.00	.07	.00	.34**	.21**	.29**
PFPDW	.29**	.04	.34**	.11	.36**	.24**	.27**	.09
PFFIN	.29**	.17**	.39**	.14*	.39**	.15*	.19**	.06
PFFSW	.21**	.02	.23**	-.02	.35**	.33**	.28**	.13*
PFRSY	.28**	.25**	.28**	.19**	.40**	.21**	.26**	.16**
PFTYP	.28**	-.12*	-.08	-.01	-.34**	.02	.11	.21**

TABLE # 4: Correlation Coefficient of PFS Primary Elements (Concl'd.)

	PFOEE	PFORG	PFPCO	PFPDW	PFPIN	PFPSW	PFRSY
PFOEE	.72**						
PFORG	.17**	.03					
PFPCO	.65**	.69**	.10				
PFPDW	.47**	.49**	-.05	.69**			
PFPIN	.64**	.56**	.15*	.74**	.50**		
PFPSW	.54**	.61**	.03	.56**	.52**	.45**	-.15*

Appendix # 6.7

Correlation Coefficients of Constructs UIS, PFS and EAMIS

	UIS	PFS	EAMIS
UIS	1.0000		
PFS	.5160**	1.0000	
EAMIS	.1627**	.2144**	1.0000

* - Signif. LE .05 ** - Signif. LE .01 (2-tailed)
 " . " is printed if a coefficient cannot be computed

Correlation Coefficients of Constructs UIS, PFS and EAMIS (Alternative)

	UIS	PFS	EAMIS-F	EAMIS-U
UIS	1.0000			
PFS	.5160**	1.0000		
EAMIS-F	.3264**	.4693**	1.0000	
EAMIS-U	-.0100	.0307	-.2197**	1.0000

* - Signif. LE .05 ** - Signif. LE .01 (2-tailed)
 " . " is printed if a coefficient cannot be computed

Appendix # 6.8

Mean, Standard Deviation and Variances of Constructs

	Mean	SD	Variance	n	Label
UIS	113.81	14.76	217.83	267	Information Satisfaction
PFS	95.15	13.15	172.96	267	Facilities Satisfaction
EAMIS	110.46	12.40	153.78	267	Executives Attitude Towards MIS

APPENDIX # 6.9

Analysis of Variance OF UIS, PFS & EAMIS by Criteria**Analysis of Variance OF UIS by Criteria**

Table # 1.

Dependent Variable	INFSAT	Information Satisfaction			
By levels of	OBANK	Group of Banks			
Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	MCBs	112.6286	13.2455	24386.6857	140
2	DNPCEBs	111.7500	13.6570	3543.7500	20
3	IPCBEs	113.1860	14.9256	9356.5116	43
4	SPBs	112.5745	17.2988	13765.4894	47
5	FBBs	131.0000	9.6760	1498.0000	17
Within Groups Total		113.8127	14.1624	52550.4367	267
Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	5392.2000	4	1348.0500	6.7210	.0000
Within Groups	52550.4367	262	200.5742		
Eta = .3051		Eta Squared = .0931			

Table # 2.

Dependent Variable	INFSAT	Information Satisfaction			
By levels of	DEPT	Department Groups			
Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Operations	117.1016	12.9096	21165.6797	128
2	Administration	106.2373	16.5543	15894.6780	59
3	Finance & Accounts	115.7632	15.1719	8516.8684	38
4	Development	112.6667	13.4303	7395.3333	42
Within Groups Total		113.8127	14.1921	52972.5594	267
Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	4970.0773	3	1656.6924	8.2252	.0000
Within Groups	52972.5594	263	201.4166		
Eta = .2929		Eta Squared = .0858			

Table # 3.

Dependent Variable		INFSAT	Information Satisfaction			
By levels of		MGTLEV	Management Level			
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	Top	110.8571	11.3738	1681.7143	14	
2	Middle Upper	111.2381	13.6074	7591.6190	42	
3	Middle Lower	115.7063	14.5828	26582.1349	126	
4	Bottom	112.7647	15.8645	21141.2941	85	
Within Groups Total		113.8127	14.7213	56996.7624	267	

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	945.8743	3	315.2914	1.4548	.2273
Within Groups	56996.7624	263	216.7177		
Eta = .1278		Eta Squared = .0163			

Table # 4.

Dependent Variable		INFSAT	Information Satisfaction			
By levels of		AGEGRP	Age Groups			
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	Below 30	116.1818	22.6498	10773.2727	22	
2	30-35	117.2895	16.4759	10043.8158	38	
3	35-40	114.4545	12.7522	12359.0909	77	
4	40-45	113.9655	15.2672	13285.9310	58	
5	45-50	111.5625	12.0564	6831.8125	48	
6	50 & Above	108.2083	11.4890	3035.9583	24	
Within Groups Total		113.8127	14.6909	56329.8813	267	

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	1612.7554	5	322.5511	1.4945	.1919
Within Groups	56329.8813	261	215.8233		
Eta = .1668		Eta Squared = .0278			

Table # 5.

Dependent Variable	INFSAT	Information Satisfaction			
By levels of	EXPLEV	Experience Level			
Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Below 5	113.6522	22.8625	11499.2174	23
2	5-10	115.6667	15.7000	9366.6667	39
3	10-15	116.9398	12.3815	12570.6988	83
4	15-20	112.6735	16.0343	12340.7755	49
5	20-25	110.4600	11.9167	6958.4200	50
6	25 & Above	109.2609	11.9819	3158.4348	23

Within Groups Total		113.8127	14.6340	55894.2131	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	2048.4236	5	409.6847	1.9130	.0925
Within Groups	55894.2131	261	214.1541		
Eta = .1880 Eta Squared = .0354					

Table # 6.

Dependent Variable	INFSAT	Information Satisfaction			
By levels of	GENDER	Gender			
Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Male	114.0000	14.8791	54904.0000	249
2	Female	111.2222	13.0814	2909.1111	18

Within Groups Total		113.8127	14.7703	57813.1111	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	129.5256	1	129.5256	.5937	.4417
Within Groups	57813.1111	265	218.1627		
Eta = .0473 Eta Squared = .0022					

Table # 7.

Dependent Variable INFSAT Information Satisfaction
By levels of EDUFAC Education Faculty

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Arts	108.2121	15.9041	16441.0303	66
2	Commerce/Business	116.2308	14.0237	20256.4615	104
3	Science	115.0309	13.8530	18422.9072	97

Within Groups Total		113.8127	14.4495	55120.3991	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	2822.2376	2	1411.1188	6.7586	.0014
Within Groups	55120.3991	264	208.7894		
Eta = .2207 Eta Squared = .0487					

Table # 8.

