

# **An informational approach to health management in low-income countries**

**by Jean Gladwin**

**Thesis submitted in accordance with the requirements of the University of  
Sheffield for the degree of Doctor of Philosophy**

**Department of Information Studies and  
School of Health and Related Research**

**University of Sheffield**

**Western Bank Sheffield S10 2TN**

**England**

**submission November 1999**

**BEST COPY**

**AVAILABLE**

Variable print quality

# **Summary of thesis**

## **An informational approach to health management in low-income countries**

**by Jean Gladwin**

This thesis investigates the introduction of new information management strategies intended to promote an informational approach to management at the operational health service level in low-income countries.

There is a lack of in-depth empirical research into the health information systems planning and implementation process in low-income countries which develops an understanding based on existing theory and research. Furthermore, a training package for managers, which is intended to strengthen health information management in low-income countries, has been introduced without independent evaluation.

In order to understand the practice and attempts at improving information support to district level management in low-income countries, two ethnographic case studies are presented. The first follows the introduction of PHC MAP, the package mentioned, and the second follows the implementation of a non-computer-based health management information system in Uganda.

The research methodology is informed by several approaches which fit within the interpretative, rather than the positivist tradition. Hence, the research question developed from the desire to understand and examine empirical situations. Furthermore, an exploratory approach was utilised rather than identifying theoretical frameworks prior to the field investigation. After the initial fieldwork, the diffusion of innovation framework, the concept of organisational forces existing in dynamic equilibrium, and different information systems development methodologies proved useful in interpreting the evidence collected.

My research indicates that the design of PHC MAP and the health management information system focused on technological issues, to the detriment of the wider issues of technological innovation management, and organisational change. The implications of this research, for the practice of introducing new information strategies in order to develop an informational approach to management, are explored.

# Acknowledgements

This research is one of the first PhDs to be produced within the Centre for Health Management Information Research, which draws upon the expertise of several departments within the University of Sheffield. Most of my personal funding, and tuition fees were paid by the Centre, for which I am grateful.

My special thanks go to Professor T D Wilson, (Department of Information Studies) and Dr R A Dixon, (School of Health and Related Research) who were my supervisors. Professor Wilson's approach to teaching and his 'wait and see what emerges from the qualitative evidence' perspective, will support me in my future career, I am sure.

This research would not have been possible without the willingness and co-operation of the people who work in, or alongside the ministry of health in Uganda, particularly those in the Health Planning Unit. I thank them for their valuable time.

Finally, the British Council in Kampala provided funding for both my visits to Uganda, without which I would not have been able to visit the country.

-----

---

## List of Contents

Title page .....	1
Summary of thesis .....	2
Acknowledgements .....	3
List of Contents .....	4
List of Figures .....	15
List of Abbreviations .....	17
<b>Foreword</b> .....	<b>20</b>
<b>Part A Setting the scene</b>	
<u>Chapter 1 Introductions</u>	
1.1 Introduction .....	25
1.2 Background to the Ugandan situation .....	25
1.2.1 Geography .....	25
1.2.2 Economic and political instability .....	25
1.2.3 Health profile .....	26
1.2.4 Changing administrative and political structure .....	27
1.2.5 Health policy context .....	27
1.2.6 Changing from the HIS to the HMIS .....	29
1.3 HIS features and strategies .....	29
1.4 HMIS features and strategies .....	31
1.5 Background to PHC MAP .....	34
1.5.1 History .....	34
1.5.2 Description .....	35
1.5.3 Needs assessment .....	35
1.5.4 Issues raised by the ‘needs assessment’ .....	36
1.5.5 PHC MAP objectives .....	38
1.5.6 Need for evaluation .....	42
1.6 PHC in theory and practice .....	44
1.6.1 International pledge to PHC .....	44
1.6.2 PHC in theory .....	45

1.6.3 PHC in practice .....	46
1.6.4 PHC and management information systems .....	48
1.7 Conclusion .....	48
 <u>Chapter 2 Literature review and setting the scene</u>	
2.1 Introduction .....	51
2.2 Clarifying concepts and terminology .....	51
2.2.1 Distinction between data and information .....	52
2.2.2 Definition of systems .....	52
2.2.3 Definition and types of information system .....	53
2.2.4 Management information systems .....	54
2.3 Problems in informational support .....	55
2.3.1 Data collection .....	55
2.3.2 Data processing and analysis .....	56
2.3.3 Use of information .....	57
2.3.4 General organisational and management issues .....	57
2.4 Information systems development methodologies .....	59
2.4.1 Non-formalised approach systems development .....	59
2.4.2 Systems approaches .....	60
2.4.3 Planning approaches .....	61
2.4.4 Participative approaches .....	63
2.4.5 Combining approaches .....	64
2.4.6 Information system development in practice .....	64
2.5 Health information systems development in low-income countries .....	66
2.5.1 Computerisation of information systems .....	66
2.5.2 Strengthening health unit management information systems .....	67
2.5.3 Health workers' training courses .....	68
2.5.4 Surveys to support routine health information .....	69
2.5.5 HMIS support to operational management .....	69
2.5.6 Central level IS development .....	71
2.5.7 Summarising papers on health information systems development in low-income countries .....	74
2.6 Conclusions and the need for research .....	75

---

**Part B Approach taken in this thesis**
Chapter 3 Theoretical frameworks and concepts

3.1 Introduction .....	79
3.2 Diffusion of Innovation framework .....	79
3.2.1 Defining an innovation .....	80
3.2.2 Types of knowledge about an innovation .....	80
3.2.3 The Innovation-Decision Process .....	80
3.2.4 The Change Agent .....	83
3.2.5 Application of the framework to organisations .....	84
3.2.6 Consequences of innovations .....	85
3.3 Organisational forces in dynamic equilibrium .....	87
3.3.1 Leavitt's diamond and dynamic equilibrium .....	87
3.3.2 Dynamic equilibrium with five forces .....	88
3.4 Related IS research .....	89
3.5 Conclusion .....	90

Chapter 4 Methodology

4.1 Introduction .....	92
4.2 Philosophical and methodological position of this research .....	92
4.2.1 Qualitative research .....	92
4.2.2 Philosophical and methodological position .....	93
4.2.3 Methods utilised .....	93
4.2.4 Relationship between theory and empirical evidence .....	95
4.3 In-depth review of the methods in this research .....	96
4.3.1 Case study .....	96
4.3.2 Ethnography .....	96
4.3.3 Autobiography of this researcher .....	97
4.3.4 Ethnographic methods: Participant Observation .....	97
4.3.5 Ethnographic methods: Interviewing .....	100
4.3.6 Ethnographic methods: Use of official documentation .....	100
4.3.7 Ethnographic methods: Correspondence with informants .....	101
4.3.8 Ethnographic methods: Analysis .....	101
4.3.9 Reviewing HMIS development in Uganda .....	103

4.4 Ensuring the quality of qualitative research .....	104
4.5 Background to the research .....	107
4.6 Summarising the sources of evidence .....	109
4.7 Conclusion .....	109

## **Part C Presentation of findings and initial discussions**

### Chapter 5 PHC MAP in Uganda

5.1. Introduction .....	112
5.2. Chronology of events .....	112
5.3. Concepts, categories and relationships that emerged .....	114
5.3.1 Different and confused presentations of PHC MAP .....	114
5.3.2 Workshop participants' have different perceptions .....	117
5.3.3 Compatibility with existing policy and management tools .....	121
5.3.4 Compatibility of training approaches .....	122
5.3.5 PHC MAP and existing materials .....	124
5.3.6 Perception of PHC MAP: advantages of using the tools .....	124
5.3.7 Perception of PHC MAP: does it fill a gap? .....	125
5.3.8 Developers lack knowledge of implementation context .....	125
5.3.9 Potential users envisage role for AKF .....	127
5.3.10 External funders and agencies influence .....	128
5.3.11 Personal agendas .....	128
5.3.12 Strategies for utilisation of PHC MAP .....	129
5.3.13 Managerial ability and innovation .....	130
5.4. Conclusion .....	130

### Chapter 6. Discussion of the findings on PHC MAP in Uganda

6.1 Introduction .....	132
6.2 Evidence for an Innovation Decision Model .....	132
6.2.1 Prior Conditions affect the decision to adopt .....	134
6.2.2 Evidence of the Knowledge Stage .....	135
6.2.3 Evidence of a Persuasion Stage .....	136
6.2.4 Evidence of use of Communication channels .....	137



6.2.5 Evidence for a Decision stage .....	137
6.3 Evidence for Innovation Process Models .....	139
6.3.1 Projected rational approach .....	139
6.3.2 Alternative model of the organisational process .....	141
6.3.3 Model of the stages in the Innovation process .....	142
6.3.4 Evidence of redefining .....	146
6.4 Contribution of the Diffusion of Innovation framework .....	147
6.4.1 Model of the Ugandan situation .....	148
6.5 Conclusion .....	152
<u>Chapter 7. Development of the decentralised HMIS in Uganda</u>	
7.1 Introduction .....	155
7.2 Description of HMIS development .....	156
7.2.1 Stage One: problem identification .....	156
7.2.2 Stage Two: definition of the Designer's approach .....	156
7.2.3 Stage Three: identification of organisational strategy .....	157
7.2.4 Stage Four: definition and specification of a business model .....	159
7.2.5 Stage Five: assessment of the extent to which current systems satisfy the business model .....	159
7.2.6 Stage Six: identifying data collection methods in relation to the management questions .....	160
7.2.7 Stage Seven: feasibility study .....	160
7.2.8 Stage Eight: stake-holder consultation and revision of system design ....	160
7.2.9 Stage Nine: systems design .....	161
7.2.10 Stage ten: pilot implementation .....	161
7.2.11 Stage Eleven: review and maintenance .....	162
7.3 Comment on the approach .....	162
7.4. Discussion of the issues arising .....	163
7.4.1 The wider organisational setting .....	163
7.4.2 Lack of in-depth analysis .....	168
7.4.3 Problems regarding the bottom-up approach .....	173
7.4.4 Major changes to the IS development methodology .....	175
7.4.5 Problems with English language and technical terminology .....	176
7.4.6 Different views on the management level served .....	177

7.5 Conclusion .....	177
 <u>Chapter 8 Process of moving from the HIS to the HMIS in Uganda</u>	
8.1 Introduction .....	179
8.2 Themes and relationships arising .....	180
8.2.1 Differing definitions .....	180
8.2.2 Inappropriate IM strategies .....	182
8.2.3 Inappropriate IM strategies for operational management .....	184
8.2.4 Inappropriate IM strategies for district level management .....	187
8.2.5 Inappropriate IM strategies for organisational situation .....	188
8.2.6 Excessive influence of external agencies .....	189
8.2.7 Training differs from that intended .....	189
8.2.8 Difficulties conducting the training and issues arising .....	193
8.2.9 Lack of perception of other organisational changes .....	195
8.2.10 Incomplete policy enactment .....	197
8.2.11 HMIS implementation and concomitant change .....	198
8.2.12 Using HMIS implementation to bring in other changes .....	199
8.2.13 Management problems at district level .....	200
8.2.14 Health unit management problems .....	201
8.2.15 IM problems at district level .....	202
8.2.16 HMIS implementation theory and practice are different .....	203
8.2.17 Issues related to organisational culture .....	203
8.2.18 Conceptual issues affecting implementation .....	205
8.2.19 Inadequate financing .....	206
8.2.20 Lack of high level support .....	206
8.2.21 Developer lacks conviction .....	207
8.2.22 Difficulties in monitoring implementation .....	207
8.3 Conclusion .....	207
 <u>Chapter 9 Discussion of HMIS implementation</u>	
9.1 Introduction .....	209
9.2 Diffusion of innovation .....	209
9.2.1 Usefulness of the 'Prior Conditions' concept .....	210

9.2.2 Usefulness of the 'Knowledge' concept .....	210
9.2.3 Usefulness of 'Form, Function and Meaning' concepts .....	212
9.2.4 Usefulness of the 'Perceived Attributes' concept .....	212
9.2.5 Usefulness of the 'Reinvention' concept .....	213
9.2.6 Social and communication structures facilitating diffusion .....	214
9.2.7 Usefulness of the 'individual-blame' concept .....	214
9.2.8 Limits to the usefulness of the Innovation Decision model .....	215
9.3 The Innovation Process model: redefining .....	215
9.3.1 Reasons for Redefining .....	218
9.3.2 Evidence for Restructuring .....	218
9.3.3 Social and communication structures impede diffusion .....	218
9.3.4 Constraints to implementation .....	219
9.3.5 Limits to the usefulness of the Innovation Process model .....	219
9.4 Dynamic equilibrium models of organisational change .....	220
9.4.1 Non-alignment of organisational forces at health unit level .....	220
9.4.2 Non-alignment of organisational forces at district level .....	223
9.5 Conclusion .....	225

## **Part D Discussion, Implications and Conclusions**

### **Chapter 10 Discussion of both case studies and implications**

10.1 Introduction .....	227
10.2 Diffusion of Innovation issues .....	227
10.2.1 Clarifying objectives .....	227
10.2.2 Reinvention prior to adoption .....	228
10.2.3 Extent of change may influence adoption decisions .....	229
10.2.4 Compatibility with felt needs and problems .....	230
10.2.5 Facilitating observability .....	231
10.2.6 Need for methods of evaluation .....	232
10.2.7 Two innovation decisions are made .....	233
10.2.8 Knowledge of the organisational situation and existing practice .....	233
10.2.9 Awareness of personal agendas .....	234
10.2.10 Adoption decision at operational level follows national decision .....	234

---

10.2.11 Meaning of an innovation .....	235
10.2.12 Timing of Knowledge introduction .....	236
10.2.13 Blaming people inappropriately .....	237
10.2.14 Using knowledge of stages .....	237
10.2.15 Widening the Change Agent and Inventor Roles .....	238
10.3 Organisation in dynamic equilibrium .....	238
10.3.1 IS changes and alignment with other organisational forces .....	238
10.3.2 Alignment of technological innovation with organisational strategy ....	241
10.3.3 Alignment of management tools and processes with IM strategies .....	242
10.3.4 Alignment of IM strategies with individual ability and roles .....	244
10.3.5 Non-alignment of power and organisational structure with management role .....	245
10.3.6 Adjustments where alignment does not exist .....	246
10.4 Information systems development methodology issues .....	247
10.4.1 Feasibility of bottom-up development .....	247
10.4.2 Domination by powerful stake-holders .....	248
10.4.3 Facilitating the participatory approach .....	250
10.4.4 Lack of high level political support .....	250
10.5 General IS issues and training .....	251
10.5.1 Lack of conceptual clarity .....	251
10.5.2 Need to focus on information use .....	252
10.5.3 Not understanding an information approach is advocated .....	253
10.5.4 Managers lack conceptual frameworks .....	254
10.5.5 Lack of understanding of IS change .....	255
10.5.6 Preconceived problem definition limits understanding .....	256
10.5.7 Lack of an ISDM .....	256
10.5.8 Need for an IM strategy .....	256
10.5.9 Lack of expertise and use of IS research .....	257
10.5.10 Sense of ownership .....	257
10.5.11 Culture of forward planning .....	258
10.5.12 Lack of training in data processing, analysis and information use .....	259
10.5.13 IS Developers unaware they are facilitating organisational change ....	259
10.6 Management issues .....	260

10.6.1 In-Charges and the management role .....	260
10.6.2 Management training .....	260
10.6.3 Strategies to encourage use of management tools .....	261
10.7 Organisational culture and power .....	262
10.7.1 Organisational culture .....	262
10.7.2 Changes in power relationships .....	262
10.7.3 Using IS development to reinforce other changes .....	263
10.8 Other implications for practice .....	263
10.8.1 Broad needs assessment .....	264
10.8.2 Different strategies for monitoring and evaluation .....	264
10.8.3 Open development approach .....	263
10.8.4 Personal agendas .....	265
10.8.5 Adequate funding for support supervision .....	265
10.8.6 EDHT training .....	265
10.8.7 Information users should receive management training .....	266
10.8.8 Management training .....	266
10.8.9 Training schedules .....	266
10.8.10 Financial implications .....	266
10.8.11 Development and implementation time .....	266
10.8.12 Need to improve communications .....	267
10.8.13 Presenting overall rationale .....	267
10.8.14 HMIS training evaluation .....	267
10.8.15 Language ability and training .....	268
10.8.16 Guidelines on managing change .....	268
10.8.17 Need for feedback .....	268
10.8.18 Strategies to overcome lack of IM skills .....	268
10.9 Conclusion .....	268
 <u>Chapter 11. Contribution to theory</u>	
11.1 Introduction .....	271
11.2 Models of the introduction to PHC MAP .....	271
11.2.1 Rational model of the Innovation Process .....	272
11.2.2 Alternative model of the Innovation Process .....	272

11.2.3 Model of the process when the innovation definition is unclear .....	274
11.2.4 Combining Rogers's two models .....	276
11.3 The PHC MAP case study and evaluation of existing frameworks .....	279
11.4 Modelling HMIS implementation .....	283
11.4.1 HMIS implementation using the Innovation-Decision model .....	283
11.4.2 HMIS implementation using the Innovation-Process model .....	284
11.4.3 Limits to the usefulness of the Innovation-Process model .....	286
11.4.4 Dynamic equilibrium models of organisational change .....	288
11.5 HMIS implementation and evaluation of existing frameworks .....	291
11.6 Evaluation of existing frameworks and both case studies .....	293
11.6.1 Linking diffusion theory and organisational theory .....	293
11.6.2 Uncertainty of innovation purpose .....	294
11.6.3 Lack of political theory .....	296
11.6.4 Other theoretical issues raised .....	296
11.7 Conclusion .....	297

## Chapter 12. General conclusions

12.1 Introduction .....	299
12.2 Summarising the contribution to theory .....	300
12.2.1 Linking diffusion theory and organisational theory .....	301
12.2.2 Questioning the rationalistic Innovation-Process model .....	302
12.2.3 Combining the Innovation-Decision and the Innovation Processes .....	302
12.2.4 Lack of political theory .....	302
12.2.5 Uncertainty of innovation purpose .....	303
12.2.6 Other concepts and terminology .....	303
12.3 Summarising the implications for practice .....	304
12.3.1 Defining the innovation .....	305
12.3.2 Understanding the potential adopter's situation .....	305
12.3.3 Perceiving IM innovations involve organisational change .....	306
12.3.4 Training .....	306
12.3.5 Broad needs assessment, monitoring and evaluation .....	307
12.3.6 Utilising a staged process in innovation adoption .....	307
12.3.7 Utilising existing expertise and research .....	308

12.3.8 Adopting conceptual frameworks .....	309
12.3.9 Understanding the cultural and political issues .....	309
12.3.10 Appropriate IM strategies and general features .....	310
12.3.11 Requirements for materials development .....	310
12.4. Contribution to methodology .....	313
12.5 Limitations of this work .....	314
12.6 Future research .....	315
12.6.1 Diffusion of innovation .....	315
12.6.2 Health management information systems .....	315
12.6.3 Organisational change .....	316
12.6.4 PHC MAP evaluation .....	316
12.6.5 Operational level investigation needed .....	317
12.7 Conclusion .....	317
<u>List of References</u> .....	320

#### List of Appendix

1. Glossary of terms .....	339
2. Map of Uganda .....	343
3. Description of PHC MAP modules given by the developers .....	344
4. List of people consulted .....	346
5. List of people consulted with themes and questions focused upon .....	355
6. Conceptual Map of the story of interview with MOH official .....	359
7. Matrix developed to aid analysis of PHC MAP case study .....	360
8. Chronology of events regarding development of the HMIS .....	365

## List of Figures and Tables

Figure 3-1	Model of the Stages in the Innovation-Decision Process (Rogers, 1995)	81
Figure 3-2	Five Stages in the Innovation Process in an organisation (Rogers, 1995)	86
Figure 3-3	Leavitt's Diamond: the organisation's forces in dynamic equilibrium (from Leavitt, <i>et al.</i> , 1973:9)	87
Figure 3-4	The MIT-90's framework (from Scott Morton, 1991:20)	89
Table 4-1	People consulted in this research	110
Figure 6-1	Model of Stages in the Innovation-Decision process regarding PHC MAP in Uganda	133
Figure 6-2	Rational model of the Initiation stage in the PHC MAP Innovation Process: claimed by the MOH Planner	142
Figure 6-3	Alternative model of the Innovation-Process: enacted by the MOH Planner	143
Figure 6-4	Model of the Stages in the Innovation-Process when perception of PHC MAP is unclear	144
Figure 6-5	Model considering PHC MAP adoption by combining Innovation-Decision Process and Innovation-Process	149
Figure 6-6	Application of dynamic equilibrium model of organisational change: PHC MAP is not aligned to Intended Strategy, Structure, Individuals and Roles, or Management Processes	151
Figure 9-1	Evidence for an Innovation-Decision model implementing the HMIS in Uganda: factors affecting implementation	211
Figure 9-2	Evidence for the Innovation Process model: implementing HMIS	217



Figure 9-3	Application of dynamic equilibrium model of organisational change in health units: the HMIS is not aligned to Intended Strategy, Structure, Individuals and Roles, or Management Process	221
Figure 9-4	District level application of dynamic equilibrium model of organisational change: the HMIS is not aligned to Intended Strategy, Individuals and Roles, or Management Processes	224
Figure 11-1	Rational model of the Initiation stage in the PHC MAP Innovation Process: claimed by the MOH Planner	273
Figure 11-2	Alternative model of the Innovation Process: enacted by the MOH Planner	275
Figure 11-3	Model of the stages in the Innovation-Process when perception of PHC MAP is unclear	277
Figure 11-4	Model of considering PHC MAP adoption: combining Innovation-Decision Process and Innovation Process	278
Figure 11-5	Application of dynamic equilibrium model of organisational change: PHC MAP is not aligned to intended Strategy, Structure, Individuals and Roles, or Management processes	280
Figure 11-6	Evidence for an Innovation-Decision model when implementing the HMIS: factors affecting implementation	285
Figure 11-7	Evidence for the Innovation Process model: implementing HMIS	287
Figure 11-8	Application of dynamic equilibrium model of organisational change in health units: the HMIS is not aligned to Intended Strategy, Structure, Individuals and Roles, or Management Processes	290
Figure 11-9	District level application of dynamic equilibrium model of organisational change: HMIS is not aligned to Intended Strategy, Structure, Individuals and Roles, or Management Processes	292

## List of Abbreviations

AKF	Aga Khan Foundation
AKFHS	Aga Khan Foundation Health Services
ARI	acute respiratory track infection
BCG	vaccine against tuberculosis (Bacille Calmette-Guerin)
CASE	computer-aided software engineering
CHW	community health worker
CBIS	community-based information system
CPHC	Comprehensive primary health care
DDT	District Dental Officer
DHI	District Health Inspector
DHT/DHMT	district health team / district health management team
DHV	district health visitor
DL/TBO	district leprosy and tuberculosis control officer
DMO	district medical officer
EDHT	extended district health team
EPI	Expanded Programme of Immunisation
ETHICS	Effective technical and human implementation of computer-based systems
FP	Family Planning
HIS	health information system(s)
HMIS	health management information system(s)
HPU	Health Planning Unit (of the Ministry of Health)
H/U or h/u	health unit
HUMC	health unit planning committee
I/C	In-charge

IM	information management
IMR	infant mortality rate
IS	information system(s)
ISDM	information system development methodology
IT	information technology
KAP	Knowledge, Attitude, Practice
MCH	Mother and Child Health programme
MIS	management information system(s)
MOH	Ministry of Health
MRO	Medical Records Officer
NGO	Non-governmental Organisation
NRM	National Resistance Movement (present government in Uganda)
NUD*IST	Non-numerical Unstructured Data Indexing Searching and Theorizing
PHC	Primary Health Care
PHC MAP	Primary Health Care Management Advancement Programme
SPHC	Selective primary health care
SISP/SSIP	strategic information systems planning
SSADM	Structured Systems Analysis and Design
SSM	soft systems methodology
TBA	Traditional Birth Attendant
UNEPI	Ugandan National Extended Programme of Immunisation
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organisation
<5MR	under-fives mortality rate

# **Foreword**

# Foreword

District health management strengthening has been the concern of supranational agencies, non-government organisations and health managers in many low-income countries for several years. There is the belief that district health management teams are not as efficient and, or, effective at delivering good quality care as they should be and consequently the delivery of Primary Health Care (PHC) is not having as positive an impact upon the health of the population as it could. A major reason for this is seen to be the lack of, and failure to use, timely, good quality and relevant health information. The latest evaluation of the World Health Organisation (WHO) on the health situation in Africa states “ *The weakness of information support is acknowledged by most Member states as a persistent obstacle to vigorous and objective management*” (WHO, 1994a:10).

The shift towards decentralisation in many low-income countries, such as Ghana, Kenya, and Uganda, has meant more skills are demanded of PHC managers, including information handling at all levels of the health care system (AKF, 1993a). This is recognised by ministries of health who are changing, from centralised reporting health information systems, to health management information systems, which place more emphasis on managers utilising information at the point of collection. Organisations which have an interest in training district level managers, also recognise the need for more skills, and the Aga Khan Foundation (AKF), initiated the development of a training package for PHC managers who would be part of the district health team. This set of materials is known as Primary Health Care Management Advancement Programme (PHC MAP).

This research investigates the introduction of new information management strategies in low-income countries. The strategies are intended to promote an informational approach to management at the operational service level.

Two ethnographic case studies are presented, based in Uganda. One follows the introduction of PHC MAP to the ministry of health (MOH) and other interested parties, and the second follows the new Health Management Information System (HMIS) implementation in districts and health units. Consequently, background to the Ugandan situation is given in Chapter 1.

The constraints imposed by having to present a thesis in a linear manner may suggest this research was carried out linearly. This was not so. Theory and literature were not prescribed and reviewed initially, leading to empirical research, analysis, discussion and conclusions. Instead theory and existing research were reviewed initially, but also returned to at several times during the research process, as the empirical work was defined, conducted, analysed, then redefined and analysed. Thus, although the research appears linear, in reality it was more iterative.

The theory and research literature informing this research initially, was very broad; however, this was narrowed as the research questions evolved. Consequently, Chapter 2 reviews the problems in information support to district and health-unit management in low-income countries and existing approaches to developing and strengthening that support. Several information systems development methodologies are also described, and relevant terminology and concepts are clarified. The chapter ends by identifying the issues that arise from this review and the research questions in this thesis, which are:

1. What is the information systems planning and implementation process in a low-income country moving from a centralised-reporting information system to a management information system which supports district and health unit management?
2. What process takes place when externally developed training materials are intended to strengthen health management information systems are introduced to potential users in low-income countries?
3. What is the implication of the findings, from the aforementioned studies, for the development and implementation of health information systems in low-income countries?

Chapter 3 describes and reviews the conceptual frameworks which have been useful in the interpretation of the empirical situations in Uganda. These are Rogers's (1995) diffusion of innovation framework and its related concepts, and Leavitt's (1965) dynamic equilibrium view of socio-technical change within organisations.

Chapter 4 identifies the methodological approach taken in this thesis, which is within the interpretative rather than the positivist tradition. My philosophical position is described, and the methods appropriate to this paradigm identified. This is followed by a discussion of the relationship between theory and empirical work, which leads on to a detailed description of the methods employed and my strategies for ensuring quality in qualitative research. To further the reader's understanding a brief background to this research is given and the sources of evidence are described in some detail.

Part C presents the two ethnographic case studies, supplemented by a description and discussion of HMIS development. The discussion following each ethnography interprets the empirical situation by drawing upon existing theory. Thus, Chapter 5 describes the process which took place when externally developed training materials, intended to strengthen health management information systems, were introduced to potential users in Uganda. The consideration of whether to use PHC MAP is presented in a thematic way, and at this point does not draw upon existing research and theory. Chapter 6, however, considers to what extent the empirical evidence supports existing theory and research by using Rogers's and Leavitt's conceptual frameworks.

Chapter 7 focuses on the HMIS development phase, not implementation, which is covered in Chapter 8. The IS development process, which I believe was undertaken, is identified by asking if there is a model which provides a sequence for the themes emerging. This, and the difficulties and issues arising during that development are discussed.

Chapter 8 describes the implementation process of moving from the central reporting system to the new HMIS in Uganda, which aims to support operational management. The themes and relationships arising from interviews, observation and documentary examination are described, and in Chapter 9 the extent to which that evidence supports Rogers's and Leavitt's frameworks is considered.

Chapter 10 in discussing both case studies, utilises existing research. A simple structure of: identification of my research findings; referring to my evidence; stating propositions; and identifying existing research which supports those propositions, gives organisation to this chapter. Hence, the third research question is addressed.

Chapter 11 collates the theoretical contribution of this research, by bringing in the findings from previous discussions, but not giving the evidence as this was undertaken in Chapters 6 and 9. It particularly focuses upon the contribution which indicates that Rogers's (1995) diffusion of innovations models and concepts, and Leavitt's (1965) dynamic equilibrium view of socio-technical change within organisations are applicable to the introduction of new information management strategies in low-income countries. Furthermore, an integration of these frameworks is demonstrated.

Chapter 12 examines the contribution of this research by summarising the theoretical contribution and the implications for practice which have been identified in earlier discussions. Features of: the training materials intended to improve the management of information by health managers; an innovation to strengthen district level health information systems; and the training for the informational approach to management, are suggested. The methodological contributions and limitations of my research are described, and suggestions for future research are given.

Finally, a list of abbreviations has been given, and I have added a Glossary (Appendix 1) which elaborates on, and defines, terms which may be unfamiliar to the reader, or have a specific technical meaning I endorse.



# **Part A Setting the scene**

## **Chapter 1**

### **Introductions**

# Chapter 1 Introductions

## 1.1 Introduction

This chapter places my research in context. A description of the Ugandan situation is given in Section 1.2, followed by a description of the information management strategies in both the original health information system (HIS) and the HMIS. Section 1.5 describes PHC MAP and briefly examines the development and promotion of the series. PHC is one of two major health policies in Uganda, and informs PHC MAP, thus the final section discusses this in theory and practice.

## 1.2 Background to the Ugandan situation

### 1.2.1 Geography

Uganda is a land-locked country in East Africa with great expanses of water, including Lake Victoria. In 1996 it had a population of 20,256,000 (UNICEF, 1998), but it is not densely populated and has a favourable climate and fertile soil. The 1993 map (Appendix 2) indicates Uganda is divided into thirty-seven districts which report directly to the national level administration. Subsequent restructuring means there are now forty-one.

### 1.2.2 Economic and political instability

In recent decades Uganda has seen what was considered a strong economy, deteriorate due to political instability and civil war, though the situation has improved since the mid-1980's.

*“At independence (1962), Uganda had one of the most vigorous and promising economies in Sub-Saharan Africa (SSA), and the years that followed independence amply demonstrated this potential. Favoured with a good climate and fertile soil, the country was self sufficient in food, with the agricultural sector being a large earner of foreign exchange. The manufacturing sector supplied the economy with basic inputs and consumer goods and was also a source of foreign exchange earnings*

*through the export of textiles and copper. Export earnings not only financed the country's import requirements but also resulted in a current account surplus. Fiscal and monetary management was sound and the domestic savings rate averaged about 15 percent GDP, enough to finance a respectable level of investment.*" (World Bank, 1993:xi)

The Amin regime (1972-9) not only halted economic and social progress, but caused it to decline dramatically. About 500,000 Ugandans died during that period, one million were displaced, and another 200,000 left the country. Furthermore, economic mismanagement accompanied the civil war, and professional standards deteriorated when skilled personnel fled (World Bank, 1993:xi). Even after Amin had been replaced, economic mismanagement and abuse of human rights continued during the Obote regime in the early 1980's. This was accompanied by dramatic falls in spending on health and education, as defence spending rapidly increased, with major consequences for mortality rates, levels of malnutrition and literacy. In January 1986 the National Resistance Movement (NRM) Government assumed power, with Museveni as President, and since then a more stable political situation has ensued, though there are recurring small pockets of instability in some parts of the county.

Uganda is now classed as one of the poorest counties in the world, and the UN, has designated it to be one of forty-nine 'least developed countries' (UNICEF, 1998:122). Several of Uganda's social indicators had been better than many other countries in Africa, yet in 1990 infant mortality and life expectancy were still only on-a-par with 1965 levels (World Bank, 1993: Table 1.4).

### **1.2.3 Health profile**

However, in recent years there has been a dramatic improvement, and in 1996 the infant mortality rate (IMR) was 88/1000 live births and the under-five mortality rate (<5MR) was 141/1000 live births. These compare favourably, with 109/1000 IMR, 171/1000 <5MR in all the 'least developed counties' (UNICEF, 1998:Table 1). Despite the advances since 1990, Uganda still has a poor health profile. HIV/AIDS threatens the adult and child population, and the World Bank (1993:xiii) expect the IMR and <5MR to rise.

The government White Paper on Health Policy, drawing on 1991 figures, showed that many of the diseases which cause premature deaths are preventable, and "*are associated with poor access to safe water, poor environmental sanitation, lack of access to maternal and child care services, harmful traditional food and nutrition*

*practices and general lack of knowledge regarding health promotive and preventive behaviour.*” (MOH, 1993b:9)

#### **1.2.4 Changing administrative and political environment**

One of the cornerstones of the Ten Point Programme of the NRM on Democracy is decentralisation, and the objectives are to: *“a) Transfer real power to the District, and b) Give political and administrative control to local authorities over services that are actually delivered at the local level. This is in effort to improve local democracy, accountability, efficiency, equity, effectiveness and sustainability in provision of services.”* Makumbi (1994). Decentralisation appears to have been embraced by the health sector at a time when the international health community, such as WHO (1993a), are also advocating its benefits. Thus, the Ugandan Medical Bulletin, states: *“The district level is recognised globally as the optimum level for determining community health needs, planning interventions, implementing, co-ordinating, monitoring and evaluating services. It is the level close enough to the community to facilitate community mobilisation for participation and involvement in health development.”* (Okoth, 1994).

#### **1.2.5 Health policy context**

The emphasis on decentralisation to district level was recognised by the MOH in the Three Year Health Plan Frame (TYP) in 1993 when the government set out its policies, priorities and strategies for the years 1993/4-1995/96. It stated:

*“ It [the TYP]<sup>1</sup> provides suggestions and options for how these policies can be implemented. The plan frame should be used by districts in developing their district level health plans. District plans are expected to reflect these national policies and guidelines, and also reflect district priorities and requirements.”* (MOH, 1993a:i)

Decentralisation was a major policy change, but only one of several policies which affected health services and health status in the early 1990's. Health policy reform was needed, according to the government, to *“restore its services to acceptable levels and match it with the changing social, economic and political environment”* (MOH, 1993b:16). The proposed changes aimed to improve coverage and health status in specific sectors of the population. This was to be achieved with cost-effective approaches, improvements in the health delivery system, as well as reorganisation, planning and management, all of which reflected international concerns, and the need to alter health delivery so it

---

<sup>1</sup> My words are added in brackets for clarity; a practice continued in the rest of the thesis.

coincided with the decentralisation policy. One of the two major policy objectives for the health sector, therefore, was to “*consolidate existing services*”, by which they intended to restore the functional capacity of existing services, including rebuilding war-damaged health units, improving staff morale and performance, and strengthening management. This was to be achieved partly by officially collecting fees from users. The second objective was to “*reorient health services to Primary Health Care*”, which recognises the multi-sectoral nature of the workload<sup>2</sup>.

Official assumptions underlying health service planning in the White Paper (MOH, 1993b) included the need to improve accountability, as corruption and abuse of health resources were perceived. Moreover, it was assumed the districts would be motivating the community to participate, and money from efficiency savings within health budgets would be redirected to other health activities. Finally, the policy assumed donors would be playing a major part in funding activities, and would follow the TYP. Thus, there was the formal policy of reorienting health services to PHC and consolidating existing services, as well as an informal policy agenda to improve accountability, driving the provision of health services between 1993 and 1997.

The late 1980's and early 1990's was, therefore, a time of considerable change within the health sector. In addition, there was also the legacy of irregular and inadequate wages for health workers, and the very strong influence of international donors on health services and policy in the country (Okonzi and Macrae, 1995). This influence meant a form of selective, rather than comprehensive PHC was the norm in Uganda (see Section 1.6). Furthermore, the nationally-based vertical programmes, often funded by international agencies, exerted influence to the extent that, when district health team (DHT) members visited health units to provide supervision and support, they delivered according to which programme was paying the out-of-office expenses and travel allowances. A senior medical officer, reviewing the state of HIS said:

*“The history of HIS in Uganda has however, been a sad one. From a vibrant performance in the 1960's, HIS collapsed in the 1970's with the onset of the economic decline. Anxious to monitor, evaluate and justify their activities, emergency vertical health programmes introduced their own system during the 1980's.”* (Okonzi, 1994)

This situation was changed in 1987 when a new HIS was introduced by the Health Planning Unit (HPU) of the MOH. It is that HIS which is currently being altered.

---

<sup>2</sup> These objectives could be seen as contradictory, because consolidating existing services would reinforce the curative orientation of the health services, not re-orientate them to PHC.

### 1.2.6 Changing from the HIS to the HMIS

The government health service in Uganda had, until 1993, intended its information system should be mainly a morbidity and mortality reporting system with information flowing one way, from individual health units to district and national level. However, this was deemed unsatisfactory in 1993, when the White Paper on Health Policy Up-date and Review (MOH, 1993b:23) identified improvements in management were needed, and criticised the HIS, saying:

*“On the side of monitoring and evaluation of health programmes and activities, the present flow of information is geared towards central level planning, it does not cater for the needs of districts to monitor and evaluate their programmes and projects. Further, the timing and type of information does not help in making prompt and appropriate management and planning decisions. There is, therefore, need to establish an effective mechanism so that the flow of information benefits policy makers, district authorities, managers and planners in the health sector. This will also help to assess the logistical needs and ensure proper use of the same.”*

The TYP also referred to the need for research, which could be *“the basis for policy development and as a tool to guide PHC implementation”* of which *“developing information for management and planning in districts”* would be one type (MOH, 1993a:vi). It also appeared that information for the district medical officer (DMO) was the priority: *“Developing data needed for planning and management so that DMOs can participate effectively in the planning of their districts”* (MOH, 1993a:32). Thus, there was a government commitment to improving the national health information system in order to serve middle-level management needs. Since 1993, an HMIS, which aims to support the management of individual health units, has been developed and is being implemented. This appears to contradict the intention to develop an information system to meet DMO needs, and will be discussed later.

The next two sections will compare the HIS and the HMIS by describing the purpose, guiding principles, data collection, data flows, processing, analysis, utilisation of information and health workers’ perceptions of the systems.

## 1.3 HIS features and strategies

There are many possible purposes of a national health information system, and that purpose will affect not only data use, it will also affect the type of data collected, processing procedures, data flows and dictate who carries out these tasks. Information on the intended strategies of the HIS has been generally

gleaned from official documents of the MOH and related bodies. In some cases the information management strategies have not been made explicit, thus it was careful reading of such documents, and interviews which produced the description below.

The purpose of the Ugandan HIS probably centred on producing data and information to monitor national and district performance of health services, and identifying the most common diseases. This was generally the purpose of centralised health information systems prior to district-level management (WHO, 1994b:7), and is implied in documents and discussions relating to the Ugandan HMIS. The general approach appears to have been collection of routine information on health unit activity to support reports of international donor feedback to their headquarters, and produce national descriptive profiles of morbidity, mortality, fertility and health service activity. This was supplemented, on an *ad hoc* basis, by community-based surveys carried out by non-governmental organisations to assess a particular population, or focus on a particular issue, such as malnutrition or immunisation coverage. From the information available I do not know if there was any official conceptual framework underpinning the information system, and the HIS did not have the mandate of providing information for the operational level of health services (Archer, 1993).

Health workers perceived that the HIS focused on reporting outpatient attendance, preventative activity, and inpatient treatment. Thus forms for stock control, records of inventories and revenue, if they existed, were not perceived as part of the information system (Archer, 1993).

Data was collected by service-providers on out-patient and in-patient attendance, preventative service and treatment of in-patients, not only for individual case management, but for other purposes as well. The most detailed reporting was from immunisation services. Health unit service-providers sent aggregated data every month on morbidity, preventative services, such as family planning, and preventive services, such as immunisation, to district level. Many forms giving the same information were also sent to national level for vertical programmes<sup>3</sup> to use. The extent of data processing and analysis is more difficult to gauge. For example, it is uncertain what data processing was undertaken in health units. It could have been merely addition of cases, and I assume it was highly dependent upon the ability of the In-Charge. It is doubtful if morbidity rates were calculated.

---

<sup>3</sup> See Section 1.6.3 for a discussion of the vertical programmes' influence on information systems.

Again I am uncertain as to what data processing took place at district level, if any. The district was probably a collating centre, rather than a base for data analysis and information use. At national level I am unclear as to what processing or use of routine information was envisaged, or actually conducted. However, the lack of integration of data collection, due to the many vertical programmes dominating the HIS, meant there was no one place where all the processing and storage of health service data and information was undertaken. Computers were not used for data processing in most districts, or in health units, although after computers had been installed in 1985, the HPU were using word processing applications and a database (Nabarro, *et. al.*, 1988).

## 1.4. HMIS features and strategies

The main purpose of the HMIS is to support the operational management of health units (Archer, 1993), and to deal with the problems found by the HIS Needs Assessment. The identified management tasks include planning, monitoring and evaluation of health services. The Designer<sup>4</sup> suggested the information should be for decision-making and was intended to improve the performance of operational health services. The general approach is for all health units to collect, process and report data from the routine interaction with patients, rather than collect data for research purposes, or only from specific units. Thus, sentinel site, sample survey information or special studies are not perceived as part of the HMIS. However, the Designer did not discount such information gathering was useful. All health units were to be included in the HMIS, not only government-owned facilities. Therefore, non-governmental organisations (NGOs), missionary and private practitioners were to be included, though it was recognised financial data from these units did not have to be given. Despite these stated intentions, the TYP appeared to focus on information for the DMO being the priority, not for the health unit staff (see MOH, 1993a:32). This difference may be due to a recognition, by the Designer, that data collectors produce better quality data if they have to use it, but no reason was given. Furthermore, the Designer's intention was to provide information which could also be used at district and national level by managers, planners, and policy makers.

The HMIS conceptual framework has four principles. The first, *relevance*, meant national policy and health programme objectives were to guide HMIS development, and it had to be relevant to the needs of health professionals in the health units. To achieve this *“the essential information for the HMIS will be determined first at the health facility level before the district and national level”*

---

<sup>4</sup> This is the term given in this thesis to indicate the person who led the HMIS design.



(Archer, 1993:2). This *bottom-up approach* is the second principle. The third is information has to be *functional*, which meant “*performance or management indicators will be created based upon the critical management issues for the daily operation of the health facility*” (Archer, 1993:4). She identified the ‘critical’ management questions she presumed were asked in the health facilities. In order to identify appropriate data collection, processing and analysis, the Designer utilised the systems framework of inputs, procedures, outputs and outcomes, which makes the assumption outcomes are the result of the other three aspects of this model. Furthermore, in identifying that the information system was to serve daily management and decision-making she is stressing the intention is “*routine data collection and reporting*”, and not data collection for research purposes. Another aspect of functionality was that information was to be utilised for immediate management, rather than awaiting feedback from higher levels. Therefore, the HMIS Manual (MOH, 1996b) indicated instructions for action and reaction needed to be included, which implies the linking of information and management tools and the use of information. The fourth principle, *integration*, refers to having one data source and set of forms in the health facility, so all the existing health programme and general administrative information would be brought together instead of having parallel, and duplicate data collection.

As described in detail in Chapter 9, many health professionals appear to see the HMIS only as a new collection of forms and procedures, rather than focusing on the use of information as well, as intended.

Data are collected from routine interaction with patients, or routine health services, from primary, secondary and possibly tertiary health services. Thus, no community-based information from the community health workers (CHWs) or traditional birth attendants (TBAs), or sanitation workers who are not managed from the health units, forms part of the HMIS. The original plan of the Designer had been to include community based information, but this was vetoed prior to the pilot project. The intention was for individual health workers to formulate additional management questions, and collect appropriate data. Data were to be collected on all aspects of the health unit manager’s role. Thus, not only morbidity information, but also logistic and supply data, information concerning staff training, and work records, financial data, equipment and building data, and data related to regulations, such as technical and medical standards and quality of care were to be included.