Dependent Variable INFSAT Information Satisfaction
By levels of EDUGRP Education Levels

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Below 14	112.2857	12.3924	921.4286	7
2	14-16	112.8571	13.5419	11369.7143	63
3	16-18	114.0642	15.4285	44275.2299	187
4	18 & Above	116.2000	11.7075	1233.6000	10

Within Groups Total		113.8127	14.8247	57799.9728	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	142.6639	3	47.5546	.2164	.8850
Within Groups	57799.9728	263	219.7718		
Eta = .0496 Eta Squared = .0025					

Table # 9.

Dependent Variable INFSAT Information Satisfaction
By levels of JOBA Job Character: Analytical

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Lowest involvement	112.8947	17.8073	5707.7895	19
2	Low involvement	111.1000	15.4269	4521.8000	20
3	Medium involvement	112.0366	16.0596	20890.8902	82
4	High involvement	114.3608	13.2163	16768.3711	97
5	Highest involvement	117.1633	13.7331	9052.6939	49

Within Groups Total		113.8127	14.7423	56941.5447	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	1001.0920	4	250.2730	1.1516	.3328
Within Groups	56941.5447	262	217.3341		
Eta = .1314 Eta Squared = .0173					

Table # 10.

Dependent Variable INFSAT Information Satisfaction
By levels of JOBI Job Character: Implement

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Lowest involvement	111.6486	15.8651	8170.4324	37
2	Low involvement	113.4390	20.1110	16178.0976	41
3	Medium involvement	112.4881	13.5304	15194.9881	84
4	High involvement	113.1053	12.9394	12557.1579	76
5	Highest involvement	122.7931	10.5877	3138.7586	29

Within Groups Total		113.8127	14.5202	55239.4346	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	2703.2021	4	675.8005	3.2053	.0136
Within Groups	55239.4346	262	210.8375		
Eta = .2160 Eta Squared = .0467					

Table # 11.

Dependent Variable		Information Satisfaction				
By levels of		Job Character: Negotiating				
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	Lowest involvement	111.6173	15.4309	19049.1358	81	
2	Low involvement	110.5111	13.2761	7755.2444	45	
3	Medium involvement	113.9048	15.0266	13999.4286	63	
4	High involvement	115.4912	13.3525	9984.2456	57	
5	Highest involvement	124.5238	13.6074	3703.2381	21	
Within Groups Total		113.8127	14.4216	54491.2925	267	

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	3451.3442	4	862.8360	4.1486	.0028
Within Groups	54491.2925	262	207.9820		
Eta = .2441		Eta Squared = .0596			

Table # 12.

Dependent Variable		Information Satisfaction				
By levels of		Job Character: Routine				
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	Lowest involvement	114.7727	12.4248	3241.8636	22	
2	Low involvement	110.4211	13.9615	3508.6316	19	
3	Medium involvement	109.4091	12.4554	10083.9545	66	
4	High involvement	114.0505	15.0451	22182.7475	99	
5	Highest involvement	118.9016	16.2385	15821.4098	61	
Within Groups Total		113.8127	14.4675	54838.6071	267	

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	3104.0296	4	776.0074	3.7075	.0059
Within Groups	54838.6071	262	209.3077		
Eta = .2315		Eta Squared = .0536			

Table # 13.

Dependent Variable INFSAT Information Satisfaction
By levels of JOBS Job Character: Staffing

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Lowest involvement	114.6605	15.6571	39468.3272	162
2	Low involvement	112.2632	10.5361	4107.3684	38
3	Medium involvement	106.6053	12.4738	5757.0789	38
4	High involvement	120.9333	10.9510	1678.9333	15
5	Highest involvement	120.1429	16.2379	3427.7143	14

Within Groups Total		113.8127	14.4147	54439.4221	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	3503.2146	4	875.8036	4.2150	.0025
Within Groups	54439.4221	262	207.7841		
Eta = .2459 Eta Squared = .0605					

Table # 14.

Dependent Variable INFSAT Information Satisfaction
By levels of JOBU Job Character: Uncertainty

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Lowest involvement	114.9878	14.1172	16142.9878	82
2	Low involvement	115.8947	14.1030	14917.1579	76
3	Medium involvement	113.0870	16.6828	18925.4783	69
4	High involvement	109.3200	11.8769	3385.4400	25
5	Highest involvement	107.6667	14.6905	3021.3333	15

Within Groups Total		113.8127	14.6710	56392.3973	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	1550.2394	4	387.5599	1.8006	.1291
Within Groups	56392.3973	262	215.2382		
Eta = .1636 Eta Squared = .0268					

Table # 15.

Dependent Variable INFSAT Information Satisfaction
By levels of MISI MIS Involvement

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Preparer	115.8058	13.8508	19568.1165	103
2	User	109.8462	11.4539	6690.7692	52
3	Both Preparer & User	113.8214	16.5645	30456.4286	112
Within Groups Total		113.8127	14.6571	56715.3143	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	1227.3224	2	613.6612	2.8565	.0592
Within Groups	56715.3143	264	214.8307		
Eta = .1455		Eta Squared = .0212			

Table # 16.

Dependent Variable INFSAT Information Satisfaction
By levels of FLM Functional Management: Control

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Lowest Involvement	111.8276	13.6152	10566.2759	58
2	Low Involvement	119.0462	14.5048	13464.8615	65
3	Medium Involvement	113.5857	15.4268	16420.9857	70
4	High Involvement	111.5091	14.5550	11439.7455	55
5	Highest Involvement	109.4737	13.7209	3388.7368	19
Within Groups Total		113.8127	14.5257	55280.6054	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	2662.0313	4	665.5078	3.1541	.0148
Within Groups	55280.6054	262	210.9947		
Eta = .2143		Eta Squared = .0459			

Table # 17.

Dependent Variable INFSAT Information Satisfaction
 By levels of FLO Functional Management: Operational

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Lowest Involvement	110.2609	12.9973	3716.4348	23
2	Low Involvement	107.5000	16.4333	7831.5000	30
3	Medium Involvement	109.0455	14.8824	9523.9091	44
4	High Involvement	115.2913	12.0600	14835.2621	103
5	Highest Involvement	118.7164	16.3826	17713.6119	67
Within Groups Total		113.8127	14.3059	53620.7179	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	4321.9188	4	1080.4797	5.2794	.0004
Within Groups	53620.7179	262	204.6592		
Eta = .2731		Eta Squared = .0746			

Table # 18.

Dependent Variable INFSAT Information Satisfaction
 By levels of FLS Functional Management: Strategic

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Lowest Involvement	113.8148	16.5621	29350.2963	108
2	Low Involvement	113.7705	15.3866	14204.7869	61
3	Medium Involvement	113.7556	13.7860	8362.3111	45
4	High Involvement	111.5143	9.8649	3308.7429	35
5	Highest Involvement	118.5556	11.1841	2126.4444	18
Within Groups Total		113.8127	14.7954	57352.5816	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	590.0551	4	147.5138	.6739	.6106
Within Groups	57352.5816	262	218.9030		
Eta = .1009		Eta Squared = .0102			

Table # 19.