The data flows were to include: the internal flow of information amongst the health unit team, especially to senior staff; written monthly reporting, from the health unit, of specific information to the DHT; oral reporting of specific information to DHT members who visited the health unit to supervise; and

written feed back from the DHT for comparison with other health facilities. However, this latter activity was theoretical only, and did not appear to have been undertaken in the pilot implementation, or subsequently. Referral notes regarding individual patients were intended to be returned to the initiating health unit after a patient was treated elsewhere (usually at secondary or tertiary level).

Data processing and analysis were intended to be primarily conducted within, and by health unit staff, and processed into summary values to give indicators of performance. Therefore, although recorded, individual observations would not be reported. The data were intended to show changes over time, and provide indicators of performance at health facility, district and national level. Furthermore, in order to make data meaningful they were intended to be aggregated only to the level where it could produce information for decision-making. Graphs of routine information were to be produced by health units for their own purposes, and population projections were to be made by health unit staff. These were to be based on actual figures from the latest ten-year census, plus a formula calculation for various patient sub-groups, including pregnant and lactating women, and under five year olds. Finally manual, not computer processing, was to be utilised at health unit level.

The intended use of information in health units is not always clear from the documentation, but implies: indicators of low performance should lead to an examination of individual records to provide insights into how to improve; collection of specific information should trigger certain actions at health unit and district level, such as notification of incidents of specific diseases leading to investigation; and targets should be made using population information, knowledge of existing attendances, and available resources. In addition, information was intended to be used to answer specific management questions, and plan future services at health unit level.

Information use at district level was intended to include: formulation, monitoring and evaluation of the Annual Workplan; monitoring and improvement of health care delivery at health units, in co-ordination with Support Supervision visits; and reporting of selected information to the District Health Committee to be used in planning, monitoring and evaluating progress toward both district and national objectives. It was also suggested information was to be used as the district health team (DHT) found appropriate, for no specific management questions were specified, though some of the health unit questions were thought to be relevant.

According to the HMIS manuals (MOH 1996a, 1996b, 1996c) district level reports were to go to the HPU, for monitoring national and international objectives, and formulating national health policy and planning. Monthly reports were to go to the Ugandan National Extended Programme of Immunisation (UNEPI), and Family Planning (FP) headquarters. No specific management questions were formulated for this level, (though the HMIS was still under development during my fieldwork). In addition to the information management strategies mentioned above, there appear to be other features within the HMIS not always made explicit. These include assumptions that: certain management tools are used; the Extended District Health Team (EDHT) would perform a teaching and supervision role; and a particular type of management style would be utilised, that is, the rational manager using an informational approach.

## 1.5 Background to PHC MAP

### 1.5.1 History

PHC MAP was developed by the Aga Khan Health Network, and PRICOR<sup>5</sup>, and takes the form of twenty-one manuals and optional software. It took several years to develop and many different people contributed. The development was co-funded by USAID and AKF (USA) between 1988 and 1994. The series was launched in 1993 in the USA, Switzerland, Canada, UK, Bangladesh, India, Kenya, Pakistan, Portugal, Tanzania, and in Thailand. All together 5000 copies were produced and distributed and in 1998 it was intended to undertake another print run with some minor alterations. Over twenty percent of the copies were distributed in India and in 1996 the series had been partially, or wholly, translated into Thai, Portuguese, Swahili, Burmese, Spanish, French, Russian, and Chinese. Thus, in 1995 and early 1996, it appeared as if there was a great world-wide demand for the series and many people had found them useful.

Since 1996 senior AKF health personnel in Geneva have changed and this appears to have coincided with a different perception of the usefulness of the materials. The original developers are no longer employed by the organisation, and there appears to be some reluctance to plough more money into PHC MAP promotion without first assessing the use and need for the materials. Hence the study of the use of the series in three countries by Thomas (1997).

---

<sup>5</sup> Primary Health Care Operations Research (PRICOR) is a world-wide project of the Centre for Human Services funded by the United States Agency for International Development (USAID).

### 1.5.2 Description

The developers of the materials, in a leaflet accompanying the series, state:

*“PHC MAP has produced a highly practical set of materials for easy use by health program managers in any setting, which are organised around nine thematic modules. Each of the nine modules include a user’s guide, a facilitator’s guide, and related computer programmes (EPI Info etc.); the series is completed by three manager’s guides and a computerised version of the PRICOR Thesaurus.”*

A list, and description, of the individual modules is given in Appendices 3.

### 1.5.3 Needs assessment

PHC MAP itself does not mention a field-based needs assessment, an academic review of existing literature, or clearly identify the needs which led to its development. The flyer attached to PHC MAP, however, states:

*“PHC MAP was planned in response to the 1987 World Health Organisation’s report on ‘Evaluation of the Strategy for Health for All by the Year 2000’ which states that : “The main constraint reported by practically all countries is inadequate information for the managerial process....to provide systematic and analytical information for continuous assessment of the situation, determination of priorities, improvement of management and evaluation.”*

and later states:

*“WHO’s Eighth Report on the World Health Situation (1992) emphasizes that: Health management must be seen as both a technical and administrative enterprise which requires better information in a number of areas: technological, epidemiological, community perspectives, professional attitudes, environmental trends’ financial and personnel status, and indicators of service performance, quality and efficiency”*

The implication here is WHO identified a need and PHC MAP addressed it, however the WHO report was produced in 1992, after the development and production of PHC MAP had been undertaken.

In November 1987 an international workshop on management information systems and microcomputers on primary health care was organised by AKF in Lisbon. This may have been perceived, by the developers, as part of the needs assessment regarding district-level health management problems, and phrases

from that document also appear in PHC MAP. The final chapter in the report (Wilson, *et. al.*, 1988), identified the needs and problems with existing district level and community-based management information systems for PHC in various countries.

The PHC MAP Developer, who was involved in the later stages of the series development, suggested that an initial needs assessment was carried out, which subsequently PHC MAP attempted to address (no documentation of this appears to exist). However, he maintained: *'the more updated version was the 1994 WHO document'* (WHO, 1994b), which resulted from a technical meeting on the need for information systems at district level. This does not include an in-depth analysis of any one country situation, but appears to have brought together practitioners who have general experience in management information in low-income countries. Since this was the result of a meeting held November 1993, after the launch of PHC MAP, his claim is puzzling.

Thus, it is not clear whether a needs assessment for PHC MAP was conducted. It may be there was no thorough review, and thus a needs assessment from other sources, such as WHO (1994b) was adopted, post hoc, by AKF for their own purposes.

#### **1.5.4 Issues raised by the 'needs assessments'**

The authors of the final paper in Lisbon place the need for improved management information systems in the context of improved management generally. They set *'Guidelines on developing and strengthening management information systems for PHC, and Guidelines on training, support and networking by regional, multinational and international organisations'*. These recommendations appear to emphasise information to support PHC policy, and suggest information management (IM) strategies should be very closely linked to appropriate management tools, management style, and a decentralised administrative structure.

The WHO (1994b) document focused on identifying problems in health management information systems at the district level. They considered poor quality PHC was due to poor management, and could be improved by appropriate district management information systems, training and better management tools. It does not address the issue of changing from one system to another. The PHC MAP Developer, presenting PHC MAP to potential users in Uganda in March 1996, drew on this document, and maintained, in a subsequent interview, that the

district-level information systems problems identified during this Orientation meeting, were the ones leading to the development of PHC MAP. He placed the need for improved health information systems in the context of improving district level health services, and identified the problems in health information systems. An *'operational health information system'* was lacking, he suggested which should be population-based, manage socio-economic, demographic and epidemiological quantitative data, and qualitative information, such as community perception. Such a system, he believed, should be used for selecting priorities, planning interventions, monitoring and evaluating process and be an action-orientated system which facilitates district initiatives. Moreover, he maintained it should not be a system which merely collected *"information from the bottom to the top at central level and that was its only function"*. He suggested it should be operated locally, though recognised the importance of collecting information for central level, even if it was not relevant to the district's day-to-day work. He recommended computerisation, but not exclusively. The PHC MAP Developer identified data collection, analysis, presentation, dissemination and use problems in existing health information systems. He also included *"lack of discussion of results with the district health medical team, and no interaction with consumers and the public"*. Furthermore, he perceived a need to enhance the DHT capacity to select indicators; master data collection techniques; analyse data and graphically represent results; interpret results; translate the results into operational guidelines; communicate results and implications; and be a catalyst for action leading to changes.

From his review, it appears he is focusing upon the small number of people who actually work at the district headquarters, rather than the staff who work in health units in the district, or even the senior staff from these units. This would not necessarily be the approach of others who have different definitions of who district level staff are. It appears the PHC MAP Developer is saying that the IS should support district level management, not health centre management.

In conclusion, it is unclear what the needs assessment, which may have informed PHCMAP development, showed. There appears to be some emphasis on the need to strengthen IS, but whether at district or health unit level it is uncertain. Furthermore, as the next section will indicate, the need for improved management in non-government individual health facilities appears to have also driven the development of PHC MAP even though this was not acknowledged when presenting the series to potential users in Uganda.

### 1.5.5 PHC MAP objectives

To clarify the objectives it is necessary to review the original intentions, and the more recent aims expressed by various developers and promoters. There appear to be several different views and insufficient specification of objectives. The original stated objectives set by AKF were difficult to obtain, however, after exercising my rights under the USA Freedom of Information Act, I obtained the relevant document (USAID, 1991). This describes five programmes for which 1.2 million dollars is given, including the continued development of PHC MAP materials. The goal for all five programmes is:

*“to contribute to improving the equity, effectiveness, efficiency and sustainability of primary health care programs in developing countries of Asia and Africa.”*

The objectives of the programme relating to PHC MAP are not completely clear, but another document (Thorne *et. al.*, 1994) clarifies the original intentions, stating the purpose and outputs to be:

*Strengthened (due to PHC MAP) management,<sup>6</sup> information systems, and sustainability (social, organisational, and financial) in 10 to 12 PHC programs. The 10 programs would address a total target population of about 731,000 in 5 countries.*

*Output C10:*

*8 field tested PHC management information modules and related training and resource materials produced, distributed, promoted, and used in all PHC/MCS projects involved.*

*Output C9:*

*Planning and management capabilities and skills of program managers and management teams strengthened (by PHC MAP), along with greater availability and more appropriate use of information for rational decision-making.*

The developers of the series, however, have differing views, and the PHC MAP Initiator maintained, in a fax dated 25/1/96:

---

<sup>6</sup> Thorne, *et. al.*, (1994) placed a comma between management and information when identifying the objectives defined by the Matching Grant Application. The objectives in the funding document (USAID, 1991) do not have the comma, but the annual evaluation report on these programs (AKFb, 1993:viii) does. This suggests two meanings: that is, strengthened management *and* information systems or strengthened management information systems. The latter is a narrower intention.

*The original objective of PHC MAP, which did not change in the course of implementing the Programme, is given in each booklet of the series in the overview section: “to help PHC management teams collect, process and analyse useful management information”.*

Similarly, when introducing the series, the Developer stated:

*“the whole concept of MAP and the whole organisation of MAP is about data. How to identify the data you need, how do you collect data, how to analyse data, how do you process it, translate those data into practical operational guidelines, how do you feed back to the user...Those MAP modules are not about management. They are about the data that are needed for management...What is needed, among other things is in fact to have data available to you on a regular basis”.*

Finally, the objectives of the series within the modules themselves are unclear. Speaking of the achievements to be gained from using the series, the following claims on the flyer accompanying the materials are made:

*“Use PHC MAP modules, guides and diskettes to enable you to achieve your health program targets and objectives more quickly and efficiently and to design and implement more sustainable programs. PHC MAP tools can empower managers to strengthen health information, operate more effective and efficient population-based health programs, and achieve the sustainability of these programs anywhere.”*

Potential series users are described in Module 1:i-ii, and this helps to illuminate the objectives. The authors refer to the changing role of district managers due to decentralisation, and indicate such managers have been given new responsibilities, such as their own planning, monitoring and management decisions. These responsibilities, they felt, coupled with the lack of useful district level management information systems, have left district managers unprepared, and hence the series. They suggest:

*‘the primary audience for PHC MAP is the local<sup>7</sup> PHC manager. Both new and experienced managers can benefit from using the modules. The modules can be used in an ongoing programme or in setting-up a new service or programme. Others who may wish to use PHC MAP modules are NGO managers, management teams, communities, outside consultants, and researchers’. [AKF 1993a: Module 1:v]*

---

<sup>7</sup> The word ‘local’ is used, but from reading the series I believe the developers intend this to mean ‘district’ and not the individual health units.



To further clarify; throughout the materials references are made to what the modules are not intended to do. These sometimes conflict with each other, and no overall, coherent view of information management or of management is given. Sometimes use of the information is focused on, and at other times only data collection and analysis are dealt with. Sometimes it is suggested the tools are intended to provide information for planning, but other narrative suggests the intention is not to teach managers how to plan. Thus:

*“It is important to note that the modules focus on selective information needs. They complement information that most managers already have or routinely produce, such as annual plans, routine financial reports and formal evaluations”.* [AKF 1993a: Module 1:iv]

and

*“The modules do not attempt to provide all information that managers use, nor do they constitute a complete management system, or even a complete management information system. They do not teach managers how to plan, for example. ... The PHC MAP modules are designed to help local PHC managers gather and analyse selective information that experience has shown they often need but do not have”.* (AKF 1993a: Module 1:3)

and: *“The entire series can be installed to strengthen overall planning and monitoring.”* [AKF 19993a: Module 1:v]

Moreover, the documentation accompanying the series does not specifically mention health management information systems, but concentrates on health information alone.

An examination of the differences raises several issues, including the differences in perceptions of which managers are to be supported, whether the intention is to strengthen IS, or management generally, and how this is to be accomplished. The USAID documents state the intention is not to support district health teams, but AKF-funded programmes, which are individual health units or community programmes. However, the Developer places a different emphasis on the management level to be supported. He emphasises PHC MAP can support the DHT, that is, middle management, whilst other developers focus on supporting junior managers in individual health units. Furthermore, the series itself gives a contradictory picture of the level of management intended to be supported. The impression given in the series is that it is not intended to support a government DHT, but the management of an individual large health facility, or project. However, passing references are made in the series to show how it could be utilised at district management level.

Another difference is whether the series is to strengthen health management or management information systems, and how this will take place. The USAID documents (USAID, 1988; USAID, 1991) indicate PHC MAP will strengthen management information systems for PHC and Mother and Child Survival programmes. They assume this will be achieved by improvement in the planning, management capabilities and skill of programme management teams, as well as the greater availability and more appropriate use of information for rational decision making. However, the PHC MAP Initiator<sup>8</sup> and Developer focus on IM strategies and not on management tools. Later, emphasis is placed on the lack of IS technical knowledge, or managers' lack of IM skills, and assumes, having gone through PHC MAP training, these deficits would no longer exist. There is no mention of new IS development, or whether the skills could have existed before, but were not being used for some reason, or what detailed features a district level HMIS for PHC needs to have. However, new AKF staff are promoting the series as a 'tool box for managers' without specifying the exact purpose. Finally, the descriptions within the series do not specifically mention health management information systems, but concentrate on health information alone. Yet many of the tools are management tools, and there is emphasis on improving effectiveness and efficiency, which are management aims.

These differences have implications, and I believe the original objectives in the USAID documents are too general, which results in confusion. The above objectives may not be contradictory, but rather express different levels of abstraction. Thus, the overall aim could be to improve managerial practice and enhance the effectiveness of health care services through improved information management and more informed decision making. If the introduction to the series had emphasised the management tools being introduced had implications for the HMIS supporting districts and health units, this may have improved understanding. However, it may be not only a presentation issue, but a lack of clarity in understanding the role of information systems: the result could be uncertainty in the developers' minds as to the appropriate contents of PHC MAP and potential achievements.

The shift in emphasis, and attempts to direct the materials to a wider audience, has not been acknowledged by the developers and has subsequently caused problems in understanding. For example, the widening of objectives, to include the DHT, has led to insufficient focus in the materials themselves on the information needs of the DHT. The different emphasis, and changing objectives may reflect the inputs of different developers and changing perceptions of need. It may be the lack of a thorough, systematic needs assessment also contributed to

---

<sup>8</sup> 'PHC MAP Initiator' is the name given to the person who initiated the development of the series and worked in AKF Geneva.

uncertainty or inability to express the objectives in a clear and comprehensive way.

In conclusion, the developers present PHC MAP as aiming to strengthen management information systems and the sustainability of PHC and Mother and Child Survival programmes within AKF's own PHC programmes. They think this will be achieved by improving the planning and management capabilities and skill of programme management teams, as well as by the greater availability and more appropriate use of information for rational decision making. However, at first the developers were not proposing the materials had a wider application than their own agency programmes. Neither were they suggesting the modules were for the government DHT, but for the managers of individual projects. The objectives were to be achieved by producing, distributing and promoting the use of eight PHC management information modules and related training and resource materials in PHC and Mother and Child Survival programmes. Yet it is unclear if that training material was just the facilitators' guides to PHC MAP, or if there was to be particular training in management or management tools. This is a complicated issue and could explain some of the apparent contradictions in the perceptions of the series held by developers and promoters. One could see PHC MAP as a series of management tools, or one could see PHC MAP as producing a management tool, that is information, or as a training package for managers. Yet, the documentation accompanying the series concentrates on health information alone.

There is also the strong suggestion, that over time, the perception of the objectives changed, partly as additional developers were recruited, and partly as the perception of need changed, even after the modules were printed. It is not certain, at this point, if the developers were specialists in HMIS development. The USAID (1991) document refers to IS strengthening, although this does not appear in PHC MAP itself. This suggests that the document was not written by PHC MAP developers. The desire to support the manager of a large health project was the original aim of the series, but later, as international organisations, such as WHO, identified district level management needed improvement, the series attempted to expand its objectives to include this.

### **1.5.6 Need for evaluation**

The PHC MAP series leaves this researcher concerned about several issues which may have a bearing on how it is perceived in the field. The lack of clarity in the original objectives, and the possible misunderstanding of who would benefit from utilising the training materials, suggests potential hazards. Furthermore, the sheer numbers of people who have access to these materials, means these are important

issues, and evaluation is required. Prior to distribution, several countries had pre-tested PHC MAP *“to make sure they are understandable, easy to use and helpful to PHC managers”* (AKF 1993a: Module 1). But this did not constitute an evaluation of use, and without knowing exactly how such pre-tests were carried out, it is difficult to comment. To my knowledge there have been no independent evaluations of the applicability, utilisation or impact of use, of PHC MAP. However, there have been three studies of the materials by: Thorne, *et al.* (1994); the Somboon Vachrotai Foundation (SVF), (1995); and Thomas (1997).

The first is an evaluation of the series development, and the authors describe it as *“a pre-test of their use”*. This was conducted as part of USAID’s funding process, but because the series distribution was delayed, the evaluators said they could not carry out their original objectives, including an assessment of whether it contributed to strengthened management information systems. Furthermore, they suggest, because the series was not being utilised in its entirety in any programme site, this affected their intentions. This comment reflects the authors’ perception of the purpose of the series. The Developers would probably say the intention was not for the series to be used in its entirety. If the objectives are not clear to a team of evaluators after in-depth review and field study, other potential users will probably have difficulty interpreting the material. Therefore, they felt there was a need *“to study users of MAP closely to see what works well for them, what doesn’t, what support they need, and what further corrections, improvements and revisions of the materials are needed”* (Thorne, *et al.* 1994:16).

Since the launch of PHC MAP, an organisation in Thailand conducted a *“survey of recipients of the Map modules to help determine how they were being used, how useful (or problematic) they have been, what corrections should have been made and what improvements should be considered before a second print”* (SVF, 1995). That survey focused mainly on copy editing and produced an addendum to the materials.

In 1997 an evaluation, funded through AKF, for six months was undertaken. This was carried out by a management consultant whose task was set by AKF Geneva, and was intended to focus on how PHC MAP was used in Thailand, India and Kenya. The draft report for Thailand states: *“The objective of this assessment was to record experience in which PHC MAP was utilised in Thailand primary health care programs. The assessment provides information concerning two primary uses of PHC MAP: as a tool for service personnel to obtain information what [sic] will allow them to improve program management, and as educational or training materials used in teaching”*. (Thomas, 1997). This study, however, was more a comment on the training aspect, rather than on the usefulness of PHC MAP in obtaining information. The Director:Health, AKF Geneva objected to

this description of the objectives and stated they should be changed to read: “*to assess the impact of PHC MAP on managerial practice*” (memo from Director:Health AKF to Thomas, July 23 1997). This apparent change in objectives has significant implications, for to assess the impact on managerial practice, rather than potential benefits to management would take much longer than the six months given for the study in three countries. Furthermore, this points to uncertainty as to whether the original series was to impact on general management practices or information management. This study did not review how PHC MAP had helped to strengthen an HMIS.

The three studies conducted have not been independent, nor have they focused on the type of evaluation that is necessary, therefore, some suggestions for evaluation topics are mentioned in Chapter 10. These topics are extremely comprehensive and beyond the scope of a single PhD. None of the evaluations above is an empirical study following the information systems planning process when an externally developed package is introduced to potential users. This is one of the objectives in this thesis, and the findings will contribute suggestions for improvements, corrections or revisions to these and other similar materials.

## **Section 1.6 PHC in theory and practice**

PHC principles are a major part of Ugandan policy, and underlie the services promoted in PHC MAP. Therefore, it is important to understand the history of these principles, the issues concerning practitioners, and their relevance to IS and management.

### **1.6.1 International pledge to PHC**

The International Conference on Primary Health Care in Alma-Ata, USSR in 1978 was a major turning point for health care world wide. It declared:

*“the health status of hundreds of millions of people in the world was unacceptable and called for a new approach to health and health care to shrink the gap between the “haves” and “have-nots”, to achieve a more equitable distribution of health resources, and to attain a level of health for all citizens of the world that would permit them to lead a socially and economically productive life” (WHO, 1987:1).*

This Conference was attended by delegations from 134 governments and by representatives of sixty-seven organisations from United Nations (UN) bodies,

other agencies and NGOs. The conference advocated PHC, and two further UN conferences endorsed this in 1979<sup>9</sup>. WHO (1987:1) interpreted this

*“reaffirmed that health was a powerful lever for socio-economic development and peace and that the goal of health for all by the year 2000, which was essential for raising the quality of life, could be attained through the primary health care approach. Subsequently, the Thirty-fourth World Health Assembly (1981) adopted the Global Strategy for Health for All by the Year 2000”.*

Therefore, WHO placed the PHC approach firmly within the Health For All (HFA) strategy. Such an approach, acknowledging the socio-economic and political influences on health, was revolutionary, and had major implications for resource allocation. Furthermore, the 1978 conference also described the national strategies, international support, operational aspects of PHC and the development necessary at community and national level to achieve PHC goals.

### 1.6.2 PHC in theory

*“Primary Health Care is essential health care made universally accessible to individuals and families in the community by means acceptable to them, through their full participation and at a cost that the community and country can afford. It forms an integral part of the country’s health system of which it is the nucleus and of the overall social and economic development of the community” (WHO and UNICEF, 1978:2).*

Thus, universal coverage and equity (meaning care should be received according to need, thereby acknowledging some have greater needs than others) are basic principles. Another is community participation, and:

*“In order to make Primary Health Care universally accessible in the community as quickly as possible, maximum community and individual self-reliance for health development are essential. To attain such self-reliance requires full community participation in the planning, organisation and management of Primary Health Care” (WHO and UNICEF, 1978 :2)*

---

<sup>9</sup> Thirty-second World Health Assembly 1979 Resolution WHA 32.30 and Thirty-fourth session of the United Nations General Assembly 1973 Resolution 43/58

Affordability, social and cultural acceptability are also identified as important, and the latter idea lays stress upon the importance of indigenous concepts of health, illness and treatment, as well as those seen as originating in the West. Inter-sectoral co-ordination is seen as essential, thus acknowledging the socio-economic influences on health. The report states:

*“Health cannot be attained by the health sector alone. In developing countries in particular, economic development, anti-poverty measure, food production, water, sanitation, housing, environmental protection and education all contribute to health and have the same goal of human development. Primary health care, as an integral part of the health system and of overall social and economic development will of necessity rest on proper co-ordination at all levels between the health and all other sectors concerned”* (WHO and UNICEF, 1978:10).

The Alma Ata declaration, although acknowledging situations vary from country to country, identified eight elements which should be provided as a minimum within primary health care. These are:

*“promotion of proper nutrition and an adequate supply of safe water; basic sanitation; maternal and child care, including family planning; immunisation against the major infectious diseases; prevention and control of locally endemic diseases; education concerning prevailing health problems and the methods of preventing and controlling them; and appropriate treatment for common diseases and injuries”* (WHO and UNICEF, 1978:2)

### 1.6.3 PHC in practice

In practice PHC implementation in the 1980's differed widely in different countries. A Selective PHC (SPHC) versus Comprehensive PHC (CPHC) debate arose as countries began to realise the full implications of ratifying the Alma Ata agreement. The history, conceptual issues and development of this debate is reviewed by Rifkin and Walt (1986), and Unger and Killingsworth (1986). Only one year after the 1978 Alma Ata Conference Declaration, Walsh and Warren (1979) said the primary health care approach was too idealistic. They argued for an alternative approach, SPHC, on the grounds it was more realistic to target scarce resources to control specific diseases which accounted for the highest mortality rates. The original PHC approach became known as CPHC, and Rifkin and Walt (1986:560) contrasted the two:

*“Briefly, we see ‘primary health care’ as being concerned with a developmental process by which people improve both their lives and lifestyles. Good health is a key factor to this process. We see ‘selective*

*primary healthcare' as being concerned with medical interventions aimed at improving the health status of most individuals at the lowest cost. The critical difference in the two views are about who controls the inputs and outcomes of health improvements and what time frame is realistic to achieve the expected results."*

Thus, SPHC is concerned with the provision of health service programmes. Rifkin and Walt (1986) believe SPHC and CPHC are not reconcilable, as the latter is a strategy for health development incorporating environmental and socio-economic issues. Since the publication of Rifkin and Walt's (1986) article the debate has continued and it is suggested that CPHC is threatened by the existence of SPHC (Newell, 1988).

In practice SPHC appears to have reinforced the vertical programme model already operating on the ground, and, as an editorial indicates, this was not merely an academic discussion:

*"By the mid-1980's it was apparent that several donor agencies had accepted the line of argument put forward by Walsh and Warren. As a result resources were increasingly being directed into vertical programmes that sought quick technical solutions to health problems rather than integrated programmes which addressed a wider range of development issues over the longer term."* (Editorial, 1988).

Other changes occurred, for some countries extended the eight basic services envisaged in the 1978 Alma Ata document. Thailand, for example, included maintenance of mental health, and the prevention and control of drug abuse (Chanawongse and Singhadej, 1988), whilst other countries included dental health.

Despite the world-wide emphasis on PHC, WHO (1993a:46), discussing global achievements towards the goal of HFA generally, and the development of health systems for PHC in particular, declared "*there is still a big gap in many countries between the acceptance of the principals of primary health care and their implementation in the development of policies, financing, organisation, management and the delivery of programmes.*" Furthermore, they suggest the successful development of health systems based on PHC care in recent years appears to be due to "*government, political, social and financial commitment; strong management capabilities for implementation; well-orientated, trained, and committed health personnel; decentralisation to district/local level;*



*community involvement in local decisions; sustained financing; and the widespread deployment of widespread affordable life-saving technologies”* (WHO, 1993a:46). Despite huge successes in implementing PHC, there is still a great deal of work to do, according to Hussein (1999), who attended the WHO twentieth anniversary conference.

#### **1.6.4 PHC and management information systems**

One needs to be aware of the selective versus comprehensive debate when examining the policies of health service providers with a view to determining the IM strategies compatible with such an approach. For example, SPHC could be advocated by a MOH as a short-term strategy, but CPHC for the long term. Alternatively SPHC may be both the short- and long-term aim. Furthermore, even if CPHC is the official policy of the MOH, other influential stake-holder may have a different view and redirect health services accordingly.

SPHC, focuses on mobilising health services to deal with the most prevalent diseases, and the vertical programmes, such as HIV/AIDS, EPI, MCH, and TB, (which often result), although operating within the MOH, lack integration at the national level. Furthermore, because of funding arrangements for such programmes in many low-income countries, it is possible to find major funders and co-ordinators, such as UNICEF, insisting upon their own reporting systems and management approaches which may not fit with each other. At the regional and district levels these vertical programme arrangements would be replicated and even at health unit level, leading to possible inefficiency and confusion. However, it is important that management approaches and IM strategies should reinforce the type of PHC being advocated, and should be compatible with the health care paradigms, and culture prevalent in the country.

### **1.7 Conclusion**

This chapter has given some of the background to the situation in Uganda. The country has, in recent decades, undergone considerable economic and social changes, and despite the difficulties is still attached to PHC principles, including equity. Supranational agencies and NGOs influence Ugandan health policy, and this is accepted in varying degrees by its nationals. President Museveni, seen in a favourable light by western governments, is reversing the recent economic decline, and the country in 1998 was paying for many of the medicines which in the early 1990s had been paid for by outsiders. The centralised HIS is being abandoned in favour of an HMIS, which reflects national health sector changes,

and international concerns. On paper these two information systems are significantly different, and the HMIS in Uganda is being watched with great interest by other East African countries who are considering developing similar radical systems. Problems in health information management in low-income countries have been identified by many researchers and practitioners in recent years. These will be briefly reviewed in the next chapter, and it was partly to deal with these problems that PHC MAP was developed. However, there appears to have been insufficient needs assessment which obscured the objectives for the series, and resulted in confusion. Moreover, no independent evaluation of the series has been conducted.

The terminology surrounding information systems and management can be confusing, therefore the next chapter will clarify many of these terms. In addition it will elaborate on the approaches to IS development and implementation which are used in low-income and industrialised countries, to set the scene for the research conducted in Uganda.

## **Chapter 2**

### **Literature review and setting the scene**

# **Chapter 2 Literature review and setting the scene**

## **2.1 Introduction**

An essential part of situating this research is to examine the meaning of the terms I will use, as many words have different meanings in different contexts. Thus, Section 2.2 clarifies terminology and concepts. This is followed by a brief description of the problems in informational support to health management in low-income countries. Section 2.4 reviews information systems development methodologies (ISDM), which leads into the review of existing approaches to developing, implementing and strengthening informational support for health managers in low-income countries, in Section 2.5. Finally Section 2.6 will identify the issues arising from the review.

## **2.2 Clarifying concepts and terminology**

The IS research literature is riddled with terminology which has meanings in lay terms, which are sometimes different from the more specific meanings attributed by researchers. Moreover, even researchers have different terminology for the same concept, and many different terms for what is, in effect, the same concept. Therefore, it is increasingly difficult for managers and academics to find their way through the confusion and develop a common understanding of terminology (Boaden and Lockett, 1991). Recognising this problem, IS and IM texts define their own terms (see Avison and Fitzgerald, 1988; Best, 1996). This confusion of terms, coupled with the wide variety of disciplines contributing to the IS study makes a bewildering set of terminology. Thus, this section will discuss and define some of the terms used in this research. A summary of definitions can be found in the Glossary (Appendices 1), with other unusual terms used.

### 2.2.1 Distinction between data and information

Information is a key resource in many organisations, and has to be managed in order to ensure effective and efficient use. But what is *information*? This seemingly obvious concept becomes more complicated when it is differentiated from data. Wilson (1984a:198), maintains it is important to use definitions which help explain an approach to analysis. He believes:

*“information to be data plus the meaning ascribed to it. Thus as an example: the number of hours worked by an employee on a specific task is a piece of data. It becomes one kind of information when used by a salaries clerk in computing the amount of pay due to the employee. It becomes totally different kind of information when used by a production scheduler who is concerned with allocating resources to tasks”.*

He is saying information equals fact plus meaning, and his definition assumes data, not information, is neutral. This idea is also supported by Avison and Fitzgerald (1988:6), who additionally indicate that the distinction between data and information is context dependent. Thus, something which is information to one person, because it is an interpretation of events, to another is raw input because it has not been analysed according to their purpose. Therefore, information is not of value in itself, but *“its value lies in its use”* (Abel, 1993:53). These definitions and comments recognise information is organisation-specific, and role- or individual-specific.

### 2.2.2 Definition of systems

The IS conceptual basis lies in the ‘systems’ idea, developed to deal with complex problem situations. This term, however, can be used in two different ways which have major implications for the analysis of problem situations and methods for dealing with them. The ‘hard systems’ approach defines ‘system’ ontologically, and sees the world as composed of such ontologically defined systems and subsystems. (Thus “A university is a system to produce a better qualified work force”.) The soft systems approach defines ‘system’ as an epistemological device for exploring the world. (Thus “a university might be regarded as a system to produce a better qualified work force”.) (Lewis, 1994:35)

A system is a set of inter-related components organised together to form an entity that, as a whole, has emergent properties that belong to no single component or subset of the components of which it is formed, (Lewis, 1994:44). Systems have organisation and purpose, whilst aggregates do not. Thus, in a system it is important how the parts are arranged, but in an aggregate it is only important if

the parts are there or not. Systems can be a single entity or formed into a hierarchy, consisting of components known as subsystems. The latter contribute to the overall goals, whilst acting as separate components in many ways. The system has an environment existing outside the system boundary, which will include those things which interact with the system, even though they are not within it. Furthermore, *“What defines that environment will depend upon the system goals, needs and achievements as well as whether it is physical or abstract”*. ... *“The system interacts with the environment by means of the input and output. Input is anything entering the system from the environment; output is anything leaving the system, crossing the boundaries to the environment.* (Senn, 1990:72). Thus, the output is a result of input being transformed within the system.

### 2.2.3 Definition and types of information system

The implication of the definition of information mentioned above, is that *“what are commonly referred to as information systems are really processed-data systems. They only become information systems when someone makes use of the output”*. (Wilson, 1984a:199). Thus, an IS must include the user. Similarly, Senn (1990:8) defines an IS as a *“set of people, data and procedures that work together to provide useful information”*. He focuses upon the systems aspect pointing out the various components have a common objective. The activities undertaken will include accepting data from outside or within the system; processing data to produce information and out-putting the information to the users. Hence, he sees an IS as a term covering a variety of systems which receive data as an input and issue information as an output. Other authors believe the definition of an IS is much more complicated, therefore: *“The IS might be seen as: a sophisticated piece of technology, a communication tool, a decision-making tool, a control mechanism and so on or an institutional arrangement”* (Lyytinen and Hirschheim, 1987:262).

My own definition of an IS is one which draws upon Senn’s (1990), Wilson’s (1984a), and Lewis’ (1994) ideas, but also focuses on the social side of information systems, and draws upon ideas from Buckingham, *et. al.*, (1987). Thus:

*an information system is the term which describes the data collection, data pathways, storage, processing and dissemination, as well as the information pathways and information use in an organisation. It describes human activity, which may not involve the use of computers.*

A common thread in most of the definitions is the focus upon the IS being a part of an organisation, or supporting an organisation. This suggests: *“it is impossible to analyse the operations of an information system or design a new one without first having a clear understanding of the activities and the objectives of the business system it serves.”* (Lewis, 1994:61).

Six types of IS have been recognised, including management information systems (Senn, 1990). All aim to process data to enable people to make decisions; to communicate information between people and locations; or to capture transaction details.

### 2.2.4 Management information systems

Management information systems (MIS) are the focus of this research, and their purpose is to provide information for decision support and other management activity, especially where information requirements can be identified in advance and usually with respect to frequently occurring decisions (Senn, 1990:13). The definition of an MIS, however, often focuses on the technology being utilised, that is, computers. For example, *“A management information system is a formalised, computer based system able to integrate data from various sources to provide the information necessary for management decision making”*. O’Hicks (1984:20), and an MIS is *“an integrated user-machine system for providing information to support operations, management, and decision-making functions in an organisation”*. (Davis and Olson, 1984)

In many low-income countries, where the cost of using computer technology is still prohibitive, this focus on information technology (IT) is not appropriate. A different definition, which reflects more of the basic concepts, rather than the means to achieve the goal, is called for. Indeed, the lack of computers allows one to concentrate on the basic concepts, as too often MIS study in the past has focused heavily on the *“enabling technology”* rather than the organisational needs and impacts of those within it (Lewis, 1994:2). This view is echoed by Holtham (1996:41) who argues strongly against a focus on IT saying *“Information is more critical to business success than information technology (IT), but IT gets most of the attention and the great bulk of the investment in managerial time, financial investment, and media attention. ...the continuation of this imbalance will be at the heart of failure to achieve the full benefits from business information systems”*.

An MIS has also been described as “*an integrated system for providing information to support the planning, control, and operations of an organisation. It aids operations, management, and decision-making by providing past-, present- and future-orientated information about internal operations and external intelligence.*” (Senn, 1990:501). The integration he refers to is, partly, the integration of the information coming from the various functional areas within the organisation, which are dependent upon each other to achieve the business aims, such as marketing and production. As such he is focusing on the organisational arrangements which facilitate data and information utilisation, as well as simply the data and information itself. This definition of an MIS points to its purpose, rather than to how it is to be achieved.

The definition used throughout this thesis, drawing upon Senn’s (1990) ideas, and others mentioned earlier, is: “*an MIS is the term which describes the provision of information to support the planning, control, and operations of an organisation. It aids operations, management, and decision-making by providing past-, present- and future-orientated information about internal operations and external intelligence.*”

## **2.3 Problems in informational support**

The literature focusing on health managers’ IM problems in low-income countries is of variable quality. There is a lack of in-depth case studies which have documented the problems, or examined the reasons for the problems. Some authors, when identifying the problems, appear to be drawing upon their own, or other practitioners’ personal observations, rather than a systematic review of a specific situation. Others indicate they are referring to empirical studies, but do not identify these adequately. This section is not intended to be a comprehensive review of the problems, but describes the issues raised. Information support for PHC management is focused on. There is no available literature review of these issues and the papers reviewed here refer mainly to individual situations.

### **2.3.1 Data collection**

Many papers indicate specific data items are missing (De Kadt, 1989; Husein, *et al.*, 1993; Keller, 1991; Sandiford, *et al.*, 1992b; Van Norren, *et al.*, 1989; WHO, 1994b). Others focus on data being incomplete or fragmented (Bekui, 1991; Keller, 1991; Smith, *et al.*, 1988) and others comment on reliability, quality or timeliness (Bekui, 1991; Finau, 1994; Folz, 1993; Husein, *et al.*, 1993; Keller,



1991; Nabarro, *et al.*, 1988; Wilson, *et al.*, 1988; WHO, 1994b). Many of these problems indicate the need for indicators which would inform operational managers' monitoring, evaluation and planning role, rather than contribute to profiling morbidity and mortality status for national use, which is the focus of central reporting health information systems.

In addition there is perceived to be lack of feedback to data collectors (Bekui, 1991; Finau, 1994). Several authors suggest data is recorded and reported by staff when it is not needed for their own work, and they are not often involved in deciding which data should be collected (Campbell, *et al.*, 1996; De Kadt, 1989; Finau, 1994; Husein, *et al.*, 1993; WHO, 1994b). Excessive time is spent in data collection and processing (Campbell, *et al.*, 1996; De Kadt, 1989; Husein, *et al.*, 1993; Sharma and Dutt, 1993; Sandiford, *et al.*, 1994; Smith, *et al.*, 1988), and lack of integration of data collection leads to duplication of forms and processing (Campbell, *et al.*, 1996; Foltz, 1993; Mock, *et al.*, 1993; Van Hartevelt, 1993).

### **2.3.2 Data processing and analysis**

Many processing and analysis problems are identified including: lack of local processing of data (Loevinsohn, 1994; Van Hartevelt, 1993; Finau, 1994) and lack of analysis and processing of intersectoral information (Keller, 1991). Poor presentation (WHO, 1994b; Van Hartevelt, 1993; Sandiford, *et al.*, 1992a), lack of useful analysis (Finau, 1994) and aid agencies requesting information for their own use, which is of no relevance for in-country managers or planners (WHO, 1994b; De Kadt, 1989; Bekui, 1991; Foltz, 1993) are also problematical.

Poor dissemination of information is a problem (WHO, 1994b), as is under-utilisation of computers for routine analysis (Schware, 1988; Finau, 1994). Data collected does not always accommodate the skill-level of collectors (Foltz, 1993), and there is insufficient training and skills development in data analysis, interpretation and presentation (WHO, 1994b; Loevinsohn, 1994; Smith, *et al.*, 1988; and Bekui, 1991). The quality of health statistics is very poor (Chae, *et al.*, 1994), whilst Kipp, *et al.*, (1994) believe there are no uniform methodologies for programme monitoring. Existing information was not always analysed (De Kadt, 1989; Campbell, *et al.*, 1996; Reynolds, 1988), and IS often produce internally inconsistent data (Schware, 1988).

The level of data aggregation lacks flexibility (De Kadt, 1989; Sandiford, *et al.*, 1992a; Van Hartevelt, 1993; WHO, 1994b; Keller, 1991), and information is not

being processed to provide a systematic assessment of the quality, or coverage, of the services provided (Crease, *et al.*, 1988; Van Hartevelt, 1993; and Keller, 1991). The lack of integration of data collection, due to vertical programmes, means the reporting system is also fragmented (Mock, *et al.*, 1993), and the separate presentation of input and process or outcome information could reflect fragmentation of management tasks (Bekui, 1991). There are insufficient skilled personnel available to process and analyse data (Keller, 1991; Bekui, 1991) and cultural issues, are problematical in newly-computerised information systems (Bertrand, 1988).

### 2.3.3 Use of information

Utilisation of information is a major concern. Little of the data sent to national ministry level is analysed and fed back to districts (WHO, 1994b), and information often fails to arrive at the decision-making level (Keller, 1991). The use of information lags considerably behind its availability (Keller, 1991), and insufficient use is made of information for local decision-making (Husein, *et al.*, 1993; Keller, 1991; Bekui, 1991; Loevinsohn, 1994; De Kadt, 1989). There is a need to link targets and objectives in order to utilise information (Wilson, *et al.*, 1988), and information is not used to compare health need, utilisation and performance (Malcolm, 1989), equity in the availability of PHC (Crease, *et al.*, 1988), or for community health activities (Schware, 1988).

Financial information is not utilised (Schware, 1988; Sandiford, *et al.*, 1992a), whilst little attempt is made to present information in the form of comparisons which could be easily understood at district and sub-district level (WHO, 1994b). Most MIS were designed without regard for analysis and use of the data (Reynolds, 1988; Loevinsohn, 1994), and there are a lack of tools to utilise information (Husein, *et al.*, 1993; Heiby, 1991). Managers do not know how to use data (Loevinsohn, 1994), and communities are not using information (Reynolds, 1988; Smith, *et al.*, 1988; Sandiford, *et al.*, 1992a; WHO, 1994b). There are constraints to a simple understanding of what is meant by 'using' information, and indicators are rarely exploited for all the purposes to which they lend themselves. Thus, an indicator may occasion selective supervision, but not enter into decision-making about resource allocation (Keller, 1991). Finally, health workers did not see the value of the information they collect (Bekui, 1991), or perceive the importance of information for management purposes (Finau, 1994).

### 2.3.4 General organisational and management issues

Information systems are over-centralised (De Kadt, 1989; Smith, *et al.*, 1988); with no possibility of estimating if health services are meeting health needs (Foltz, 1993), or the health status of the district's population (Chae, *et al.*, 1994). There is a lack of IS integration (Crease, *et al.*, 1988), and IS do not reflect the tasks and responsibilities of managers (Reynolds, 1988; Crease, *et al.*, 1988; Loevinsohn, 1994).