Dependent Variable		INFSAT	Information Satisfaction			
By levels of		COMEXP	Computer Experience			
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	Novice	108.8265	14.7976	21240.0510	98	
2	Lower	117.3051	15.0462	13130.5885	59	
3	Moderate	114.7564	11.7641	10656.3718	78	
4	Almost Expert	122.3704	15.0771	5910.2963	27	
5	Expert	109.4000	20.6470	1705.2000	5	
Within Groups Total		113.8127	14.1748	52642.4276	267	

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	5300.2091	4	1325.0523	6.5948	.0000
Within Groups	52642.4276	262	200.9253		
		Eta = .3024	Eta Squared = .0915		

APPENDIX # 6.9 (Cont.)

Analysis of Variance of PFS by Criteria

Table # 20.

Dependent Variable		INFSAT	Information Satisfaction			
By levels of		COMKNO	Computer Knowledge			
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	Novice	107.8971	15.6235	16354.2794	60	
2	Lower	112.2903	13.7893	11598.7742	62	
3	Moderate	117.1942	12.2146	15218.1165	103	
4	Almost Expert	120.6429	16.3395	7208.4286	28	
5	Expert	106.6667	21.2101	2249.3333	6	
Within Groups Total		113.8127	14.1730	52628.9320	267	

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	5313.7047	4	1328.4262	6.6132	.0000
Within Groups	52628.9320	262	200.8738		
		Eta = .3028	Eta Squared = .0917		

Table # 21.

Dependent Variable By levels of		PFACIL GBANK	Facilities Satisfaction Group of Banks			
Value	Label		Mean	Std Dev	Sum of Sq	Cases
1	NCBs		92.9643	12.9128	23176.8214	140
2	DNPCBs		91.2000	13.7098	3571.2000	20
3	IPCBS		102.0465	12.3191	6373.9070	43
4	SPBs		93.7447	11.9081	6522.9362	47
5	FBBs		104.2941	10.6698	1821.5294	17
Within Groups Total			95.1536	12.5805	41466.3940	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	4540.3101	4	1135.0775	7.1718	.0000
Within Groups	41466.3940	262	158.2687		
Eta = .3141		Eta Squared = .0987			

Table # 22.

Dependent Variable By levels of		PFACIL DEPT	Facilities Satisfaction Department Groups			
Value	Label		Mean	Std Dev	Sum of Sq	Cases
1	Operations		97.7578	11.6225	17155.4922	128
2	Administration		89.0847	14.5594	12294.5763	59
3	Finance & Accounts		93.2632	12.0689	5389.3684	38
4	Development		97.4524	13.7649	7768.4048	42
Within Groups Total			95.1536	12.7282	42607.8416	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	3398.8625	3	1132.9542	6.9932	.0002
Within Groups	42607.8416	263	162.0070		
Eta = .2718		Eta Squared = .0739			

Table # 23.

Dependent Variable PFACIL Facilities Satisfaction
By levels of MGTLEV Management Level

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Top	95.2143	14.2784	2650.3571	14
2	Middle Upper	93.9762	14.8874	9086.9762	42
3	Middle Lower	95.8413	12.0734	18220.8254	126
4	Bottom	94.7059	13.7640	15913.6471	85

Within Groups Total		95.1536	13.2067	45871.8058	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	134.8983	3	44.9661	.2578	.8557
Within Groups	45871.8058	263	174.4175		
Eta = .0541 Eta Squared = .0029					

Table # 24.

Dependent Variable PFACIL Facilities Satisfaction
By levels of AGEGRP Age Groups

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Below 30	96.5455	17.9250	6747.4545	22
2	30-35	99.0263	10.2284	3870.9737	38
3	35-40	95.7143	12.4381	11757.7143	77
4	40-45	95.1207	13.9323	11064.1552	58
5	45-50	92.6667	11.6424	6370.6667	48
6	50 & Above	91.0000	14.5184	4848.0000	24

Within Groups Total		95.1536	13.0808	44658.9644	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	1347.7398	5	269.5400	1.5753	.1673
Within Groups	44658.9644	261	171.1071		
Eta = .1712 Eta Squared = .0293					

Table # 25.

Dependent Variable PFACIL Facilities Satisfaction
By levels of EXPLEV Experience Level

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Below 5	93.3913	10.5980	7609.4783	23
2	5-10	97.0256	11.4512	4982.9744	39
3	10-15	98.0964	10.8747	9697.2289	83
4	15-20	94.4490	14.9333	10704.1224	49
5	20-25	92.2400	12.5463	7713.1200	50
6	25 & Above	90.9565	12.6472	3518.9565	23
Within Groups Total		95.1536	13.0172	44225.8805	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	1780.8236	5	356.1647	2.1019	.0656
Within Groups	44225.8805	261	169.4478		
Eta = .1967		Eta Squared = .0387			

Table # 26.

Dependent Variable PFACIL Facilities Satisfaction
By levels of GENDER Gender

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Male	94.9759	13.3573	44247.8554	249
2	Female	97.6111	9.8288	1642.2778	18
Within Groups Total		95.1536	13.1594	45890.1332	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	116.5709	1	116.5709	.6732	.4127
Within Groups	45890.1332	265	173.1703		
Eta = .0503		Eta Squared = .0025			

Table # 27.

Dependent Variable	PFACIL	Facilities Satisfaction			
By levels of	EDUFAC	Education Faculty			
Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Arts	93.1667	15.0503	14723.1667	66
2	Commerce/Business	96.2596	12.1392	15177.9904	104
3	Science	95.3196	12.7945	15715.0928	97
Within Groups Total		95.1536	13.1449	45616.2498	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	390.4543	2	195.2271	1.1299	.3246
Within Groups	45616.2498	264	172.7888		
Eta = .0921		Eta Squared = .0085			

Table # 20.

Dependent Variable	PFACIL	Facilities Satisfaction			
By levels of	EDUGRP	Education Levels			
Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Below 14	90.5714	12.4346	927.7143	7
2	14-16	92.4127	12.7881	10139.2698	63
3	16-18	95.8235	13.3934	33365.1765	187
4	18 & Above	103.1000	5.1521	238.9000	10
Within Groups Total		95.1536	13.0327	44671.0606	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	1335.6435	3	445.2145	2.6212	.0512
Within Groups	44671.0606	263	169.8519		
Eta = .1704		Eta Squared = .0290			

Table # 29.