Some authors recommend developing individualised information systems, rather than using standardised indicators (Bertrand, 1988; De Kadt, 1989; Foltz, 1993). Sandiford, *et al.*, (1992a), believe designers should relate information needs to intervention possibilities, and the IS should retrace the steps taken in the decision-making processes. Data collection should be linked with decisions to be made (Nabarro, *et al.*, 1988; Bertrand, 1988; Husein, *et al.*, 1993; Finau, 1994). Moreover, there is a need to have IS which support existing polices, such as PHC (Husein, *et al.*, 1993).

Furthermore, WHO (1994b) when reviewing the IS problems, felt there were "*Few apparent improvements in services and programmes despite much time spent in data handling and report production*". They maintained: "*Efforts to strengthen national information systems have often produced little improvement and have sometimes made the problems worse*". Rational decision-making does not necessarily follow from improvements in information (Sandiford, *et al.*, 1992a), and even when information is available, an informational approach is not automatic (Husein, *et al.*, 1993).

As many decisions are influenced by political factors, managers need to be given the information for a more rational basis for decision making Campbell, *et al.*, (1996). Underlying this comment is the idea that a new informational approach to management is being advocated here, which is often not acknowledged by researchers or managers focusing on HMIS problems.

These papers by researchers and operational managers note that existing IS do not always monitor health policies, or reflect the changing management roles of health service providers (see AKF, 1993a). However, it is unclear if individual IS face all these problems, or whether only certain people within the organisation find them problematical. For example, senior managers may have problems with one particular system, but operational managers may be quite content, as it serves

their needs. It would be useful to have a thorough needs assessment of an individual IS, or a diagnosis of problems which indicates at what level it is inadequate and where it is not, including the views of all those involved. Furthermore, research is needed which not only describes IM problems, but also describes the problems experienced when changing from the traditional role of health unit In-charge, or district co-ordinator with limited power, to an informational-approach to management undertaken by managers with control over resources in a decentralised administration.

Before reviewing the literature on HMIS development in low-income countries, the next section will describe the techniques which could be utilised for that purpose.

## **Section 2.4 Information systems development methodologies**

An information systems development methodology (ISDM) is “*a methodological approach to information systems planning, analysis and design*” (Rowley, 1993). It describes the phases and sub-phases through which the project may pass and identifies the choice of techniques at the planning, management control and evaluation stages (Avison and Fitzgerald, 1988:4).

Several ways of classifying ISDM exist, including distinguishing between those utilising an interpretative perspective and those which do not (Walsham, 1993a), distinguishing hard and soft methodologies (Rowley, 1993), distinguishing conventional and human orientated views (Grunden, 1986), and Lyttinen’s (1987) complex taxonomy employing distinctions according to the assumed epistemological and ontological stance, as well as other criteria. Avison and Fitzgerald’s (1988) partly historical perspective, which also categorises the methodologies according to the problems arising with conventional systems development, will be utilised here, though only those with an emphasis wider than computer-based methodologies are described.

### **2.4.1 Non-formalised approach to systems development**

In the 1950’s “*there was no formalised methodology to develop data processing systems*”. (Avison and Fitzgerald, 1988:10). They suggest computer programmers

implemented systems, which essentially focused on data-processing functions, such as copying, retrieval, filing, sorting, checking calculating and communicating. The problems arising at the time included lack of user input, poor documentation, lack of uniform practices and techniques, late and costly systems development, and little emphasis on analysis and design.

## 2.4.2 Systems approaches

Consequently methodologies were developed to counter these problems. Some of these are collectively known as *systems approaches*, and incorporate systems ideas including: the concept of a boundary, environment, the whole being greater than a sum of its parts, the organisation as an open system, and defining a system as a set of inter-related elements.

### hard systems approaches

One of these, '*conventional systems analysis*', also known as 'traditional systems analysis', 'the systems development life-cycle' and 'the water-fall method', was developed. This methodology contained several steps including: feasibility study, systems investigation, systems analysis, systems design, implementation and review and maintenance. Hard systems methodologies, such as Structured Systems Analysis and Design methodology (SSADM), have been described by Rowley (1993) as seeking to develop a technical solution to problems, through the implementation of a computer system. This author suggests "*they assume the possibility of a clear and agreed statement of both the current situation and its problems and the desired state of affairs to be achieved. The problem for systems analysis and design is then seen as that of designing a solution that will take us from where we are now to where we want to be. Users are viewed as sources of information about the system, and are viewed in terms of their information requirements, and as devices for data input. The role of the analyst is that of the expert who is responsible for the design of the system*".

### soft systems approaches

Alternatively, soft systems approaches acknowledge the importance of people in systems analysis and design, realising the problem situation is often not clear, and view the analyst as part of a team. In particular Checkland (1981) developed *Soft Systems Methodology* (SSM), as a way of developing an in-depth understanding in situations where problems are not well defined, as often is the case in organisations. He emphasised the need to model Human Activity Systems, which include people as well as data and processes. This idea was further developed by

Wilson (1990a) into a staged methodology. The intention is to improve organisational understanding utilising various perspectives in the real world, and systems thinking about the real world.

An early critique of this approach stressed it did not take into account the constraints imposed by existing power relations, and therefore had a tendency to be conservative and support the vested interests of the powerful stakeholders (Jackson, 1982). Furthermore, the assumption of attaining an agreed root definition and conceptual model, which does not mainly reflect the viewpoint of already powerful decision-makers, maybe naive. This critique is also identified by Hirshheim, *et al.*, (1995) when they analyse the weaknesses of the paradigm on which SSM is based. Others, such as Iivari (1989), emphasise the acknowledgement of conflict supports Checkland's (1982) own view, that this methodology is not restricted to consensus situations. Flood and Jackson (1991:190) offer a useful suggestion saying: "*SSM is best suited to situations where there is a coalition of organisational stake-holders and the need is to create, temporarily at least, a shared appreciation amongst these stake-holders of what is the best way forward from a given problem. It is extremely adept at providing creative solutions that enable organisational actors to escape the 'traps' into which their current thinking has led them*". But they also add "*In coercive contexts SSM is to be avoided because of the ease with which it lends its support to already powerful decision makers*".

### 2.4.3 Planning approaches

The HMIS development approach has aspects of a planning approach contained within it, therefore a deeper review of this ISDM is offered here. Planning approaches developed particularly to counter the possibility of information systems being implemented in a piecemeal way. "*Rather than look at individual applications and sub-systems in detail, planning approaches involve the top (strategic) management (the management director, financial services manager, and so on) of the organisation in the analysis of the objectives of that organisation*". (Avison and Fitzgerald, 1988). Planning approaches, therefore, take an organisation-wide perspective initially, which differs from systems approaches. The initial stage is to conduct a business analysis, defined by Avison (1985) as involving an assessment of the strategic goals of the organisation, which could be long term survival, increasing market share, increasing profits or improving public image. One of the earlier methodologies was IBM's Business Systems Planning as described in IBM (1982) and Avison and Fitzgerald (1988:32). This was based on three principles, of which the first is the organisation-wide perspective. Secondly, analysis from top management downwards dominates, which is intended to ensure strategic management

perspectives define organisational need and priorities, and hence the initial system definition. Avison and Fitzgerald (1988:32) state, however, that a bottom-up orientation is utilised in the design and implementation phases, during which time the database is created and the processing requirements necessary to fulfil the organisational objectives are defined. The third principle is to ensure the business plan is independent of computer applications, so that existing data, storage processing and retrieval computer applications do not limit the changes desired. The stages are: identification of requirements; definition of requirements; general design; detailed design; development and test; installation; and operation. The major difference between this methodology and the conventional approach is the emphasis on strategic planning at the early stage and the iterative nature of the stages.

Not all planning approaches start with a review of the requirements of top management, however; Senn (1990:654) identifies two types of IS planning: top-down and bottom-up. The former, as described above, has a high degree of top-management involvement in the planning process with the initial focus on the main goals and objectives of the organisation regarding present and future operating and planning strategies. The next stage identifies and examines decision-areas to determine what information is needed and its form, and from this examination design specifications are developed. By contrast, he notes that the bottom-up approach emphasises the basic elements of the system as the application modules and the relevant supporting data. Thus, the first stage identifies managers' information needs and develops information systems to meet the needs. It is only as the system evolves, that the modules are linked together through a common data base, and models are developed to assist with higher level decision-making. This latter approach is considered to be more responsive to information needs. Although it is possible to dispute the bottom-up approach described here is a planning approach, Senn's (1990) distinction between the two illuminates the two methods very well.

Avison and Fitzgerald's classification was developed in the late 1980's. Since then "*there has been a growing awareness that information systems planning within organisations should be integral to the organisation's strategic plan*". (Rowley, 1993). Thus, the planning approach has been more fully developed and refined to include the ideas and tools developed by authors such as Earl (1989), who suggests in order to align the information system with the business strategy it is necessary to have an Information System strategy, and Galliers (1993) who recommends a Change Management or Implementation strategy as well. Rowley (1993) has described this approach as Strategic Information Systems Planning (SSIP *sic*), after the work of Remenyi (1991). Rowley (1993) suggests this

approach developed in recognition that previous ISDM had not produced the desired results either for IS departments or the organisation as a whole.

*“SSIP is the process of establishing a programme for the implementation of and use of information system in such a way that it will optimise the effectiveness of the organisation’s information resources and use them to support the objectives of the whole enterprise as much as possible.”*

Rowley (1993) describes the typical components of SSIP as including: a) identification or determination of organisational business objectives, corporate strategy and critical success factors; b) definition and specification of a business model which must reflect both the business needs as they now exist as well as being able to accommodate the anticipated growth over the next five years; c) an assessment of the extent to which current systems satisfy the business model; d) the creation of a list of application software requirements showing how these programmes relate to the performance of the new systems to ensure the success of the business function under consideration; e) the identification of appropriate statistical measures for the monitoring of the performance of the new systems to ensure the success of the application may be measured; f) the creation of a timetable showing all resources required and expenditure for the project. Furthermore, the author suggests typically a short term twelve to eighteen-month plan, as well as a longer term three to five year plan would be made available. The steps described here, however, are not comprehensive, as feasibility studies and other aspects of hard systems stages are not included.

#### **2.4.4 Participative approaches**

Participative approaches emphasise the involvement of all IS users in the analysis, design and implementation of information systems relevant to their work, under the assumption this will lead to reduced maintenance time, user dissatisfaction, stress and absenteeism (Maclaren, *et al.*, 1991). This approach was derived from the,

*“research of the socio-technical school on the design of work in organisations. The socio-technical approach to work organisation places emphasis on the need to match social and technical systems in an appropriate way, and not to emphasise the technical system at the expense of the human system; the approach also recognises the importance of job satisfaction, autonomy and self determination for social groups”.*  
(Walsham, 1993a:188).

Three types of participation have been identified (Mumford, 1983a), consultative, representative and consensus, which describe different degrees of participation



ranging from merely consulting and encouraging job satisfaction, to a user-driven process where design decisions may be made by different user groups within the organisation. The most well-known of the participative approaches is promoted by Mumford and Weir (1979), with its emphasis on participative design. Effective Technical and Human Implementation of Computer-based Systems (ETHICS), as their approach is entitled, views the development of computer-based systems as a change process which will involve conflicts of interest between the participants.

Participation can create problems, such as the polarising or fragmentation of user groups; the possibility of manipulating the process so only those groups with 'correct' or 'right' views are involved; and, participation can create resentment on the part of analysts who think their job is being taken away, or users who believe their role is not to develop information systems (Avison and Fitzgerald, 1998:37). Moreover, this approach assumes the various groups in an organisation, although having different goals and perspectives, can pursue those goals yet still arrive at an acceptable compromise. This is also one of the criticisms of SSM.

### **2.4.5 Combining approaches**

As can be seen from the descriptions above it is not always easy to categorise the different ISDM, as there are overlapping features. For example, the development of an overall plan for the organisation in the planning approach is similar to SSM, and the top management involvement of the planning approaches is similar to the participative approach. Furthermore, in recent years methodologies incorporating aspects of several approaches have been developed. One of these, Multiview, developed originally by Wood-Harper, *et al.*, (1985), claims to bring together the analysis of human activity systems, socio-technical systems, data analysis and structured analysis. It does not consist of detailed steps, but is rather a general approach which consists of stages including: analysis of human activity, information analysis, analysis and design of the socio-technical aspects, design of the human-computer interface and design of the technical aspects. These stages are not considered to be necessarily linear, though the authors consider the outputs of each stage could become inputs to the following stage, or a major output of the methodology (Avison and Wood-Harper, 1990:xiv). Their intention is for the methodology to be utilised flexibly, according to each situation.

### **2.4.6 Information system development in practice**

These ISDM are utilised in many countries, particularly for computer-based information systems. For example, SSADM has been used in a number of

government applications since 1981, and it was mandatory in many Civil Service applications in the 1980's (Avison and Fitzgerald, 1988:191). The SSM approach is widely used by management practitioners and IS developers in the UK (Mingers and Taylor, 1992). It is primarily used for understanding the problem situation, and not for implementing solutions. Consequently, it is often utilised before other systems methodologies which emphasise design, development and implementation. It has been utilised in Multiview developed by Avison and Wood-Harper (1990), and by Galliers (1995). Although the action research leading to SSM development was initially carried out in industry (Checkland and Howell, 1998:173), the authors describe, in the same book, many examples from the public sector, as this is where much of their work in the last decade has been conducted. They utilised SSM, in the Huddersfield clinical IS, to rethink an IS strategy in the Royal Victoria Infirmary in Newcastle, and in the methodology for an evaluation of Resource Management sites, which was an initiative of UK central government in the 1990s.

ETHICS has been utilised in many situations, hence the descriptions of how a group of secretaries designed new work systems for themselves as part of the process of introducing word processing equipment (Mumford, 1983b), and how a group of Purchase Invoice Clerks participated in the design of a major on-line computer system (Mumford, 1983a).

A number of empirical uses of the Planning approaches are described in Earl (1993), and Ward and Griffiths (1996) aim to provide a structured framework and practical approach by identifying various tools and methods which can be utilised to facilitate the links between IT and business strategy. Unfortunately, Ward and Griffiths (1996:547), also suggest few organisations appear to have adopted an organisational approach to IS planning as yet. Experiences utilising combined approaches include the Multiview approach, as described in Avison and Woodharper (1990), Woodharper (1989) and Avison (1990).

This section has described the approaches taken in industrialised countries. The next section will review the approaches which have informed the move from a centralised recording HIS to an HMIS which supports operational management, in low-income countries.

## Section 2.5 Health information systems development in low-income countries

The aim of this review is understand the processes undertaken when developing and implementing health information systems in low-income countries. A distinction is made between those papers only making recommendations, compared to those which describe the practice. It is difficult to ascertain the approach adopted by some developers, perhaps partly because they are not necessarily IS trained personnel, or the authors do not fully document the process, or they use inconsistent terminology. Therefore, it may be that I have made assumptions about the approach of authors which they would not agree with, but I have taken them at face value. Many of the papers mentioned in Section 2.3 make suggestions for improving data collection, processing and use of information. Few, however, base their suggestions on an in-depth description of developing information systems. Thus, only, the papers drawing upon empirical case studies will be discussed.

### 2.5.1 Computerisation of information systems

Nabarro, *et al.*, (1988) suggest the appropriate approach to developing information systems is the analysis of information needs, investigation of data sources, establishment of data processing pathways, identification of appropriate software and selection of suitable hardware. They state, however: "*in our experience, such sequencing is rarely possible in practice*", but do not enlarge upon this. Their aim, instead, is to design "*some guiding principles for computerisation*". Consequently, they describe the development of an IS to support MCH and Family Planning (FP) field staff in Sindhupalchock District in Nepal, and the computerisation of the national offices of a Health Planning Unit, within the MOH in Uganda, which is where the HIS is based.

The new IS in Nepal was intended to produce information for fieldworkers, supervisors, local village leaders, the district MCH/FP manager and the national level MCH/FP project chief. Computer technology was being introduced at the same time as new data collection, processing, analysis, and information use strategies. The process involved initial specifications of how information was to be utilised, and some negotiations between managers and field workers took place. Data management techniques were specified at the beginning, with an attempt to minimise data items. The emphasis was on indicators of service-uptake, not indicators for evaluation of impact, and the developers attempted to prevent IS strategies directing health services, rather than supporting them. No in-depth description is given of the process, and apparently lessons are not drawn

from previous research. This paper is more like a report than a research paper, and it gives no account of how the changes in the information system can be understood. Its intention was to focus on computers not only IS development.

### **2.5.2 Strengthening health unit management information systems**

Hansen and Echols (1988), in the review of four Aga Khan supported PHC projects in Bangladesh, Kenya and Pakistan, make several recommendations for strengthening management information systems. This is a review of IS development in four individual health projects, which the authors maintain hold lessons for MIS development generally. The descriptions of the development process are not in-depth, but the authors advocate something similar to an information audit (Buchanan and Gibb, 1998), and the linking of information management strategies with policy and management tasks. Using information was a problem, but they make no suggestions of how to promote an appreciation of the utility of information, beyond saying there was a problem in management style, and managers had difficulty specifying how they had used certain indicators in decision-making. Several retrospective recommendations for strengthening management information systems are made.

Ferrinho, *et al.*, (1991), although not focusing on district level MIS in a low-income country, describe the development of an MIS for a PHC centre in South Africa, a middle-income country. The initial aim had been to collect information needed for: fulfilment of state, professional, legal and academic requirements; health centre and departmental management; clinical care of patients; and monitoring of staff workloads. Their review of development describes in detail six overlapping stages: 'starting', which appears to be a review of what data was collected, who it went to and whether it was analysed. This is not a full information audit, but traces data collection and flow. The 'conceptual' stage established the initial aim (mentioned above), and principals of data management; the 'developmental' stage involved selecting and defining data items, form design, consultations at departmental level, drafting and final reviews of forms and implementation; the 'practical profile stage' followed, whereby HIS data provided a profile of patients attending the health centre; the 'redesign' stage came about two years after the beginning of the conceptual stage and identified new problems; and the final, 'operational' stage existed at the time of writing. This involved developing and implementing new principals from the redesign stage, and it appears, in order to ensure utilisation of information, actions triggered by specific information or decision-making tools were set-up. Hence, they say "*we are developing a system that highlights 'high-risk' and chronic patients and promotes awareness of missed opportunities for preventative and*

*promotive care*". At the redesign stage they identified problems and decided to add six 'principals' to their IS development.

Their approach, suggests that they had inadequately conceived of the IS purpose initially, and probably did not have the tools to design an adequate IS when they began. It appears that the developers were learning on-the-job. Thus, an inadequate needs assessment was conducted, and although they described some data collection and processing, no in-depth information audit was carried out. If it had there may have been an examination of the information needed to make decisions in the present, and future. Furthermore, the systems conceptual framework of input-process-output could have facilitated the definition of appropriate indicators. Neither was there an early review of the possible features of an IS which would support their PHC policy. Such a review would have realised population-based, as well as clinic-based indicators, would be required.

The lack of specification of data management techniques at an earlier stage also shows a lack of knowledge in IS development, and there was little attempt initially to involve all stake-holders, which led to conflict later on. Although this paper illustrates in many ways how not to develop an IS, the authors' final analysis is useful.

### **2.5.3 Health workers' training courses**

Chanawongse and Singhadej (1988) describe training courses developed for PHC workers, in recognition of the importance of information in carrying out health policies. They suggest IS should be appropriate, functional and relevant, hence emphasising the policies the IS has to support, including PHC principals and the Basic Minimum Needs strategy developed in several provinces in Thailand. The training course in Information Systems for Quality of Life Development (a broad policy to improve the living conditions of all people in rural areas) is described and the objectives include: identifying the need for, and availability of information regarding PHC and Quality of Life; describing procedures and processes for data acquisition and linkages at focal points; and describing information distribution to decision-making points. Their aim is to provide "*community and government agencies with a sound, rational basis for decision-making, management and evaluation*". Hence, they acknowledge a different management style, but make no mention of management training or organisational change needed to facilitate this.

### 2.5.4 Surveys to support routine health information

Chanawongse and Singhadej (1988) also describe the development of a survey which used fifty-three indicators to monitor progress towards implementation of the Basic Minimum Needs strategy. Those indicators were closely related to the management tasks, as they reflected existing targets, and did not appear to be in addition to the normal work objectives. This is a description of an annual survey to supplement routine data collection in the health units and intersectoral data, which is intended to monitor progress towards the policy principles mentioned above. There are attempts to link policy and IM strategies, as well as IM strategies and management tasks. No reference, however, is made to possible stake-holder conflict, as the survey methodology appears to be imposed. Participation of the community was sought in collecting data and identification of priority problems in the villages. Data management techniques were specified at the start.

Neither the training course, nor the survey, mentions being part of an overall national IM strategy, and no information audit was conducted, or developmental stages described.

### 2.5.5 HMIS support for operational management

Campbell, *et al.* (1996) trace HMIS development in three of the ten regions of Ghana. The existing system was a reporting system focusing on data collection, and the authors envisage the new HMIS will contribute towards the conscious use of information. HMIS development is placed in the context of MOH national policies and *“managers at every level throughout the country are expected to regularly monitor their efforts to implement these policies and make informed decisions to achieve their own goals and targets”*. Although it is not clear from the document, this management approach could be a shift from a different management style, and appears to imply an informational approach to decision-making. The authors give four objectives of the system, including:

*“1) to improve the ability of the health service providers, managers and policy makers to assess both individual and institutional performance with respect to coverage of the catchment area, the quality of the services provided, and the effectiveness of different strategies; 2) to compare performance over time, and to compare their own situation to that of other facilities, districts or regions, as well as local or national targets; 3) to identify health facilities, districts and regions in need of support and supervision; and 4) to monitor trends in coverage, quality and*

*effectiveness-which can guide policy development, planning and budgeting”.*

These objectives imply that monitoring is one of the main management tasks the HMIS is to facilitate, but it is not clear from these objectives whether the HMIS is primarily for operational management of health facilities, or management at other levels, but is probably the former. Indeed the authors say: *“the main focus of the development of a health MIS was on self-assessment and action related to monitoring and supervision”*, which suggests other management tasks, such as planning, are not facilitated by this HMIS. The need to strengthen district management teams, as part of the decentralisation process initiated by central government, was the impetus for the reformed HMIS. The initial phase, after identifying the need to change, appears to have been consultation with MOH leadership on problems and possible solutions, and included reviewing some health service goals and targets, and defining a minimum set of indicators to allow monitoring of the coverage and quality. It is assumed that indicators to cover other management tasks would be developed in future. The consultation also yielded some assumptions which became design principles. However, it does not appear to draw upon existing ISDM or theoretical frameworks of diffusion and organisational change.

Part of the initial phase was to describe information flows in the present and anticipated system. MIS development was facilitated by the technical assistance of two people from the Royal Tropical Institute in the Netherlands, and appears to have been strongly guided by the Director of Health Service, regional directors and technical heads of various national level units. There also appears to have been an MIS working group. The initial phase, of general problem identification and meeting with several MOH figures to define design principles, was followed by eight stages, including fact finding, pre-design, design, two district pre-test, redesign, regional implementation covering regional, district and health facility training, extended field trial in Central Region and an impact evaluation. The fact-finding stage appears to have been a form of information audit, with a review of what data was being collected and procedures, as well as asking programme managers and policy makers what information they needed for decision-making and assessment. It is not clear if the audit was mainly at district or health facility level. The pre-design stage was held at a workshop which reviewed, with technical heads and regional bio-statisticians, the above findings, in the context of the design principals and health services policy. This workshop produced the MIS components, including: tally sheets, register formats and client cards; self assessment tools (graphs and aggregation formats) to be used by service providers and their supervisors to monitor their own individual and team performance; procedures for self assessment, reporting and feedback that emphasised managerial and supervisory use of information; training materials, including an instruction manual, reference manual and exercise workbook; and teaching

strategy for teaching service providers how to use the system. The twelve-week, two-district pre-test indicated problems leading to some re-design, after which regional implementers trained regional staff, who trained the district health management teams, who trained health unit staff. This case study of the new HMIS does not follow the implementation process in detail, although it covers the design process and makes useful suggestions of how to resolve important issues that arose.

This same case is referred to in a paper by Van Hartevelt (1993). He discusses the need for an Information Management approach when strengthening information systems in Ghana, and believes the *“introduction of information systems is only successful when implemented as part of an information strategy leading towards integrated IM which support the organisations’ objectives rather than as an objective in itself”*. This author is writing the paper at an earlier stage than Campbell, *et al.* (1996), and he gives a wider conceptual framework. The paper indicates the author has a wider knowledge of developing information systems, but he does not follow the implementation process in detail, and he is referring to intentions rather than to actual events.

### **2.5.6 Central level IS development**

Foltz (1993), although focusing on technology transfer to improve a national routine reporting system, rather than a district-level HMIS, illustrates her approach with a case study in Chad. IS reform is needed, she suggests, due to MOH problems, such as lack of information needed for planning and management. Funding was obtained from USAID and three expatriate long term advisors were provided. The next stage involved the MOH making two strategic decisions *“The first was to proceed by a consensus of users and collectors of data<sup>1</sup>; the second was to proceed on the basis of the expressed information needs identified by health administrator and planners”*. As these decisions were prompted with the encouragement of the three technical assistants it suggests they were aware of the need to acknowledge, and deal with major stake-holder conflict, from the beginning, and it appears they were attempting to link policy, management tasks and IM strategies. This stage was facilitated by the setting-up of a committee including directors of all service divisions in the ministry, the vertical programme directors, a regional medical officer, representatives of major donors involved in health services, and Bureau of Statistics and Planning personnel.

---

<sup>1</sup> the developers intended data gathering to accommodate the skills of the collectors not needs of users.



No information audit was undertaken, but committee members were asked what data they required for programme management, planning and evaluation. These were expressed in terms of the two objectives they wanted to achieve and the means to measure progress toward these objectives. This appears to be an attempt at aligning policy with IM strategies, although it is difficult to understand whether the decisions of managers dictated the IM strategies. The technical consultant's main task at this time was to facilitate consensus amongst the stakeholders. After the MOH had approved the IS design, the reporting forms were designed, pretested, and finalised and the distribution systems set up. Subsequently, training at regional, district and local level was carried out to *"train health workers in how to use the system and ensure that reports were being filled out and the information was flowing to central officials for analysis"*.

It appears this IS was not developed for operational management of health services at health facility level, but for national and international purposes, and its emphasis is as a routine reporting system. Consequently the author, when describing its accomplishment, focuses on the number of health facilities sending monthly reports to the Bureau of Statistics, statistical year books produced centrally, and giving data on health needs, health facility activities and resources. Its success was not measured in terms of using the information for management, or in having analysed data or information available at the point of operational management. Yet when discussing the structure of the IS later in the paper, the author said *"the main objective of central and regional Ministry officials on the CSIS was to have data for management of health facilities and resources"*. This apparent discrepancy may be due to a perception that the regional staff were managers, not health facility staff. Certainly the paper does not indicate the In-Charges were consulted, despite the strategic decision at the initial stage to consult users and collectors. Thus, unlike other HMIS, the decentralisation of management role was not being proposed, however, other changes to administrative structure had been undertaken previously or were planned and the IS reinforced these changes, according to the author.

In conjunction with the IS reinforcing the administrative structure, and consensus development, two other factors were seen by the author to be essential in creating an environment favourable to the success of the new IS. These were: the leadership provided by the Director-General of the MOH; and the existence of technical assistants, who brought the funding and the consensual approach, backed by more traditional IS skills. The author, did not make any reference to adopting management approaches needed for utilising information, though he argues: *"Routine surveillance and maintenance of personal computers require a highly developed physical and organisational environment, management skills, and a hierarchy that encourages initiatives by managers"*. The lack of reference

to changing management approaches may be because the emphasis was on information for central level reporting, rather than information for management. Little attention was paid to the collectors, except that their skills were supposed to define the complexity of the data collection forms.

Mock, *et al.* (1993) present a case study of the development of an IS in Niger, focusing, only in retrospect, on developing information-based planning, rather than simply the IS itself, thereby acknowledging a different management approach is needed. They describe the change from a centralised reporting system to an MIS, but it appears it is not the district or health unit management being facilitated, but central management in the MOH headquarters. This paper was written mainly by the expatriate consultants who were employed to develop the new HMIS in the 1980's, before the international emphasis on decentralisation, but after the pledge to PHC. It appears there was a major push for health sector reform from external donors, mainly USAID, which included recovering the costs of hospital and non-hospital services, cost containment, allocation of financial resources, resource management, health planning (including IS development) and family planning. Giving a history of the development of the new IS the authors state: *"the MOH initially blocked the design and implementation of the automated information system by creating a series of bureaucratic barriers"*, which suggests it was imposed on a reluctant MOH. It appears the IS developers did not anticipate there would be a need for change in organisational structure, or management capacity and approach. Rather they were intending to improve the quality of statistical information, but did not recognise they were introducing information-based planning and management. Consequently their focus was not on dealing with such issues until they met opposition.

Therefore, the first step, after the initial demand and funding allocation by external agencies, was convincing the MOH that a new IS was desirable. The next step was a type of information audit which was intended to *"document all the MOH's data collection, transmission, and reporting activities at the project's start-up and to attempt to identify the managers' needs for information"*. Furthermore, the authors maintain this helped create support for the new IS. The information audit identified that the initial priority was for basic management information relating to allocation of personnel, vehicles and fixed structures, and the next stage was the development of computerised databases of this information at the central level, using data sent from health units via district and provincial levels. The following stage appears to have been a redesign, as MOH officials realised information produced by the system *"was of limited value for planning or management"*. The redesign also involved dealing with a lack of *"pre-defined and regular mechanisms for decision-making within the MOH"*, and some MOH officials' reluctance to give up perceived or real power. In fact, the authors claim

it was the pressure from the funders which forced resolution of the issues. This led to the next stage which was testing the HIS components, including information on health services utilisation and morbidity.

Mock, *et al.* (1993) recommend that IS development has to be undertaken in the context of developing organisational structures and capacity for planning. They do not, however, suggest there needs to be a way of dealing with stake-holder conflict as part of the developmental process. Their approach of developing HMIS in stages, that is personnel, vehicle and fixed-structure information first, and then later bringing in health service and morbidity information, could be seen as their way of encouraging ownership of the new system, or could be construed as an inability to put across the new approach to management and IS. Even though an information audit was conducted, a very narrow conception of management tasks was utilised when trying to relate this to information management strategies. It is uncertain if attempts were made to relate policy to information management strategies. No suggestions were made about: data collectors being users; implementation strategy; data management techniques specified at the beginning; or of a district HMIS. Despite an IS professional being on the technical team, organisational, management and social change were not initially recognised as important, which may be due to the narrow perception of that role. The authors did not mention starting with a series of design principals, either imposed or negotiated, as other authors have mentioned.

### **2.5.7 Summarising papers on health information systems development in low-income countries**

Despite the many papers concerning problems in health information systems in low-income countries, there are relatively few which concern the development of a new or revised HMIS for operational management and describe the process in detail. In fact, it was partly this which led a team in Ghana to document their own experience. They state:

*“the limited available literature on health MIS is generally focused on either technical aspects of computerisation, specific design issues of individual client cards or registers, or general issues related to the use of MIS. An extensive look at the literature has not turned up any one document that examines a more comprehensive picture of MIS, including the design process, technical aspects of specific MIS instruments and the potential for using information at various levels of the health system”.*  
Campbell, *et al.* (1996).

Even Campbell, *et al.* (1996) do not follow the implementation process in detail, or draw upon existing research to understand their findings. Of the papers which do document some HIS design or implementation process in low-income countries, many are reports rather than pieces of research, as they do not build on previous work or utilise theoretical concepts to facilitate improvements. Several of the papers mentioned in Section 2.3 identify a problem, such as non-use of information, or users feeling no ownership, and suggest strategies for change with those problems in mind, but without a holistic approach to changing the system. It appears, however, that the authors who identified a multiplicity of causes regarding the problems in information systems are more likely to envisage IS development as a complex process.

Few of the papers in Section 2.5 describe a holistic approach to developing information systems and it may be the case that many HIS are strengthened in this fashion. It may be rather than developing a complex understanding and strategies of change which result from a major review of the existing system, they are altered in piecemeal fashion. Thus, two papers have focused on computerisation, whilst another focusses on improving health unit IS and assumes the approach can simply be expanded to include all units within a district or country. One paper suggests improving health workers' attitudes to information, and developing a survey can strengthen the link between information and management, and another attempts to improve an IS by improving central level analysis and processing of data with computers. Only one paper focuses on developing an HMIS to strengthen operational management, and as mentioned above, this does not cover implementation or attempt to understand the process using existing research. Finally, one paper describes in detail the change from a central reporting system to a MIS, but it appears central management, not operational or district management is being supported.

## **2.6 Conclusions and the need for research**

The review of the papers identifying the problems in IS for PHC managers at district level indicates that various degrees of complexity are perceived by authors to be the causes of the problems. This lack of in-depth analysis may lead to inappropriate problem identification and one is led to question the researchers' views of MIS change. This may indicate a lack of clear conceptual framework for reviewing MIS, within the context of the organisation generally. A lack of clear framework for analysis may also be the reason that, although several of the papers appear to suggest there are a lack of management tools in the hands of PHC managers and workers, there is inconsistency in defining what the tools are; for

example, whether they are information management tools or management tools. Many authors comment on poor information use and other matters, but appear to view these as data management issues only. This lack of a systems or other holistic framework may hinder viewing the problems in all their complexity.

Some papers appear to assume that identifying information needs by reviewing the management role and the decisions to be made, via information audit, will be a politically neutral task. They make no provision for a variety of stake-holders with different, contested opinions. Other authors, however, have indicated the policy position may be multi-faceted, for example, mentioning international donors and even internal MOH officials may have different agendas. Both views have implications for developing HMIS, and the non-neutral approach indicates the need to negotiate with various stake-holders at various stages of development. No description of an operational-level HMIS exists, to suggest whether this happens in practice, however, or how it was resolved.

Use of information is assumed, by many, to take place automatically, yet no case study of HMIS development for the operational level in a low-income country has examined if this is a problem in practice. Furthermore, although some authors accept utilisation of techniques of data collection and analysis is not automatic, even when workers are trained, there is lack of investigation into how IS development has dealt with this. A major problem in data and information management appears to be either the use of information, or the perception that the inability to use information is linked to other problems in data collection and processing. Many authors do not have suggestions to deal with this however, though the need to ensure that the use of information falls within the remit of those developing IS, or identifying problems in existing systems is reinforced by the prospective study in Tanzania by Kanga, *et al.* (1992).

Although many authors speak of using data and information for management and decision making, there is little focus on what they actually mean. Some authors appear to lack a conceptual framework to help understand the causes of IS problems in low-income countries. Others may lack the tools to facilitate the development of strategies they would like to undertake. In order to understand whether this is the case, one needs to follow a situation where a new HMIS is being developed and attempt to understand it. Finally, there may be an inadequate perception of the problem, and inadequate needs assessment which clouds a developer's judgement when designing and implementing new IS.

The literature review indicates there is no in-depth empirical study which follows the IS planning and implementation process in a low-income country, and seeks to develop an understanding of that process based upon existing research and theory. Furthermore, as Section 1.5 indicates, there is no empirical study which follows the IS planning process when PHC MAP, is introduced to potential users, and develops an understanding of that process based upon existing research and theory. Therefore the questions asked in this research are:

- 1. What is the information systems planning and implementation process in a low-income country moving from a centralised-reporting information system to a management information system which supports district and health unit management?**
- 2. What process takes place when externally developed training materials which are intended to strengthen health management information systems, are introduced to potential users in low-income countries?**
- 3. What is the implication of the findings, from the afore-mentioned studies, for the development and implementation of health information systems in low-income counties?**

## **Part B**

### **Approach taken in this thesis**

#### **Chapter 3**

##### **Theoretical frameworks and concepts**

# Chapter 3

## Theoretical frameworks and concepts

### 3.1 Introduction

This chapter describes the theories utilised in interpreting the evidence collected during this research. These include the diffusion of innovation theoretical framework and related concepts, and the dynamic equilibrium view of socio-technical change within organisations. These theoretical frameworks are extensive and aspects of them are beyond the scope of this thesis, therefore only the concepts relevant to this research are described.

### 3.2. Diffusion of innovation framework

This is an explicit theoretical framework relevant to technological innovation. It is a problem-solving approach to identify the problems in a specific situation, or identify in advance, the issues which may inhibit or facilitate the adoption of the specific technological change. Diffusion is *“the process by which an innovation is communicated through certain channels over time among members of a social system”*. (Rogers, 1995:35). He suggests *“diffusion is a special type of communication concerned with the spread of messages that are perceived as new ideas”*, and *“communication is a process in which participants create and share information with one another in order to reach a mutual understanding”*.

On the basis of an extensive review of the literature from diverse fields, Rogers (1995) refined the framework and identified eighty-seven generalisations which summarise the results of the research, drawing upon theories and analysis from other disciplines. These generalisations imply strategies for practice.



### 3.2.1 Defining an innovation

Rogers (1995:12-13) uses the term ‘innovation’ as synonymous with the word ‘technology’, which he defines as having two components, hardware and software. The former, he suggests, consists of the tool embodying the technology as a material or physical object, and the latter consists of the information base for the tool. He suggests that at times the hardware component will be dominant and at other times the innovation may be almost entirely composed of information, such as a political philosophy, a rumour, or news event.

### 3.2.2 Types of knowledge about an innovation

In Rogers’s (1995) view three types of knowledge are sought by individuals regarding software information. These include awareness-knowledge, how-to knowledge, and principles knowledge. Awareness-knowledge focuses on the innovation’s existence, which when obtained, would motivate an individual to seek other types of knowledge. This type of information-seeking is prevalent at the knowledge stage of the innovation-decision process, but may also occur at the persuasion and decision stages (Rogers, 1995:165). How-to knowledge is the necessary information to use the innovation, in terms of the quantity to use and how to use it correctly. Thus, in complex innovations the amount of how-to knowledge needed for adoption is great, for if inadequate information is acquired prior to trial and adoption, rejection or discontinuance is likely. Principles knowledge deals with the functioning principles underlying how an innovation works, and although it is not always necessary to have this knowledge prior to adoption, the chances of appropriate use and success are higher if it is known.

### 3.2.3 The Innovation-Decision Process

The decision regarding an innovation is seen as a process, rather than an instantaneous act, and is defined as the Innovation-Decision Process:

*“the process through which an individual (or other decision-making unit) passes 1) from first knowledge of an innovation, 2) to forming an attitude towards the innovation, 3) to a decision to adopt or reject, 4) to implementation of the new idea, and 5) to confirmation of this decision”.*  
(Rogers, 1995:161)

Furthermore, the author indicates that individuals have to deal with the uncertainty inherently involved in deciding about the new alternative, compared to those in existence. Hence, he proposes a staged model of the Innovation-Decision Process (see Figure 3-1), which suggests Prior Conditions, including

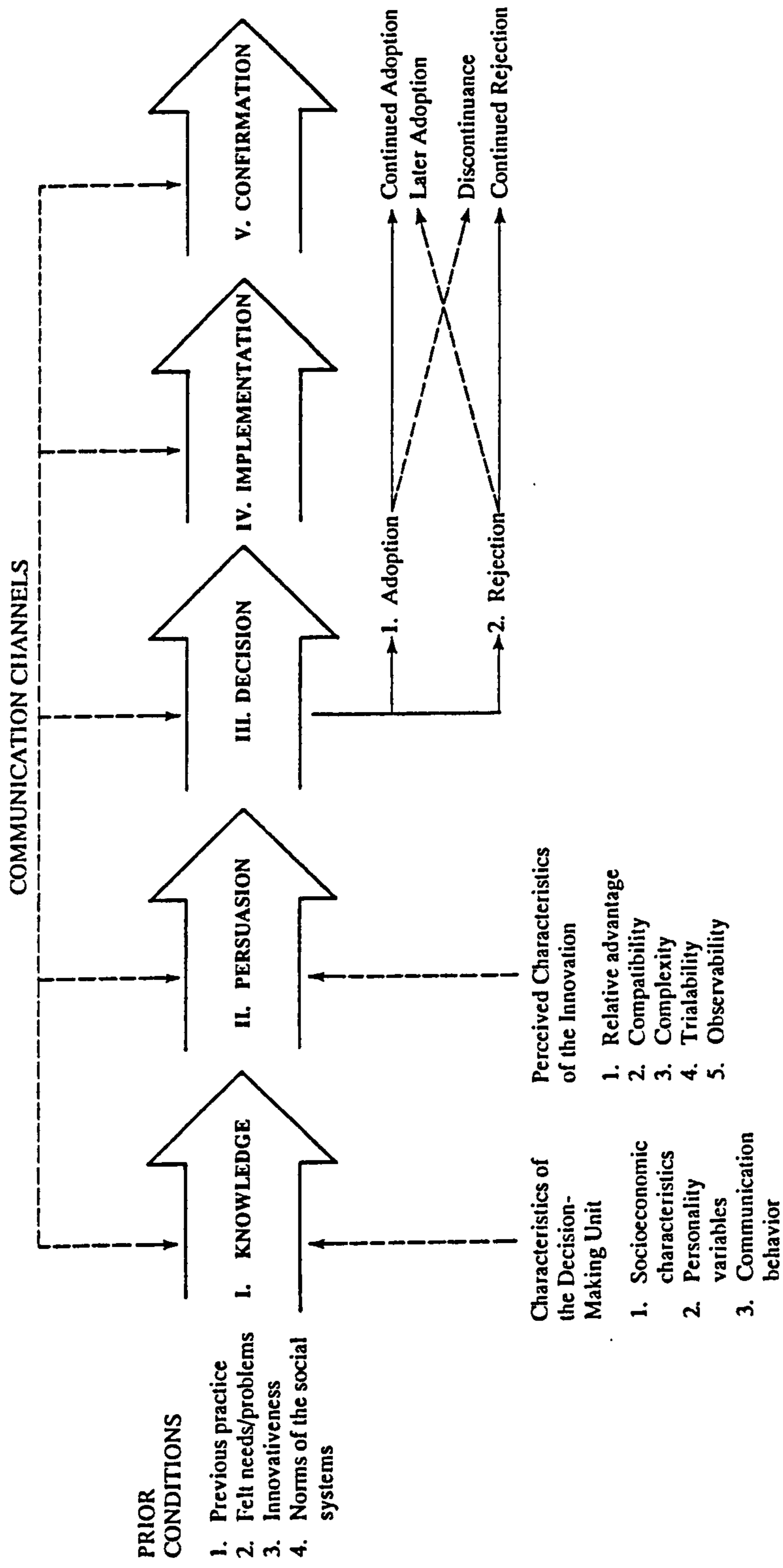


Figure 3-1 Model of the stages in the Innovation-Decision Process (Rogers, 1995)

previous practice, felt need or problems, innovativeness and the norms of the social system affect the decision to adopt. The first stage is Knowledge, and he suggests early or late ‘knowers’ will be defined by their socio-economic characteristics, personality variables and communication behaviour. At the Persuasion stage the individual forms a favourable or unfavourable attitude towards the innovation, and Rogers (1995:168) states “*it is the perceived attributes of the innovation that are especially important at this stage*”. The Decision stage occurs when an individual (or other decision-making unit) engages in activities which lead to a choice to adopt or reject an innovation. It is at this point the individual will try out a new idea in order to assess the consequences and Rogers (1995:171) sees this as part of the decision to adopt. He identifies research which has focused on trials by others as a substitute for individuals trying the innovation. Finally, Rogers (1995:172) suggests the knowledge-persuasion-decision process may be culture bound, and in some situations a variance of this process may be displayed, such as knowledge-decision-persuasion. The underlying premise of the author is:

*“the innovation decision process is essentially an information seeking and information processing activity in which the individual is motivated to reduce uncertainty about the advantage and disadvantages of an innovation. The individual wishes to understand the innovation and give meaning to it”* Rogers (1995:165).

The Implementation Stage for individuals is characterised by uncertainty of the expected consequences, and possible innovation re-invention. The latter process may ensure the innovation is more appropriately matched to the adopters’ pre-existing problems and more responsive to new problems arising during the innovation-decision process (Rogers, 1995:177).