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Lowest involvement	96.5789	13.3513	3208.6316	19
2	Low involvement	90.0500	11.5005	2512.9500	20
3	Medium involvement	95.0488	12.9690	13623.8049	82
4	High involvement	95.3299	12.2251	14347.4433	97
5	Highest involvement	96.5102	15.5859	11660.2449	49
Within Groups Total		95.1536	13.1569	45353.0747	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	653.6295	4	163.4074	.9440	.4390
Within Groups	45353.0747	262	173.1033		
Eta = .1192		Eta Squared = .0142			

Table # 30.

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Lowest involvement	91.6216	10.9045	4280.7027	37
2	Low involvement	94.8537	15.7806	9961.1220	41
3	Medium involvement	96.0952	11.9473	11847.2381	84
4	High involvement	94.8289	12.7931	12274.7763	76
5	Highest involvement	98.2069	15.6122	6824.7586	29
Within Groups Total		95.1536	13.1330	45188.5977	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	818.1064	4	204.5266	1.1858	.3174
Within Groups	45188.5977	262	172.4756		
Eta = .1334		Eta Squared = .0178			

Table # 31.

Dependent Variable	PFACIL	Facilities Satisfaction			
By levels of	JOBN	Job Character: Negotiating			
Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Lowest involvement	92.0617	13.3439	14244.6914	81
2	Low involvement	91.5556	10.3409	4705.1111	45
3	Medium involvement	97.8571	12.7138	10021.7143	63
4	High involvement	96.3158	14.4162	11638.3158	57
5	Highest involvement	103.5238	10.0778	2031.2381	21
Within Groups Total		95.1536	12.7574	42641.0706	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	3365.6335	4	841.4084	5.1699	.0005
Within Groups	42641.0706	262	162.7522		
Eta = .2705		Eta Squared = .0732			

Table # 32.

Dependent Variable	PFACIL	Facilities Satisfaction			
By levels of	JOBR	Job Character: Routine			
Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Lowest involvement	95.0909	14.2057	4237.8182	22
2	Low involvement	91.1579	13.7124	3384.5263	19
3	Medium involvement	93.9545	13.0389	11050.8636	66
4	High involvement	94.7980	12.7175	15849.9596	99
5	Highest involvement	98.2951	13.2103	10470.6805	61
Within Groups Total		95.1536	13.1047	44993.8563	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	1012.8479	4	253.2120	1.4745	.2103
Within Groups	44993.8563	262	171.7323		
Eta = .1484		Eta Squared = .0220			

Table # 33.

Dependent Variable PFACIL Facilities Satisfaction
By levels of JOBS Job Character: Staffing

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Lowest involvement	94.3272	13.0669	27489.6605	162
2	Low involvement	98.0789	11.2907	4716.7632	38
3	Medium involvement	92.5789	14.0494	7303.2632	38
4	High involvement	97.1333	11.3633	1807.7333	15
5	Highest involvement	101.6429	16.0605	3353.2143	14

Within Groups Total		95.1536	13.0575	44670.6344	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	1336.0697	4	334.0174	1.9591	.1011
Within Groups	44670.6344	262	170.4986		
Eta = .1704 Eta Squared = .0290					

Table # 34.

Dependent Variable PFACIL Facilities Satisfaction
By levels of JOBU Job Character: Uncertainty

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Lowest involvement	93.3049	14.1898	16309.3780	82
2	Low involvement	96.6316	12.4759	11673.6842	76
3	Medium involvement	94.8406	14.0844	13489.2464	69
4	High involvement	98.2000	10.2021	2498.0000	25
5	Highest involvement	94.1333	9.7678	1335.7333	15

Within Groups Total		95.1536	13.1501	45306.0420	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	700.6622	4	175.1655	1.0130	.4011
Within Groups	45306.0420	262	172.9238		
Eta = .1234 Eta Squared = .0152					

Table # 35.

Dependent Variable		PFACIL	Facilities Satisfaction			
By levels of		MISI	MIS Involvement			
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	Preparer	93.5825	11.5330	13567.0485	103	
2	User	90.8654	14.9431	11388.0577	52	
3	Both Preparer & User	98.5893	12.9166	18519.1071	112	
Within Groups Total		95.1536	12.8326	43474.2134	267	

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	2532.4907	2	1266.2454	7.6894	.0006
Within Groups	43474.2134	264	164.6751		
Eta = .2346		Eta Squared = .0550			

Table # 36.

Dependent Variable		PFACIL	Facilities Satisfaction			
By levels of		FLM	Functional Management: Control			
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	Lowest Involvement	94.4310	11.3942	7400.2241	58	
2	Low Involvement	96.5231	12.4726	9956.2154	65	
3	Medium Involvement	95.5857	12.4126	10630.9857	70	
4	High Involvement	91.1818	15.7845	13454.1818	55	
5	Highest Involvement	102.5789	11.7488	2484.6316	19	
Within Groups Total		95.1536	12.9483	43926.2386	267	

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	2080.4655	4	520.1164	3.1023	.0161
Within Groups	43926.2386	262	167.6574		
Eta = .2127		Eta Squared = .0452			

Table # 37.

Dependent Variable PFACIL Facilities Satisfaction
By levels of FLO Functional Management: Operational

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Lowest Involvement	95.6957	15.1310	5036.8696	23
2	Low Involvement	92.2333	18.1216	9523.3667	30
3	Medium Involvement	91.7273	13.8956	8302.7273	44
4	High Involvement	96.2136	11.0716	12503.3010	103
5	Highest Involvement	96.8955	12.0241	9542.2687	67

Within Groups Total		95.1536	13.0922	44908.5331	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	1098.1710	4	274.5427	1.6017	.1742
Within Groups	44908.5331	262	171.4066		
Eta = .1545 Eta Squared = .0239					

Table # 38.

Dependent Variable PFACIL Facilities Satisfaction
By levels of FLS Functional Management: Strategic

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Lowest Involvement	95.2685	13.2817	18875.2130	108
2	Low Involvement	93.7213	11.9626	8586.2623	61
3	Medium Involvement	96.3778	12.0214	6358.5778	45
4	High Involvement	94.2857	13.1386	5869.1429	35
5	Highest Involvement	97.9444	18.7192	5956.9444	18

Within Groups Total		95.1536	13.1993	45646.1403	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	360.5638	4	90.1409	.5174	.7230
Within Groups	45646.1403	262	174.2219		
Eta = .0885 Eta Squared = .0078					

Table # 39.

Dependent Variable PFACIL Facilities Satisfaction
By levels of COMEXP Computer Experience

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Novice	89.4082	14.4742	20321.6735	98
2	Lower	96.7966	13.8574	11137.5593	59
3	Moderate	100.0800	9.0180	6262.0000	78
4	Almost Expert	97.5556	10.3490	2784.6667	27
5	Expert	99.8000	1.6432	10.8000	5

Within Groups Total		95.1536	12.4356	40516.6995	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	5490.0047	4	1372.5012	8.8752	.0000
Within Groups	40516.6995	262	154.6439		
Eta = .3454		Eta Squared = .1193			

Table # 40.