At the Confirmation stage it is suggested that “*the individual (or some other decision-making body) seeks reinforcement of the innovation-decision already made, or reverses a previous decision to adopt or reject the innovation if exposed to conflicting messages about the innovation.*” Rogers (1995:181). The concept of *dissonance* is used at this point, suggesting people seek to avoid this stage, or reduce it if it occurs, so their attitudes and actions are not in conflict with each other. At this stage, innovation Discontinuation may take place, with the decision to reject a previously adopted innovation. This may occur due to *Replacement*, when a better idea or innovation is adopted, or because of *Disenchantment*, when the adopter is not satisfied with the innovation’s performance.

Rogers (1995) sees four main elements in the diffusion of innovation framework. The first is the *innovation*, which is an idea, practice or object perceived as new. He suggests the perceived characteristics of the innovation will determine the rate

of its adoption. Thus, he states “*innovations that are perceived by individuals to have greater relative advantage, compatibility, trialability, observability and less complexity will be adopted more rapidly than other innovations*”. The second is the *communication channels*; the means by which messages get from one individual to another, including mass media and interpersonal channels. The third is *time*, which is a main element on three counts:

a) the innovation-decision process: the mental process which the individual (or other decision-making unit) goes through, including knowledge, persuasion, decision, implementation and confirmation. Rogers (1995) believes the decision-making unit will seek information at various stages in the innovation-decision process, to decrease uncertainty about an innovation’s expected consequences.

b) innovativeness: the extent to which the individual or organisation is early or late in its adoption of the innovation.

c) rate of adoption: five adopter categories are identified according to the rate of adoption. The rate of adoption he identifies as, the relative speed with which an innovation is adopted by members of a social system.

The fourth element is the social system, which is “*a set of interrelated units that are engaged in joint problem-solving to accomplish a common goal*” (Rogers 1995:37). The system has structure, which is a patterned arrangement of the units in a system, giving stability and regularity to individual behaviour in the system. Furthermore, the social and communication structures in a system can facilitate or impede diffusion. Thus, norms, opinion leaders, change agents and aides influence innovation decisions.

Conceptualising diffusion as social change, Rogers (1995:6) suggests that when new ideas are invented, diffused, adopted or rejected, and lead to certain consequences, social change occurs. This is the process by which alteration occurs in the structure and function of society, and he acknowledges such change can also be due to political revolution, natural events or government regulation.

### 3.2.4 The Change Agent

As part of the diffusion framework Rogers (1995:335) introduces the idea of the Change Agent who is “*an individual who influences clients’ innovation-decisions in a direction deemed desirable by a change agency*”. He suggests they usually aim to secure the adoption of the innovation, but could attempt to control the speed of the process, or prevent the adoption of specific innovations deemed to have undesirable effects. *Communication* is the process by which the change

agents and clients create and share information with one another, in order to reach mutual understanding. Furthermore, the author suggests Change Agents would not be needed in the diffusion process if it were not for the “*social and technical chasms between the change agency and the client system*”. His review of research has led him to describe seven roles for the Change agent including to: develop a need for change; establish an information-exchange relationship; diagnose problems; create an intent in the client to change; translate an intent to action; stabilise adoption and prevent discontinuance; and achieve a terminal relationship. He describes various factors influencing Change Agent success, from which he develops four related generalisations. The research to date, he maintains, has suggested the greater the similarity between the Change agents and their clients, the more effective the Communication between them. In situations where there is little similarity between clients and Change Agent, an Aide could be used, who would be socially closer to the client group, even if he or she had less technical knowledge of the innovation.

### 3.2.5 Application of the framework to organisations

Diffusion of innovation ideas have been applied to organisations, as well as individuals, and Rogers (1995:391) states: “*The general assumption of research on innovation in organisations is that organisational variables act on innovation behaviour in a manner over and above that of the aggregate of individual members of the organisation*”. Despite this comment, Rogers (1995) appears to use two approaches to understand the organisational adoption of innovations, one being the same approach as innovations and individuals as outlined above. This assumes people in positions of formal power act on behalf of their organisation and, therefore, may be studied as individual adopters, or that organisations act as individuals (Greer, 1977). The second uses many of the concepts above, except instead of the *Innovation-Decision* process being enacted, the organisation undergoes an *Innovation Process*. This is in recognition of implementation not automatically taking place, even if a decision has been made to adopt. This second approach also brings in some organisational theory as it relates organisational properties to the innovation process, which is lacking in the first approach (Greer, 1977).

Rogers (1995:403) suggests the Innovation Process in organisations has five stages (see Figure 3-2) including: Agenda-setting, and Matching, which are part of the Initiation stage; Redefining/restructuring, Clarifying and Routinizing, which are part of the Implementation stage. The Agenda-setting stage occurs when a general organisational problem is defined and creates a need for an innovation. This leads to a search of the organisation’s environment for potential innovations to the existing problem. A performance gap (the discrepancy between an organisation’s expectations and its actual performance), may trigger the

Innovation Process, though the existence of an innovation may be the initiator. Matching, is the process of fitting an organisational problem to an innovation. Redefining and Restructuring takes place when the external innovation is re-invented to meet the organisational needs and structure, and the organisational structure is modified to fit the innovation. *“This mutual adaptation must occur because the innovation almost never fits perfectly in the organisation in which it is to be imbedded”*. (Rogers, 1995:395). Furthermore, if an innovation is internal, individuals will find this less problematical. Clarifying occurs as the innovation is put into more widespread use within the organisation, and Routinisation, the final stage, takes place when the innovation loses its separate identity within the organisation as it becomes part of normal activity.

The framework, in its applications to organisations, is predicated on the following ideas:

*“An organisation is a stable system of individuals who work together to achieve common goals through a hierarchy of ranks and a division of labour. Individual behaviour in an organisation is relatively stable and predictable because organisational structure is characterised by predetermined goals, prescribed roles, an authority structure, rules and regulations, and informal patterns. Although behaviour in organisations is relatively stable, innovation is going on all the time. Both the innovation and the organisation usually change in the innovation process within organisations”*. Rogers (1995:403)

### **3.2.6 Consequences of innovations**

Rogers (1995:405) claims that research on the consequences of innovations is not well advanced. Consequences, he perceives as the changes occurring to an individual, or a social system, as a result of the adoption or rejection of an innovation. Although he admits present research can describe the consequences, and establish categories for classifying consequences, he suggests recent research cannot predict when and how these consequences will happen. He has developed a model, from existing research, for studying the consequences of innovations, which emphasises the under-researched area. This model is further developed using other ideas including the consequences of Form, Function and Meaning an

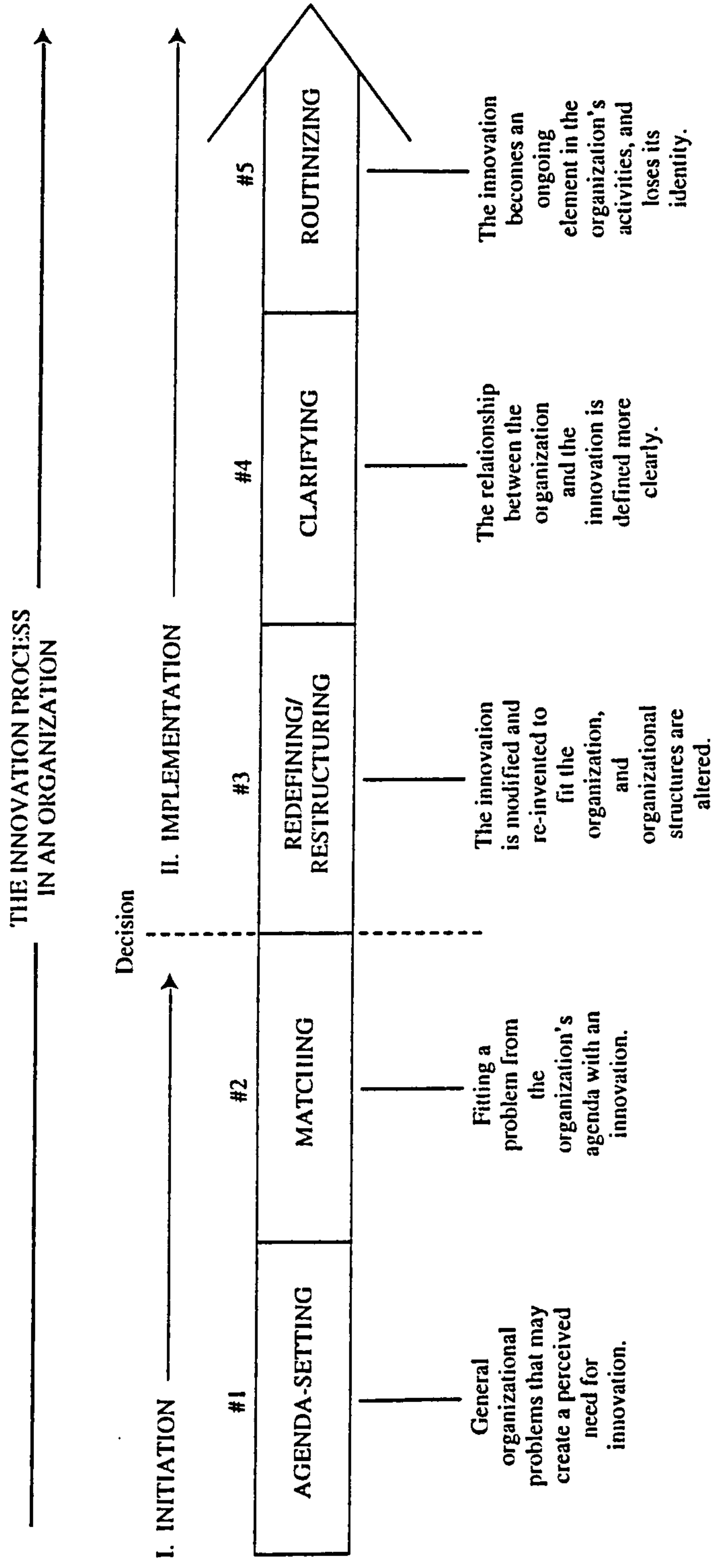


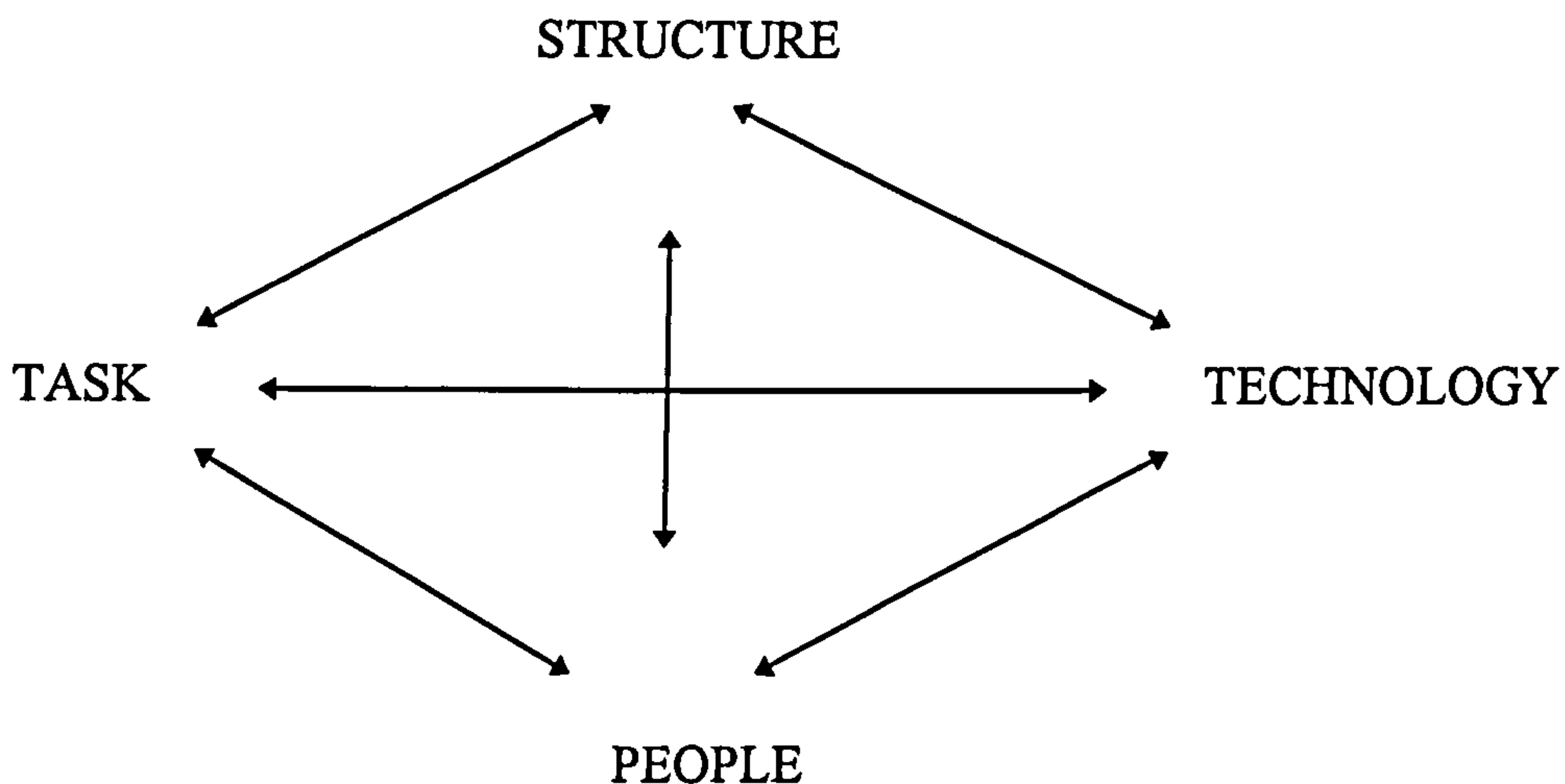
Figure 3-2 Five stages in the Innovation Process in an organisation (Rogers, 1995)

innovation brings. 'Form' is the directly observable physical appearance and substance of the innovation and 'Function' is the contribution made by an innovation to the way of life of members of a social system. 'Meaning' is the subjective and frequently unconscious perception of an innovation by members of a social system and is more difficult to diffuse as the receivers may attach new meanings.

### 3.3 Organisational forces in dynamic equilibrium

#### 3.3.1 Leavitt's diamond and dynamic equilibrium

The idea of an organisation as four sets of forces in dynamic equilibrium with each other, was first postulated by Leavitt (1965) and elaborated by Leavitt, *et al.* (1973). Leavitt (1965:1144) suggests an organisation consists of Tasks, Structure, People and Technology and a relationship exists between all these parts, as depicted in Figure 3-3.



**Figure 3-3 Leavitt's Diamond: the organisation's forces in dynamic equilibrium (from Leavitt, *et al.*, 1973:9)**

He suggests "*Tasks... refers, of course to industrial organisations' raison d'etre: the production of goods and services, including the large numbers of different but operationally meaningful subtasks that may exist in complex organisations.*



*Actors refers chiefly to people, but with the qualifications that acts executed by people at some time or place need not remain exclusively in the human domain".* By Technology he means the tools which enable people, or machines, to perform tasks, and which can also provide the means for administrative control. Structure, is the systems of communication, authority (or other roles) and systems of work flow and decision-making. Leavitt, *et al.* (1973) elaborate, and suggest the organisation has a more or less permanent framework, which is an arrangement of the processes, material resources and people in some sequence and hierarchy. A change in one part of the organisation will lead to change in other parts of the organisation, hence their comment: *"If we introduce something into one part of the system, bells ring and lights flash all over the system (often in parts we never knew were wired for sound and light)"*. (Leavitt, *et al.*, 1973:9).

### 3.3.2 Dynamic equilibrium with five forces

Leavitt's idea has been elaborated on (but not acknowledged), by several authors in a series of writings, edited by Scott Morton (1991), which examine the impact of IT on organisations. This suggests an organisation should be thought of as consisting of five forces, not four, with the extra force being management processes, which they suggest includes the planning and control processes within the organisation. Moreover, they maintain *"a central task of general management is to ensure that the organisation, that is, all five "forces" (represented by the boxes), moves through time to accomplish the organisations objectives"*. They also change 'Task' to 'Strategy', meaning the business and IT strategy in the organisation, and rename 'People' as 'Individuals and Roles'. Additionally, they make the boundaries of the organisation explicit, and indicate there is, outside the organisation, a technological and socio-economic environment within which the organisation exists. Figure 3-4 illustrates their view graphically. Furthermore, *alignment* of the various forces within the organisation, is made explicit by Mckersie and Walton (1991), in the same series of writings. They elaborate on the concept, particularly as it is related to IT and the organisation which operates it:

*"Alignment refers to the idea that the requirements of the particular IT system - for certain levels of motivation, types and amounts of knowledge and skill, and communication and co-ordination - are matched by the capabilities of the organisation. Conversely, alignment also means that the requirements of the organisation - for example, decentralised decision making, continuous learning, challenging jobs, or attractive career paths - are accommodated by the design of the IT system"*.

There are several routes to alignment which include; some of the enabling organisational conditions already existing or being developed in anticipation of

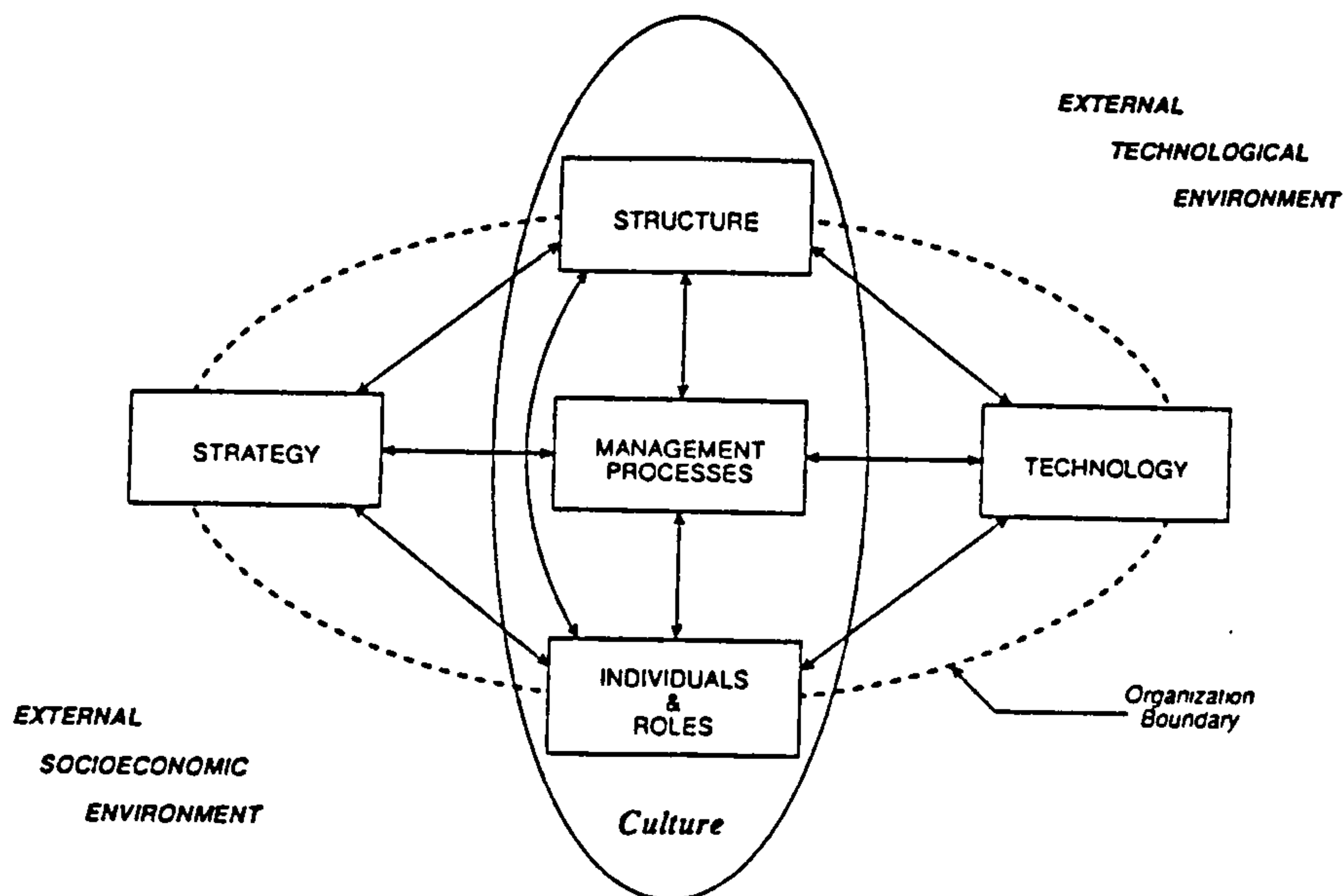


Figure 3-4 The MIT90s framework (from Scott Morton, 1991:20)

the IT change; the organisation helping to pull the technology into place by both the organisation, and the technology being developed simultaneously; and the management focusing primarily on implementing the technology, but allowing the organisation to be pushed by the change. Furthermore, they suggest this latter route is the most common, though it presents obstacles to alignment.

### 3.4 Related IS research

Existing theory can be utilised in several ways in research, including to test theory, or during post-data collection reflection to assist interpretation. Kwon (1990) uses the diffusion of innovation framework to develop and test a hypothesis, concerning communication behaviour and opinion leader roles. Similarly, Chin and Gopal (1995), using quantitative methods, test whether the perceived attributes of a group support system can predict adoption intention, and Chae, *et al.* (1994) claim to have utilised Rogers's (1983) model to measure variables from the Knowledge, Persuasion and Decision stages before and after implementation of an HMIS.

Alternatively, the research aim could be to give primacy to realism of context, and theoretical and conceptual development (Pettigrew, 1990), in which case existing theory could be utilised after an empirical study has been conducted, to interpret the findings. Such an approach was taken by Orlikowski (1993) who followed a grounded theory approach with the aim of "*generating a descriptive*

*and explanatory theory of the organisational changes associated with CASE [computer-aided software engineering] tools rooted in the experience of specific systems development operations*". Consequently, after generating concepts from the field study, she developed insights by drawing upon innovation theory, and that theory supported her recommendations for development practice. Similarly, Kaplan (1991) utilises the Innovation-Decision process to understand the adoption and diffusion of a medical IS. Drawing upon other work (Kaplan, 1985; Kaplan, 1987) the author describes the events in terms of Rogers's (1983) classic diffusion model, and prescribes solutions, including: better education, further technological development and requiring the system to be utilised. He also uses Social Interaction and Problem solving models to interpret the same situation.

Although not mentioning Leavitt by name, many researchers draw upon his concept of organisational equilibrium. As mentioned already, Scott Morton (1991) has refined Leavitt's original idea, and utilised the framework to understand new IT and organisational transformation. Other writers have advocated that Leavitt's diamond should inform IS development (Keen, 1981), and the framework has widely influenced organisational-oriented IS research leading to, as its by-product, an implicit concept of organisational fit of an IS, according to Iivari (1992). Finally, Wilson (1995), acknowledging the practical implications of Leavitt's theoretical model, suggests it should be featured in every IS design office.

### **3.5 Conclusion**

This chapter has given a brief outline of the diffusion of innovation and organisational forces in equilibrium theoretical frameworks, and reviewed related research. The discussions sections in the thesis will elaborate by introducing more research which has tested the theories or utilised them in order to interpret the findings. The next chapter will discuss the methodological approach in this thesis.

# **Chapter 4**

## **Methodology**

# Chapter 4 Methodology

## 4.1. Introduction

The research questions, at the end of Chapter 2, have evolved over time after a consideration of the empirical situation and the literature in this area. This chapter elucidates the methodological position and related issues in the thesis. Section 4.2 identifies the philosophical position regarding the nature of knowledge, the nature of reality, and the view on how knowledge about the world is gained. The methods appropriate to this paradigm are identified, and a discussion of the relationship between theory and empirical work in subjective research follows. Section 4.3 describes in detail the methods utilised, and in Section 4.4 the discussion focuses on the quality of qualitative research and my strategies to ensure this. As the research questions changed in the course of this research Section 4.5 gives some background. Finally, Section 4.6 summarises the sources of evidence utilised in this research in order to increase transparency.

## 4.2 Philosophical and methodological position of this research

### 4.2.1 Qualitative research

This investigation utilises a qualitative research approach, which:

*“is multi-method in focus, involving an interpretative, naturalistic approach to its subject matter. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them. Qualitative research involves the studied use and collection of a variety of empirical material - case study, personal experience, introspective, life story, interview, observational, historical, interactional, and visual text -*

*that describe routine and problematic moments and meanings in individuals' lives". (Denzin and Lincoln, 1994:2).*

The research methodology in this thesis is informed by several approaches which fit within the interpretative, or anti-positivist, rather than positivist tradition. There are, however, different methods of classifying the approaches, which at times suffer from a plethora of terminology, so often the same word has different meanings. In recognition of this, after Guba (1990:17), Denzin and Lincoln (1994:13) suggest "*the net that contains the researcher's epistemological, ontological and methodological premises may be termed a paradigm, or interpretative framework, i.e., a basic set of beliefs that guides action*". Furthermore, in support of Burrell and Morgan's (1979:3) idea, that it is important for social researchers to identify their epistemological and ontological position with regard to the nature of social science, (as this holds implications for the methodological position one utilises), the next section identifies the paradigm my approach is associated with.

#### **4.2.2 Philosophical and methodological position**

The main paradigm, or qualitative research approach I have taken is "*ethnography from a cultural anthropology*". (Morse, 1994:224). Thus, I have adopted a Nominalist ontology, based on the idea that "*the social world external to individual cognition is made up of nothing more than names, concepts and labels which are used to structure reality*". Burrell and Morgan (1979:4). Thus, from this latter viewpoint, there are no real structures which these concepts describe. As the concepts are a product of different people's minds there are multiple realities, and in order to understand the situation I am investigating I need to search for these multiple realities, by participating in the social situation. I also assume a Anti-positivist epistemology, which is the belief that the knower and subject create understanding. This position is opposed to the search for laws or underlying regularities. Instead, the '*social world is relativistic and can only be understood from the point of view of the individuals who are directly involved in the activities which are to be studied*', (Burrell and Morgan, 1979:5). The anti-positivist position maintains that one can only understand events by inhabiting the same frame of reference as the participant, which involves understanding from the inside, rather than the outside. This emphasises the subjective, rather than objective nature of social science. The methodological approach in this research utilises the Ideographic stance, which is based upon the view that "*one can only understand the social world by obtaining first hand knowledge of the subject under investigation*" (Burrell and Morgan, 1979). This follows from the anti-positivist epistemology and Nominalist ontology mentioned above. Consequently there is an emphasis upon getting close to the subject and letting its nature and character unfold, and on analysing the subjective accounts which the researcher develops in those circumstances.

Interpretative paradigms can be defined by the theoretical position adopted, the typical form the interpretative or theoretical statement assume in the paradigm, and hence the criteria for evaluating the research, and the type of narration produced (Denzin and Lincoln, 1994:13). The constructivist paradigm, (which describes the approach in this research) they maintain, assumes a substantive or formal theoretical form, and is likely to produce an interpretative or ethnographic fiction. Attempts to distinguish between several constructivist and interpretative perspectives according to their epistemological and methodological beliefs, have been made by Schwandt (1994). At this point, however, I am merely subscribing to the general approach:

*The constructivist or interpretivist believes that to understand this world of meaning [that is, the world that is under investigation] one must interpret it. The inquirer must elucidate the process of meaning construction and clarify what and how meanings are embodied in the language and actions of social actors. To prepare an interpretation is itself to construct a reading of these meanings; it is to offer the inquirer's construction of the actors one studies". (Schwandt, 1994:118).*

Following Morse (1994:223), however, my strategy in this research was not based on a conscious, prior consideration of my stand on philosophical questions, but on the *"purpose of the study, the nature of the research questions, and the skills and resources available to the investigator"*. I have assumed her position: *"if the question concerns the nature of the phenomenon, then the answer is best obtained by using ethnography"* (Morse, 1994:223). Thus, a large part of my work is ethnographic description, as I describe the process of HMIS strengthening in Uganda.

### 4.2.3 Methods utilised

There is a theoretical link between paradigm and methods, and methods should be consistent with the paradigm being claimed (Denzin and Lincoln, 1994:3; Burrell and Morgan, 1979; Guba and Lincoln, 1989). The subjective or Ideographic methodological position emphasises getting close to the subject and analysing the subjective accounts the researcher develops, hence the qualitative evidence from the field notes of participant observation, discussions, diaries, and official documents. In this research, several methods of data collection and analysis were utilised, according to the circumstances. Two ethnographic case studies of the process of strengthening health information systems in Uganda were developed, using participant observation, interview, examination of official documents and writing of field-notes and diaries. This is supported by an examination of the development of the HMIS. Development of themes was aided by using the

software NUD.ist to file, sort and store the textual data, and the background to PHC MAP was obtained by interview, request- and question-based correspondence, and examination of documents. A review of these methods and an in-depth exploration their use of them is in Section 4.3.

#### **4.2.4 Relationship between theory and empirical evidence**

Using Phillips and Pugh's (1994:49) categorisation of the relationship between theory and empirical evidence, my approach is not problem-solving or theory-testing research. Rather my aim is exploratory, as I use theory not to guide the research, but to elucidate, and interpret when I analyse the empirical data, which can lead to an elaboration of existing theory. Thus, I am not using existing theory to provide *a priori* categories into which I force the analysis.

In Uganda, my intention was not to test a hypothesis using existing theoretical constructs, but to describe and analyse the substantive situation. The initial data collection, and analysis was not guided by existing theory but, as Glaser and Strauss (1967) have defined in their approach of building theory grounded in the empirical situation, I was 'theoretically aware' prior to the fieldwork. I subsequently identified the themes and relationships which emerged out of the data, rather than imposing themes and relationships.

My subsequent analytical approach was to explore the situation using existing theoretical constructs with the aim of interpreting the evidence. That exploratory analysis drew upon existing theory, some of which I was aware of prior to analysis, and some which I was not. Thus, initial discussion is facilitated by asking to what extent the empirical evidence is similar to or different from a particular theory and what areas the theory does not cover. Subsequent discussion relates the empirical situation to those found elsewhere. The themes and relationships, were then utilised to identify important implications for the substantive area generally.

A similar approach was utilised by Orlikowski (1993), who followed her description of the introduction of new IS tools into two organisations by integrating the concepts and findings with insights from the innovation literature. This produced an analytic framework for conceptualising CASE tool adoption and use in organisations.



## 4.3 In-depth review of the methods in this research

Several methods have been utilised in this research:

### 4.3.1 Case study

*“A case study is an empirical enquiry that investigates a contemporary phenomena within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident”.* (Yin, 1994:13). Yet case studies and ethnography are not the same, as the former can apply a wider variety of both qualitative and quantitative methods than the latter. Furthermore, phenomenology, ethnography and grounded theory, are different ‘research strategies’ (Morse, 1994:224), therefore a case-study is not a research strategy, although Yin (1994:9) would disagree. However, the ethnographic research strategy may incorporate a case study.

The case study, has much to offer for ‘how’ questions and in contemporary situations where the investigator has little or no control (Yin, 1994:9), (e.g. how does an organisation respond to the introduction of PHC MAP?). I decided to conduct case studies because I was carrying out an empirical enquiry, in an unknown situation where I had no control, and I wanted to discover how the IS planning process was undertaken. I use ethnography as a research strategy because of its ability to deal with descriptive questions which involve values, beliefs and practices of a cultural group. The cultural group in this case is the MOH organisation, and hence my approach can be termed ‘organisational ethnography’.

### 4.3.2 Ethnography

Ethnography is the work of describing a culture, where culture is the acquired knowledge people use to interpret experience and generate behaviour (Spradley, 1980:3-6). Three characteristics of ethnography have been identified: it utilises an empirical approach, thus the phenomenon cannot be deduced, but requires empirical observation; it displays openness of observation, by not using *a priori* codified elements, but remains open to the elements which arise in the field situation; and it grounds the phenomena observed in its specific context, including the cultural, historical, organisational and political. Baszanger and Dodier (1997:8) emphasise that all three characteristics must be present if a study is to be an ‘ethnography’, and that an empirical study which does not ground the phenomenon in the context in which it is observed, is not an ethnographic study.

In recent years one of the important principles of ethnography, has been the use and acknowledgement of reflexivity. This implies that the researcher “*can not isolate a body of data uncontaminated by the researcher by turning him into an automaton or into a neutral vessel of cultural experience ... Reflexivity thus implies that the orientation of researchers will be shaped by their socio-historical locations, including the values and interests that these locations confer upon them.*” (Hammersley and Atkinson, 1995:16). Reflexivity is the basis of the assumption, in ethnography, that no set of observations is theory-free, and even the research problem selected is influenced by one’s interpretation of the social world. Moreover, that interpretation inevitably involves a theoretical component, even if only implicitly. Hence, the methods I have used are described in detail below, beginning with information on the researcher.

### **4.3.3 Autobiography of this researcher**

The reflexive nature of participant observation, and hence the researcher as instrument of collection and analysis, suggests the need to introduce some autobiographical data to facilitate the reader’s understanding. I am of white Caucasian origin; a mature female; and a nutritionist by training, having worked in many low-income countries in East Africa and South-East Asia on research projects and in emergency situations. The role of technical adviser at district level is not new to me, although I have not worked as technical adviser at national level. I am also a trained and experienced teacher of English as foreign language. My research to-date before the PhD, has mainly been of a quantitative nature.

### **4.3.4 Ethnographic methods : Participant Observation**

Participant observation can be distinguished by the type of observational role, stages of observation and the types of data collected. These are referred to below and my own position elaborated on, with some of the difficulties encountered.

#### **(a) Observational role**

Observational techniques can be used within both quantitative and qualitative frameworks. The types of questions asked, however, vary (Alder and Alder, 1994:378), and the observational roles are different. Several participant observation roles can be utilised (Spradley, 1980:36; Hammersley and Atkinson, 1995:104; Alder and Alder, 1994:380). The latter identify three basic membership roles utilised by contemporary naturalistic social scientists. These include the peripheral membership role, the active membership role and the complete membership role, each distinguished by the extent of researcher involvement within the group inhabited by their subjects. Although in all three roles an *insider’s perspective* is seen as vital, the peripheral membership role is

one where an insider's *identity* is not achieved. Here the researcher is not fully committed to member's values and goals or to being a genuine member of the group. Instead the researcher observes and interacts closely, without participating in the core activities constituting group membership.

In my research I took on the peripheral observer role, which was very productive most of the time. This was not always acceptable, however, to informants, who appeared to demand more from me. For example, the HMIS Developer requested feedback from me saying "*you have asked all these questions, now what do you think?*" Likewise, the Trainers asked for my input, as did national officers from the MOH, and the medical officer of an NGO health unit. Thus, at times I found myself taking on the role of technical adviser in order to 'give something', which is closer to the active membership role of "*assuming responsibilities that advance the group, but without fully committing to themselves to members' values and goals*" (Alder and Alder, 1994:380). It is possible that I felt I needed to give something in return because this was part of my previous role of nutrition advisor. I believe, however, it was conveyed to me by the people I observed or interviewed during this research. Furthermore, I think the role of observer or social researcher was alien to the people I was with, whilst the role of expatriate technical adviser was familiar. Consequently they could have been seeing me in the latter role. Thus, to be sensitive to, and faithfully describe the commonsensical world of others, I attempted to be as minimalist as possible in my intervention, by taking on a role the participants were comfortable with. I tried, however, not to become a channel for comments from one part of the health system to another, and attempted to give feedback in vague terms about things already known, until the end of the fieldwork when I felt more comfortable about giving comments which might earlier have unduly influenced the situation.

Although the role of an ethnographer is to develop an understanding of the research situation subjectively, it is also the role of the researcher to maintain a detachment in order to be reflexive. This conflict was difficult to resolve and in Uganda I had difficulty maintaining a detachment from the MOH staff of the various levels, especially as the relationships I developed were very personal and open, and I spent non-work time with them. Writing field notes each day, however, helped me to maintain an outsider's view.

It appeared to me, in some of the situations I was observing or conducting interviews, that there was a possibility the informants were regarding me as being 'on the side' of the person who had accompanied me. This could have unduly influenced the behaviour of the informants and yet it was very difficult to

counter-balance. I visited health centres usually accompanied by a DHT member or a HMIS Trainer, who were generally regarded by the staff as having a higher position in the health service hierarchy. At times the rapport I gained with informants was open, but at others times I think I was not so successful. More time in specific districts could have helped, as I could have spent extra time with specific individuals.

### **(b) Observation stages**

Following Spradley (1980) I can identify different stages in my observation in Uganda. He suggested that observation research usually changes over the length of a project and includes initial descriptive observation, focused observation and selected observation. He acknowledges, however, that descriptive observation will continue during the length of the project, which will lead to new themes, and focused observation, even if some themes are directing the selected observation stage at the same time. This was the approach I took. For example, I undertook descriptive observation when I visited a health unit in April 1996 in a district piloting the HMIS. That visit was an attempt to gain an understanding of the issues involved in developing the new information system. Later, after initial data analysis, focused observation was undertaken as I followed up on themes such as 'lack of knowledge of management tools', and 'lack of fluency in English language' by visiting other health units or checking my observations against the knowledge of people involved in IS development. Finally, selective observation was undertaken when I observed a HMIS training course for the health unit staff, conducted by Trainers. At the time one of my interests was in discovering how much management training was being conducted, and assumed by the Trainers.

### **(c) Data collection**

Data collected during participant observation is partly the result of asking questions of oneself. Although observational techniques can be used both within quantitative and qualitative frameworks, the scope of the observations of the qualitative researcher are often much broader, as they look for larger trends, patterns and styles of behaviour, compared to the quantitative researcher and the types of questions asked also vary (Alder and Alder, 1994:378). Spradley (1980:32) points out "*In doing participant observation for ethnographic purposes, as far as possible, both questions and answers must be discovered in the social situation being studied*". This was the case in Uganda with my research.

The type of questions one asks usually correspond to the type of observation being undertaken (Spradley, 1980:32). This author suggests broad descriptive questions are usually asked at the descriptive observation stage, structural questions are asked at the focused observation stage and contrast question are

asked at the selective observation stage. As the example of observations in the previous paragraph illustrates, I conducted selective observation regarding the level of management expertise demonstrated by health unit staff, after initial and focused observation. The questions in the selective observations included ‘how much management training is being conducted here’, and “how much knowledge of management tools is being assumed by the Trainers?” My comments were written down in note-form during the observations, and very soon afterwards full field-notes were written up.

### **4.3.5 Ethnographic methods: Interviewing**

Ethnography utilises interviewing as well as participant observation, though the interviews usually follow observation. Two types are identified, including informal ethnographic interviewing, when the researcher asks someone a question during participant observation; and formal interviews which usually occur at an appointed time and result from a specific request to hold an interview (Spradley, 1980). I utilised both during my research. For example, I observed the training of health unit staff by Trainers in Mubende District in 1997. During the classroom training of approximately forty staff there was a refreshment break and I was able to ask questions of the Trainers, in an informal interview, to clarify my observations. Conversely, in April 1996 I conducted formal interviews with several MOH officials, at an appointed time, in their respective offices, concerning their reactions to PHC MAP after the Workshop, which I observed.

Many of the formal interviews were tape recorded, transcribed, and taken into NUD.ist software, for sorting, coding and indexing. In some circumstances I judged it was inappropriate to record the conversation. For example, if I thought the informant might feel threatened, or there was excessive noise due to conversations taking place in a vehicle on route to a health unit or district. Field notes were also made during and after observations and interviews, though it was not always appropriate or possible to write notes when interviewing. A diary was kept during the four years of the PhD and it was very heavily used during the Ugandan visits. The informal interviews were not tape recorded, but usually notes were taken at the time and written up shortly after the observation session.

### **4.3.6 Ethnographic methods: Use of official documentation**

I collected many official documents during this research. These were the reports produced by the MOH in Uganda as they undertook the process of developing and implementing a new information system. Thus, they include needs assessment documents, pilot and revised versions of manuals the health unit and

district level staff were supposed to use for setting up and learning about the new HMIS; internal reports from the HMIS Developers; external evaluation of the pilot HMIS; and forms for the new and old IS. Thus, the documents used were not *“inside written accounts”* produced especially for the research (Hammersley and Atkinson, 1995:158), but those generated routinely for other purposes.

As Hammersley and Atkinson (1995:168) recommend, I have attempted to view these documents as social products, rather than sources of data which are more or less biased. Thus, my attention to them has focused on the role they play in the socially organised process I am investigating, and, following Hammersley and Atkinson (1995:169), I am not treating them as *“unproblematically neutral or transparent representations of reality”*. The same authors suggest documentary sources can provide the ethnographer with analytical topics and sources of information, and I have utilised documents to gain background information to the processes being investigated. I also used documents as a source of analytic topics and have drawn upon the following questions to analyse the material:

*“How are documents written? How are they read? Who writes them? Who reads them? For what purposes? On what occasions? With what outcomes? What is recorded? What is omitted? What does the writer seem to take for granted about the reader(s)? What do readers need to know in order to make sense of them?”* (Hammersley and Atkinson, 1995:173).

Subsequently I also developed questions of my own. Finally, as elaborated below, I have used documents as part of the triangulation process.

#### **4.3.7 Ethnographic methods: Correspondence with informants**

In order to establish the background to PHC MAP development I corresponded with two developers, using a request and question format.

#### **4.3.8 Ethnographic methods: Analysis**

Data collection and analysis are not usually conducted sequentially in ethnographic research, and I believe:

*“In ethnography the analysis of data is not a distinct stage of the research. In many ways, it begins in the pre-field work phase, in the formulation and clarification of research problems, and continues through to the process of writing reports, articles, and books. Formally, it starts to take shape in analytic notes and memoranda; informally, it is*

*embodied in the ethnographers' ideas and hunches"*. (Hammersley and Atkinson, 1995:205).

This position is supported by Huberman and Miles (1994:429), who suggest the components of data analysis (data reduction, data display and conclusion drawing or verification) all interact with one another and with data collection.

During observation I often wrote analytical notes as I was recording the events taking place. My field notes, in my diary or in the transcribed texts, make a clear distinction between the two. Thus, during the second visit to Uganda my observational field notes use the code 'OB:' for something I literally observed, 'AN:' for my analysis, and a variety of two to four digit codes for reference when a particular person was speaking.

As the identification of the research question was evolutionary, so was the analysis. More than one approach was taken before arriving at a way of breaking down and building up a picture produced an ethnographic description. Miles and Huberman (1994:9) have identified what they considered to be a "*fairly classic set of analytic moves*" in qualitative research. These are:

*"Affixing codes to a set of field notes drawn from observations or interviews; Noting reflections or other remarks in the margins; Sorting or sifting through these materials to identify similar phrases, relationships between variables; patterns, themes, distinct differences between subgroups, and common sequences; Isolating these patterns and processes, commonalities and differences, and taking them out to the field in the next wave of data collection; Gradually elaborating a small set of generalisations that cover the consistencies discerned in the data base; Confronting those generalisations with a formalised body of knowledge in the form of constructs or theories"*.

This is generally the approach I took in analysing the observational field notes, interview notes and other material from the fieldwork in Uganda. These moves are listed in sequence, though my own work progressed in a more iterative way, as themes developed at different times during the fieldwork. The iterative process of movement between concept and data allowed the concepts to emerge out of the data, rather than being imposed. My analysis of the two ethnographic studies was conducted by identifying themes, and then using the themes to write a story of the informant's view on certain issues. This text-based story was then represented graphically in a Conceptual Map which facilitated the writing of the ethnographic description, and reduced the data to manageable sizes. Appendix 6 is an example of a Conceptual Map which describes the interview with an MOH official based

at the national office. The contents have been reduced to fit the thesis format. This interview was conducted after the official had attended the workshop introducing PHC MAP, and the Map links together different aspects of the discussion. This was one of the first interviews to be analysed and reduced. Later interviews and field notes were not always displayed in such detail and did not lead to such in-depth stories, as I became more familiar with the process and could clarify my ideas more. The development of a matrix, as recommended by Miles and Huberman (1994:11), which listed the themes developed and the data supporting those themes, also proved to be a useful way of reducing the data and considering it in the light of existing theoretical frameworks. Appendix 7 is the matrix developed to aid the analysis of the PHC MAP case study.