Dependent Variable PFACIL Facilities Satisfaction
By levels of COMKNO Computer Knowledge

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Novice	86.7353	14.5547	14193.2353	68
2	Lower	94.4677	11.8137	8513.4355	62
3	Moderate	100.0971	11.2829	12985.0291	103
4	Almost Expert	98.1786	9.8019	2594.1071	28
5	Expert	98.6667	2.2509	25.3333	6

Within Groups Total		95.1536	12.0924	38311.1404	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	7695.5637	4	1923.8909	13.1570	.0000
Within Groups	38311.1404	262	146.2257		
Eta = .4090		Eta Squared = .1673			

APPENDIX # 6.9 (Cont.)

Analysis of Variance of EAMIS by Criteria

Table # 41.

Dependent Variable	EAMIS	Executives Attitude Towards MIS			
By levels of	GBANK	Group of Banks			
Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	NCBs	108.0500	11.4943	18364.6500	140
2	DNPBs	107.4000	17.8485	6052.8000	20
3	IPCBs	114.2791	12.5988	6666.6512	43
4	SPBs	113.3617	10.7145	5280.8511	47
5	FBBs	116.2941	11.0100	1939.5294	17

Within Groups Total		110.4644	12.0913	38304.4816	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	2601.9303	4	650.4826	4.4493	.0017
Within Groups	38304.4816	262	146.2003		
		Eta = .2522	Eta Squared = .0636		

Table # 42.

Dependent Variable	EAMIS	Executives Attitude Towards MIS			
By levels of	DEPT	Department Groups			
Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Operations	110.6797	11.9044	17997.8672	128
2	Administration	107.5085	14.6103	12380.7458	59
3	Finance & Accounts	111.2105	13.4469	6690.3158	38
4	Development	113.2857	8.4976	2960.5714	42

Within Groups Total		110.4644	12.3371	40029.5002	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	876.9118	3	292.3039	1.9205	.1266
Within Groups	40029.5002	263	152.2034		
		Eta = .1464	Eta Squared = .0214		

Table # 43.

Dependent Variable EAMIS Executives Attitude Towards MIS
By levels of MOTLEV Management Level

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Top	111.2857	8.8616	1020.8571	14
2	Middle Upper	112.4762	10.5974	4604.4762	42
3	Middle Lower	110.9921	13.3107	22146.9921	126
4	Bottom	108.5529	12.2518	12609.0118	85
Within Groups Total		110.4644	12.3912	40381.3372	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	525.0748	3	175.0249	1.1399	.3334
Within Groups	40381.3372	263	153.5412		
Eta = .1133		Eta Squared = .0128			

Table # 44.

Dependent Variable EAMIS Executives Attitude Towards MIS
By levels of AGEGRP Age Groups

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Below 30	110.0455	13.3612	3748.9545	22
2	30-35	114.3684	9.7021	3482.8421	38
3	35-40	109.8831	13.4839	13817.9481	77
4	40-45	109.0172	13.1689	9884.9828	58
5	45-50	111.3333	11.4656	6178.6667	48
6	50 & Above	108.2917	11.2539	2912.9583	24
Within Groups Total		110.4644	12.3838	40026.3525	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	880.0595	5	176.0119	1.1477	.3356
Within Groups	40026.3525	261	153.3577		
Eta = .1467		Eta Squared = .0215			

Table # 45.

Dependent Variable		EAMIS	Executives Attitude Towards MIS			
By levels of		EXPLEV	Experience Level			
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	Below 5	110.6087	12.4051	3305.4783	23	
2	5-10	112.2564	9.8321	3673.4359	39	
3	10-15	109.6386	13.5894	15143.1566	83	
4	15-20	112.1429	13.4505	8684.0000	49	
5	20-25	110.1800	12.1146	7191.3800	50	
6	25 & Above	107.3043	10.1607	2274.8696	23	
Within Groups Total		110.4644	12.4341	40352.3204	267	

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	554.0916	5	110.8183	.7168	.6113
Within Groups	40352.3204	261	154.6066		
Eta = .1164		Eta Squared = .0135			

Table # 46.

Dependent Variable		EAMIS	Executives Attitude Towards MIS			
By levels of		GENDER	Gender			
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	Male	110.1365	11.8943	35085.3574	249	
2	Female	115.0000	17.8622	5424.0000	18	
Within Groups Total		110.4644	12.3639	40509.3574	267	

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	397.0546	1	397.0546	2.5974	.1082
Within Groups	40509.3574	265	152.8655		
Eta = .0985		Eta Squared = .0097			

Table # 47.

Dependent Variable EAMIS Executives Attitude Towards MIS
By levels of EDUFAC Education Faculty

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Arts	110.7273	13.2358	11387.0909	66
2	Commerce/Business	112.5385	12.3169	15625.8462	104
3	Science	108.0619	11.5838	12881.6289	97
Within Groups Total		110.4644	12.2929	39894.5659	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	1011.8461	2	505.9230	3.3479	.0367
Within Groups	39894.5659	264	151.1158		
Eta = .1573		Eta Squared = .0247			

Table # 40.

Dependent Variable EAMIS Executives Attitude Towards MIS
By levels of EDUGRP Education Levels

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Below 14	104.1429	22.9886	3170.8571	7
2	14-16	107.9048	11.8045	8639.4286	63
3	16-18	110.9947	11.9216	26434.9947	187
4	18 & Above	121.1000	9.3387	784.9000	10
Within Groups Total		110.4644	12.1821	39030.1804	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	1876.2316	3	625.4105	4.2143	.0062
Within Groups	39030.1804	263	148.4037		
Eta = .2142		Eta Squared = .0459			

Table # 49.

Dependent Variable		EAMIS	Executives Attitude Towards MIS			
By levels of		JOBA	Job Character: Analytical			
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	Lowest involvement	110.1579	11.0316	2190.5263	19	
2	Low involvement	110.1500	16.6300	5254.5500	20	
3	Medium involvement	108.3415	11.3912	10510.4390	82	
4	High involvement	111.8144	11.9333	13670.6598	97	
5	Highest involvement	111.5918	13.4300	8667.8367	49	
Within Groups Total		110.4644	12.4014	40294.0119	267	

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	612.4001	4	153.1000	.9955	.4105
Within Groups	40294.0119	262	153.7939		
Eta = .1224		Eta Squared = .0150			

Table # 50.

Dependent Variable		EAMIS	Executives Attitude Towards MIS			
By levels of		JOBI	Job Character: Implement			
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	Lowest involvement	113.6486	14.0361	7092.4324	37	
2	Low involvement	109.3171	14.6739	8612.8780	41	
3	Medium involvement	110.6786	12.0922	12136.3214	84	
4	High involvement	110.1447	10.0488	7573.4079	76	
5	Highest involvement	108.2414	13.2386	4907.3103	29	
Within Groups Total		110.4644	12.4057	40322.3501	267	

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	584.0618	4	146.0155	.9488	.4363
Within Groups	40322.3501	262	153.9021		
Eta = .1195		Eta Squared = .0143			

Table # 51.

Dependent Variable EAMIS Executives Attitude Towards MIS
By levels of JOBN Job Character: Negotiating

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Lowest involvement	109.6543	12.8230	13154.3210	81
2	Low involvement	110.3778	8.6898	3322.5778	45
3	Medium involvement	110.4762	12.0280	8969.7143	63
4	High involvement	111.4737	15.1104	12786.2105	57
5	Highest involvement	111.0000	11.3049	2556.0000	21

Within Groups Total		110.4644	12.4773	40788.8236	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	117.5884	4	29.3971	.1888	.9441
Within Groups	40788.8236	262	155.6825		
Eta = .0536		Eta Squared = .0029			

Table # 52.

Dependent Variable EAMIS Executives Attitude Towards MIS
By levels of JOBR Job Character: Routine

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Lowest involvement	114.9091	11.2458	2655.8182	22
2	Low involvement	104.1579	9.4591	1610.5263	19
3	Medium involvement	110.9242	10.8349	7630.6212	66
4	High involvement	109.9394	12.2548	14717.6364	99
5	Highest involvement	111.1803	14.7360	13029.0164	61

Within Groups Total		110.4644	12.3009	39643.6185	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	1262.7935	4	315.6984	2.0864	.0829
Within Groups	39643.6185	262	151.3115		
Eta = .1757		Eta Squared = .0309			

Table # 53.

Dependent Variable EAMIS Executives Attitude Towards MIS
By levels of JOBS Job Character: Staffing

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Lowest involvement	110.7469	11.7845	22358.6235	162
2	Low involvement	111.2105	12.3204	5616.3158	38
3	Medium involvement	109.2368	14.8131	8118.8684	38
4	High involvement	109.4667	7.6426	817.7333	15
5	Highest involvement	109.5714	17.2703	3877.4286	14

Within Groups Total		110.4644	12.4773	40788.9696	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	117.4424	4	29.3606	.1886	.9442
Within Groups	40788.9696	262	155.6831		
Eta = .0536 Eta Squared = .0029					

Table # 54.

Dependent Variable EAMIS Executives Attitude Towards MIS
By levels of JOBU Job Character: Uncertainty

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Lowest involvement	111.7927	13.4777	14713.4756	82
2	Low involvement	111.5526	10.2103	7818.7895	76
3	Medium involvement	105.9275	13.0004	11492.6377	69
4	High involvement	110.8400	10.1763	2485.3600	25
5	Highest involvement	117.9333	11.6525	1900.9333	15

Within Groups Total		110.4644	12.1082	38411.1961	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	2495.2159	4	623.0040	4.2549	.0024
Within Groups	38411.1961	262	146.6076		
Eta = .2470 Eta Squared = .0610					

Table # 55.

Dependent Variable		EAMIS	Executives Attitude Towards MIS			
By levels of		MISI	MIS Involvement			
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	Preparer	110.9223	12.5070	15955.3786	103	
2	User	111.2692	10.2577	5366.2308	52	
3	Both Preparer & User	109.6696	13.2403	19458.7768	112	
Within Groups Total		110.4644	12.4206	40780.3862	267	

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	126.0258	2	63.0129	.4079	.6654
Within Groups	40780.3862	264	154.4712		
Eta = .0555		Eta Squared = .0031			

Table # 56.

Dependent Variable		EAMIS	Executives Attitude Towards MIS			
By levels of		FLM	Functional Management: Control			
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	Lowest Involvement	110.9655	12.6157	9071.9310	58	
2	Low Involvement	108.0154	13.9514	12456.9846	65	
3	Medium Involvement	111.2000	11.3987	8965.2000	70	
4	High Involvement	110.4727	11.4534	7083.7091	55	
5	Highest Involvement	114.5789	11.9365	2564.6316	19	
Within Groups Total		110.4644	12.3780	40142.4563	267	

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	763.9557	4	190.9889	1.2465	.2916
Within Groups	40142.4563	262	153.2155		
Eta = .1367		Eta Squared = .0187			

Table # 57.

Dependent Variable EAMIS Executives Attitude Towards MIS
 By levels of FLO Functional Management: Operational

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Lowest Involvement	115.0000	10.0860	2238.0000	23
2	Low Involvement	105.6000	9.7436	2753.2000	30
3	Medium Involvement	108.0182	12.1373	6334.5455	44
4	High Involvement	111.2816	12.5467	16056.8350	103
5	Highest Involvement	110.9104	13.5621	12139.4627	67

Within Groups Total		110.4644	12.2820	39522.0431	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	1384.3689	4	346.0922	2.2943	.0598
Within Groups	39522.0431	262	150.8475		
Eta = .1840		Eta Squared = .0338			

Table # 58.

Dependent Variable EAMIS Executives Attitude Towards MIS
 By levels of FLS Functional Management: Strategic

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Lowest Involvement	112.1852	12.4075	16472.2963	108
2	Low Involvement	110.1475	13.0011	10141.6721	61
3	Medium Involvement	104.1556	13.1235	7577.9111	45
4	High Involvement	112.5714	10.6309	3842.5714	35
5	Highest Involvement	112.8889	5.3894	493.7778	18

Within Groups Total		110.4644	12.1266	38528.2287	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	2378.1832	4	594.5458	4.0430	.0034
Within Groups	38528.2287	262	147.0543		
Eta = .2411		Eta Squared = .0581			

Table # 59.

Dependent Variable		EAMIS	Executives Attitude Towards MIS			
By levels of		COMEXP	Computer Experience			
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	Novice	109.6224	13.7267	18277.0306	98	
2	Lower	108.3729	11.3971	7533.7966	59	
3	Moderate	111.6410	10.2627	8109.9487	78	
4	Almost Expert	111.8889	14.2864	5306.6667	27	
5	Expert	125.6000	3.2863	43.2000	5	
Within Groups Total		110.4644	12.2429	39270.6426	267	

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	1635.7694	4	408.9423	2.7283	.0297
Within Groups	39270.6426	262	149.8879		
Eta = .2000		Eta Squared = .0400			

Table # 60.