Initial case study discussion was facilitated by asking to what extent the empirical evidence is similar, or different to a particular theory or theoretical framework, and what areas the theory does not cover. The ultimate aim here being to identify a theoretical framework which describes the relationships within the evidence. Subsequent discussion relates the empirical situations to those found elsewhere. After the two case study descriptions had been written and reviewed in the light of existing theory and frameworks, comparison of the two case studies indicated similarities which enabled further clarification of themes and theoretical constructs. For example, the concept *'uncertainty what the innovation is'*, and *'need to situate the innovation within the complexity of the organisation'* were themes arising in both studies. This served to further enrich the description of the two case studies.

Finally, the writing of an ethnography is not something which takes place after the analysis of the data, but is an integral part of analysis. As can be seen later in the thesis, my approach has been to present the description of the processes taking place in Uganda in the light of existing theory. This act of writing deepened the final analysis, and led to identifying implications for practice.

#### **4.3.9 Reviewing HMIS development in Uganda**

The HMIS development and implementation process in Uganda has not been documented in great detail by the developers. It is difficult to understand which ISDM was employed. Therefore, I have utilised various Ugandan documents to describe and interpret in the light of existing approaches.



## 4.4 Ensuring the quality of qualitative research

The positivist approach to ensuring the quality of research focuses on validity and reliability, particularly on “... *eliminating the effect of the observer by developing an explicit, standardised set of data elicitation procedures. This allows replication by others so that an assessment of the reliability of the findings can be made*” (Hammersley and Atkinson, 1995:5). The approach to ensuring quality in qualitative research has taken several directions. Some researchers use the same criteria of validity and reliability, (LeCompte and Goetz, 1982), whilst others do not identify specific criteria (Werner and Schoepfle, 1987), and others use different criteria. Altheide and Johnson (1994:485) prefer to use the term ‘interpretative validity’ as a way of assessing the adequacy of qualitative research, particularly for ethnography. Leininger (1994:97) questions qualitative researchers’ use of quantitative criteria to interpret, explain and support their research findings, saying:

*“ Using quantitative criteria to evaluate qualitative studies is clearly inconsistent with the philosophy, purposes, and goals of each paradigm and reduces the credibility of the findings. Qualitative research criteria must be used to fit with the philosophical assumptions, purposes, and goals of the qualitative paradigm ”.*

Consequently, six general criteria should be used to assess the quality of qualitative research (Leininger, 1994:104 -7). These “*have meaning and are appropriate for all qualitative methods*”, although she acknowledges different criteria may be emphasised, depending upon the methods being used. The criteria are credibility, transferability, confirmability, meaning-in-context, recurrent patterning and saturation.

Although I support this position, to some extent, this author does not distinguish sufficiently between the different interpretative paradigms when identifying the criteria. Denzin and Lincoln (1994:12-14), however, have reviewed the various paradigms in social research and concluded each type has its own criteria for evaluating research. They identify the work of the ethnographer as lying within the constructivist paradigm, and state with this paradigm, “*terms such as credibility, transferability, dependability, and confirmability replace the usual positivist criteria of internal and external validity, reliability and objectivity*”. Consequently they attach specific strategies and criteria to each of these components. There is much overlap in the two sets of criteria set by Denzin and Lincoln (1994) and Leininger (1994), however, I believe it is proper to use the criteria appropriate to the methodological approach to guide and evaluate parts of this research. Hence, it is the former criteria, clarified by Lincoln and Guba (1985) which informed my work.

Credibility refers to:

*“the ‘truth’, ‘value’, or believability’ of findings that have been established by the researcher through prolonged observations, engagements or participation with informants or the situation... Credibility refers to the truth as known, experienced, or deeply felt by the people being studied (emic or local) and interpreted from the findings with co-participant evidence as the ‘real world’, or the truth in reality (this includes subjective, inter-subjective, and objective realities). Etic (or outsiders’) views are studied in relation to emic perspectives”.*  
(Leininger, 1994:105)

Lincoln and Guba (1985:301) suggest credibility is increased by prolonged field engagement, persistent observation, triangulation, peer debriefing, negative case analysis, referential analysis and member checks. Thus, in an attempt to produce more credible findings and interpretation I intended to conduct prolonged engagement, persistent observation and triangulation. Due to lack of funding I was only able to spend five weeks in Uganda in 1996, and nine weeks in 1997, thus the opportunities for observation were limited. The lack of field study time meant prolonged engagement was not always possible, and although I was able to spend much time with the HMIS Developer I spent less time with the health unit staff themselves, and that time was always in the presence of a DHT member. Prior to the field work, however, I had worked as a nutritionist in Uganda for one year which meant I had much contact with MOH health services, NGOs and the general Ugandan culture. Furthermore, my approach was to become familiar with health service issues generally, prior to narrowing the focus to the HMIS.

I utilised triangulation of several methods, for example observation, formal interview, informal interviews in my work. This procedure is intended to confirm a finding from different methods or sources, and it is possible to triangulate sources, investigators, theories and methods (Lincoln and Guba, 1985:305). Peer debriefing, which is intended to provide an external check on the enquiry process, took place, though negative case analysis, which is intended to refine working hypothesis was not conducted. Referential adequacy, which is intended to check preliminary findings and interpretations against archived ‘raw data’ was not undertaken, though member checking, (also known as respondent validation by Hammersley and Atkinson, 1995:227) which is intended to provide the direct test of findings and interpretations with the people from where it came, was conducted to some extent. With regard to member checks, I gave and received feedback from the HMIS Developer (at his request, as well as to verify my findings), the Trainers in HMIS, and the developers and promoters of the PHC MAP materials. This feedback related to identification of themes, or elements which emerged and on the relationships between the themes. However, even

though some of the same themes did emerge from several health units it would have been useful to cover more health units and affirm those findings.

Confirmability, *“refers to the repeated direct participatory and documented evidence observed or obtained from primary informant sources. Confirmability means obtaining direct and often repeated affirmations of what the researchers has heard, seen or experienced with respect to the phenomena under study”*. (Leininger, 1994:105). This will include obtaining evidence from the informants regarding the researcher’s findings, in what Lincoln and Guba (1985:319) have termed “audit trails”, use of written field notes, memos, a field diary, process and personal notes, and a reflexive journal. The audit trail is a method developed by Halpern (1983), and described in Lincoln and Guba (1985). It involves the systematic keeping and filing of six categories of records including the raw data, data reduction and analysis products, data reconstruction and synthesis products, process notes, materials relating to intentions and dispositions, and finally instrument development information. The second aspect of the audit trail is the five stages of the audit process itself. This research has systematically kept and filed categories of work, thereby recording the process by which data are generated.

Transferability is not very carefully described by Lincoln and Guba (1985), possibly because they equate it with external validity, which is one way of measuring the quality of research in the positivist tradition, and they have difficulty reconciling it with qualitative approaches. It relates to the applicability of the findings to other situations, however, and they suggest:

*“the naturalist cannot specify the external validity of an enquiry; he or she can provide only thick description necessary to enable someone interested in making a transfer to reach a conclusion about whether transfer can be contemplated as a possibility”* (Lincoln and Guba 1985:316)

I have provided thick description in the chapters covering the two case studies.

Dependability can be enhanced by use of overlapping methods, (Lincoln and Guba, 1985), which appears to be similar to triangulation and stepwise replications. The latter utilises more than one researcher in a process intended to replicate the emergent findings, and they recognise there are theoretical difficulties with this method. The other method advocated to ensure dependability is the inquiry audit, which is part of the audit trail mentioned above. Inquiry audit requires the use of well-informed subjects (Lincoln and Guba, 1995), and

although I was only a short time in Uganda, I believe the informants I was fortunate enough to gain access to within the MOH and related organisations, were the senior decision-makers, and were well informed about the subjects under investigation. At the district and health unit level I believe I also accessed well-informed people, even though I only spent a limited time with the health unit personnel. Finally, I also kept a field diary, which contains memos and reflexive notes, which is intended to enhance dependability.

## **4.5 Background to the research**

As in many other qualitative research projects (Marshall and Rossman 1995:17, Walsham 1993:245) this research did not follow the linear course of literature review, identification of research problem, data collection, data processing and analysis, write-up of findings and discussion, although the linear layout of the thesis does appear to indicate this. Instead a much more iterative process was undertaken, with visits to the field helping to identify the research question; which informed the literature review and next wave of data collection; which led to utilisation of existing theory in the analysis of data and continued the cyclical process.

My original aims for this research had been to:

- a) discover what problems had been experienced in teaching the information management aspects of PHC MAP;
- b) determine what problems had been experienced in implementing the information management directions of PHC MAP;
- c) discover how local needs and circumstances affect the ability to implement the information management strategies set out in PHC MAP;
- d) to determine what changes or developments in management information support can be attributed to the use of PHC MAP;
- e) to determine what changes may be necessary in a further revision of PHC MAP.

It had been my intention to conduct this research in two or three low-income countries, however, although PHC MAP was distributed in many countries, few

countries were using the series. Moreover, despite months of searching for funds to visit and conduct research in countries where the series was being used, it was only from the British Council in Uganda that I was able to obtain funding. Furthermore, my research not only suffered from lack of funding, but also funding at short notice, as the funds for Uganda were agreed only a few weeks prior to departure, and had to be spent at that particular time, rather than carried over into another financial year. My choice of situation to research within Uganda was also limited and circumstances sometimes over-rode my attempts to gain access to particular sites. The political situation, restricted finance, transport, shortage of time, and the lack of suitable 'patrons', all affected my choice of field site.

The fieldwork in Uganda for my two case studies, to answer the research questions in Section 2.6, Chapter 2, was undertaken at two separate times, that is, during a four week visit to Uganda in spring 1996, and a nine week visit in spring 1997. I had intended that the first visit to Uganda would be the first of several trips where I would focus on the initial research aims. However, as there appeared to be little interest in PHC MAP after the initial introduction, this case study was self limiting, and my research focused on the series introduction and acceptance by the organisation.

During the first trip I visited a district which was piloting the new HMIS, and held initial conversations with the HMIS Developers. I did not know at the time that I would develop a case study on the development and implementation of the HMIS, however, that second case study developed extremely fortuitously considering it was only in Uganda I was able to obtain the funds for the field visits. It was not until I went to Uganda the second time that I was able to develop the research question and case study of changing from the HIS to the HMIS.

Initially I intended that the two case studies would inform my initial research aims, but it became clear to me after reviewing my evidence, that my material on these two case studies alone answered different and potentially more interesting research questions. Moreover, after unsuccessfully searching for more field sites and funding after that second field visit, I realised that I would not be able to deal with all the original research aims because of lack of time, field sites and funds.

The changing of research focus is an issue discussed by Hammersley and Atkinson (1995:37) who acknowledge "*the ethnographer is rarely in a position to specify the precise nature of the setting required*". They suggest the nature of

the setting the researcher has access to may shape the development of the research question. In their view *“in ethnographic research the development of research problems is rarely completed before field work begins; indeed, the collection of primary data often plays a key role in that process of development”* (Hammersley and Atkinson 1995:37). My research has changed from that originally intended, but, as these authors note, this is not unusual.

## 4.6 Summarising the sources of evidence

In the course of the field study, observations and interviews were conducted with people from different organisations and in different roles. Appendices 4 lists the people consulted, the source of evidence, and the approximate length of interviews and observations. Table 4-1 below identifies the people consulted by their role within the organisations, and Appendix 5 identifies these people again but adds the general categories and themes from the interviews and observations. This detail is included in order to give the reader a deeper understanding of the evidence and the research process.

## 4.5 Conclusion

The research methodology in this thesis is informed by several approaches which fit within the interpretative, rather than the positivist tradition. The empirical research emphasises an organisational ethnography approach, and the research is not intended to test theory, but is descriptive and exploratory. I did not enter the field intending to test a hypothesis derived from a theory, or intending to search for data which would fit elements of existing theoretical constructs. Rather I entered the field aware of some of the theory which later proved useful in understanding the situation, aware of some theory which did not prove useful, and in my analysis utilised some theory I was not aware of at the first wave of data collection. This study is not only descriptive, because it has a theoretical dimension, and seeks to understand and explain features of the social life beyond the particular people and settings studied. I have used the descriptive evidence to illustrate theories and concepts. The limitations of the study alluded to in this chapter are further clarified in Chapter 12. The next part of this thesis presents the descriptions and discussions.

**Table 4-1 People consulted in this research**

<b>Role of observee and interviewee</b>	<b>number of people</b>
MOH central office	4
Supervisors and other EDHT members	37
I/Cs and other health workers	74)
Trainers	10
HMIS Developers	2
PHC MAP Developer	1
PHC MAP Initiator	1
PHC MAP promoter	1
PHC MAP Workshop participants	59
AKF East Africa representative	1
Kenyan Management Trainer	1
university staff	7
NGO national staff	3
AKF Uganda representative	1
PHC MAP evaluator	1

## **Part C**

# **Presentation of findings and initial discussions**

## **Chapter 5**

# **PHC MAP in Uganda**



# Chapter 5 PHC MAP in Uganda

## 5.1. Introduction

This chapter presents a description of the process taking place when externally developed training materials, intended to strengthen health management information systems, are introduced to potential users in low-income countries. The materials are the series PHC MAP, and the country chosen is Uganda. Consideration of whether to use the series is presented in a thematic way below; however, as the evidence was gathered chronologically, the first section briefly outlines the events before moving on to Section 5.3. The information is drawn from observation and interviews, and to ensure confidentiality individual names have been erased and the role they play referred to instead. An explanation of the titles is given in Appendix 4 which gives a list of the people consulted in this research.

Although well-known internationally, AKF, which initiated the development of PHC MAP, had only recently begun working in Uganda. Its focus in 1996, at the time of my first field trip, was on community-based agricultural and educational projects; however, it was hoping to become involved in health care. In 1996 its in-country strategy was still uncertain, and the final approach would depend upon MOH needs, as well as AKF's own objectives, which would reflect policies agreed with international partner organisations.

## 5.2. Chronology of events

PHC MAP was introduced by AKF, at a one-day Orientation Workshop on March 7th 1996. This was an important event for AKF, as they took the opportunity to herald their wish to become involved in Ugandan health services. They invited participants, organised the venue and set the agenda. AKF personnel had little detailed knowledge of Ugandan health services issues, and they had not assessed whether the country's health services needed PHC MAP. The workshop

was being held to discharge their responsibility to funders. There were fifty-three invitees, of whom eighteen were nationally-based MOH personnel, and ten were NGO health service providers. Six were representatives from major funders, including UNICEF and USAID, eight were academics, and there were eight other medical people. One person was from the Aga Khan Foundation Health Service (AKFHS, part of the Aga Khan network of organisations) in Uganda, one was from a government health management training centre and one was of unknown affiliation. No district-based personnel were invited. In the event, fifty-nine people attended, the additional six from MOH, NGO providers, major funders and other medical personnel.

After the official workshop opening, by the Minister of Health, there was an introduction to PHC MAP, focusing on why it was needed, and a description, given by one of the PHC MAP Developers, from AKF Geneva. A presentation by a PHC MAP User from AMREF in Kenya followed, on how the materials had been used to train six district health teams, followed by a question and answer session. Finally, there was a discussion, requested by AKF and open to all workshop participants, of whether PHC MAP was relevant to Uganda.

After the workshop the PHC MAP Developer held brief discussions with WHO and MOH personnel involved in the HMIS development in Uganda, regarding the possible usefulness of PHC MAP. The day after the workshop I interviewed the PHC MAP Developer, and the PHC MAP User from Kenya. Using the list of attendees, I interviewed national level MOH officials who were likely decision-makers regarding the use of PHC MAP. A University Management Trainer, who was also involved in district management training, and a University Researcher, were also interviewed because they had attended the workshop, as were an NGO Management Trainer and an NGO Manager from the Ugandan branch of an international NGO providing health and other services.

Shortly after the workshop the MOH submitted a proposal to AKF, requesting funding and technical support for a PHC MAP training course for MOH personnel. This did not receive a definite response from AKF, due to their internal concerns of the appropriateness of the materials, and even when I returned to Uganda one year later in Spring 1997 the MOH were uncertain whether AKF was interested.

## 5.3 Concepts, categories and relationships

The themes emerging from this work have been identified and are described below.

### 5.3.1 Different and confused presentations of PHC MAP

It became apparent that there were different views regarding the potential benefits of PHC MAP. The PHC Developer presented PHC MAP as a package to strengthen information systems, in the context of needing to improve health services. His focus was on the need to improve accessibility, quality, efficacy and cost effectiveness of district health services, which he believed could be achieved by decentralisation to district level, the availability of sufficient resources, increasing local capacity and an operational health information system. He presented his view of HIS problems, which included issues of data collection, analysis, processing, dissemination and information use, and suggested appropriate features for a district IS to support PHC. PHC MAP, he maintained, was developed to deal with these problems at district level. Thus, the PHC MAP Developer was quite clear that the background which inspired PHC MAP development was one of poor information systems and use of information at the district level for PHC services by the MOH District Health Management Team, (though he acknowledged the role of non-governmental health service providers). This purpose was further illustrated when he gave his overall definition and purpose for PHC MAP, which he stressed several times at the workshop:

*“... those MAP modules are not about management. They are about the data which are needed for management. ... How to identify the data you need, how do you collect data, how do you analyse data, how do you process it, translate those data into practical operational guidelines, how do you feedback to the user”*

Later he explained that he did not think ‘Management Advancement Programme’ was a good title for the series, saying:

*“But we have the definition, they are modules for improving the quality of data and strengthening the effectiveness, efficiency and sustainability of primary health care and population based health programmes. That was almost the mandate and core of these modules”.*

I believe he was saying that the PHC MAP aim was improvement in collecting, analysing, presenting and using information by district level managers of PHC

services, and this would lead to improved management. His vision for improved management appears to be greater efficiency, effectiveness and sustainability. This indicates to me the Developer has a different interpretation of the purpose of PHC MAP compared with the original objectives, and with the materials as they exist in their present form. I believe, however, that he obscured his vision of the purpose of the materials when he later said, to the audience:

*“...what is the contribution of those modules? Again it is not about management but data for management. It’s about the management of data for management. But what it does, it helps the manager identify the information needs. ... Also it helps you determine your strength and weakness in primary care management and the quality of your services, its also helps you decide if you are identifying a lot of problems, or a series of problems, how you should prioritise them. ... It helps you to track your services of course, the cost, also the revenue, ... it help[s] you in having better sustainability of your programmes.”<sup>1</sup>*

The Kenyan management Trainer presented PHC MAP as a management training package when invited to describe his approach and opinion of the materials. Thus, this presentation was not on how PHC MAP had been used to strengthen a Kenyan HMIS. Instead the Kenyan NGO decided they would be interested in using PHC MAP after being approached by AKF, who were willing to fund the NGO’s use of the materials as part of PHC MAP’s development. At the time, part of the NGO’s role was to strengthen district level management. Thus, they considered their purpose for using the materials was to strengthen DHMT management, improve the HMIS at district level and complement existing management training manuals in six districts. (This purpose was disputed by the Developer in a personal interview, who felt the Kenyan NGO had never really understood the purpose of the materials. He believed the purpose of using PHC MAP in Kenya was to document the extent of health sector reform and bring problems to the attention of relevant decision-makers. In his view this would generate specific kinds of information, and by directing this information to relevant committees, particular decisions result.) Effectively, the PHC MAP modules, plus the supplementary material, had supplanted an existing management training course for the DHT.

The supplementary material covered collection, analysis, interpretation, use and dissemination of information; intersectoral and intrasectoral issues; report

---

<sup>1</sup> Italicised words in brackets are my words inserted for clarification. This practice will continue throughout the thesis.

writing; government planning cycle, leadership and group dynamics, supplies management, management of conflicts and discipline; Civil Service Code of Regulations; supervision and motivation, time and space management and support supervision, which are mainly cover management issues.

The Trainer expanded on his vision of PHC MAP's usefulness in an interview, suggesting PHC MAP identified problems in management, and the supplementary topics were management training modules. He said that the curriculum, prior to using PHC MAP, had covered health management information systems, but had fallen short as it had not utilised the systems framework, which he believed enabled managers to assess the adequacy of existing information. This clarification of the definition and use of PHC MAP was not apparent in the Workshop. [For though he did focus on the systems framework as being an important feature of the materials he did not elucidate his position]. If he had focused on the value of the systems approach, I think the participants would have been less confused. As it was, many of them thought his review was not objective and lacked critical appraisal.

Furthermore, the Trainer emphasised that PHC MAP had consequences for management. He claimed several effects including: ability to identify problems, such as lack of job descriptions, and performance standards; encouragement of team work; reinforcement of the provincial health management team (PHMT) which had been failing; improvement in the control of expenditure leading to greater efficiency; transparency; increase in user fees; reinforcement of PHC principles, particularly increasing community skills<sup>2</sup>; and an HMIS which had more appropriate indicators. One would expect the effects claimed when strengthening the HMIS, would include improvements in data collection, processing, analysis and decision-making, not the above-mentioned indirect effects. Yet the impacts claimed are mainly indicators of impact on management, and it may be that misunderstanding PHC MAP purpose, and potential achievement, obscured the indicators perceived to be relevant for evaluating use of PHC MAP.

In a private interview later, the Trainer was willing to take a more critical approach. His suggestions for improvements to PHC MAP, I believe, relate to his vision of the modules as a training course for managers, not only information

---

<sup>2</sup> I think he means voluntary health workers, not all the community, when he uses the term 'community'.

systems. Thus, he believed his supplementary topics should be included in any revision of the series, with more focus on planning, and support supervision. Finally, he thought some of the material was too difficult for the DHT and needed to be simplified, especially the cost-analysis module, which he thought should not be computer-dependent.

### 5.3.2 Workshop participants have different perceptions

The response from workshop participants focused on the materials themselves, information systems, some management issues, and evaluation. The national level MOH officials sought clarity regarding PHC MAP's purpose. Some officials wanted to know the effect of using the materials, and asked how decisions or policy had changed as a result. The issue of whether a decision, based on information resulting from the routine IS or use of PHC MAP information would be any different, brought to light possible mis-interpretations of PHC MAP approach. For example some people interpreted PHC MAP as not promoting routine information but surveys, whereas in fact a close examination of the series indicates routine information is not excluded. However, the discussion illustrated a sophisticated understanding regarding possible reasons for making changes to existing information systems. An official from the MOH Planning Unit said, after the Kenya presentation:

*It has become clear to me that not much decision-making has come as a result of this kind of modules. We have heard very well about the modules but I have not heard a dramatic decision as a result of this kind of information, that could not be made through the routine information system. It is not clear to me yet ... I would like you to enlighten me on that maybe later, whether a decision has been made on management or on policy as a result of this generation of information.*

This assumption that PHC MAP tools did not include utilisation of routine information led him to ask if existing data from the routine IS was insufficient to make decisions, and hence required information from other types of data collection. Again, seeking clarity regarding the modules' potential achievements, another official wanted to know if PHC MAP would contribute to the decentralisation process in Uganda.

The MOH officials appeared to interpret PHC MAP according to the perceived benefit to themselves. Thus, despite the many questions seeking to clarify the purpose of PHC MAP in the Workshop, and dealt with to some extent by the presenters, there was uncertainty in the minds of MOH officials a few days later. One national level MOH official, with responsibility for strengthening district

level management, and likely to be involved in the decision whether or not to use PHC MAP, had heard about the series prior to the Workshop, but did not know what it was. After the meeting he said he thought *“MAP focused on survey data, community involvement and ad hoc information gathering, whereas the present Ugandan information system is for routine data”*. He suggested that PHC MAP had, an *“informational approach”*, by which I believe he meant the aim was to gather information for decision-making, and he appeared to have a fairly negative attitude to the materials. He was struggling to find the uniqueness and application of the materials and felt they were not easily understood in one day. Furthermore, he described them as inadequate, inappropriate and irrelevant, and suggested the materials would generate an excessive amount of information. When considering if PHC MAP would be used in Uganda, he set the issue in the context of the new HMIS objectives. One year later his perception of PHC MAP still focused on HMIS strengthening at district level and the gathering of information to support decision making when he said:

*“You see we are also trying to encourage the districts to develop a practical approach to research to solve the management problems and most of those management problems are related to gathering information.”*

Another national level MOH official, whose work focused on PHC and health education, had a positive attitude towards PHC MAP, but was unclear how to use it. He felt it was not easy to understand, but accepted that the intention was to improve information management for health service delivery at district level, through better collection, analysis and use of information for planning and monitoring. He felt the materials were not unique and that the Kenyan case study could have been more informative. The senior national MOH official, for EPI, health education, environmental health, and occupational health, responded positively to PHC MAP. He considered it could be useful for improving patient follow-up and non-routine information gathering, such as the socio-economic background of patients. His focus was on PHC MAP as training materials and was considering how parts could be incorporated into existing EPI training modules, though he was concerned whether training materials developed elsewhere were relevant for Uganda. He was not focusing on PHC MAP for information management alone, but as containing a set of management tools. It appears that these MOH officials were responding to PHC MAP by wondering how they could use them, and not only in the ways presented by the developer.

It appeared as though PHC MAP was perceived as useful, but mainly where an IS did not exist. An MOH technical adviser in communicable disease prevention and control attended the Workshop and reacted positively, but appeared to believe the

series was not useful for situations where an IS already existed saying: *“It’s something that is really profitable if its implemented in a kind of virgin setting where nothing has been happening before”*. She assumed PHC MAP *“had to be implemented as a total package, but felt she did not really understand it”*. In her opinion it lacked an overall rationale, but she would be particularly interested in using Module One: ‘Assessing Information Needs’. The HMIS Developer did not attend the workshop, but briefly reviewed the materials prior to our discussion. He also appeared to think PHC MAP was only of use where no IS existed before. Yet a thorough review of the materials indicates this is not the case, because the information audit tool (it is not given this name) is clearly for situations where information systems already exist.

The University Management Trainer, an academic involved in the MOH-recognised national training for DMOs and their deputies at Makerere University, did not know the reason for developing PHC MAP. The two-year training he organises is very advanced, being a Masters in Public Health with class-room and field training, which all DMOs are obliged to attend. He had known of PHC MAP’s existence prior to the Workshop, but had not known exactly its purpose. He felt, after attending the Workshop, that he did not know the developers’ objectives for the materials or the gap they were trying to fill. In his opinion PHC MAP brought a set of tools and questionnaires, and he said:

*“You see the way I have understood it, this PHC MAP, is that it is a set of tools that, er, used for data management, that information, when generated, is used for management purposes. Right? For taking decisions, for planning, taking management decisions, monitoring and even evaluation, right?”*

I believe he views the series as bringing an ‘informational approach’ to decision-making. Generally, he appeared to be fairly antagonistic to AKF’s approach and felt it was inappropriate for him to be invited to discuss material he had not seen before.

The University Researcher sought to clarify the definition and purpose of PHC MAP. His role involved training district teams in action-based or operational research, conducting needs assessments and situational analysis at district level, with a special interest in PHC. Even though he was positive, he was confused and did not know what to do with the series. Thus, he said *“I think it still needs some bit of explaining further, and maybe unless one tries out it will be very difficult to see how, umm, to begin to use them in the first instance”*. He felt it was not easy to understand, but was intended to be for well-trained people, such as those at Masters level. In his opinion, it was intended to improve the HMIS and equip



managers to use information. Hence, he said “...we don't know how we should go about it. But eventually we should like to be able to test them out in the, some districts maybe. Umm, one or two modules at a time and see what they could do in terms of, you know, gathering data, and really improving the health information system”.

An NGO management trainer perceived PHC MAP as management training materials which emphasised information management, but did not focus on whether or not PHC MAP was confusing. He had seen the materials before the Workshop and believed they were management training materials, not for information management alone. In the Workshop he said: “*The MAP modules are excellent materials that depend a lot on survey methodology, rapid assessment methodology and so on*”. He was interested in using some modules to improve his own management training materials in the future.

An NGO manager and IS co-ordinator appreciated PHC MAP, but had difficulty knowing how to utilise it. He was a Public Health Inspector with medical training, working for a local NGO which had affiliations to an international body, and the organisation's Co-ordinator of Management and Health Information. Despite having some statistical and management training he had not undertaken an MSc in public health or management, though he aspired to it. It is possible that he had prior knowledge of PHC MAP because his organisation gave a funding proposal to AKF at the Workshop, and he did seem more familiar with the material than other informants. His reaction to PHC MAP and workshop was positive, and he said:

*“They will guide you if you are going to do something like monitoring. It will spell out the steps. So if you were monitoring you would know I do this, I do that. If there is more information that you needed then you would right away go to a certain book or manual to get out more information on about it.”*

He particularly appreciated the introduction of the systems planning cycle, and the way it could be used to identify indicators of input, process, outcome and impact indicators. Moreover, he thought the series brought together management and information in a way which other training had not, which was why it was unique. At the same time, however, he displayed uncertainty regarding the usefulness of the series to him. Instead, he referred to an internal meeting at which he briefed his colleagues, saying:

*“We felt that we would contact the Aga Khan Foundation, even without the Ministry of Health, for assistance really. Depending upon how good*

*they are, they could take us through those modules, guide us, facilitate us going through them, and then we could see the use.”*

It appears the NGO Manager focused on the part of the series which he personally would find useful in his own day-to-day work, in particular modules 1 and 2, rather than the developers’ aims for the series or any vision of its overall concept.

In conclusion, the different and conflicting perceptions of PHC MAP appeared to be an obstacle to the decision whether or not to use the series. This is exemplified in the questions people ask such as *‘does the IS need PHC MAP?’*, or *‘does existing management training need PHC MAP?’*, and *‘how can we use these modules?’*. These questions may have arisen because people interpreted the series in the light of their own role and needs, and, it may be due to lack of guidance during the presentation, or in the series itself.

### **5.3.3 Compatibility with existing policy and management tools**

Many of the issues raised at the workshop by participants, or in the interviews, appeared to concern the extent to which PHC MAP materials would be compatible with the existing HMIS, with existing policy and training approaches, with the DHT skills and whether information gathered using PHC MAP tools would conflict with that already gathered, using different methods of data collection and analysis. An overall concern in the workshop was how PHC MAP training materials were linked to Ugandan health policy, particularly PHC, decentralisation and cost-sharing, (which involves patients contributing to the costs of medical treatment). Thus, one speaker asked: *“I would like to know whether in the six districts what role PHC MAP has played in the implementation of the decentralisation policy in Kenya?”*

The participants also focused on whether PHC MAP was compatible with community participation, inter-sectoral and intra-sectoral approaches. One Workshop attendee asked how the materials would contribute to improving community involvement at the district level. Furthermore, a national-level MOH official said he would liked to see how the series could improve community involvement in using health information to assess and plan health services. Another participant, focusing on compatibility with general PHC policy, asked how PHC MAP had contributed to PHC policy implementation. Similarly, another attendee asked *“...We know that primary health care is actually a classical approach and when I look at your presentation you talk about training district teams. It seems you left out the other sectors which are involved at the*

*district level*". This refers to the intersectoral approach which is a cornerstone of the comprehensive PHC policy.

PHC MAP compatibility with existing management tools was also an issue. In Ugandan health services, and related organisations, there are existing management tools and concepts which are strongly advocated. One participant at the Workshop appeared to want to align such tools and concepts with PHC MAP tools, and stated:

*"we are now talking a lot about networking, and I am aware that UNICEF is one of the biggest advocates of networking. But in this presentation I think you didn't talk about it. I have yet to see how other NGO's and government, how they put into play in supporting the activities of [this] intervention"*.

Concern was raised about possible conflicting information being produced due to different methods of collection by an MOH Planning Unit official. Whilst appearing to believe PHC MAP did not advocate use of routine information, he said:

*"The third thing is about conflict in [the] generation of information. We have seen that routine information leads to conflicting data to that produced by, ... surveys. It has not been mentioned to me here whether there is any profit in information processes about health care needs of the community that is collected through routine information and that that is collected through this kind of module or survey"*.

Similarly, questions also focused on aligning policy and information management tools, particularly use of rapid appraisal techniques.

### **5.3.4 Compatibility of training approaches**

In recognition of Ugandan information management and management training being co-ordinated nationally, questions were raised concerning DHT ability, integrating information management training and PHC MAP, management training and government priorities, training through support supervision and the extent of decentralisation of training.

Kenyan management training is not co-ordinated nationally, as in Uganda where the training of DMOs and assistant DMOs is carried out through a Masters in Public Health and Management at the Institute of Public Health (IPH), or for junior DHMT members, at a government institute in Mbale, which has been given technical and financial support from external aid agencies<sup>3</sup>. The latter training is a three-month management course which aims to incorporate IM training, and does not see the two as separate. It is not about developing the routine IS. The MSc course also covers information collection, processing and use, thus the approach in Uganda is to combine management and information training, and people were concerned about whether PHC MAP would be compatible with this approach. The NGO Management Trainer felt PHC MAP developers did not understand the situation regarding the HMIS and training of managers in Uganda. In his opinion, training in data collection, processing and use information should be done in the context of general management training and not separated, which was the vision being presented by the developers of PHC MAP at the meeting. In this respect he appeared to agree with the Kenyan approach. Furthermore, the NGO Management Trainer suggested the developers did not have a realistic view of the Ugandan situation when they developed PHC MAP, because the priority for health development was not the IS at district level, but district management. It may be that this informant was assuming the modules were to be digested at district level, whereas in fact this may not be the case. Moreover, he felt it was too much information for the districts to digest, and it would take too much time. Despite these reservations, however, an openness to new ideas was apparent from most of the trainers.

Compatibility of training approaches outlined in PHC MAP and those in place in Uganda was raised by the University Management Trainer. He also focused on compatibility with DHT education and training level, and felt PHC MAP tools were too basic for the DMO. Moreover, he said that if the person did not have such knowledge, they belonged on a training course, not in-post at district level. The technique of not allowing students to develop their own questionnaires was not something he supported, either, for he felt training materials should provide basic techniques, not answers in the form of detailed questionnaires. He envisaged PHC MAP could be reference material for managers already trained in the techniques, or as part of a health management training course, though students would need to develop their own ideas. Thus, he appears to feel that the materials have the potential to undermine the existing teaching approach. The NGO Management Trainer also felt there was a danger in utilising fully prepared material, as it could ultimately limit understanding. Moreover, in some ways he felt the presentation was too slick compared with the simplicity of training

---

<sup>3</sup> this course was set up by AMREF, UNICEF and other funders in an attempt to co-ordinate the management training being carried out separately by vertical programmes.

materials he and other organisations used in Uganda, which could create some antipathy to the series.

Compatibility with Support Supervision was also an issue. The NGO Management Trainer used this training approach, which relies upon the DHT working as a team. Hence, upgrading the skills of all the team was important for him, as against only relying upon senior personnel. He felt the material was too difficult for some district level staff, suggesting that senior, well-educated staff could probably comprehend, but many were less well-educated and would have difficulties. Later, in an interview, he said that the quality assurance approach in the series conflicted with the support supervision teaching approach used by his agency and others, including the MOH .

Generally, the focus of the discussions was not on how the IM strategies and management tools could be incorporated into existing training, but on how, physically, the modules would be incorporated. There was less emphasis on content and its implications, although the NGO Management Trainer spoke of using the approach in PHC MAP Module 2 to teach health workers how to conduct surveys. This suggests the emphasis on the ‘informational approach’ to management and the consequences for IM, of using certain management tools, should have been more clearly presented at the Workshop.

### **5.3.5 PHC MAP and existing materials**

The modules were presented as training modules at the Workshop, not just as reference books. PHC MAP appeared to be seen to be in competition with the existing training materials, though management trainers appeared willing to incorporate some of the PHC MAP modules, or parts of them, into their own material.

### **5.3.6 Perception of PHC MAP: advantages of using the tools**

Several participants wanted to know the effect of using PHC MAP. One MOH official wanted to know if using PHC MAP had led to the redirecting of resources, and he was very sceptical about the Kenyan claim that there had been an increase in user fees. Similarly, another official felt that before he could consider using PHC MAP tools he would have to be convinced there was a significant comparative advantage to be gained. His approach was that Uganda already had existing systems in place and therefore, did not want a whole new IS,

just improvements, hence the need to assess and identify the gap. He did not want to make major changes to the IS because of the upheaval it would cause, although he did see the need for alterations.

### **5.3.7 Perception of PHC MAP: does it fill a gap?**

Needing to know if there was a 'gap' in the Ugandan system, which the series could fill, indicates the need to have detailed knowledge of PHC MAP's contribution and the effects of using the series. Many participants assumed a committee to review the PHC MAP materials for possible adaptation and adoption for Uganda, would be formed. One MOH official anticipated that this would comprise training officers from different programmes at the national level. The likely process, in another MOH official's view, would be a team of people who knew the materials and the present situation in Uganda, would get together in a review committee invoked by the Permanent Secretary. This committee, making use of a technical advisor, would establish if there was a gap in the decision-making at various levels which needed additional information. They would review how PHC MAP could be integrated with the HMIS and investigate the possibility of adapting the PHC MAP materials for use in Uganda. He imagined the committee would also have to identify indicators by which to evaluate the impact of using the PHC MAP materials.

Another MOH official felt that a method of evaluating the materials' use was necessary, and that there should be an illustration of the community benefit. He was also concerned about how to get the materials to the district level. In practice, despite the calls for a review committee at the Workshop (though the University Management Trainer felt this would not take place), this did not happen.

### **5.3.8 Developers lack knowledge of implementation context**

Several participants at the workshop suggested AKF were not fully aware of the situation in Uganda, particularly regarding the administrative set-up and likely decision-making process. One NGO health service provider, pointed out that the Ministry of Local Government, which managed NGOs working at district level, was not represented at the Workshop and he believed they should have been invited. This district-level approach is a reflection of the decentralisation process under way in Uganda and suggests that AKF was unaware of the important stakeholders. Similarly, another MOH official anticipated that the decision of whether to utilise the materials would be made at the national level, not the district level, as appears to be suggested in PHC MAP.

Some people, including the University Management Trainer, believed AKF's assessment of Uganda's needs was inappropriate. Training of district level staff already existed, although training in information use might be a problem. He suggested that there needed to be some training of health-unit level staff in data processing and use of information, and more resources to implement their existing training. But he also felt that, if PHC MAP developers' assumptions regarding DMO ability were true, these should be addressed by attendance at a training course, not by giving reference books. In fact, he displayed some antagonism towards the developers, as if they had made the assumption Ugandans and Kenyans were untrained in certain techniques, for example in defining and using indicators to monitor and plan health services. He said:

*“But my fundamental question is: say you are finding [PHC MAP tools] useful for doing this, were [the DHT] initially trained in management, in epidemiology and so on, and somehow they didn't either go through this, or when they got trained it got wiped off? So that now suddenly PHC MAP wakes them up?”*

Concerns of participants also included the need for the IS to be concerned with the issues of communities contributing to the financial stability of health services, and the need to have supplies and logistic data. The general financing of health services and assessing training needs was mentioned and so was the non-computer focus within Ugandan health services.

Difficulty putting training into practice was one of the main issues in Uganda, according to several people. The University Management Trainer suggested this was due to lack of finance and time. He maintained that wider management and organisational issues were a problem, not knowledge of IS techniques. He suggested, therefore, that if one wanted to improve the IS by utilising tools and techniques, it would be necessary to bring in other resources, and acknowledge the wider issues. For him, much of the material was not new, and he pointed out the existence of indicators in earlier publications, in particular citing 'Development of Indicators for monitoring progress towards health for all by the year 2000', by WHO in 1981. It appears as if he thought the workshop presenters had not given sufficient background material for him to make a judgement about PHC MAP, as they had not said what their needs assessment was, and how PHC MAP was going to help deal with those defined problems. It may be some of his antagonism was due to a belief that solutions brought by outsiders were not appropriate, and an internal needs assessment should be undertaken, followed by development of Uganda's own training materials. Alternatively, he could have perceived that an external agency was blaming the Ugandan health system for not acting in a rational way by utilising IM tools, whereas, he believed, it was not lack of knowledge which prevented the implementation, but other reasons

including financial. Some participants also raised the problem of motivating health workers when salaries are very low and sometimes irregular.

Another area in which the developers appeared not to have considered the local organisational situation concerns their lack of awareness of Uganda's managerial approach to new practice, in particular the need to evaluate new interventions. MOH officials were extremely reluctant to bring in changes unless they were convinced these would be of benefit. Thus, they needed to know the impact of using PHC MAP before considering its use, and required tools to monitor and evaluate its utilisation. Such evaluation techniques were not in existence in the modules, or in the presentation at the workshop.

As far as the PHC MAP Developer was concerned, however, he was simply introducing PHC MAP to those who were interested, and he appeared to dismiss the idea that he had a responsibility to identify if Ugandan health services needed the materials before developing and introducing them, as irrelevant. He maintained his role was only to pass on the information, although he said AKF may consider supporting a funding proposal if any health service providers were interested in using PHC MAP.

### **5.3.9 Potential users envisage role for AKF**

Several people, regardless of organisational affiliation, envisaged a role for AKF either as funders; to clarify the contents; or to act as technical advisers in other ways. The University Researcher felt there was a role for AKF to play in the use of PHC MAP, hence he had written to them soon after the Workshop. He declined to say how he thought AKF could help, but anticipated using the series in a pilot project first. His interest in PHC MAP was to improve PHC and he anticipated using some modules, though not all. His approach would be to integrate them with existing materials. The NGO Manager and IS Co-ordinator felt there was a role for AKF to play in introducing PHC MAP either as funders, trainers or facilitators to help health service providers to understand the usefulness of the tools. His organisation had submitted a funding proposal to AKF. In the Workshop itself an MOH official, speaking of the need for a committee to review the materials and the possibility of integrating them into the existing Ugandan system, said:

*“It now should be the duty of the Aga Khan office in Kampala, and the co-ordinators of the meeting from the ministry here...[to] get together and make sure the committee is formed”.*



After the Workshop the MOH submitted a funding proposal to AKF, which made use of the Kenyan training model, and was primarily written by someone who had worked for the Kenyan organisation. He was familiar with PHC MAP and its utilisation in Kenya, and requested funding and technical help from AKF to train a small number of district teams.

### **5.3.10 External funders and agencies influence**

It appeared that AKF had its own agenda when introducing PHC MAP. The Developer had his own agenda, which was to fulfil the funding objectives, and probably convince his own organisation there was utility in the series. His response to the idea that AKF had a role to play in utilising the PHC MAP series in Uganda was mixed and he suggested, in interview, that it was unlikely the MOH would use the materials in a major way. In fact, in an interview, the AKF Ugandan Representative said that she knew the workshop participants indicated after the workshop, that technical and funding support was needed from AKF in order to utilise PHC MAP. It also appeared, after the workshop, that AKF were not strongly promoting PHC MAP in Uganda.

Other external influence appears to have been strong. The international strategy of strengthening district health management and information systems, especially in low-income countries was strongly promoted by agencies such as WHO and USAID, who provide funding and technical support. The MOH Planner was aware of funding opportunities, especially those concerning strengthening district level management. Hence, he submitted a funding proposal along those lines, which suggests the availability of funding partially dictates policy and programmes. Moreover, although he did not enlarge upon this, he believed rivalry between the different donors would impact upon the training and IM strategies which would be eventually proposed for Uganda. Therefore, the decision to utilise appears to be contingent upon whether the funding and technical support is available. As no reply from the funders was received by June 1997, however, it appears no decision to use the series within the MOH health services, was taken.

### **5.3.11 Personal agendas**

As mentioned above, it appeared that the Developer had a personal agenda for introducing PHC MAP. He had invested a lot of emotional energy and professional time into the series and wanted it to be utilised and promoted by AKF, although he maintained it was not being utilised within the AKF Pakistan programme due to professional jealousy. The MOH Planner also appeared to be motivated by personal reasons, as he was aware that some advantage might be

accrued when (or if) he resumed working for the Ugandan MOH in a very senior position. In particular, he had an in-depth knowledge of PHC MAP utilisation in Kenya, and it was he who submitted the MOH funding proposal to AKF to use the series in a similar way to its use in Kenya. Finally, it appears that the University Management Trainer, saw PHC MAP as materials imposed on a low-income country by a rich country, which is an example of such countries dictating policies.