Dependent Variable		EAMIS	Executives Attitude Towards MIS			
By levels of		COMKNO	Computer Knowledge			
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	Novice	108.8971	13.7929	12746.2794	68	
2	Lower	108.7097	13.4108	10970.7742	62	
3	Moderate	111.9029	9.9907	10181.0291	103	
4	Almost Expert	111.0714	13.0382	4589.8571	28	
5	Expert	118.8333	16.8335	1416.8333	6	
Within Groups Total		110.4644	12.3413	39904.7732	267	

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	1001.6388	4	250.4097	1.6441	.1635
Within Groups	39904.7732	262	152.3083		
Eta = .1565		Eta Squared = .0245			

APPENDIX # 6.10

Analysis of Variance of MISP by Criteria

TABLE # 1.

Dependent Variable		MISP	MIS Performance			
By levels of		GBANK	Group of Banks			
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	NCBs	205.5929	22.8989	72885.7929	140	
2	DNPCBs	202.9500	23.5137	10504.9500	20	
3	IPCBs	215.2326	23.6229	23437.6744	43	
4	SPBs	206.3191	25.6414	30244.2128	47	
5	FBBs	235.2941	15.8854	4037.5294	17	
Within Groups Total		208.9663	23.2075	141110.159	267	
Source	Sum of Squares	d.f.	Mean Square	F	Sig.	
Between Groups	16118.5372	4	4029.6343	7.4818	.0000	
Within Groups	141110.1595	262	538.5804			
Eta = .3202		Eta Squared = .1025				

TABLE # 2.

Dependent Variable		MISP	MIS Performance			
By levels of		DEPT	Department Groups			
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	Operations	214.8594	21.5541	59001.4688	128	
2	Administration	195.3220	28.1268	45884.8814	59	
3	Finance & Accounts	209.0263	20.8592	16098.9737	38	
4	Development	210.1190	22.5012	20758.4048	42	
Within Groups Total		200.9663	23.2153	141743.729	267	
Source	Sum of Squares	d.f.	Mean Square	F	Sig.	
Between Groups	15484.9681	3	5161.6560	9.5773	.0000	
Within Groups	141743.7286	263	538.9495			
Eta = .3138		Eta Squared = .0985				

TABLE # 3.

Dependent Variable		MISP	MIS Performance			
By levels of		MGTLEV	Management Level			
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	Top	206.0714	21.8402	6200.9286	14	
2	Middle Upper	205.2143	24.0300	23675.0714	42	
3	Middle Lower	211.5476	22.3816	62617.2143	126	
4	Bottom	207.4706	27.3855	62997.1765	85	
Within Groups Total		208.9663	24.3150	155490.391	267	

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	1738.3059	3	579.4353	.9801	.4026
Within Groups	155490.3908	263	591.2182		
Eta = .1051		Eta Squared = .0111			

TABLE # 4.

Dependent Variable		MISP	MIS Performance			
By levels of		AGEGRP	Age Groups			
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	Below 30	212.7273	38.8185	31644.3636	22	
2	30-35	216.3150	22.8534	19324.2105	38	
3	35-40	210.1688	21.8610	36320.8052	77	
4	40-45	209.0862	25.0930	35890.5690	58	
5	45-50	204.2292	17.5720	14512.4792	48	
6	50 & Above	199.2083	24.4042	13697.9583	24	
Within Groups Total		208.9663	24.0840	151390.386	267	

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	5838.3108	5	1167.6622	2.0131	.0772
Within Groups	151390.3858	261	580.0398		
Eta = .1927		Eta Squared = .0371			

TABLE # 5.

Dependent Variable		MISP	MIS Performance			
By levels of		EXPLEV	Experience Level			
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	Below 5	207.0435	39.2619	33912.9565	23	
2	5-10	212.6923	23.5608	21094.3077	39	
3	10-15	215.0361	18.8411	29108.8916	83	
4	15-20	207.1224	27.4626	36201.2653	49	
5	20-25	202.7000	19.3172	18284.5000	50	
6	25 & Above	200.2174	22.4134	11051.9130	23	
Within Groups Total		208.9663	23.9455	149653.834	267	

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	7574.8625	5	1514.9725	2.6421	.0237
Within Groups	149653.8341	261	573.3863		
Eta = .2195		Eta Squared = .0482			

TABLE # 6.

Dependent Variable		MISP	MIS Performance			
By levels of		GENDER	Gender			
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	Male	208.9759	24.6123	150229.855	249	
2	Female	208.8333	20.2898	6998.5000	18	
Within Groups Total		208.9663	24.3580	157228.355	267	

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	.3412	1	.3412	.0006	.9809
Within Groups	157228.3554	265	593.3145		
Eta = .0015		Eta Squared = .0000			

TABLE # 7.

Dependent Variable MIS Performance
By levels of EDUFAC Education Faculty

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Arts	201.3788	28.9858	54611.5303	66
2	Commerce/Business	212.4904	22.1263	50425.9904	104
3	Science	210.3505	22.1063	46914.0825	97

Within Groups Total		208.9663	23.9911	151951.603	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	5277.0935	2	2638.5467	4.5842	.0110
Within Groups	151951.6032	264	575.5743		
Eta = .1832 Eta Squared = .0336					

TABLE # 8.

Dependent Variable MIS Performance
By levels of EDUGRP Education Levels

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Below 14	202.8571	23.1187	3206.8571	7
2	14-16	205.2698	22.5726	31590.4127	63
3	16-18	209.0877	25.1561	117706.642	187
4	18 & Above	219.3000	16.2484	2376.1000	10

Within Groups Total		208.9663	24.2672	154800.012	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	2348.6051	3	782.8950	1.3294	.2652
Within Groups	154800.0116	263	588.8974		
Eta = .1222 Eta Squared = .0149					

TABLE # 9.

Dependent Variable	MISP	MIS Performance			
By levels of	JOBA	Job Character: Analytical			
Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Lowest involvement	209.4737	29.0505	15190.7368	19
2	Low involvement	201.1500	23.9896	10934.5500	20
3	Medium involvement	207.0854	26.1110	55224.4024	82
4	High involvement	209.6907	22.2085	47348.7216	97
5	Highest involvement	213.6735	23.2185	25876.7755	49
Within Groups Total		208.9663	24.2895	154575.186	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	2653.5102	4	663.3775	1.1244	.3454
Within Groups	154575.1864	262	589.9816		
Eta = .1299		Eta Squared = .0169			

TABLE # 10.

Dependent Variable	MISP	MIS Performance			
By levels of	JOBI	Job Character: Implement			
Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Lowest involvement	203.2703	22.0109	17441.2973	37
2	Low involvement	208.2927	33.8941	45952.4878	41
3	Medium involvement	208.5833	21.3796	37938.4167	84
4	High involvement	207.9342	23.1023	40028.6711	76
5	Highest involvement	221.0000	19.2317	10356.0000	29
Within Groups Total		208.9663	24.0639	151716.873	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	5511.0238	4	1377.9560	2.3796	.0522
Within Groups	151716.8728	262	579.0720		
Eta = .1872		Eta Squared = .0351			

TABLE # 11.