### 5.3.12 Strategies for utilisation of PHC MAP

One of the main themes emerging from the Workshop and subsequent interviews was that potential users were considering making changes to PHC MAP modules in order to integrate them into existing training programmes or systems. This could have arisen because of a misconception of what the series was; for example, some people thought the developers were advocating the implementation of the whole package whereas the PHC MAP Developer maintained there was no ‘implementation’, but ‘utilisation’ of some of the techniques in the modules. Whatever the interpretation, many attendees spoke about adaptation and integration. One of the main developers of the HMIS in Uganda focused on this issue very well and suggested that one of the reasons the modules would not be adopted *on masse* was because an HMIS already existed, though he could see how individual modules or tools could be of use to the DMO. He comments:

*In general I think there is not one country where you have to start from scratch, from zero. You have things running and so on. So really the approach [is], ... I take my manual User's Guide number one, that is where I will start. Well, that is nowhere the case, because if you already have a number of things running, so you never start from zero. ... You have to jump in, to use some of the things, other things are not appropriate and so on."*

Another strategy for utilising PHC MAP was to integrate them into existing management training and IM strategies. The NGO Management Trainer, who was also a technical adviser to the government management training institute, focused on the need to proceed cautiously with new materials. He mentioned that coordinated DHT training was now underway in Uganda, as well as HMIS strengthening. Thus, before deciding to use PHC MAP, he believed it was important for Uganda to agree a strategy for gathering information, to adapt the management tools in response to the new HMIS, then to establish the gap in existing information and see which PHC MAP module could fill the gap.

Moreover, he asked, at the Workshop, if AKF had experience in integrating the modules into other training materials.

A third strategy proposed was to identify needs and then select specific modules. The expatriate clinical adviser, like many others, was interested in how PHC MAP could be integrated with existing training or activities. She felt some of the issues in the series were already addressed in Uganda, and therefore she did not see a role for using the modules in their entirety. Instead, she thought it would be more appropriate to identify the areas in the health system which were in need of improvement and use selected PHC MAP modules to address those issues. Similarly the University Researcher anticipated PHC MAP could be useful in equipping managers to use information and thought it was likely the series would be integrated with existing materials.

### **5.3.13 Managerial ability and innovation**

Finally, one of the MOH officials suggested DMOs were not able to prioritise their needs when using the questionnaires, and would possibly use all the questions indiscriminately. This may be a remnant of the highly centralised health system in the recent past.

## **5.4 Conclusion**

This chapter has described the evidence of the health services' response to the introduction of the PHC MAP materials. This indicates there is an interest in using PHC MAP, but many factors affect whether it is utilised. There are different and confused perceptions of the series, due to poor presentation, hence individuals define the series in terms of what immediate use they could be to them. Furthermore, because of the uncertainty, steps are taken to improve their comprehension. The next chapter will draw upon existing theoretical concepts and research, in order to interpret the situation.

# **Chapter 6**

**Discussion of the findings on**

**PHC MAP in Uganda**

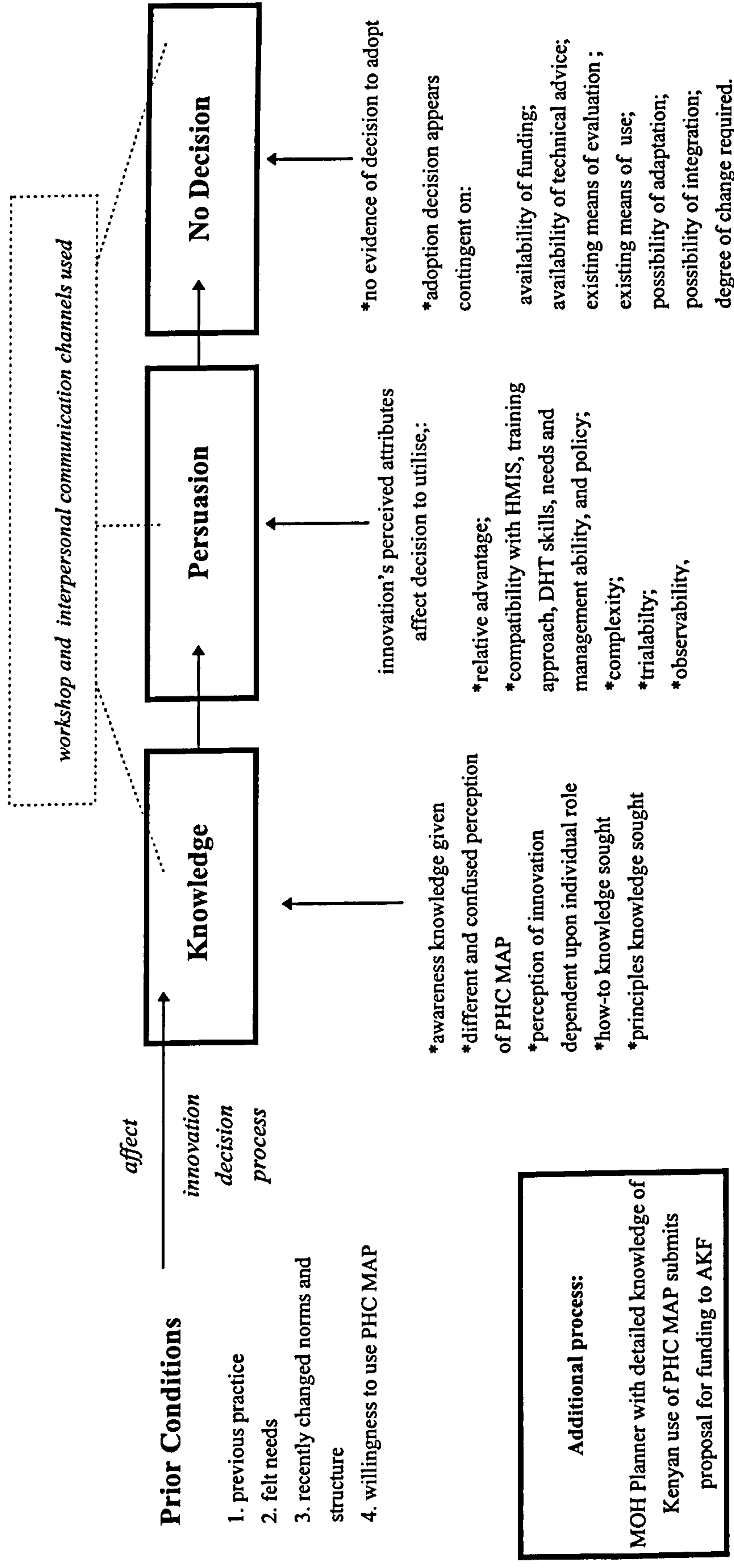
# **Chapter 6 Discussion of the findings on PHC MAP in Uganda**

## **6.1. Introduction**

As indicated in Chapter 4, the approach in this work was to identify themes and relationships which arose during field work and then use existing theory to interpret the evidence. This chapter analyses the PHC MAP case study using the concepts and approach in the Diffusion of Innovation framework (Rogers, 1995). I consider to what extent the empirical evidence supports existing theory and research, and what lies outside. The ultimate aim is identify a theoretical framework which describes the relationships within the evidence. As indicated in Chapter 3, Rogers (1995) describes two approaches to adopting innovations into organisations. The first is the classic model where individuals are considered the potential adopter, and the Innovation-Decision Process is enacted. The second is where the organisation is considered the potential adopter, and the Innovations Process takes place. Both models are considered here, in Sections 6.2 and 6.3. Although these are useful, it is only by bringing the two approaches together, in Section 6.4, that more complete interpretation is achieved.

## **6.2 Evidence for an Innovation Decision model**

‘Prior Conditions’ affect the decision to adopt an innovation and various stages are enacted, including Knowledge, Persuasion and Decision Rogers (1995). Figure 6-1 is a Model of the Stages in the Innovation-Decision process regarding PHC MAP in Uganda, graphically illustrating the situation using the theoretical framework and concepts in the Diffusion of Innovation.



**Figure 6-1 Model of the Stages in the Innovation-Decision Process regarding PHC MAP in Uganda**

### 6.2.1 Prior Conditions affect the decision to adopt

The evidence from Uganda confirms that previous practice, felt needs or problems, innovativeness and norms of the social system affect the decision to adopt, or reject. Previous practice including: the new HMIS; existing emphasis on management training; and a particular management training style, were all raised as issues when potential users were considering using PHC MAP. The felt needs or problems raised included lack of DHT time; awareness that training and knowledge alone do not produce change, as other organisational issues are involved, making it difficult to put training into practice; the need for more resources at health unit level to implement existing training; need for training of health unit workers in data processing and use of information; problems at DHT level in utilising information for management; need for logistics and supplies data; need for financial data at health unit level; non-computer focus in existing information and management systems at district and health unit level; general financing of health services and training; and the belief that DMO's were not skilled in prioritising their needs. Moreover, because potential users were also suggesting that PHC MAP developers had inappropriately assessed Ugandan needs, potential users were probably considering whether PHC MAP met previously perceived needs.

Innovativeness did not appear to be an important issue, except that several informants appeared to be willing to use the materials, provided funding and technical help were available. Ugandan health service organisations had recently changed, and the norms (established behaviour patterns for the members of a social system) and structure of the existing social system appeared to be affecting the decision to utilise the innovation. These influences included, health service restructuring through decentralisation; the introduction of patient fees to be retained at health centre level, partly to supplement staff salaries; the Ugandan managerial approach to new practice; the MOH decision-making process; and a continued emphasis on comprehensive<sup>1</sup> PHC policy. Generally, therefore, potential PHC MAP users appeared to have these Prior Conditions in mind when considering whether to adopt the series. Rogers (1995) does not use the term 'structure' as one of the prior conditions influencing the decision to adopt or reject an innovation though it appears to be a useful concept in this study.

---

<sup>1</sup> Uganda stresses the comprehensive PHC policy which emphasises all the community should be involved not just voluntary health workers as AKF appears to do, and emphasises equality, which does not feature in PHC MAP.

## 6.2.2 Evidence of the Knowledge Stage

This is the stage when an individual (or other decision-making unit) is exposed to an innovation's existence and gains some understanding of how it functions. Rogers's (1995) generalisations at this point, focus on the characteristics of early knowers of an innovation, including socio-economic characteristics, personality variables, and communications behaviour. In Uganda it was at the Workshop, that most participants first knew about PHC MAP. The NGO Management Trainer and the University Management Trainer, however, were previously aware of the series, even if they did not know its purpose and other details. The former knew about it because he belonged to the Ugandan branch of the organisation which had used the series in Kenya, and had also been approached by AKF in the past, regarding its use. Thus, the characteristics of the knowers were not a strong element in the evidence from Uganda.

Other issues are raised at this stage, and the concept of different types of knowledge, (Awareness Knowledge, How-to knowledge and Principles Knowledge), helps the interpretation. Evidence from the observations and interviews in Uganda indicates that seeking information on the clarity of purpose of the innovation, how to use it and its impacts, were the main focus of the participant's questions. Several people sought to clarify the developers' intentions in producing PHC MAP, and a definition of the series. This was made especially difficult as the Developer presented the purpose and definition of the series in a contradictory way, and the situation was further exacerbated when the Kenyan Trainer presented the series in a different light. Later in the Workshop the Developer suggested the Kenyan Trainer had even misunderstood the purpose of the series! The lack of clarity in the definition of the innovation led participants to develop their own definition, which often depended upon their role and responsibilities and how the innovation could help them, rather than how it was originally conceived by Developers. Moreover, rather than the overall principles of the series being identified as useful, several people focused on one small part which had attracted them. For example, the HMIS Developer liked the Manager's Tips booklet, which could be seen as a superficial add-on to the main modules which deal with information management. Thus, Awareness-knowledge was being sought, but this need did not appear to have been met successfully.

How-to knowledge was also sought by the participants at the workshop wanting to know how to use PHC MAP, as many were confused. Thus, potential users sought AKF's technical support in putting the series into practice. Principles-knowledge was actively sought by the participants, as indicated during the Workshop and in later interviews. Thus, one MOH official described the series as having "*an informational approach*". Another defined the series in terms of different information strategies compared to those in the HMIS, saying: "*MAP*



*focuses on survey data, community involvement and ad hoc information gathering, whereas the present Ugandan information system is for routine data*". (which is not strictly true). Participants also wanted to know the impacts of using the series, and questioned the impacts claimed from its use in Kenya.

Thus, although the Knowledge stage is not seen in the evidence from Uganda in terms of description of knowers, the different types of information being sought by informants is clarified by the Knowledge concepts Rogers (1995) refers to at this stage. Furthermore, it may be that the Knowledge and Persuasion stages have been brought together.

### 6.2.3 Evidence of a Persuasion Stage

The Persuasion stage of the *Innovation-Decision Model* is when the individual forms an attitude to the innovation, which implies the individual knows the innovation, even if the knowledge is not that anticipated by the promoter. The situation in Uganda is rather complicated by the existence of several interpretations of the function of the series as mentioned above. Diffusion of innovation theory suggests an individual's rate of adoption of an innovation depends on five perceived attributes, including: relative advantage of the innovation, its compatibility, its complexity, its availability for testing and the observability or visibility of its outcome (Rogers, 1995). Although the empirical evidence does not indicate whether adoption or rejection of PHC MAP explicitly took place, it did appear that the consideration of whether to adopt the innovation focused on several perceived attributes.

The relative advantage was being considered by potential users both in the interviews and at the Workshop. A national level MOH official put it most succinctly, saying: *"But for us to have to approach, to use, an alternative method or system it must have significant comparative advantage. And that was never apparent to me during the presentation"*. Moreover, he was intending to take steps to assess if there would be comparative advantage, by using the services of a technical adviser. Other people in the Workshop and in interviews supported this approach. Compatibility with previous experience, existing values and needs of potential adopters also affects adoption or rejection of an innovation, according to Rogers (1995), and although compatibility was raised as an issue in this situation it was with regard to the HMIS, health policy, training approaches, and DHT skills. It is interesting to note several people focused upon the possibility of adapting the PHC MAP modules, rather than accepting them as they stood which could be seen as a way of trying to ensure compatibility with the existing IS, policy, training approaches and skill levels.

The perceived complexity of the innovation was most apparent in considering whether to use PHC MAP, as it was perceived as difficult to understand, and there were conflicting ideas of what it was, or could achieve. One MOH official suggested he could not easily understand the tools in one day and, generally, he seemed to be struggling to find the uniqueness and application of PHC MAP. Therefore, his solution was to identify a committee and technical advisers who could interpret the materials for him.

Trialability, which is the degree to which an innovation may be experimented with on a limited basis, did not appear to concern the potential users of PHC MAP tools, except one academic suggested his approach would be to run a pilot test of training in the materials prior to use on a wider scale. He said *“I think it still needs some bit of explaining further, and maybe unless one tries out it will be very difficult to see how, umm, to begin to use them in the first instance”*. If consideration of PHC MAP adoption had continued, however, this issue may have been relevant. Observability, meaning the degree to which the results of an innovation are visible to others, was a very important issue. The potential users were very concerned about the impact of using the innovation and wanted evidence of utilisation and impact of PHC MAP’s use in Kenya. Unfortunately the presentation by a user from Kenya did not address this problem to audience’s satisfaction. Thus, the five perceived attributes of the innovation do appear to affect the consideration on whether to utilise PHC MAP series, with some attributes being more important than others. The definition and interpretation of the purpose of the innovation, however, dominated the perception of those attributes.

#### **6.2.4 Evidence of use of Communication channels**

PHC MAP developers and promoters were using interpersonal channels to communicate the information about the innovation, and the Workshop brought potential users face-to-face with a Developer and the Kenyan Trainer. Potential users were also taking other steps to improve their knowledge of the innovation, which affected their perception of it and the decision to adopt or reject. Thus, clarity was being sought at the Workshop, and in individuals’ communications with AKF.

#### **6.2.5 Evidence for a Decision Stage**

Although my evidence on the process of introducing the PHC MAP series into Uganda did not cover the Decision stage in great detail, the concept of individuals trying out a new idea by using other people’s experience, is useful. This appears to be the intention of PHC MAP developers and promoters when they invited the

Kenyan Trainer to describe his experience. Unfortunately, the presentation was not very well thought out, and did not answer all the questions asked by the audience. Another issue which appeared to be relevant at this point was the availability of funding and technical advice. Thus, several people had expressed an interest in using PHC MAP and had submitted proposals to AKF seeking financial and technical support to introduce the series. The degree of concomitant change required when bringing in the innovation was raised, and one MOH official was concerned to have the least disruption possible within the health system, saying:

*“Why should someone replace an existing system with something completely different, ...[when] it would disorganise what has already been entrenched. What we just need to do is improve the existing system, but not to replace[with] a set of questionnaires”*

The possibility of altering or adapting the innovation also appeared to influence the decision to utilise. This is related to how PHC MAP is defined, but one of the main themes which emerged from the Workshop and subsequent interviews, was potential users, e.g. the NGO manager and IS Co-ordinator were considering making changes to the PHC MAP modules to integrate them into existing training or systems. Many informants also spoke of integrating parts of the series into existing information training, or the existing management training programme.

Another issue which concerned MOH personnel considering adoption, was whether there existed a means of evaluating the impact of changes brought by the innovation. It is uncertain if this was sought in order to clarify what exactly the innovation was, or if they really did not know how to evaluate using the materials. It is interesting to note that Rogers (1995:357), focuses on this issue of potential adopters being able to evaluate their use of the innovation. He suggests (Generalisation 9-12) *“Change agent success in securing the adoption of innovations by clients is positively related to increasing client ability to evaluate innovations”*. But he also says the goal of self reliance, rather than dependence of the clients on the change agents, is seldom reached by most change agencies as they usually promote the adoption of innovations, rather than seeking to teach clients the basic skill of how to evaluate innovations themselves.

The assumption behind the Innovation-Decision Process when applying it to organisations appears to be individuals will be performing in their organisational role without this conflicting with their personal priorities. This assumption may be challenged. Thus, the next section analyses the empirical situation using Rogers’s (1995) Diffusion of Innovation framework as it applies to organisations.

## 6.3 Evidence for Innovation Process Models

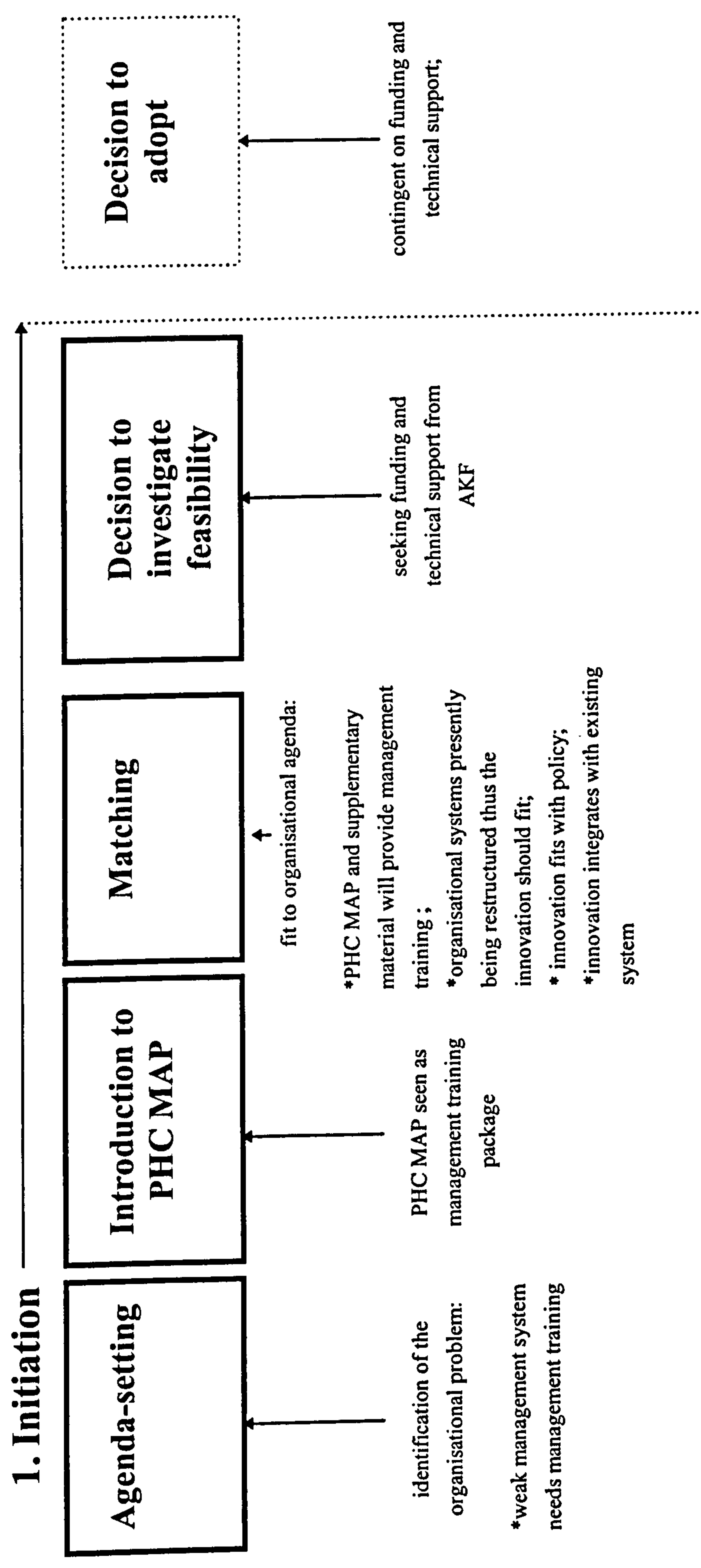
One could consider the situation being investigated was where the MOH, and not individuals, were potential adopters of an innovation, even though individuals dominate the process. Rogers (1995), suggests that organisations take part in the *Innovation Process* which consists of agenda setting, matching, redefining and restructuring, clarifying and routinizing. Even though the data I have only covers the early stages of considering whether to use an innovation, it is interesting to investigate if this is a useful way to view the empirical evidence. From the evidence, multiple, complex pictures of the *Innovation Process* emerge, which are described graphically in Figures 6-2, 6-3 and 6-4. The first is a rational model of the stages in the Innovation Process regarding the PHC MAP series, as portrayed by the MOH Planner who submitted a funding application to AKF. The next figure is my interpretation of the same process, using additional evidence. The third picture is one where the MOH Planner is not very involved, except he helps AKF by being a source of information at the Workshop, and the perception of the purpose of PHC MAP is more confused. All three situations were happening at the same time, and were highly dependent upon different perceptions of PHC MAP.

### 6.3.1 Projected rational approach

The MOH proposal was submitted two months after the Workshop. A draft had already been prepared prior to the Workshop, by someone who had been working for the organisation in Kenya where PHC MAP was used, though he did not coordinate the training. He was about to start work in Uganda with the MOH Health Planning Unit. The proposal was for financial and technical support from AKF to use PHC MAP as had been used in Kenya. Thus, the project purpose and four objectives were:

*“The improvement of management and resource utilisation skills of the health workers and managers at district level through training. The major project objectives will be: the improvement of the efficiency and effectiveness of planning and management systems at the district level; the training of 60 DHT members in Uganda during the project period; follow-up the trainees in the field and discuss problems; and the assessment of the effects of the training in order to better manage PHC programmes through better use of information”.*

The proposal was portrayed as embodying the rational approach of matching an existing problem with a solution. Weak management systems, which contributed to poor health services and under-utilisation of resources, were perceived as problematical, therefore management training was needed. It was suggested PHC MAP, plus supplementary material, would be the training to fill that gap, hence



**Figure 6-2 Rational Model of the Initiation stage in the PHC MAP Innovation Process: claimed by the MOH Planner**

the proposal which includes a modification of PHC MAP. A three year project in ten selected districts would be a first stage and later other districts would be included. He acknowledged strengthening management capabilities alone would not guarantee improvements in health services and health status. The proposal also focused on other health policies and strategies being enacted in Uganda, such as decentralisation, attempts to improve intersectoral collaboration, the cost sharing initiative and the support supervision approach. PHC MAP, after adaptation, would fit with existing policy, management and training approaches. Hence, the Decision to Investigate Feasibility had been taken and the ultimate decision to utilise would be dependent upon funding and technical support from donors.

The proposal claimed Uganda was in need of management training; however, the evidence cited was from several reports relating to Africa generally, and not Uganda particularly. Furthermore, these were several years old (dated 1991 and 1993) and there was no suggestion they still applied. There was no evidence that an up-to-date needs assessment in Uganda had been conducted, although the problems and their causes in Uganda were detailed. Consequently no mention was made of present DHT training being conducted by the Centre in Mbale, or the changes and training resulting in the HMIS, which seemed to indicate a lack of co-ordination with other district level management training schemes and the HMIS development team. The proposer acknowledged the needs assessment was not detailed, but maintained there was no time to conduct a thorough assessment because the potential funders needed a quick response. One year later AKF had not rejected or committed themselves to this proposal, because they were uncertain if they wanted PHC MAP to be used as part of their own health services support strategy in East Africa.

Thus, it appears the proposer wanted to use the series, and utilised the rational approach, as depicted by Rogers' (1995) Initiation stage of the Innovation Process, when trying to convince funders to provide resources, prior to the organisational decision to use PHC MAP. This is depicted in Figure 6-2 'Rational model of the stages in the Innovation Process: as presented by MOH Planner'. The model suggests the priorities of the organisation match the priorities of individuals within the organisation.

### **6.3.2 Alternative model of the organisational process**

Alternatively one could see that the MOH Planner had a perception of PHC MAP as a management training series, and knew supplementary material had been added, because he had been working for the same organisation using the series in Kenya. His intention was to gain a prestigious position in Uganda and he may be

using his recent experience in Kenya to support his chances of return to the Ugandan MOH. He knew the innovation had been successfully adapted and his perception was based upon that use. Agenda setting could be perceived as taking place prior to, or after, the innovation introduction; however, weak district level management systems had been a feature of the Ugandan MOH for several years. I consider very little detailed Matching took place because the MOH Planner who wrote the proposal made little attempt to integrate with the existing management training or information management strategies within the new HMIS. No review committee was established to see if the innovation fitted the needs, although the MOH Planner said that he consulted other members of the Health Planning Unit. At this point however, an adaptation of the innovation took place, for before searching for AKF support, additional topics were added to the training programme of which the PHC MAP series would be a part, and adaptation was based on the Kenyan experience. Rogers (1995) suggests adaptation takes place in the Implementation Stage, but in this situation it appears to have taken place prior to the decision to adopt.

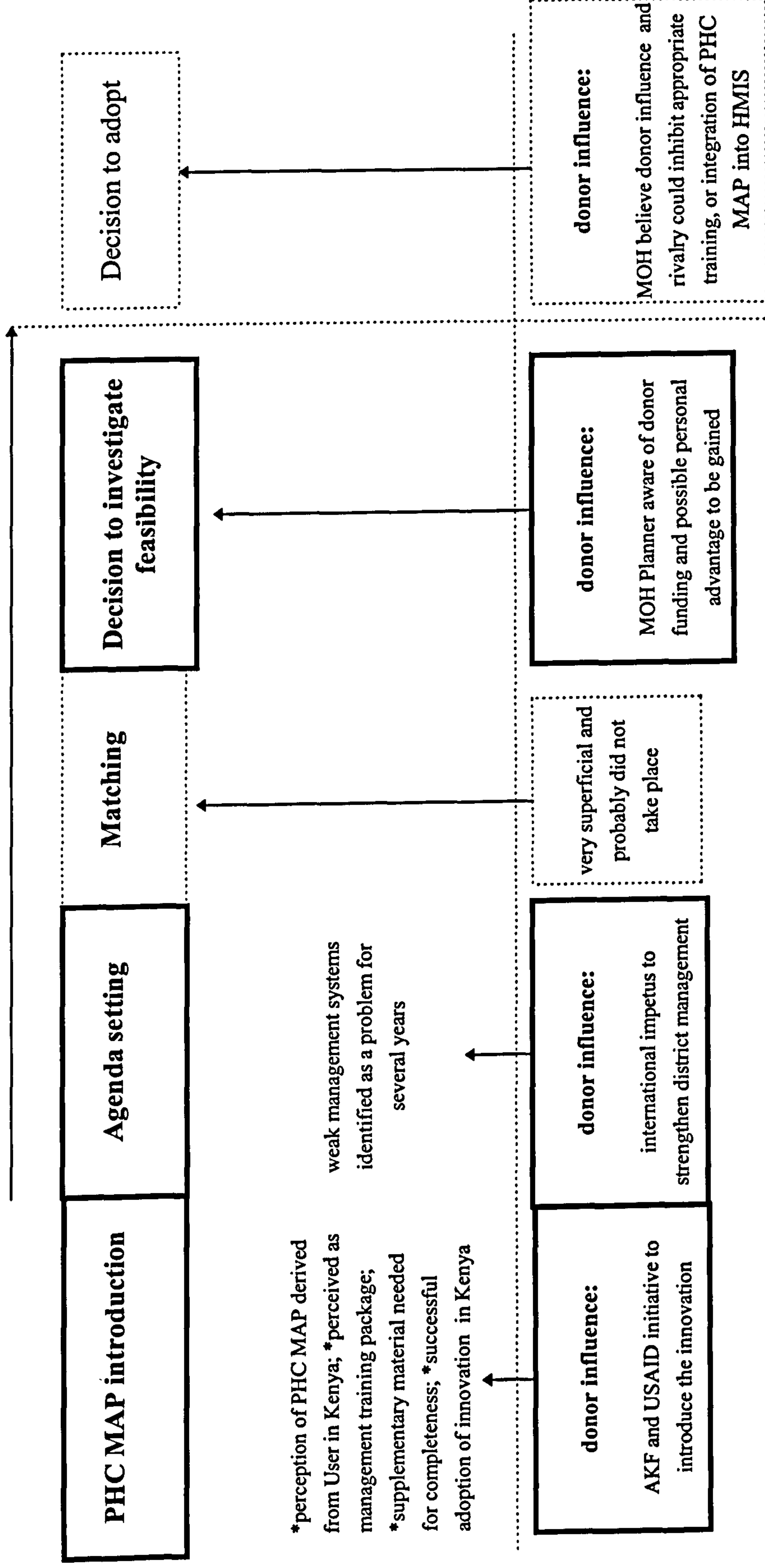
External donor influence appears to have been very strong at each of the stages so far defined. The MOH Planner was aware of funding opportunities, especially those concerned with strengthening district level management. Hence, he submitted a funding proposal along those lines, which suggests the availability of funding partially dictates policy and programmes. Moreover, although he did not enlarge very much on this, he believes rivalry between the different donors will impact upon the training and information management strategies which will eventually be proposed for Uganda. Therefore, the decision to use PHC MAP appears to be contingent upon whether the funding and technical support was available, hence the intermediate Decision to Investigate Feasibility.

Figure 6-3 illustrates, that although the *Innovation Process* is being considered here, the Initiation Process has an extra stage compared to Rogers's (1995) *Innovation Process* model, shown in Figure 3-2, Chapter 3. This is similar to Rogers's (1995) Decision stage in the *Innovation-Decision Process*. The implication is that Rogers's (1995) model of the *Innovation Process* would benefit from adding a stage from the *Innovation-Decision Process*, as the former lacks clarity and is in need of refinement.

### 6.3.3 Model of the stages in the Innovation process

The third model emerging is one where the innovation definition is not clear and involves other people as well as the MOH Planner. In this model (Figure 6-4) there was very little evidence that the decision to adopt or reject PHC MAP was affected by a prior consideration of organisational need, that is Agenda Setting.

### 1. Initiation Process



**Figure 6-3 Alternative Model of the Innovation-Process: enacted by MOH Planner**



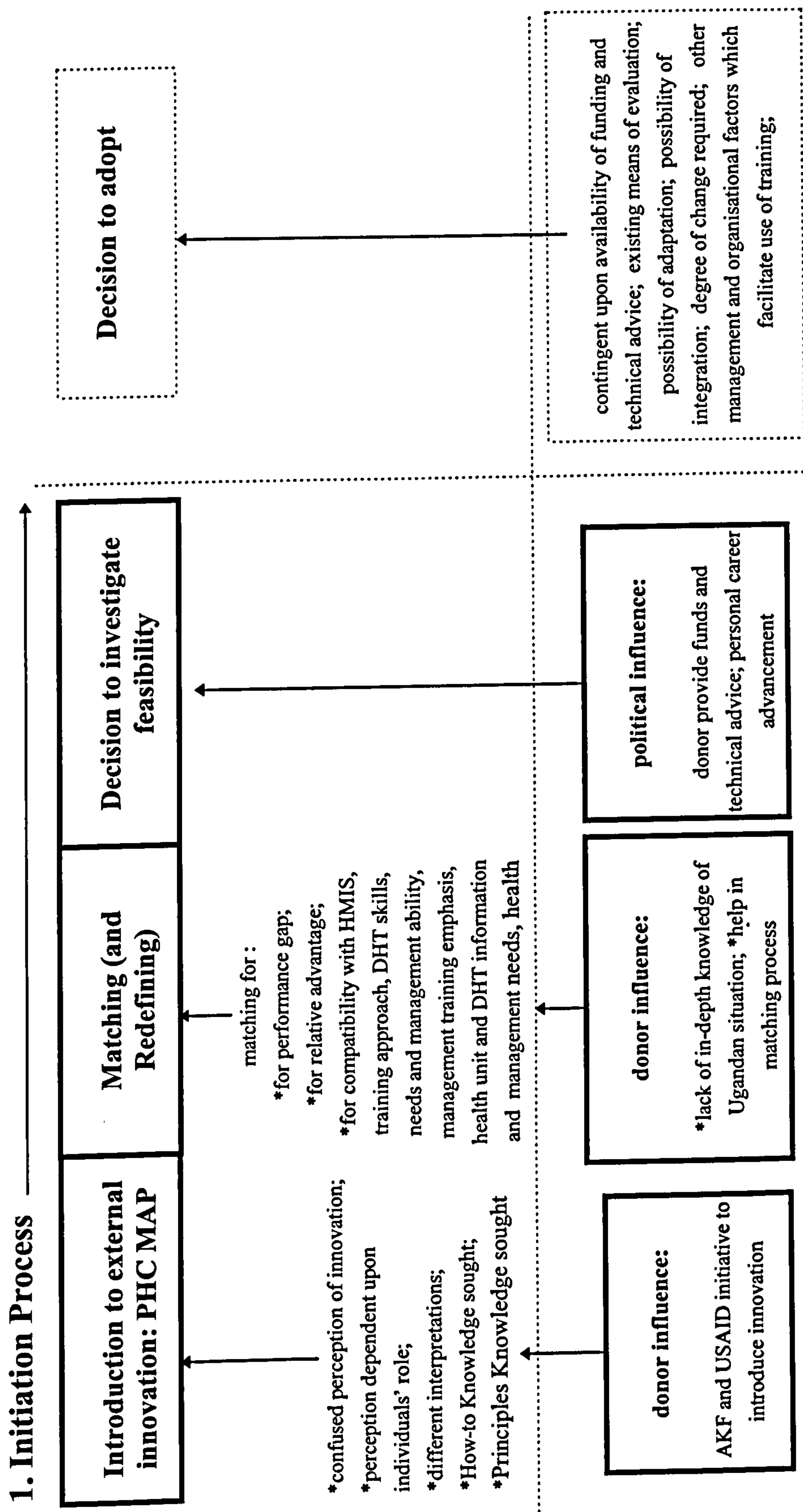


Figure 6-4 Model of the stages in the Innovation-Process when perception of PHC MAP is unclear

This may be because such a process was not taking place, or because evidence has not been found. It could be, however, that the existence of PHC MAP predates the Innovation Process, rather than a search for an innovation being initiated due to the defined need. Certainly, it was AKF who wanted to introduce the series to the health service providers and others in Uganda, rather than vice versa. There was a general awareness within the MOH and amongst other health service providers and funders, however, that some major changes within the health sector were necessary, to improve health service delivery and health status in the country.

As mentioned, AKF introduced PHC MAP to people who generally had no prior knowledge of the innovation. At the Workshop, and a few days later, the perception of the series purpose was confused, and it appeared to be highly dependent upon individuals' own roles. There were several different interpretations of PHC MAP, and thus Awareness knowledge was lacking, and How-to knowledge and Principles knowledge was being sought.

The Matching process, where an organisation investigates whether an innovation fits with an organisational need was being enacted at the Workshop to some extent, but this was widened to include consideration of whether various parts of the organisation were compatible with the innovation. Thus, some of the participants at the workshop felt that before deciding whether or not to use the PHC MAP materials they would have to know if there was a performance 'gap' in the Ugandan system, which the series could fill. This clearly relates to the need to have a detailed knowledge of the exact contribution PHC MAP could make and the effects of using the series. The relative advantage of the innovation, the possibility of adaptation, integration and the extent of the change needed to utilise the innovation were being considered. Also compatibility with many areas such as the HMIS, training approaches, skill of the DHT, needs, management ability, the emphasis on management training, rather than information management training alone, and with the needs of the health unit and DHT with regard to information management skills, was also raised.

As previously suggested, the Initiation Process, in the *Innovation Process* model, lacks clarity as 'Decision' is not seen as a process. Therefore, taking the 'Decision Process' concept from the *Innovation-Decision* model is useful. Individuals appear to first undertake the Decision to Investigate Feasibility, and then the Decision to utilise the PHC MAP series is contingent upon: the availability of funding and technical expertise; existing means of evaluation; the possibility of dealing with the other organisational and management factors which affect implementation; the possibility of adaptation; possibility of

integration; and, the degree of change required. Potential users may be partly drawing upon a conceptual model of organisational change, developed from experience or a theoretical knowledge, when they identify such factors as inhibiting implementation.

At the Introduction, Matching and Decision stages, the influence of the Donors or Innovation Developers, is apparent. AKF initiated, developed and introduced the innovation. At the Matching stage several people, regardless of organisation affiliation, envisaged a role for AKF either as funders, to clarify the contents or to act as technical advisers in other ways. Several participants at the workshop, however, suggested that AKF were not fully aware of the Ugandan situation, regarding the administrative set-up, likely decision-making process, time available at district level, and the problems being experienced in information systems and health service provision. For example, the assumption in PHC MAP appears to be the district would take the decision to utilise PHC MAP, but in practise this is more likely to be made at national level. Using Rogers's (1995) concept of the types of innovation-decision, one could suggest, that the decision to utilise the PHC MAP series was likely to be made at national level within the MOH. Later contingent-innovation decisions to utilise would need to be made at district level. As Figure 6-4 indicates, the donors also appear to greatly influence the decision to adopt or reject, by providing funding and technical expertise.

Finally, the requests from potential users of PHC MAP, to AKF, and the position AKF placed themselves in, could be construed as AKF acting as Change Agents. This is, "*an individual who influences clients' innovation-decisions in a direction deemed desirable by a change agency*", Rogers (1995:335). If AKF were to take on the role, however, they would need to decide when, and which of the seven roles of the change agent mentioned by Rogers (1995), they needed to perform.

### 6.3.4 Evidence of redefining

The evidence, with regard to PHC MAP in Uganda, has shown that reinvention or redefining was occurring prior to the decision to adopt, and not in the implementation stage. This was probably related to the perceived definition of PHC MAP, and it could be argued that more than one innovation was being introduced; one by the Developer who focused on information management, and the other by the Kenyan User who focused on the series as a management training package, with added supplementary materials. In addition some people saw the innovation as the '*informational approach*' to management. Thus, it may be a redefinition was taking place because the definition of the innovation, and its purpose was variable and complex, which is found in other research. Rogers

(1995) suggests several reasons for redefining, including the desire to simplify a complex and difficult to understand innovation; adopters lacking full knowledge of the innovation; because the innovation is an abstract concept; and because it is a tool with many uses, all of which could be relevant here. In Uganda another reason could be the inventors and change agents lacked full knowledge of the innovation.

## **6.4 Contribution of the Diffusion of Innovation framework**

The analysis above has indicated many of the concepts in Rogers's (1995) model of the Innovation decision process have proved very useful in interpreting the empirical situation in Uganda. Figure 6-1 portrays attempts to understand the evidence in terms of Rogers (1995) framework. Prior Conditions were raised as issues when considering the usefulness of the PHC MAP series in Ugandan health services, and the structure of the social system, as well as previous practice, felt needs, problems, and the norms of the social system was important. The Knowledge stage was a useful concept, as it allows the analyst to indicate Awareness-knowledge was given, but How-to Knowledge and Principles Knowledge was lacking and sought. During the Persuasion Stage, perceived attributes appeared to affect the decision to utilise, as Rogers (1995) suggests, though compatibility of the innovation with the existing systems, appears to need further deconstructing, in order to more usefully understand events, and make recommendations for future practice. It may be potential users have a vision of the organisational change necessary for specific kinds of innovations to be successfully adopted. Or it may be useful to think of an innovation as bringing a cluster of changes, rather than the idea of the innovation standing alone. The Decision itself to adopt or reject PHC MAP in Uganda was more complicated than the Innovation-Decision process indicates. It appears a Decision of Investigate Feasibility is made prior to the Adoption or Rejection Decision, which appeared to be contingent upon many issues which do not concern prior conditions, knowledge or persuasion. Thus, this analysis has suggested the empirical data points to a refinement of the Innovation-Decision concepts, and utilisation of other concepts may be productive.

This chapter has produced three models of the Innovation Process regarding the decision to adopt or reject PHC MAP. The rational approach, Figure 6-2, projected by the MOH planner was utilised when searching for funding, but the second interpretation of events, Figure 6-3, appears to be more realistic. The third model, Figure 6-4, like the second, indicates the Agenda Setting stage was bypassed. This may be because the innovation was unsolicited by the

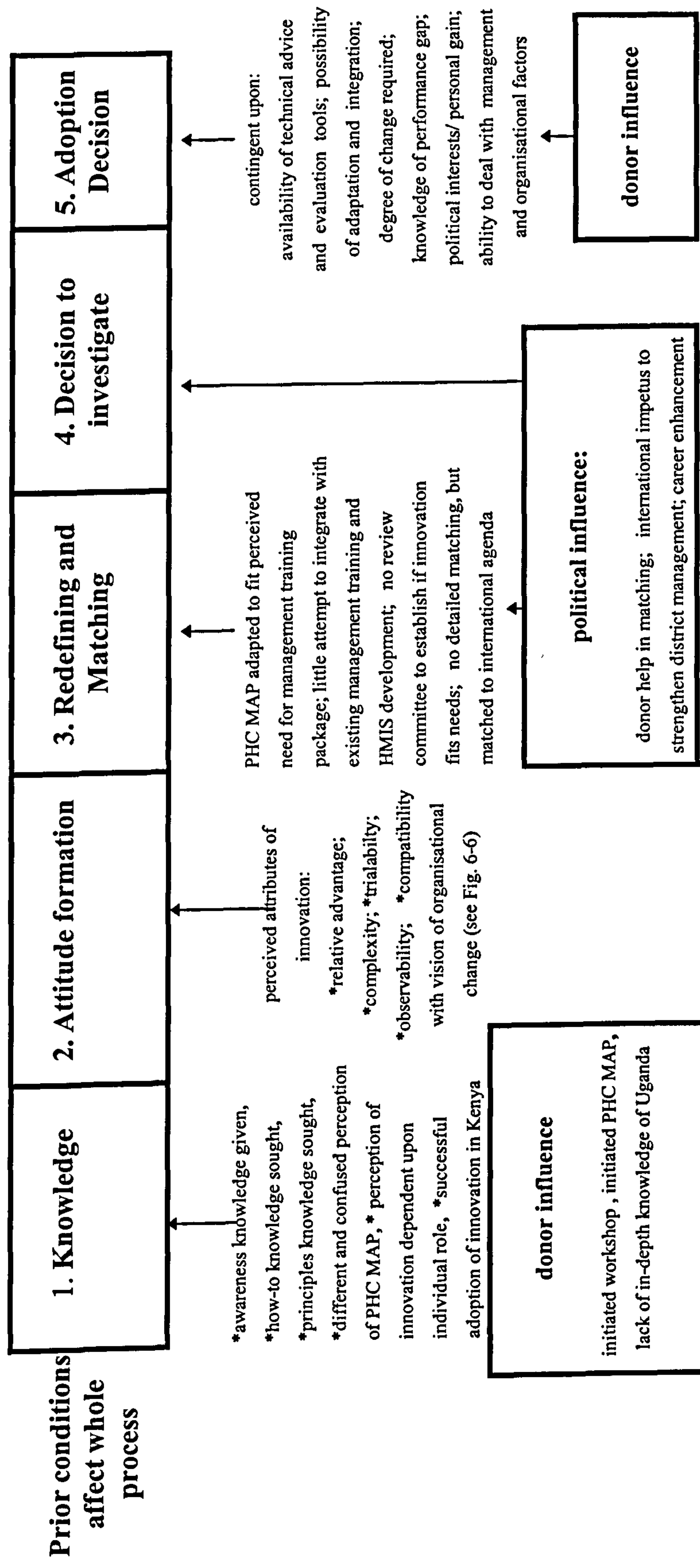
organisation, and suggests a refinement of Rogers's (1995) framework. The last model (Figure 6-4), which makes use of some concepts from the Innovation-Decision Process, but is basically the Innovation Process, appears to be the most useful in understanding the Ugandan situation, though it has limitations.

Matching has been shown to be a very complicated process, and it may be the disruption caused by the innovation needs be matched against some vision of the benefits to be gained. Some disruption may be acceptable and other disruption not acceptable. Thus, it is possible some deeper understanding of this idea and compatibility is needed. Potential users may have a vision of the organisational change necessary in order for specific kinds of innovations to be successfully adopted.

The Decision itself to adopt or reject the PHC MAP series in Uganda was more complicated than the Innovation-Decision process indicates for it appeared to be contingent upon many issues which did not concern Knowledge or Matching. Some of these are features of the innovation, and thus may be considered as perceived attributes, but others do not sit very comfortably within the existing concepts. Thus, in this analysis the empirical data indicate a refinement of the Innovation-Decision concepts, and use of other concepts may be productive. Furthermore, the strength of donor influence at all stages in the process has been apparent and yet these external influences are underplayed in the theoretical framework. Thus, it is useful to combine the two approaches and develop a further model, as in Figure 6-5. The detailed evidence is not referred to here as it has already been described earlier in the chapter

### **6.4.1 Model of the Ugandan situation**

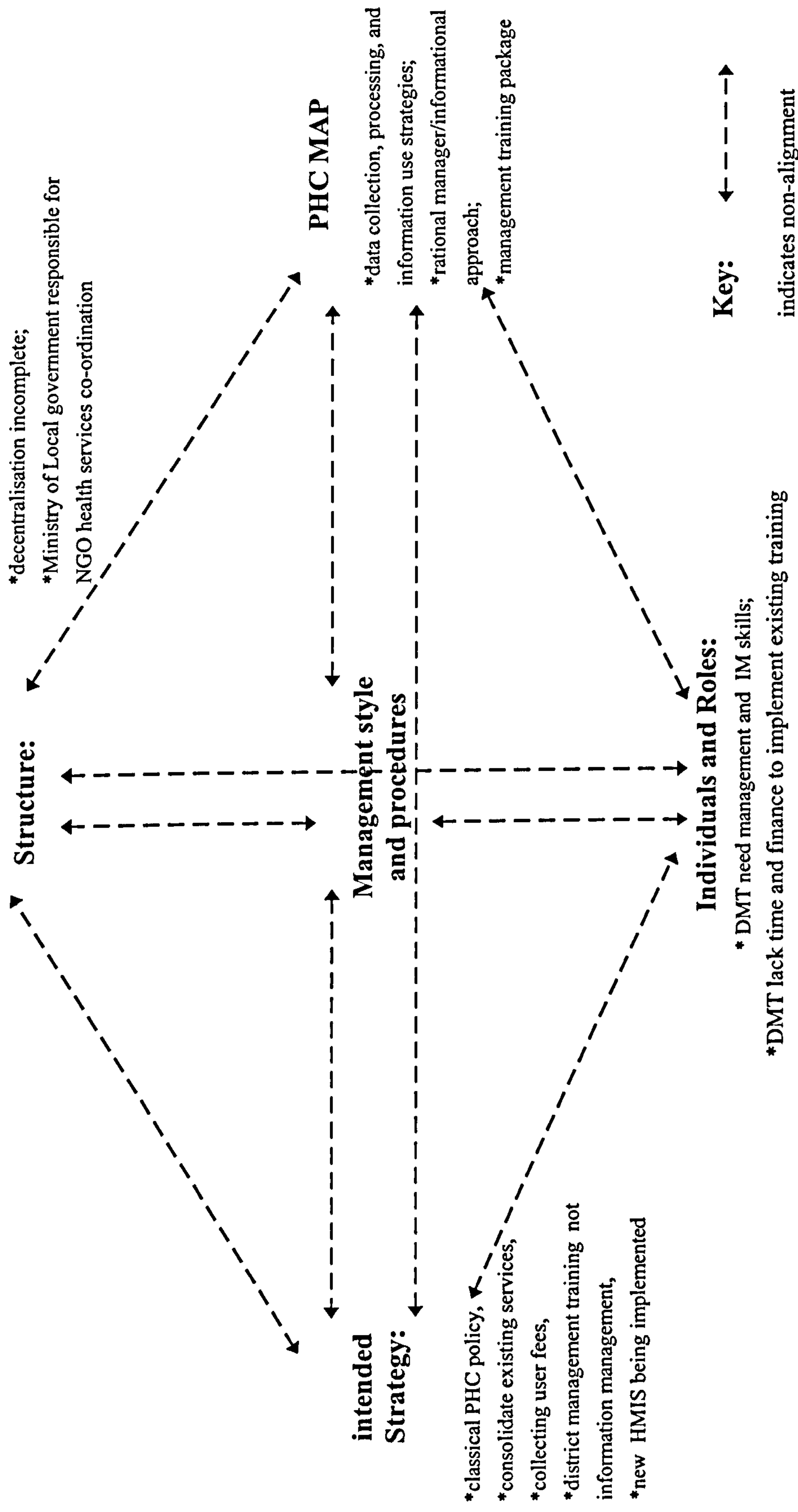
This model illustrates that the Actors concerned in considering the innovation underwent stages in both processes. At the workshop the Knowledge Stage was enacted, as Awareness Knowledge was given, and although How-to and Principles Knowledge was sought, it was not given satisfactorily. Conflicting definitions of the innovation were given - a situation exacerbated by the different definitions in the publicity material and modules themselves. Thus, the series was introduced as a training package to strengthen IM, a management training package (in need of supplementary material as in Kenya), and tools to provide information. At this stage, because of contradictory presentations, the participants interpreted the innovation dependent upon their own role, rather than how it was presented. The donors initiated this workshop, and developed the series, but lacked in-depth knowledge of the Ugandan situation.



**Figure 6-5 Model of considering PHC MAP adoption: combining Innovation-Decision Process and Innovation Process**

During the workshop, Persuasion, another of Rogers's (1995) stages appears to have been executed, but I believe this name does not aptly describe the Ugandan process. It could be more appropriately named 'Attitude Formation' and the Decision to Investigate the Feasibility of Adoption, rather than the Decision to Adopt, was being undertaken. Thus, perceived attributes were considered by potential users, including relative advantage, compatibility, complexity, trialability and observability. On the latter point the existence of a trial-by-others (presented by the Kenyan Trainer) did not answer the queries and offered a confused vision of the series.

Compatibility with previous practice including the existing HMIS, the support supervision training approach, DHT skills and management ability, and existing policy was important for potential users. In addition, compatibility with what Rogers (1995) termed 'Prior Conditions' affected people's attitude towards the innovation, particularly felt needs or problems, and the organisations' norms and structures. Felt needs and problems included: lack of DHT time; need for more financial and other resources at health unit level to implement existing training; training in data processing and use of information for health workers; need for logistic, supply and financial information; DHT difficulties in using information; DMO lacking management skills; Uganda's HMIS non-computer focus; and general financing of health services and training. Moreover, potential users suggested PHC MAP developers had inappropriately assessed the needs in Uganda, which indicates potential users were considering whether PHC MAP met previously perceived needs. The organisation of the health service had recently changed, thus norms (established behaviour patterns for members of a social system) and the existing structure of health services also appeared to influence Attitude Formation. The latter influences included: health service restructuring through decentralisation; the introduction of patient fees to be retained at health units, partly to supplement staff salaries; the desire to evaluate new practice; the MOH decision-making process; and a continued emphasis on comprehensive PHC place. Furthermore, compatibility with a vision of organisational change was important, as participants appeared to believe training and knowledge alone do not bring organisational change. Rather, they appeared to be drawing upon a conceptual model of organisational change, developed from experience or a theoretical knowledge, when identifying factors inhibiting implementation. Leavitt's (1965) model of an organisation existing in dynamic equilibrium has been useful here. Assuming 'Technology' is PHC MAP, it may be productive to change 'Task' to 'Strategy', add 'Management Processes' as an additional force, and change 'People' to 'Individuals and Roles' as Scott Morton (1991) recommended. Figure 6-6 depicts the five forces and issues raised, thus, although PHC MAP developers envisage a technical innovation needing implementation, potential users saw the situation as one of organisational change.



**Figure 6-6 Application of dynamic equilibrium model of organisational change: PHC MAP is not aligned to Intended Strategy, Structure, Individuals and Roles, or Management processes**



Innovativeness was an issue, as many workshop participants appeared very willing to use PHC MAP under certain conditions, though one participant voiced his annoyance at having materials imposed by external agencies.

Assuming the Decision to Investigate the Feasibility of Adoption occurs when an individual or other decision-making unit engages in activities leading to the choice to further investigate or not, such activities appeared to be taking place at the workshop and a short time afterwards. The Decision to Adopt or Reject came later. There was much discussion and the former decision appeared contingent on availability of technical advice, possibility of adapting the innovation, degree of change required, possibility of integration, existing means of evaluation, political and personal interests, and whether a performance gap had been identified which PHC MAP could fill. It may be the decision to investigate was also contingent upon political factors, including personal gain accruing to MOH personnel. Finally the possibility of dealing with other organisational and management factors which affected implementation was also raised.

After the workshop it appears as if a Decision to Investigate the feasibility of adoption had been made, and the MOH submitted a funding proposal to AKF requesting technical assistance and funding. This proposal, based on the perception of PHC MAP as a management training package, followed the Kenyan lead by suggesting supplementary material would be needed, which indicates adaptation and redefining had taken place. As mentioned before, little attempt was made to integrate PHC MAP material with the existing management training and HMIS development and implementation, and no review committee to establish if the innovation met the organisation's needs. No detailed matching was undertaken, as the international agenda of district management strengthening was invoked, by the MOH Planner, as the reason why the material was needed. This was the influence of international donors in operation. At the time of my field work no decision to adopt or reject the innovation by the MOH had been made because they had not received a reply from AKF regarding the funding and technical assistance request. The MOH Planner, however, believed donor rivalry was very strong and could influence management training programmes, to the detriment of MOH intentions for HMIS and management training strategies.

## **6.5 Conclusion**

This discussion has indicated the diffusion of innovation framework, as outlined by Rogers (1995), has been useful in understanding the introduction of PHC

MAP in Uganda. Some of the stages described in the framework were useful, and many of the concepts were valuable. Some of the concepts, however, need further deconstructing and the rational approach depicted has been questioned, especially as the interests of individual decision-makers do not coincide with those of the organisation. This, and other political influences, suggest a broader model needs to be constructed. Hence, Figure 6-5 combining both approaches, has been developed.

Not all the issues raised by the case study have been discussed here, but will be further developed with similar issues raised by the case study concerning HMIS implementation, in Chapter 10. Other research can contribute an understanding to the situation in Uganda, and that chapter will also focus on research which found similar concepts to those in Uganda, including adaptation of the innovation taking place at a stage different to that proposed by Rogers (1995), purpose of the innovation, uncertainty of purpose, adoption decision influenced by the change needed to accompany an innovation, complexity of the compatibility concept, proof of usefulness of the innovation, the need to be able to evaluate utilisation and the usefulness of an externally designed innovation.

As the empirical evidence from this case study and the examination within existing theoretical frameworks and theory suggest implications for practice, these are identified in Chapter 10. The contribution of this research to theory is reviewed in Chapter 11, and the next chapter is a case study of the development and planning process involved in changing the HIS in Uganda.

## **Chapter 7**

# **Development of the decentralised HMIS in Uganda**

# Chapter 7

## Development of the decentralised HMIS in Uganda

### 7.1. Introduction

Chapter 1 has noted that the government White Paper entitled 'Health Policy Update and Review' (MOH, 1993b), identified that improvements in the HIS were needed in order to serve middle-level management, that is the DHT. Until that time the government had intended the HIS should mainly be a morbidity and mortality reporting system with information flowing one way, from the individual health units to the district and national level. The detailed IM strategies of the HIS are identified in Section 1.3

This chapter focuses on the HMIS development phase, as the implementation will be covered separately, though development and implementation overlap. The cut-off I have taken is spring 1997, the point at which the districts not involved in the pilot began to be introduced to the HMIS. This also marks the beginning of the period of participant observation. The detailed information management strategies of the HMIS are identified in Section 1.4.

Section 7.2 describes the IS development process which I believe was undertaken. In the absence of a declared approach by the Designer, I have described the events in terms of the IS development process I believe she undertook, using the documents available. Section 7.3 comments on the approach, and the apparent difficulties and issues arising during the development are identified in Section 7.4.

## **7.2. Description of HMIS development**

As Section 2.6 has illustrated, there are many ISDM. Such methodologies should identify phases and sub-phases, techniques, procedures, a mechanism for communicating with system designers and an acknowledgement of the philosophical view concerning the introduction of an IS (Avison and Fitzgerald, 1988:4). This section reviews the material from the HMIS development in order to describe the ISDM used in Uganda. The evidence for the development process is limited, as my visits to Uganda were in 1996 and 1997, after most of the development had taken place. Thus, interviews are retrospective and much of the evidence is drawn from official documents produced as part of the development process. Appendix 8 identifies the events and publications relating to the development, and briefly outlines the purpose of the documents, workshop or event, where relevant. This table provides an understanding of the chronological process.

There is no definitive statement of the ISDM employed by the team developing the HMIS in Uganda, and it appears that a combination of two approaches may have been taken. The planning and development process is described below as a series of stages, utilising the approaches described by Rowley (1993), as Strategic Information Systems Planning approach, and Conventional Systems Development.

### **7.2.1 Stage One: problem identification**

In 1993 a government White Paper indicated that the HIS did not meet the needs of the new health management structure, or the need for efficiency and effectiveness. Therefore, the MOH decided the IS needed improving, and subsequently a study was commissioned from an external consultant in 1993.

### **7.2.2 Stage Two: Definition of the Designer's approach**

The consultant, after a very short investigation, provided a document entitled "Needs Assessment", and saw her work as the first stage in a long process in which she would play a vital role. This provides a pre-existing conceptual framework and strategy for determining what she considered were the Essential Information Requirements for operational management in Uganda, (Archer, 1993). It was not an operational document, and I do not know if she provided an Action Plan.

The conceptual framework included several principles, including the view that the IS should be based on health services routine management, “*relevant information, functional information and integrated programmes and administration*”. (Archer, 1993). The routine management purpose stressed that the IS was intended to serve the management roles of planning, monitoring and evaluation of performance, and the information was for decision-making. The Designer specified that the IS should mainly support health unit management, which is the operational level, and subsequently specified the appropriate information flows and level of aggregation appropriate to this. The relevant information, she suggested, could be identified by identifying the national policy and health programme objectives, but the operational managers’ needs would determine the essential information needs in the health unit level, initially. This, she claimed, was “*creating the system from the bottom up, and not from the top down* (Archer, 1993:1). To do this she suggested that the systems framework of inputs, procedures, outputs and outcome or impact indicators should be utilised. After the health unit needs were determined, it was intended that the district, and later national information needs would be identified. The functional information were the performance or management indicators, developed from the critical management issues in the daily operation of the health facility. These management issues were intended to inform the development of critical management questions. The Designer specified particular properties for the indicators, which were intended to facilitate the ‘management by exception’ method. This indicates that, “*Actions taken by the health staff are directed at the problem issues, leaving those issues that are within the range of acceptability to continue as they are*” (Archer, 1993:4). The integrated programmes aspect was intended to ensure that common information, data collection and processing were not duplicated, thereby giving one data source in the health facility. It was also intended that community-based information would be part of the database.

The application of this framework to the Ugandan situation was intended to determine the essential information requirements in Uganda. This would be done by identifying national policy and health programme objectives, and management responsibilities at health unit level. Thus the conceptual framework did not only prioritise national objectives and strategy, but appeared to assume that these objectives would be reflected in the objectives and strategies at the operational level facilities, as the HMIS Designer declared that operational level needs would determine information strategy.

### **7.2.3 Stage Three: identification of organisational strategy**

The Designer’s priority when applying the conceptual framework appeared to be to conduct a business analysis and identify the organisation’s strategic goals to

---

enable the strategic management perspective to inform the initial systems definition, as in a typical Strategic Information Systems Planning Approach (SSIP). This information was gained from the TYP 1993-95 (MOH, 1993a), which identified two major policy objectives: consolidation of existing services, and reorientation to primary health care. The former implies no building of new hospitals or health centres, but war-damaged centres would be rebuilt, with donor support. Furthermore, the need to account for donor funding, at the health unit level, had implications for the HMIS.

Similarly, by identifying the priority areas for PHC as: child immunisations, extensions of family planning services, health education in schools, control of communicable disease, improved nutrition, water and sanitation, the Designer was identifying these as the priority areas for the HMIS. The Rehabilitation and Development Plan 1991/2 to 1994/5 (MOH, 1990) gave more detail and hence the Designer identified, in addition to rehabilitation and building programmes, nine other programmes including a Community focus (improved water sanitation and community participation), Health Manpower Training and Development Programme, Management Support, Strengthening of the Health Education System, Uganda Essential Drugs Management Programme, Strengthen Primary Health Care Services, Control and Prevention of Disease among Children, National Population Programme, and the Uganda National AIDs Control Programme.

Archer (1993) appears to acknowledge that a major strategy for achieving organisational objectives was the decentralisation policy, and the TYP detailed the roles of the different MOH levels. Thus, the central ministry would take responsibility for policy, planning, supervision, ensuring technical quality and efficiency of health services, and the districts would be responsible for preparing, approving and implementing health plans, as well as integrating health unit-based and community-based health activities. The district would also co-ordinate other ministries involved in health related activities, and be the site for integrating health unit and community-based health care. The health facilities were to integrate all patient and client activities into one operational system, with the mandate to collect user-charges and community contributions. They were also to be responsible to their health unit management committees (HUMC) for revenue and efficient and effective use of resources.

Thus, the external consultant utilised the MOH policy documents as a way of defining the business objectives and strategies of the health service in Uganda. Acknowledging the existence of parallel IS and potential conflict, however, she

states she negotiated with donors and other influential stake-holders at national level. The focus of these negotiations is not known however, but it does not appear, from the documentation, that any other vision of the organisational objectives and strategies was utilised beyond those described in the official documents, which are government objectives. Neither is it known to what extent the critical management issues attributed to the operational units were devised by her or known as a result of consultation with operational level managers.

#### **7.2.4 Stage Four: definition and specification of a business model**

If this was a SISP approach, the next step would be to identify the business model, which includes business needs at the present time and up to five years ahead. It appears, however, that the Designer imposed her own business model on the organisation - the systems model of inputs, process, outputs and outcomes.

#### **7.2.5 Stage Five: assessment of the extent to which current systems satisfy the business model**

After identifying the conceptual framework, the Designer gathered information about the current HIS, and reviewed how it supported the organisation's needs, by applying the framework to the Uganda situation. She assessed it in relation to the national policies and management roles and found it did not meet the needs she had identified. Thus, she had investigated the functional requirements of the present system and whether the requirements were being met; any constraints imposed; the range of data types and volumes which had to be processed, and problems in the present working methods, which are described by Avison and Fitzgerald (1988:14) as appropriate to a systems investigation in the traditional systems development cycle. But the Designer did not appear to collect information on any constraints imposed, and exception conditions, which the authors also identify as usual at this point. Moreover, the Designer's investigation probably suffered from a lack of in-depth investigation into the different types of operational health unit, as the list of units consulted in her report (Archer, 1993) is limited in number and type. Neither did she, to my knowledge, produce the documentation usual for such systems investigation which Avison and Fitzgerald (1988:14) suggest is the usual procedure. The level of detail given at this point, however, was similar to that expected at the systems design stage, (Avison and Fitzgerald, 1988:15), as her design documentation contains details of input data, manual forms to be utilised, outputs of the system and strategies for utilising the data.



### **7.2.6 Stage Six: identifying data collection methods in relation to the management questions**

The SISP model at this point would identify the list of applications software requirements showing how these programmes relate to the performance of the new systems to ensure the success of the business function under consideration. In Uganda, where the IS is not computer based, the Designer specified the data collection methods in relation to the critical management questions, which encompassed the Designer's perceptions of the health system objectives, which in turn, could be interpreted as the business function.

### **7.2.7 Stage Seven: feasibility study**

The SISP approach would presumably include a feasibility study, though this is not mentioned by Rowley (1993). Usually, feasibility studies would also include: statement of manpower and time-scale needs; cost-benefit analysis; and evaluation of the feasibility of the project from the technical, human and operational view points, (Avison and Wood-Harper 1990:8). This was not included, though may have been part of a Plan of Action.

### **7.2.8 Stage Eight: consultation with stakeholders and revision of system design**

Stages two to six took place over a very short period, at approximately the same time, and are reflected in the report the Designer submitted to the MOH (Archer, 1993). Shortly after this, according to the HMIS Brief (MOH, 1995f), the government HIS Steering Committee was formed, which devised the HMIS terms of reference. There followed, it claims, a revision of those terms of reference, undertaken by the Steering Committee, national representatives from health programmes and the HMIS Designer. This led to the formation of a Counterpart Internal Consultant Team, consisting of a statistician, medical managers and planners, and an external WHO consultant who was a medical doctor, possibly with experience in information systems. It was intended that the HMIS Designer would play a significant role in the development of the HMIS, by advising the team.

It is claimed, by the Developers, that drafts of data collection formats and management questions were produced and discussed with selected health units, DHTs and national programme managers in autumn 1993. The drafts were based on the conceptual framework defined by Archer (1993), which took into

consideration health policies, and assumed management roles and administrative procedures in the health units. It appears that health unit information needs were not primarily determined by health unit personnel, however. The resulting comments were taken into consideration when the HIS Steering Committee revised the formats (MOH, 1995f).

The management questions in the manuals utilised during the pilot and final implementation stages, however, do not appear to be very different from those identified by Archer (1993) at the feasibility stage. This suggests that whatever negotiation with stakeholders took place, after the Designer had made her preliminary suggestions of appropriate indicators and data collection and processing, it had little impact on the manuals. In late 1993 a very detailed comment on the Needs Assessment (Archer, 1993) was written by the subsequent in-country HMIS developer (VanDamme, 1993). He had more experience of the Ugandan situation than Archer, and gave some alternative suggestions. It is difficult, however, to ascertain to what extent his comments were incorporated into the development process at this time, though they may be utilised in later revisions. Finally, a review of the proposed format and critical management questions supposedly asked at health unit level, was held in January 1994, and identified the information to be reported from health units to other levels. This review involved national level Programme Managers, NGO representatives, donors and health unit and district representatives.

### **7.2.9 Stage Nine: systems design**

According to Avison and Fitzgerald (1988:15) the systems design stage also includes systems testing and development of implementation plans. This took place in Uganda during the first half of 1994, when the selection of pilot districts, development of manuals for health unit level, identification of national trainers and the development of training manuals took place.

### **7.2.10 Stage Ten: pilot implementation**

Avison and Fitzgerald (1988:18) suggest that, in Conventional Systems Analysis, Implementation is the stage after systems design, when either phased implementation, parallel running, or a pilot run would be introduced. In Uganda, the training of Supervisors from two districts took place in July 1994, marking the beginning of the pilot HMIS. In the following month the first phase of health unit staff training began, focusing on collection and processing of data. It was not until November that the second phase training in the use of information to answer the designated management questions, was undertaken. December saw the

reprinting of the revised health unit manuals, and in March 1995 the pilot district received the district level HMIS manuals for the first time.

### **7.2.11 Stage Eleven: review and maintenance**

The final stage in Conventional Systems Analysis is review and maintenance (Avison and Fitzgerald, 1988:13). In Uganda an internal evaluation of the pilot HMIS was conducted at a workshop in May 1995, attended by the EDHT members and the HPU team, with the former writing a mainly positive report (MOH 1995e). Before the external evaluation the in-country developers produced a document giving their own views on the pilot project and suggestions for improvement (see HIS/HPU, 1995). The external evaluation team produced recommendations and action points (see Evaluation Team, MOH, 1995), which led to a revision of health unit and district manuals in February 1996. Other recommendations from the external evaluation led to attempts to define national level 'essential health indicators for the HMIS' by bringing together the national Programme Managers, in a workshop. This was intended to ensure parallel reporting was halted and to prevent the national vertical programmes constantly pressing for changes. It was also intended to determine the training schedule for the HMIS in other districts. Other issues found in both the internal and external evaluation of the HMIS were addressed in this workshop, such as who was to conduct analysis, and a review of the appropriateness of the critical management questions specified by the Designer. That workshop led to a revision of the format, forms and indicators which, after post-workshop deliberations, led to the production of a "Final report: the documentation of essential indicators for Uganda" (HIS, 1996b). It was intended those indicators would be the ones utilised in the training of all other districts in Uganda.

Finally, in December 1996, another set of HMIS manuals was published (MOH 1996a, 1996b, 1996c, 1996d) incorporating the March revisions. In January 1997 twelve people were trained to become Trainers for the HMIS, and the training of Supervisors and I/Cs in all other districts began, with the intention of the implementation of the HMIS in all other districts taking thirteen months.

## **7.3 Comment on the approach**

As mentioned above, it is difficult to assess exactly which ISDM was employed by the team developing the HMIS, in the absence of a definitive statement. It appears similar to Conventional Systems Analysis, however, which focuses on

the needs of operational management. It appears some stages were not undertaken, however, and others did not take place in sequence. It also has aspects of what Avison and Fitzgerald (1988:32) term 'Planning approaches', which aim to address the requirements of top management and the importance of ensuring information systems development coincides with, and supports the business plan. Some planning approaches may be hard systems approaches, with additional examination of organisational strategy. This appears in many ways to be the case in Uganda. Thus, the stages suggested by Rowley (1993) are reflected to some extent in the Uganda situation, though not necessarily in the sequence he describes. Furthermore, the HMIS Designer advocated consultation with various stakeholders, which is usually a feature of participative approaches, though the extent of this in practice is not known. Finally, as the HMIS, like the HIS, is not a computer-based system this affected the activities taking place at the various stages.

## **7.4. Discussion of the issues arising**

My review of the systems development process regarding the HMIS has led to the identification of several issues affecting the situation. These are described below.

### **7.4.1 The wider organisational setting**

Walsham (1993a:188) suggests that the socio-technical approach to organisational change developed in recognition of technical systems needing to match social systems. This was one of the inspirations of participative approaches to information systems development. Yet the evidence below indicates, that the technological issues dominated the planned change to the HMIS in Uganda.

The initial systems assessment, design and vision has a limited focus, for it appears that the external consultant did not address wider issues relevant to development of a new IS, and focused more on HMIS as only a technological innovation. Thus, the Needs Assessment document only focused on appropriate IM strategies for the health policies and the assumed management tasks at district level. It did not deal with other organisational issues, such as whether the I/Cs have the capability and training to manage the health units, carry out the data processing, and use the information, which would usually be part of a feasibility study (Avison and Fitzgerald, 1988). There was also a lack of understanding, at the planning stages, of the changes needed to accompany the HMIS, therefore, it appears the Developers and Designer had not realised the enormity of the task in

changing the IS, and did not appear to draw upon recent research. Furthermore, although the Needs Assessment was not an operational document, several areas could have been mentioned including: managing change, expected problems, timing or sequence of changes, and who was going to further develop and implement, for example, IS developers, management advisers, statisticians, and clinicians. Such issues are addressed in Mumford's ETHICS ISDM.

Neither was the HMIS Designer reviewing other organisational changes needed in order to facilitate the new HMIS, or dealing with the issue of non-use of information, establishing sense of ownership and other problems identified in the literature and manuals for HMIS development (such as WHO, 1993). The designer uses the systems conceptual framework, but if managers utilise a different approach, this implies they need to be trained to visualise health service provision and planning in this way, or the Designer should use the managers' framework. The SSIP approach, described by Rowley (1993), suggests a business model should be developed, which reflects the organisation's own business objectives and strategies, not an imposed model, as appears to be the case in Uganda.

The Designer intended the document she wrote, and the suggested indicators, should be considered by the HPU, the HIS committee, selected districts and health facilities. It is noticeable, at this point, that she is not suggesting all stakeholders should be part of the review such as international donors and heads of the vertical Projects, NGOs, private practitioners, mission and other health service providers. Neither is it clear which areas are available for negotiation, as this could include the assumed management questions of health units, the conceptual framework or indicators to be used. My research unfortunately has not been able to look in-depth at how this document was utilised.

Limited aspects of IS development dominated the internal evaluation conducted by pilot district teams and Developers. From 29 May-2 June 1995 there was a Workshop to review the pilot HMIS, about nine months after the initial training in the HMIS, and the participants included twenty-one people from the EDHT in the two pilot districts. The facilitators were the HMIS Developers from the Health Planning Unit, and the report was written by the participants. The discussion focused on HMIS training, the forms and management questions and concluded with recommendations. Each health unit in both districts was monitored and identified who received phase one and phase two training, the number of EDHT follow-up visits, and ranked for "*corrections, accuracy and timeliness*". It is not known, however, if these terms refer to data collection, processing or reporting to

the DHT (though I suspect timeliness refers to reports reaching District offices, which is an indicator of use to the DHT, not the health unit). The report's layout and emphasis, confirms to me health personnel defined the HMIS as set of forms and data to be processed, whilst the management questions, or utilisation of information are secondary, or not part of the HMIS. Finally, health unit staff opinions do not appear to have been sought for this evaluation.

Technological, rather than wider organisational issues, dominated the recommendations of the internal evaluation of the pilot HMIS. The Workshop report focused extensively on the thirty-four forms and registers, and on the eight tables to be completed within the health unit. Each was scrutinised for relevance and usefulness, and individual recommendations of adjustments, elimination or no change, were made. Some of the issues raised concerned: clarifying the format of forms, including quality of wording, quality of paper, need for pre-ruled lines and headings instead of adapting shop-bought registers; whether the health unit or DHT were responsible for calculating projected population figures; lack of action despite reporting of problems, such as faulty equipment; administrative and management issues, including all staff needing to be involved in cash analysis; lack of necessary equipment such as weighing scales; impaired effectiveness of forms, as incomplete referral forms inhibited the clinicians role; outdated management tools, as the list of notifiable diseases, did not including dysentery. One section of the report acknowledged other management issues affected the HMIS, including: lack of porters to clean health units, unpaid or late salaries, need to increase or lack of allowances, lack of maintenance of equipment and excessive workload. Thus, a wide variety of issues was raised, yet it is interesting to note the final Recommendations do not take into account many of the issues related to individual forms, and failed to emphasise the administration, management and structural issues which I believe have been highlighted in the main body of this report.

An assessment of the management questions for the health units' utilisation was made at the Workshop, and many were regarded as useful. Furthermore, a critique of the HMIS pilot implementation was made which focused on problems in training schedules, the amount of training and being overloaded in the early stages. Problems of moving from the old to the new system were highlighted, though no suggestions for dealing with those were made. The report also gave "*some examples of use of information*" from the HMIS which involved a huge emphasis on finance, accountability, transparency, availability of information and ease of compiling reports. But it is not certain if these were actual observed examples or merely projections of anticipated use. Overall there was a positive response to the HMIS by the extended DHT in the two pilot districts. The internal evaluation covered the HMIS pilot at district level as well, and focusing on DHT

training, recommending they should be trained in phases, rather than all thirty-nine districts at once. There were individual comments on the twenty-one tables to be utilised at the DHT office, which focused again on clarifying the forms, explanations of how to utilise the forms, and the management tool which was appropriate to the information. Comments were made on the HMIS introduction, focusing on the training approach and excessive work load. The problems created by the vertical programmes were cited, and again utilisation of data was described, though possibly as a wish-list rather than documenting observed cases.

The overall recommendations of the internal evaluation report focused on the health workers needing training in statistics, although this had not appeared in the main body of the report. From discussions with the Developers and others, however, I know that processing and analysis of data is a problem. Thus, it would have been useful if facilitators had focused more on this instead of only data collection. The Workshop could have been improved by a more rigorous emphasis by the workshop facilitators on the utilisation of data. This could have made the conceptual link between management tools and information. Furthermore, I think the training could have been improved by beginning with the management questions (either elicited or given), or decisions, and then asking what information was needed to answer those management questions. Thus, the focus of this evaluation was the technology itself, including the data to be collected, the data flows, points of processing and analysis. Although other issues were raised which related to organisational concerns they were not highlighted in the Final Recommendations, which focused only on the technology itself and the training in the technology.

The terms of reference for the external evaluation were limited, as there was insufficient focus on wider organisational issues. These terms were prescribed by the Designer and Developer, in relation to the HMIS initial aims in the Needs Assessment, and issues identified by the Developer and EDHT during the internal evaluations. The latter covered technological issues regarding the HMIS, and not all the wider organisational issues, though, some were mentioned.

The external evaluators, however, widened their remit and reviewed issues beyond the technical ones, but still many organisational factors were ignored. Extra issues included: management skills and training to some extent; stakeholder conflict and the need to compromise; problems of accuracy relating to the use of information by the collector; political climate; and motivation of the workers. One area addressed, by the evaluation team, was relating the complete management structure to the HMIS, which had not been a priority during the

pilot. Thus, they identified that the HUMC should receive information from the HMIS, as they played a management role at the health unit. Moreover, as the Sub-County administration was also an important player in health care provision (it provides the TBAs, other voluntary workers, and sanitation personnel, as well as leading health campaigns), they recommended it should also be informed.

Although the terms of reference were widened by the external evaluation team, this was not sufficient to gain in-depth understanding of the causes of problems. For example, several times it was observed recording of maximum and minimum stocks of individual drugs was not carried out. As this facilitates the ordering of drugs, lack of information meant another method was used to identify needs. Yet no recommendations concerning the teaching of this management tool, or further investigation, was made. Similarly, despite attending HMIS training, several investigated health units could not set targets, but no recommendation for training was made. Other problems with management practice at health unit level, including decentralisation, were not discussed. Neither did the team conduct an information audit to discover if the data and information needs of the health units were being met by the HMIS. Thus, it appears, either the terms of reference, or the conceptual framework utilised, restricted the Recommendations made, even though the findings are broader than those in the internal evaluation.

It appears that inappropriate people were blamed, due to lack of recognition of the need for organisational changes. Before the external evaluation of the pilot HMIS in 1995, the Health Planning Unit produced an internal evaluation document for the external evaluation team. This document blamed health unit and district level staff for poor performance of the HMIS, suggesting high staff turnover, slow learning speed, and a lack of initiative in collecting and compiling data, were the sources of problems. Yet it could be that, as the Designer and Developers did not understand all issues involved in developing the HMIS and the new skills needed, they did not provide appropriate training. Consequently a culture of blame, appeared to be developing, as HMIS Developers blamed the district and health unit staff.

It appears that the Developers and Designer did not recognise the implications of introducing the HMIS, and difficulties defining the HMIS were raised. They concentrated on the HMIS as data and procedures for the management of data, but not the new management roles, new job descriptions, and the notion of the rational manager, which accompanied those data and procedure changes, as the next chapter indicates. The HMIS also brought a cluster of additional changes, including the non-payment of form-completion from vertical programmes. The



lack of acknowledgement of what the HMIS was, meant there was lack of recognition, at an early stage, that the new IS had organisational implications. This affected the training conducted, which failed to put across the concepts of the HMIS and all the new skills needed. Moreover there were no guidelines on managing change, timing and sequences of changes, establishing ownership and expected problems. Neither was there any assessment of I/C ability to conduct the management tasks and information management expected of them.

The lack of recognition of other changes needed meant a change-over phase was not expected, and not dealt with in the Needs Assessment document. For example, the vertical programmes still required some of the HIS forms to be completed, even after the pilot stage had begun. This was interpreted negatively by the Developer, but the demand may have been due to the new forms not coming through, rather than an insistence on the old ways. The systems development model employed by the Designer, clearly did not take into consideration the social issues, which the socio-technical approach to work organisation typified by Mumford's ETHICS approach to information system development emphasises (see Mumford and Weir, 1979).

#### **7.4.2. Lack of in-depth systems analysis**

Conventional Systems Development includes an in-depth analysis of the existing system, but, this was not conducted adequately in Uganda. Therefore, the analysis of the technical problems, the reasons for non-utilisation of current information, the actual role and ability of health unit managers, and the extent of decentralisation was insufficiently investigated.

In addition to not acknowledging the wider organisational setting in the Needs Assessment (Archer, 1993), other IM technical issues were not addressed sufficiently. However, Archer did recognise that:

- it was difficult to ascertain how much data was collected at health units, because additional forms to those in the official HIS were used and there was non-use of official forms, sometimes incorrect versions of forms were used, and there was duplication of reporting, for example for the vertical programmes;
- there was no official or routine monitoring of maintenance and upkeep of buildings;
- a lack of records on staff performance;

- little up-to-date tracking of curative and preventive attendances; and no routine procedures for handling user charges;
- the monitoring of the knowledge and adherence to procedures was not routinely done or recorded;
- the HIS focus was on monitoring inputs;
- the excessive amount of data meant it was unrealistic to expect staff to identify the essential data to monitor;
- some health workers were using population figures to identify target attendance but their estimates were too high;
- the large number of categories on outpatient and inpatient reporting forms did not lend themselves to analysis, which was compounded by the lack of aggregation on forms;
- HIS forms did not facilitate specific diagnosis and treatment taking place in different rooms in the health units;
- forms lacked clear instruction, simplicity of format at times, and duplication was occurring even in the data collected and retained at the health unit level;
- health units did not conduct annual staff evaluation, and no records of this procedure were seen at the units she visited;
- and the reporting of notifiable diseases was informal in some health units.

Despite these findings the Designer made no attempt to identify the time spent completing forms, although she acknowledged that there were a large number of forms to be completed and a poor response rate. She focused on whether the information was being utilised to meet operational managers' needs, to some extent, but did not explicitly review the problems of processing and analysis. Furthermore, the last two points indicate that management tools were not being used appropriately, but her recommendations did not address this issue.

This section so far has indicated some formally-recognised HIS problems; however, it appeared that district and health unit staff had ideas which did not necessarily coincide with the official view. For example, one I/C developed his own cash-flow paperwork and financial analysis, because he did not realise the district was going to introduce these types of procedures to him. In effect, he had identified a gap in the HIS. Furthermore, a District TB/Leprosy Officer, when

interviewed, mentioned several HIS problems in his district. These included inaccessible information, though he thought computers helped in this matter; lack of a Medical Records Officer (MRO), for financial reasons, increased the burden on other DHT members; health units were not using the information collected; collection of data was a problem; poorly completed forms; monthly reports were often late; often a lack of forms; and often information would be lost.

There was also a lack of investigation into why the current information was not used. The Designer appears to make the assumption that if data collection and processing strategies are appropriate, other issues regarding utilisation of management tools and use of information would follow automatically.

The Designer did not conduct an investigation into the actual role and ability of the health unit managers, and the Developer believed she had misunderstood the situation in Uganda, regarding the actual structure and procedures of the health service. He suggested that the Designer misunderstood the level of responsibility, the management structure, and the skills of the I/Cs at the health units. [Several months after the report was produced, the Developer, who had more experience in Uganda, commented on the HMIS Designer's Needs Assessment (Van Damme 1993), and disputed her assumption of the management role undertaken by the In-Charges.] He suggested that in small health facilities the management tasks of planning, monitoring, and evaluation could not be left to the I/C, and in some large health facilities it was not only the I/C who could perform these roles. In his opinion:

*“In small facilities with few staff internal control is not possible. In this case it will be the district supervisor who will perform the checks and discuss the results with the H.F. (health facility) staff. In large facilities, with a lot of personnel, the I/C has an important function of management, supervision and control and most of the indicators have to be checked by himself. In hospitals monitoring of a subset of these indicators can be assigned to a senior staff member”.* (Van Damme, 1993:1)

Thus, he is concerned about the Designer's assumptions regarding I/C behaviour, and whether they use specific management tools, including checklists, targets and criteria for action, such as thresholds levels which, if reached, indicate a certain procedure has to be followed, for example notifying DHT about a disease outbreak. He also disputes that the HMIS needs to be based on specific management tools, such as targets, as he believes this is open to abuse. In his opinion the meeting of targets could become an end in itself, rather than improving health services. His other concerns focus on In-Charges lacking

---

decision-making power, although he does not use this phrase, and he feels the Designer was simplifying a complex situation.

He suggests the Designer has misunderstood the way Supervisors and I/Cs work, the decisions made and the availability of management tools at health unit level. It appears from his critique he has interpreted the list of questions in the Archer document as if she were proposing this would be used as a check list by which supervisors (from district or within the health unit) would conduct the supervision<sup>1</sup> of staff. My interpretation, however, was these were questions she assumed the In-Charges were asking themselves. His other point was that supervisors were not likely to formally monitor in this way, and he states: *“A check list is certainly a good tool, but it is questionable if in the long run supervisors, from the district or I/Cs will continue to transform their observations in formal answers to formal indicators”* (Van Damme, 1993:1). This implies that he is not expecting the supervisors to monitor, in a formal way, the operation of the health services. This may be a reflection of his view of the ability of managers, or his knowledge of what is expected of managers. Either way it is a vision of managers which is not in keeping with the vision of managers who are utilising a HMIS. For this type of IS assumes managers make decisions based on evidence or information, rather than conducting activities because that is ‘how they have always done things’. It may be the Developer’s vision of the I/C role is more accurate, but if the HMIS is dependent upon a different vision, a way of changing the role of the I/Cs needs to be developed.

Finally, the Developer suggests the Designer has misunderstood what is feasible in health units. He considers each of the management questions individually, and his critique focuses on: a) the Designer underestimating the extent of decentralisation for I/C’s do not have complete financial control, as some remains with the DHT; b) the Designer advocating extensive monitoring of the buildings, stock, equipment and work-load of staff which is unrealistic and inflexible; c) the management tools advocated are not appropriate for rural health units, for example, minimum-stock levels; d) the non-existence of financial accounting systems to monitor cash flows, e) some management questions being more appropriate for district, not small health units, f) the indicators chosen being open to interpretation, and not measuring what the Designer intended, g) questioning whether the monitoring of fertility, morbidity, mortality, comprehension of health

---

<sup>1</sup> The Developer may have interpreted in this way because of the support supervision approach utilised in Uganda, which Archer did not know. However, this interpretation may also account for the misunderstanding by the DMRO in one of the pilot districts, who thought the management questions were not for the I/C, but for the DHT to utilise.

messages, the health environment and the community should take place from the health facility. The Developer believed this monitoring was only useful, or feasible at the district level, and would need to be established by special surveys, h) whether the impact indicators advocated by the Designer, for example levels of malnutrition, were within the ability of individual health units to affect on their own, and i) whether data collection should only taking place if an action or decision, related to that information, was possible.