Dependent Variable		MISP	MIS Performance			
By levels of		JOBN	Job Character: Negotiating			
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	Lowest involvement	203.6790	25.1037	50415.6543	81	
2	Low involvement	202.0667	18.8564	15644.8000	45	
3	Medium involvement	211.7619	24.3116	36645.4286	63	
4	High involvement	211.8070	24.3776	33278.8772	57	
5	Highest involvement	228.0476	20.2965	8238.9524	21	
Within Groups Total		208.9663	23.4621	144223.712	267	

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	13004.9842	4	3251.2460	5.9063	.0001
Within Groups	144223.7125	262	550.4722		
Eta = .2876		Eta Squared = .0827			

TABLE # 12.

Dependent Variable		MISP	MIS Performance			
By levels of		JOBR	Job Character: Routine			
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	Lowest involvement	209.8636	21.6955	9884.5909	22	
2	Low involvement	201.5789	23.3460	9810.6316	19	
3	Medium involvement	203.3636	22.3198	32381.2727	66	
4	High involvement	208.8485	24.4767	58712.7273	99	
5	Highest involvement	217.1967	25.5537	39179.6393	61	
Within Groups Total		208.9663	23.9249	149968.862	267	

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	7259.8348	4	1814.9587	3.1708	.0144
Within Groups	149968.8618	262	572.4002		
Eta = .2149		Eta Squared = .0462			

TABLE # 13.

Dependent Variable		MISP	MIS Performance			
By levels of		JOBS	Job Character: Staffing			
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	Lowest involvement	208.9877	25.3752	103667.975	162	
2	Low involvement	210.3421	18.0064	11996.5526	38	
3	Medium involvement	199.1842	22.6332	18953.7105	38	
4	High involvement	210.0667	17.1025	4094.9333	15	
5	Highest involvement	221.7857	29.4362	11264.3571	14	
Within Groups Total		208.9663	23.9256	149977.529	267	

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	7251.1677	4	1812.7919	3.1668	.0145
Within Groups	149977.5289	262	572.4333		
Eta = .2148		Eta Squared = .0461			

TABLE # 14.

Dependent Variable		MISP	MIS Performance			
By levels of		JOBU	Job Character: Uncertainty			
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	Lowest involvement	208.2927	24.3364	47972.9756	82	
2	Low involvement	212.5263	22.7464	38804.9474	76	
3	Medium involvement	207.9275	27.9418	53090.6377	69	
4	High involvement	207.5200	20.4555	10042.2400	25	
5	Highest involvement	201.8000	19.6767	5420.4000	15	
Within Groups Total		208.9663	24.3489	155331.201	267	

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	1897.4960	4	474.3740	.8001	.5260
Within Groups	155331.2007	262	592.8672		
Eta = .1099		Eta Squared = .0121			

TABLE # 15.

Dependent Variable	MISP	MIS Performance			
By levels of	MISI	MIS Involvement			
Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Preparer	209.3883	20.9866	44924.4660	103
2	User	200.7115	23.5342	28246.6731	52
3	Both Preparer & User	212.4107	26.7061	79167.1071	112
Within Groups Total		208.9663	24.0216	152338.246	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	4890.4504	2	2445.2252	4.2375	.0154
Within Groups	152338.2462	264	577.0388		
Eta = .1764		Eta Squared = .0311			

TABLE # 16.

Dependent Variable	MISP	MIS Performance			
By levels of	FLM	Functional Management: Control			
Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Lowest Involvement	206.2586	20.6113	24215.1207	58
2	Low Involvement	215.5692	24.6595	38917.9385	65
3	Medium Involvement	209.1714	24.5799	41687.9429	70
4	High Involvement	202.6909	26.4812	37867.7455	55
5	Highest Involvement	212.0526	22.2747	8930.9474	19
Within Groups Total		208.9663	24.0562	151619.695	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	5609.0018	4	1402.2504	2.4231	.0487
Within Groups	151619.6948	262	578.7011		
Eta = .1889		Eta Squared = .0357			

TABLE # 17.

Dependent Variable MIS P MIS Performance
 By levels of FLO Functional Management: Operational

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Lowest Involvement	205.9565	24.0728	12748.9565	23
2	Low Involvement	199.7333	32.0107	29715.8667	30
3	Medium Involvement	200.7727	25.0412	26963.7273	44
4	High Involvement	211.5049	19.5939	39159.7476	103
5	Highest Involvement	215.6119	24.4013	39297.9104	67

Within Groups Total		208.9663	23.7582	147886.208	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	9342.4881	4	2335.6220	4.1379	.0029
Within Groups	147886.2085	262	564.4512		
Eta = .2438		Eta Squared = .0594			

TABLE # 18.

Dependent Variable MIS P MIS Performance
 By levels of FLS Functional Management: Strategic

Value	Label	Mean	Std Dev	Sum of Sq	Cases
1	Lowest Involvement	209.0833	27.2483	79444.2500	108
2	Low Involvement	207.4918	24.3643	35617.2459	61
3	Medium Involvement	210.1333	22.0501	21393.2000	45
4	High Involvement	205.8000	15.7402	8423.6000	35
5	Highest Involvement	216.5000	25.1846	10782.5000	18

Within Groups Total		208.9663	24.3747	155660.796	267

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	1567.9007	4	391.9752	.6598	.6205
Within Groups	155660.7959	262	594.1252		
Eta = .0999		Eta Squared = .0100			

TABLE # 19.

Dependent Variable		MISP	MIS Performance			
By levels of		COMEXP	Computer Experience			
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	Novice	198.2347	26.0941	66047.6020	90	
2	Lower	214.1017	25.6136	38051.3898	59	
3	Moderate	214.7564	18.1839	25460.3718	78	
4	Almost Expert	219.9259	16.9976	7511.8519	27	
5	Expert	209.2000	19.0840	1456.8000	5	
Within Groups Total		208.9663	22.9942	138528.016	267	

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	18700.6811	4	4675.1703	8.8422	.0000
Within Groups	138528.0155	262	528.7329		
Eta = .3449		Eta Squared = .1189			

TABLE # 20.

Dependent Variable		MISP	MIS Performance			
By levels of		COMKNO	Computer Knowledge			
Value	Label	Mean	Std Dev	Sum of Sq	Cases	
1	Novice	194.6324	27.8514	51971.8088	60	
2	Lower	206.7581	21.3616	27835.3710	62	
3	Moderate	217.2913	20.4247	42551.2621	103	
4	Almost Expert	218.8214	17.6825	8442.1071	28	
5	Expert	205.3333	21.0586	2217.3333	6	
Within Groups Total		208.9663	22.5322	133017.882	267	

Source	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	24210.8142	4	6052.7036	11.9218	.0000
Within Groups	133017.8024	262	507.7018		
Eta = .3924		Eta Squared = .1540			

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