Some of the Developer's comments appear to indicate fundamentally different views of appropriate information strategies. Furthermore, he gives a detailed suggested list of management questions for the I/C, and makes it obvious which of Archer's questions he believes should be for the district, not the health unit level. He also identifies some extra management tools necessary for the functioning of the health unit, especially those which are staffed by not very extensively trained personnel. In particular he advocates the use of diagnostic guidelines, as well as treatment guidelines, saying,

*“Patients don't attend the centre with a diagnosis but with a complaint: fever, vomiting, fatigue, abdominal pain... How to treat a child with 40 degree of fever and who convulsed once, how to tackle the problem of a woman with abdominal pain..etc... are the practical problems of a health worker has to resolve. Diagnostic guidelines would be a very useful complement to the existing treatment guidelines. The national treatment guidelines also describe very few symptomatic treatments: high fever, convulsions, headache.” (Van Damme, 1993:42)*

This major difference in opinion regarding the state of affairs in the health units may reflect Van Damme's greater knowledge of the situation, or illustrate that the Designer was designing an IS based on a theoretical model of the health units. I do not know, however, if, in identifying revised critical management questions to enable information use, the Developer is using his understanding of the I/C role, or if he has spoken to their representatives in order to establish whether these are pertinent management questions for them. Neither do I know whether his comments were taken into account when taking the HMIS implementation forward at this point, although the external evaluation in 1995 did recognise several of these points were valid.

The Designer's intention that the HMIS should meet the needs of health unit management seems to have been initially unfulfilled, as she appears to have incorrectly identified the management role played in health units. Thus, in March

1993, during the devising of the national indicators, there was also a revision of the data which would be collected at health unit level in recognition that some was more appropriately collected by the district staff routinely, or by sample survey, and some during sentinel surveillance by selected health units. Moreover, although the Designer advocated the information from community-based health workers, such as TBAs, sanitation workers and others, should be part of the health unit data base, it was decided not to incorporate their information into the HMIS, because such people were not managed from the health units, but from sub-county headquarters or district health quarters. Again this may indicate a lack of understanding of the management structure at the design stage.

Finally, there was a lack of understanding of the extent of decentralisation and the management style, at the design stage. Archer (1993) assumes complete decentralisation had taken place, which was not the case, and specific management tools were assumed to exist. There was an assumed link between information and management tools in the health units, but I do not think this was investigated by the Designer. She also appeared to assume the I/Cs were managers, and data and information would be used simply because it existed, thus she appears to be basing her approach on the idea that 'rational managers' worked in the health units.

### **7.4.3 Problems regarding the bottom-up approach**

The Designer specified that the HMIS should be developed from the health unit upwards, which she described as 'bottom-up planning', in order to ensure health unit managers' information needs were catered for. However, it was district and national level stake-holders who were guiding the process, and little input appears to have come from health units. It appears other levels identified the health unit management issues, based on their own agendas. Moreover, after the Essential National Indicators had been devised in March 1996, the health unit and district level HMIS manuals were further revised.

Thus, the desire for a bottom-up approach appears to have conflicted with the desire to allow participation in the development of the HMIS, and was possibly influenced by the most powerful stakeholders. The Designer appears to have assumed that the most important stakeholders would be international agencies, district managers, politicians and some members of the EDHT, and appeared to place less emphasis on the health unit managers. Thus, even at the early planning stage the bottom-up approach did not appear to include health unit managers having major input into designing the HMIS features. Moreover, the Designer

appeared not to have identified strategies to facilitate meshing together the needs of different stake-holders.

Consequently, the Designer appeared to have a limited view of the policies and agendas assumed to be relevant to IS development. She suggested that two major policies should guide the development of the HMIS: the consolidation of existing services and a reorientation to primary health care. Yet different stake-holders had different agendas, which suggests that other policies or agendas needed to be considered. For example, some stake-holders were interested in promoting SPHC, rather than CPHC. Furthermore, not all the PHC principles could be monitored by the indicators chosen by the Needs Assessor, such as equity, universal coverage, community involvement. Neither was there any allowance for a dynamic system, which allows a change of indicators, to deal with changing circumstances. This situation could have arisen because the Designer did not realise which PHC principles Ugandan health services supported, or believing that surveys were more appropriate for monitoring PHC principles. Furthermore, the Designer and Developer may have had hidden agendas which affected HMIS development, as they appear to have a desire to reduce the power of vertical programmes and international donors, at the same time as developing a new HMIS. For example, Archer (1993:35) suggests that needs assessment would be followed by negotiations with a specific set of stake-holders, regarding the indicators and management questions proposed. Yet the list of stake-holders did not include the international donors and vertical programme managers. The possibility of manipulating the process so that only those groups with the 'right' views are involved is mentioned by Avison and Fitzgerald, (1998:37), as likely in participative approaches to IS development.

In addition to the main two policies identified by the Designer, other organisation strategies needed to be taken into consideration. For example, implicit in the management questions utilised, was the change to 'cost sharing', which involves patients who can afford to, contributing towards health care. Thus, management tools and data collection needed to focus on cash flow and budgets at the health centres. The Designer did not ignore this issue, but saw it as an issue of health unit functioning, rather than a policy to be taken into consideration, which could have repercussions.

The HMIS Developer suggested that the final IM strategies and indicators reflected the power of stake-holders and the national organisational policy objectives to a large extent, rather than the information needs of health unit managers. For example, it appears that the international agencies' demand for

specific data had over-ridden the intention that data should be collected only if of use to the health unit. Thus, some of the detailed family planning data, collected by each unit, is utilised by an international development agency in reporting to their international headquarters, and for monitoring of their programmes, rather than to inform the I/C's decisions.

Although the Developer was aware that some ISDM recognised many stakeholders should be involved, he was not very happy with this process. I believe this was because he did not think it was appropriate for external donors, with large amounts of money, to influence health services policy. In particular he did not approve of their emphasis on selective primary health care which also influenced IM strategies within the HMIS. He perceived himself to be in struggle with those international agencies, other government departments, and district health teams, whilst considering himself as supporting staff in the health units.

#### **7.4.4. Major changes to the IS development methodology**

Only after the pilot had been operating for more than one year did Developers realise that other organisational change was needed when introducing the HMIS. For example the Developers, having identified what they considered was a lack of co-operation and co-ordination from the DMOs, national and donors suggested there was a *“vital need for the Ministry of Health to communicate the importance of a HMIS for the basic operation of the health services and to create a policy or protocol that governs the collection of routine at health units”* (MOH, 1995e:2). This recognition of the need for a national Information Management Policy could indicate a lack of expertise in developing information systems. Alternatively, it may indicate that an inappropriate developmental approach was taken.

Similarly, it appears that it was only during the pilot's informal review that the Developer recognised HMIS training should cover management skills and use of information, such as rapid assessments using records review, supervision skills, logistics management, organisation and retrieval of information, and accountability. Moreover, the HMIS Developer (seconded from WHO) had a copy of a WHO practical manual for developing health management information systems (WHO, 1993b), and cites it as a reference. Several of the problems he cites post-pilot are mentioned in this, yet he appears not to have taken these into consideration at an early stage in the HMIS development. These include realising that an inappropriate training approach had been utilised. For example, a large proportion of the pilot training was away from the health unit, and assumes those trained would share skills with others on their return, which was not always the



case. It was only after the pilot implementation the Developer realised the HMIS was broader than originally conceived, in particular, that it was not just for medical records, but for general management, indicating all the DHT needed training, not only the MRO. Hence his recommendation for all health workers to be trained in IM, and all training and education programmes to have an IM component.

The lack of guidelines for detailed action from the external evaluation team may also indicate an inexperience in developing information systems or an inappropriate development methodology. For example, one recommendation was: *“The in-charges and supervisors should ensure that all health unit staff recognise the importance of the data they record through the use of HMIS for informed decision-making”* (Stefanini, et al. 1995:36). Yet no actions, to accomplish this were specified. Furthermore, although it was recognised in the health units *“training and supervision are not yet adequate and a special effort is required to help weaker staff to make better use of the information collected, especially by linking it to management practices”* (Stefanini, et al. 1995:ii), no suggestion was made to train I/C’s in management. Again the same document suggested *“supervisors should link the HMIS with the management practices of the health unit”*, but it was not specified how this was to be accomplished.

#### **7.4.5. Problems with English language and technical terminology**

It appears that language difficulties arose during HMIS development, an example of which is obliquely highlighted in the evaluation document. The evaluators, quite appropriately, defined their term ‘use of information’ and said *‘a form or register is considered ‘used’ if any action or decision has ever been taken to react to some information contained in it.’* (Stefanini, et al. 1995:13). Yet consideration of English as a second language was not dealt with in HMIS manuals, despite health unit staff being expected to gain knowledge of the HMIS by reading the manuals. There is great potential for misunderstanding the terminology, even amongst people with good English fluency. Furthermore, during the external evaluation investigators found some health workers said they developed graphs using the data collected, yet close observation of such graphs indicated this was not the case (Stefanini, et al. 1995:10). This contradiction may have arisen for many reasons, including misunderstanding the words used. To some extent the Developer recognised this problem during implementation, and was searching for a way of simplifying the HMIS manuals. But such a fundamental issue as utilising a new technical language, plus using English with many people for whom it was not their first language, should have been addressed at an earlier stage.

#### 7.4.6. Different views on the management level to be served

There are different views on which level of management is to be served by the HMIS. The Designer focused on an HMIS serving health unit management, but some MOH documents suggest the HMIS should be for district level. Moreover, the external evaluation appears to focus on the HMIS for district management, as the authors state the district is expected “*to acquire the capacity of effective decision-making*”, and district managers are perceived to need “*relevant, accurate and timely information*” (Stefanini, *et al.* 1995:1). This may also be the reason there is less emphasis on the health units acquiring management training and skills in complex data processing in the evaluation.

### 7.5. Conclusion

This chapter has identified the IS development process undertaken in Uganda, by asking if there is a model which provides a sequence for the categories emerging, and the issues and problems arising during my examination of the process. It appears that no one approach describes the process in Uganda, as the issues arising can be related to features of several approaches. Furthermore, the idea of preconceived problem-perception limiting understanding of a situation, and hence the strategies for improvement, (as is mentioned in the literature review), is borne out in the developmental approach taken in Uganda. Hence designers and developers focused on the HMIS as a technological innovation, rather than considering the wider organisational setting, partly as a result of a lack of in-depth systems analysis. Consequently, evaluation during the development process found important aspects which had not been taken into consideration at the planning stages. Unfortunately, the evaluation did not broaden out the planning and development process to include many of the necessary organisation changes, though some were addressed. Major changes in the IS developmental methodology during the process indicates an inappropriate developmental model, or lack of expertise in developing information systems; problems with language; different perceptions of the management level to be supported; and problems of the bottom-up development approach, are all areas which have arisen in other research. Further discussion of these issues is in Chapter 10.

This chapter has described the HMIS development process, including the pilot. The next chapter presents the findings of the ethnographic investigation following HMIS implementation in 1996 and 1997 in the non-pilot districts, with the aim of understanding the process and the issues emerging.

## **Chapter 8**

# **Process of moving from the HIS to the HMIS in Uganda**

---

# Chapter 8 Process of moving from the HIS to the HMIS in Uganda

## 8.1 Introduction

This chapter describes some of the process of moving from the central reporting system to the new HMIS, which aims to support operational management. In doing so it contributes to the first research question in this thesis. The focus is on implementation, as development has been covered in Chapter 7, although the two are very close with some overlap. For example, during implementation an appropriate training approach was still being developed and unforeseen problems arose, which should have been addressed during development. A description of the themes and relationships arising out of the interviews, observation and examination of relevant documents is undertaken, and, to facilitate anonymity, individual names have been erased and their role referred to instead. An explanation of titles is given in Appendix 4.

The key national level actors in the HMIS implementation process were the Health Policy and Planning Unit (HPU) personnel from the MOH, including the HMIS Developer and his assistant, and twelve Trainers. The intended HMIS training relied upon a cascade approach. HPU staff taught Trainers and Trainers taught the EDHT to become HMIS Supervisors. The EDHT consisted of the district staff working from the district headquarters and the Medical Officers from district hospitals or other large health units. The former numbered up to thirteen, and could include the DMO, Assistant DMO, District Health Visitor (DHV), District Health Inspector (DHI), District Leprosy and TB Supervisor (DL/TB), District Health Educator, District Nursing Officer, Drug Inspector, District Vector Control Officer, Family Planning Co-ordinator, Medical Records Officer (MRO), and the Ophthalmic Clinical Officer. Supervisors had the task of training I/Cs, first on a two-day sensitisation course at district headquarters, and then on monthly or by-monthly visits to health units. It was intended that the person attending sensitisation training would pass on knowledge to other health workers at the same health unit. Training by Supervisors in health units would be for the I/C, and other health staff, depending upon the forms and management questions being dealt with. For example, the stores person was trained in the control of drug stocks forms, and laboratory technician was trained in the laboratory register, but both people would not need to be trained in each form.

Initial training of Trainers took place in two districts in January 1997, and Trainers were supervised and monitored by the HPU members. Training of Supervisors took place during an intensive three week session, during which time four Trainers trained the Supervisors, one district at a time, with occasional input from the Developer. Therefore, three districts were trained at any one time, and the forty districts would be completed in approximately thirteen months. The Supervisors' initial training was later supplemented by supervision visits from the Developer, or Trainers, to deal with problems ranging from teaching and implementation, to logistics and financial issues. The Developer contended that this training was solely concerned with introducing the new HMIS and was not management training, which was conducted by others. The Trainers were very competent, many having had training experience at national level in either clinical or management skills.

The Supervisors' training was to cover data collection and processing, as well as information use, for their own purposes at district level and for them to pass on skills to health units. The systems conceptual framework and HMIS general approach was also to be covered. Health worker training was in data collection, data processing and information use. The latter was to focus upon specified management questions, recognising that the use of information was difficult for the health workers. Hence the Assistant HMIS Developer said, "*we emphasise the [management] questions*", in supervisory visits from the extended DHMT. In addition, Supervisors were expected to teach, during support supervision sessions, the use of management tools, such as targets, and stock control. It is not clear if this would be a first introduction to management tools, or whether the intention was to refresh memories. As there was an existing IS, the training at health units was also to focus on integration of existing forms with the HMIS, rather than only replacement. This was especially necessary in NGO health units where they may have additional data collection for their own purposes.

## **8.2 Themes and relationships arising**

### **8.2.1 Differing definitions**

Defining what the HMIS was, or could achieve, was a focal issue, and the HMIS Designer and Developer appeared to have different opinions compared with Supervisors, Trainers and health unit personnel. It could be that their interpretation of the HMIS depended on how it impacted on their jobs, however, even if they had been given different information by developers initially. The

HMIS Designer saw the HMIS as a set of procedures to process data into information and the utilisation of information to inform decisions, or answer management questions. She envisaged it would support operational management at health unit level. The HMIS Developer's view appeared similar to the Designer's, and he claimed health unit management questions guided identification of data collection and processing. Furthermore, he maintained that those management questions were identified in HMIS manuals to help health unit managers to utilise information. He acknowledged the HMIS could be of use at the district level, however, even though it was too difficult, and not appropriate, to have specific management questions for that level. He also appears to suggest I/Cs were moving from a situation where they had not been using HIS information, to a situation where they were now expected to use HMIS information to manage their workload. Although the Developer did not use the words, he implied that an underlying intention was for I/Cs to make decisions based on information, and not on 'gut-feeling', as in the past. Despite his claim for the HMIS to support health unit operational management, he also suggested too much routine data was collected by each health unit and he thought an IS based on sentinel site surveillance would be more effective. Such a system would mean each unit would not be collecting data, but only a specified sample of health units. This indicates to me there is a strong possibility he was thinking the HMIS was for district or national decision-making purposes and not operational level decision-making.

A DHV, who was a Supervisor and senior member of the DHT from a pilot district, claimed the HMIS enabled her to be more effective in her work. Her definition of the HMIS included for example, the use of information to trigger specific actions, as well as new forms and data processing procedures. She focused, however, on how the HMIS benefited her, not the health units, and admitted that she failed to introduce all the HMIS management questions to health unit managers. The DMO in the same district defined HMIS by focusing on data flows, rather than use of information at health unit level. He found it problematical for child growth-monitoring data to come to the district office, when he was not obliged to forward it to the national level. He acknowledged the new forms and data processing aspect of the HMIS, but did not focus on the shift in purpose to serve health unit management. Furthermore, he had not introduced many management questions when conducting supervision. The MRO in the district saw the HMIS as new forms and new data processing procedures. He did not promote the use of management questions when conducting support supervision at health units, for he thought these were for the district team to use. Nor did he include himself as someone who would be utilising the questions.

The Trainers' views of the HMIS focused heavily on forms and data processing procedures, but there was emphasis on linking information and management tools, especially at district level. Examination of the management questions was not part of the classroom-based curriculum for Supervisors or health-unit managers, however. One would, therefore, have expected the questions to arise during on-the-job training of Supervisors by the Trainers, but I do not think this took place. For example, the introduction of the HMIS register for health unit laboratories, by one Trainer, began with a comparison between the new and old registers. The new procedure was for each specimen type, such as stools, blood and urine to have its own register, which would facilitate monthly monitoring of chemical reagent supplies. The differences in the two procedures were discussed, but the management questions were not raised. Thus, this Trainer focused on forms and procedures at the health unit level, and this appeared to be the approach of most Trainers. One Trainer, however, during the Sensitisation of I/Cs (the classroom-based training), did seem to project a vision of information gathering being aligned to the management role of the I/Cs.

### **8.2.2 Inappropriate IM strategies**

The HMIS Designer, when identifying relevant IM strategies, appears to have made several assumptions about health unit staff and procedures, which appear not to be enacted in practice. HMIS data collection, processing and information use assumes that a certain level of general education, and specialist training, had been undertaken by health workers. I believe this assumption is unfounded, however, especially in some smaller health units. For example, the small number of support supervision visits in HMIS training, assumes that health unit personnel quickly grasp new skills, such as statistics.

Furthermore, the English language is the means of oral and written communication in the HMIS, yet some I/Cs have insufficient language ability for this. Several health centres I visited were staffed with workers, even I/Cs, with whom I had to use a translator, as they were unable to follow when I spoke in English, or showed them written material. Some had better reading and writing skills compared to spoken and listening in English, but the HMIS documents were too difficult for some I/Cs to understand and the HMIS Developer recognised this. In particular, nursing aides, trained mainly on-the-job, not in the classroom, had poorer English language ability.

The Trainers also assumed I/Cs could easily be taught various methods of data processing, but this was not always the case, especially compiling graphs, and

even after three years many I/Cs in pilot areas had problems. In addition, many health units did not have the equipment and/or expertise to diagnose all of the diseases monitored in the HMIS, which indicates that data collection was not linked to diagnostic ability. Nursing aides with low education level often could only make simple diagnoses, yet were often in charge of health units. Furthermore, the HMIS, and its training approach appears to assume a certain amount of management training by I/Cs, which I believe is not the case for most, though senior people working in hospitals often received such training. Thus, some health unit staff did not have the ability, level of expertise, management training or equipment assumed by the HMIS Designer.

Although I do not think a study confirmed this, the Developer believed HMIS data collection demands were too great, and there was high risk of poor quality information being collected from many units, especially with nursing aides in charge. Inappropriate data collection, not linked to use of information, was also an issue in the new system. For example, the Developer believed the HMIS should follow a reduced number of diseases in the routine system, with a focus on notifiable disease which were linked to decision-making. Moreover, because the morbidity pattern changed very slowly, he believed it was not useful to collect large amounts of morbidity information as it would not inform decisions, and would not be useful at health unit level. Therefore, instead of collecting morbidity data within the routine IS from every unit every month, he proposed collecting data on non-notifiable diseases from sentinel sites.

The Developer also thought data collection should be linked to decision-making, such as for individual patient management. The strategy of data collection focusing on diagnosis of illness rather than symptoms, which is the HMIS approach, was criticised by some people. For example, the Developer felt the *“focus should be on symptoms such as fever, ARI, diarrhoea, rather than expect sophisticated diagnosis beyond the capacity of the In-Charge and the equipment”*. This approach was supported by an NGO Management trainer, who argued symptom identification, not disease diagnosis, was always part of decision-making tools in the health unit. For example, using a diarrhoea decision-tree guides questioning and helps the health worker identify if there is vomiting, and whether the diarrhoea is persistent or not. Answers to those questions would direct the worker to a specific treatment, but not necessarily to full diagnosis at that stage. In this case data transferred to aggregated tally sheets could be diarrhoea and vomiting, which are the symptoms, instead of dysentery or something else, which is a diagnosis. Thus, the Developer and the NGO Management Trainer believed data collection should be linked to decision-making and the diagnostic reality in health units.



### 8.2.3 Inappropriate IM strategies for operational management

It appears the HMIS Designer was not completely aware of existing management roles enacted at health units, and these issues were not adequately addressed during implementation. Ugandan health units range in size, type, quality, and funding agency, yet there is only one set of HMIS documents and critical management questions. This assumes, there are standard management questions and management practice regardless of differences. In practice it appears management practice differs amongst the different units and differs from the HMIS Designer assumptions. The HMIS Developer held a different opinion to the HMIS Designer on the appropriateness of critical management questions. He thought they were too formal and were not the only ones asked by health units. In his opinion it was useful that many demanded a 'yes', or 'no', answer, but he also believed some demanded more in-depth searching, which was not facilitated by the HMIS. He also thought there was insufficient emphasis on using information to solve problems in health units, and this could be remedied by utilising a problem-solving training approach during support supervision. In his opinion I/Cs should additionally formulate their own management questions. The frequency of asking certain management questions was also different in some units, compared to Archer's (1993) assumptions. She, for example, assumes "*Is the expected amount of money collected?*", would be asked annually, whereas in a health unit in Rakai District, the I/C asked this, and subsidiary questions, monthly. It could be the Designer had in mind a larger health unit, such as a hospital, when she was determining the questions, but in this small health unit staffed by an Enrolled nurse, Midwife and four Nursing Aides, financial issues were focused on more often than she assumed.

Similarly, the critical management question on notifiable diseases indicates the Designer lacked knowledge of health unit procedures. It appeared she assumed there was a threshold level, after which notifiable diseases were brought to DHT's attention, whereas in practice, each case was reported. Maybe the hospital system was different, but again, in the smaller health units I investigated, the procedures were not as assumed. The management questions also assume health units collected mortality figures, which they do not, though hospitals may, and in reality most mortality and cause-of-death statistics are collected at sub-county level.

The I/C did not ask all the management questions the Designer assumed and sometimes asked additional questions, which indicates the latter was unaware of the health units role in practice. For example, one extra management question was "*Do we have the equipment for the planned activity?*". This arose when an I/C mentioned he planned to open an aid-post supported from his unit with

personnel and supplies, but was unable to do so because he lacked transport. Such a question indicates an extra aspect of the management role not catered for by the Designer. Another area which provoked extra questions concerned patient and staff comfort. Thus, questions such as: *“Do the staff have suitable accommodation [i.e. housing]?”*, and *“Do the patients have comfortable surroundings?”*, *“Are the staff empathetic with patients?”*, *“Are [sic] the flow of patients acceptable?”* were asked by another I/C. He was interested in patient comfort because he wanted to avoid complaints. Similarly an I/C in another district, was concerned to increase the number of patients. He saw himself competing for patients with nearby units, and attempting to increase his market-share, asking himself *“How can I increase the standard of the health facility”*, *“Why are patients not coming to these health facilities?”*, *“Why do they not want to pay the cost sharing?”*. Both I/Cs were highly enthusiastic about their work and were in a district where the cost-sharing policy was implemented, so perhaps the extra money to fund health services and staff salaries was a major motivator. Another issue relating to the management questions was the health unit’s management structure. It appears I/Cs did not always take the in-charge-of-staff role, as the Designer’s questions assume. The I/C at a health unit in Rakai was rather confused by the Designer’s question: *“Are workloads acceptable?”*, as he maintained his staff chose their work loads. Thus, even though he was nominally in charge he did not appear to see himself as in control of the other staff. This may be a legacy of the time when staff were controlled from the DHT, but it indicates the Designer’s view of the ‘business’ of health units did not always coincide with I/Cs’ views.

Another example of health units competing for patients was observed at a hospital operated by an NGO. Speaking in the context of his staff being accustomed to recent change, the Medical Superintendent (MS) said: *“before they [the hospital staff] used to think, oh well, if the patients don’t like it they can go elsewhere. But now they see patients as contributing towards their salaries”*. In practice it may have been more appropriate to identify management questions for different types of health units and issue several types of paperwork, as well as consulting the I/Cs on the management questions they ask. Thus, again it appears the HMIS Designer may have different views of the ‘business’ of health units, compared to I/C’s views. This implies senior managers should not assume they know the business of health units, but should involve I/Cs in IS development.

The HMIS assumes In-Charges have a particular ability level, but my observations indicate In-Charges and other health workers were not always able to use management tools, such as targets, standard guidelines, priority setting and check-lists, or able to process data into graphs. Several interviewed I/Cs did not appear to set financial targets, and most did not know the concepts of maximum

and minimum stock levels. Some districts appeared to have I/Cs who were better trained or able to carry out management tasks, compared with others. In Rakai District one particular I/C was very capable, and did ask the majority of Archer's (1993) questions. Our discussion indicated he planned ahead and monitored health services in his unit, though he was probably not using much information from the routine system to do this. He was considered, by the DHT in Rakai, to be an active I/C, and highly regarded. He had attended a training session to help identify projected populations, and obtained existing population figures from the sub-county office in order to calculate projected populations, using a given formula. Despite this training, he said, his targets were devised by the DHT, though he had been able to calculate projected populations of people, pregnant women and other women for 1997. The same I/C used check-lists to monitor the accuracy of information on patient's health-cards, but did not have a record of staff leave, or illness. He was not able to understand or calculate the minimum levels of drugs needed when undertaking stock control, and neither did his storeman. So, even in better health units, there was a lack of management tools in use. There also appeared to be a lack of specified written standards and guidelines, or check-lists to monitor environmental standards at health units, though this is implied by the critical management questions. At another health unit in Rakai, the I/C was very interested in his work and appeared to be attempting to be a good manager, but lacked management tools and information to complete the task. He did not have a clear understanding of stock-control methods, as he thought minimum-stock referred to zero, rather than the level needed to operate for a specified level of time, as assumed by Archer (1993). Furthermore, when the Mubende I/Cs were introduced to the HMIS, many were unable to set and use targets. In Rakai district the DHT appeared to recognise the inability of I/Cs to set targets, and they set them instead. Thus, again some managers were not able to use the management tools, assumed by the HMIS Designer to be in existence.

HMIS data collection strategies may not be linked with decision-making at health unit level. For example, the Developer suggested the morbidity profile in health units, districts and even countries changed very slowly, therefore it was not useful to track these monthly, in health units. He also criticised the HMIS for not linking health unit tasks and decision-making with information gathering, saying:

*“the demands of the HMIS regarding the cost analysis was unrealistic, especially as the majority of their costs were fixed, and thus the information could be used only in a limited way, as they controlled only part of the money.”*

Furthermore, it appears health units may lack decision tools to enable their use of information. Some decision tools, such as decision-trees relating to individual patient management, were in evidence at health units, but there may not be many

other such tools. Thus, even though information was collected, it is not certain to what extent it was utilised.

When I asked, health unit managers identified problems in information processing, a heavy work load, and the need for pre-prepared registers. It appeared HMIS designers had limited understanding of health services objectives and strategies of health units, for example there was lack of alignment of IM strategies with child monitoring. Moreover, the Developer thought there were additional questions, particularly related to the Knowledge, Attitude and Practice (KAP: a method for assessing the impact of health interventions) of the health service users, which required not only 'yes' or 'no' answers, and should have been part of the HMIS, though he thought a survey would also be useful in this respect. Finally, some administrative procedures were not reflected in IS procedures, for example in hospital wards.

#### 8.2.4 Inappropriate IM strategies for district level management

HMIS information management strategies and implementation procedures appear to indicate the role and ability of district level management was inaccurately assessed. Management practice appeared to be different, in the districts I investigated, to that assumed by the Designer and Developer. As indicated above not only In-Charges lack the ability to use specific management tools, but the DHT, who were supposed to train them, were also not extensively skilled in this area. The Developer illustrated this, speaking of immunisation target setting. He felt the DHT had unrealistic expectations, and said:

*“for example they said they wanted to achieve an increase of twenty percent at district level, but they had not thought this out because, in a health unit where there was eighty percent coverage already, then a twenty percent increase was unrealistic. If there was sixty percent coverage, maybe twenty percent was realistic, and in forty percent and twenty percent maybe twenty percent was realistic. So maybe twenty percent at district level was the end result, but they had not systematically thought it out to get that figure, but just plucked it out of the sky” .*

This indicates the tendency to make decisions based on 'gut feeling', or other criteria, but not existing information. Yet, in order to move away from this type of decision-making, to evidence-based decision-making or a rational manager approach, there is need for training and utilisation of appropriate management tools.

In one particular district Trainers taught the EDHT to construct and understand graphs, as some were not able to. Other management tools, such as targets, were also taught, and Trainers believed the EDHT in other areas had the same problem. Thus, in another district, at the Sensitisation of In-Charges, when participants failed to immediately comprehend target-setting and use, the Trainers set targets, and even bypassed the DHT because they also doubted their ability.

It is assumed, by the HMIS Designer's critical management questions, to be possible to share district level work loads. This is the basis of Support Supervision, thus the DHV should supervise I/Cs engaged in dental work, and the District Dental Officer should supervise nutrition interventions in the health units, whereas in fact this is probably not feasible. For example, I visited a health unit with the Dental Officer from one district and he incorrectly advised the I/C on a fairly fundamental issue concerning the re-feeding of malnourished children, (though I do not know if this was standard practice advocated by the district nursing staff who were more likely to have nutrition training).

### **8.2.5 Inappropriate IM strategies for organisational situation**

Even though a formal assessment of problems in the HMIS had not been undertaken it was possible to glean the issues involved, from conversation, observation and review of documents. Many were related to IM strategies not being appropriate to the organisational situation generally, for example some Supervisors wanted to combine the community-based information system (CBIS) and the HMIS. The former collected information, not from health units, but from other sources, such as Traditional Birth Attendants (TBAs), sanitation workers and others who reported to the sub-county or DHT directly. This lack of integration meant, at best, more than one district level database, and, at worse, such information was not collected. The district staff in one of the pilot districts also thought integrating the two would facilitate the work of the DHI.

Moreover, the financial year in the health services was not same as the HMIS calendar year, which meant management tools were not aligned with IM tools. Therefore, information users often had to conduct lengthy calculations to transpose the information, and make it meaningful for annual monitoring and planning reports.

### 8.2.6 Excessive influence of external agencies

A key perception of people implementing the HMIS was that international donors had excessive influence on health unit data collection. For example, country-wide programmes, many funded by a particular donor, tried to dictate the type of data collected. The Developer felt, that ultimately the external donors and national level MOH, not the district or health unit staff, often determined data collection. This was an issue during development, and the Developer said this indicated external agencies were acting in a decision-making, not advisory capacity, thus undermining HPU influence. For example, a major programme, using HMIS data collection and processing strategies, had added an additional category to one form, which was against the spirit of integration of data collection, and changed the agreed paperwork. In fact, the Developer was so aware of this issue, he felt it important to stress no one should demand extra forms and procedures, beyond those agreed. Thus, when discussing HMIS implementation problems with the Supervisors in Mbale District, he said: *"the HMIS shouldn't change now. If other people bring new forms the DHT should resist them!"*. And in Rakai District a national vertical programme, which had recently completed I/C training regarding supplies and equipment, had introduced extra data items to be collected.

### 8.2.7 Training differs from that intended

In reality, it appeared to me, the training did not always coincide with Trainers' and Developers' stated intentions. The training of Supervisors linked management tools and IM for DHT management purposes, and thereby taught the use of information. In each district the format for this training was the same, so over a period of fourteen days there were about nine days of classroom teaching for EDHT, two days sensitisation of I/Cs, with the Supervisors present, and approximately three field visits to health units. The classroom teaching activities were identified by the forms, registers or reports to be completed, such as Logistics and Commodities, when the stock card, record of issuing, requisition and issue vouchers were introduced. Thus, it did not appear health unit management questions or decisions were guiding the training, although one day on Planning included the Annual Work Plan, Work Plan Form, Activity Responsibility Report, Budget Form and Project Summary. The sessions covered the forms which the DHT were to complete and use, and those for health units which Supervisors would teach. In practice<sup>1</sup> the Trainers appeared to conduct some management training for district level personnel in the context of completion of reports, using data at the district level, the introduction and completion of forms, processing of the data on the forms, and promoting the

---

<sup>1</sup> I was unable to follow the full three week training course but attended the Sensitisation of In-Charges plus approximately three days of training by the Trainers

rational manager approach. For example, in Rukungiri District one Trainer, introducing the District Annual Report, began by eliciting the meaning of 'planning', and later by eliciting their usual practice, reviewed the meaning in the district context, focusing on setting objectives for immunisation and other services. This discussion finally led to him say, triumphantly, "*Now the Planning Unit has produced forms which can deal with all these issues in thirty minutes*". He then produced four documents which would be involved in drafting the Annual District Plan: the Budget Form, Workplan Form, Activity Responsibility Form and Project Summary Form. In order to be able to understand and complete this document, the EDHT needed training in management skills, such as finance, budgeting and costing, and priority setting. The terminology used, and numbering, on the Budget forms appeared to come from a pre-existing planning manual. Effectively this session was linking management tools and IM. Moreover, it was relying upon participants having received training in various management techniques and hence was reinforcing skills. The Trainers were also teaching use of information, by showing Supervisors how it could be used for monitoring health service performance against previously defined targets.

The training of Supervisors however, omitted teaching, and describing the link, between management tools and IM for health unit management purposes. Thus, use of information at health units did not appear to have been taught to Supervisors. Neither was the identification of management questions at the district level, and use of data from forms to answer those questions, taught by Trainers. This is important because the teaching principle of Support Supervision is teaching by example, and I think it would be too much to expect the EDHT to pick up management questions and use them to teach I/Cs, in the way the Trainer used the District Annual Report to point to the need for certain information and forms at district level, unless they had been shown how to do this. Thus, Supervisors should have been trained in the management questions for health units prior to data collection and processing, but I am not sure this took place, either in the classroom teaching, or visits to health units. Part of the Supervisors' training, by Trainers, was on-the-job training in health units at which I/Cs were introduced to the HMIS. Theoretically, this introduction of the HMIS was in the context of the management questions, and from these would follow the introduction of new forms, registers, ways of processing data and reports. My observations, when I accompanied Trainers and Supervisors to health units as part of the three-week Supervisors' training, indicate the management questions were not introduced. These could have been introduced at other visits I did not attend (though I doubt this), and I did not see the Trainers teaching the Supervisors how to introduce the health unit management questions. It appeared Trainers were teaching integration and completion of forms at health unit level, but not use of information. Thus, on the visit to a hospital, the Trainer introduced the new In-Patients' Register to the Records Officer by comparing it with the existing In-Patients' Register. He concentrated on differences in client

numbering, but stated that there was no reason to change if their system worked. The headings were checked to see if they coincided, and the extra columns in the HMIS form were noted. Next he introduced the Health Unit Data-Base, which is a loose-leaf file containing all information relating to the health unit, including inventories, and processed information, such as monthly, quarterly and annual activities, plus special events information. This was a new concept for the health unit, and many forms were shown to the Records Officer. The monthly report was introduced, and the Trainer said the intention was to ask management questions, not simply to fill in forms. He did not identify the questions, however. The next forms he introduced were those on target setting and graphing, but, again he did not explain how to do this. Instead he said a Supervisor would visit in future and train the Records Officer. Other forms introduced included the Inpatient Census, Essential Drugs, Quarterly Activities and Annual Statistics. Thus, only data collection training took place, not data processing, or use of information. At the same hospital the Trainer helped a Supervisor to introduce the HMIS in the Maternity Unit. Again, this was not done in the context of critical management questions, but compared old and new registers, and it appeared the former was able to replace three existing ones. In the FP Department of the same hospital a Supervisor introduced the Family Planning Form and Inventory of Equipment form. There was no discussion of how to use data from these forms, even the Equipment Form, which the FP provider had not been required to use before. This was not an isolated incident at one hospital. Another Trainer in a health unit, also focused on completing forms and integrating new with old, rather than the management questions when introducing the HMIS to the I/C.

The content of Trainers' teaching of data processing and information use was variable. One Trainer, teaching Supervisors in one district said: *"Graphing is to be done by all units. The In-Charges are expected to be able to draw graphs. If they can't, you need to teach them on-the-job. See page 37 in this [HMIS Health Unit Data Base] for instructions"*. But offered no other help to do this. In contrast, in another district the Trainer taught Supervisors to explain ideas of graphing in great detail. Similarly, the same Trainer teaching Supervisors in a different district, said he assumed Supervisors had been trained in, and understood development and use of indicators as part of developing a Work Plan, but from my observation it was by no means certain they had. This Trainer was originally from the Health Planning Unit and obviously had high expectations of the EDHT.

Despite Supervisors being taught use of information and management tools by Trainers, for use at district level, the teaching of Supervisors focused on completion of reports and introducing new forms even for senior health staff. Furthermore, there was no training of Supervisors in how they could train health



workers in identifying new data for new management questions they would like to ask. Therefore, although management tools and IM appears to have been linked at district level, it does not make a strong appearance at health unit level. This reinforces my view that, although the HMIS was intended to support health units primarily, in practice it appears to support district health teams. Moreover, although HMIS developers did not acknowledge management training and use of information training was needed, it was being conducted for the EDHT.

It appeared that training of I/Cs, by Trainers and Supervisors, did not adequately cover use of information and make links to management questions. For example, the training of I/Cs in one district, by Trainers, was entitled 'A Sensitisation' and intended to be a brief introduction to the HMIS, not management training. In practice little explanation of the link between data collection and management tools was undertaken. For many attendees the idea of target setting was completely new, I believe, and was not introduced properly. No vision of how national, district or health units would use specified targets was described, but Trainers placed a great deal of emphasis on obtaining written targets, to take to national headquarters. This was because Trainers were pressurised to obtain targets and they felt, based on past experience, the DHT would not send on this information. I/Cs were trained in data collection therefore, but the link was not done well. Moreover, even though it appears that Trainers, when training Supervisors at health units, may refer to information use and the critical management questions, when Supervisors go alone this may not happen place. Instead it appears the focus is on collection of data and completing forms. For example, the Medical Records Officer in one pilot district was a Supervisor, and introduced finance forms to an I/C. Yet, no management question concerning this, or any idea of managing cash, or setting targets for cash receipts was raised. In fact, whilst visiting this unit, the MRO said he did not realise the management questions were for health units, as he thought they were only for district level. This is a major issue considering he works in district which piloted the HMIS, and had been operating for three years. The DHV and DMO, both Supervisors in the same district, maintained they taught management questions as well as completion of forms. The latter, however, was defensive, and said staff would know the equipment questions, as there had been a workshop on this, but he acknowledged "*we still have a lot to do about using information*". The Developer gave the impression the I/C training covered completion of forms and using the management questions. But he also said the sequence of training had changed, for during the pilot, he maintained, the two were separate, with form completion preceding questions, however, afterwards the separation was not made. But, as my experience above indicates, this did not always happen in practice, and Supervisors from the same district appeared to conduct different training.

Training did not appear to cover the HMIS conceptual basis or conceptual links between information and management in great detail. Although there was a brief mention of the systems framework driving identification of data items for the HMIS, by Trainers and Supervisors in their teaching, I think there was a lack of understanding of the concepts and certainly they were not explained properly. Moreover, no mention was made of links between information and management, or the idea of information driving decision-making, rather than 'gut feeling, or tradition. Thus, I believe there was insufficient preparation of the DHT for HMIS introduction and training, particularly regarding its purpose, and subsequently these ideas did not filter down to the I/Cs.

### **8.2.8 Difficulties conducting the training and issues arising**

The previous section focused on how the intended training did not always take place; however, many other training issues arose. Despite assuming the EDHT could conduct competent support supervision, I believe this is debatable. The support supervision method assumes EDHT members can successfully train other people to acquire the knowledge they hold. Yet within HMIS training there was little emphasis on the teaching role Supervisors would perform: it seems that, in practice, the Developer and Trainers assumed Supervisors would adopt the training approach they used. Thus, in one district when the Developer conducted a follow-up visit with Supervisors, the latter said that I/Cs had difficulty making graphs of data, but they, the Supervisors, did not know how to teach them. Therefore, after confirming that Supervisors could understand graphs, the Developer had to describe a teaching method, which involved graphing the I/Cs' own data. Furthermore, the Developer maintained that some people conducting support supervision in health units were often not the right calibre, as they did not have any more training, or a wider view, compared to the people they were supervising, so they could not necessarily conduct such supervision. Another way of dealing with inappropriate Supervisors was to allocate them according to ability. Thus, one Trainer suggested to the EDHT, when allocating Supervisors to particular units, they should bear in mind Supervisors' skill level and types of health unit personnel being supervised. She believed it would be inappropriate for the DHI, for example, to be the supervisory person at the hospital, but he could be at a dispensary with fewer services on offer and less skilled personnel. Thus, there were doubts over the ability of some Supervisors to conduct support supervision, and a lack of training in teaching.

There were two incidences where Trainers and Supervisors appeared to undermine the training they were expected to conduct. One involved Trainers in one district deciding target populations for health units, instead of I/Cs taking the decision, which could indicate more control and planning was retained by the

national level than was formally recognised. Trainers justified this on the grounds of I/C incompetence, and national level wanting the information immediately. The second incident involved a Supervisor in another district not training I/Cs in the target-setting method he had been taught. Instead he taught a simplified method, again on the grounds of I/C inability to utilise the other method, but he also thought the complex target setting was not a useful tool. One DMO maintained he taught the complicated method, but I believe his MRO, and many I/Cs found it too difficult.

The HMIS Developer assumed Supervisors were introducing management questions during training, and management tools were being used in the way he specified. As mentioned above, however, there did appear to be deliberate undermining of the training. Furthermore, in one district the DHV said she introduced management questions to health workers, but the MRO did not. The word of the DHV was not verified by observation, however. The reason for this apparent discrepancy could be DHT or health unit skill level. Further evidence of lack of training in management questions comes from my interviews with I/Cs. There appeared to be no differences in knowledge of the questions between HMIS-trained and non-HMIS-trained districts. None of the six I/Cs interviewed were familiar with language of Archer's (1993) questions, thus, although the Developer assumed Supervisors were training health workers to answer the management questions, in reality this appears to not always be the case.

It appears that the HMIS Designer and HMIS Developer had different views of health workers' ability and the management role they perform. For example, the Needs Assessment (Archer, 1993), and written reaction to this (Van Damme, 1993), both acknowledge small health units would not have some management functions, as these were retained by district staff, particularly relating to supervision and control. Yet HMIS operational documents do not acknowledge this, and neither did the training I observed.

Questions from I/Cs during training indicated uncertainty in using the information collected, and many appeared not to have a great deal of knowledge of health service administrative and logistics. It was also apparent that some I/Cs were more able and more experienced than others. For example, there were varying responses when one Trainer asked, during the I/C Sensitisation, how they used specific information. Some indicated they had made requisitions for supplies, made targets to increase FP visits, or used the information to identify the need for education talks on malaria. But others were confused by the question.

Also some were absent from the Workshop, sending a deputy, and the DMO suggested others may not have received the invitation in time.

Furthermore, Supervisors felt: the training approach expected too much in a short time; it was a problem for I/Cs to deal with graphs and interpretation; I/Cs could not use information; and target setting was a difficult tool. The DHV in one pilot district felt I/Cs in her district needed a refresher course, especially because they had not introduced the management questions sufficiently.

Finally, the Developer, when training Supervisors, was using a problem-solving approach in his teaching. He asked what problems they had encountered and helped them to deal with these. It was intended Supervisors would use the same approach with I/Cs, and the Developer thought this was the best way to teach use of information. He also used the opportunity to conduct training on management issues which arose at the time, for example planning, time management, team working and meetings agendas. Yet, as mentioned earlier, he believed his role was not to conduct management training.

### **8.2.9 Lack of perception of other organisational changes**

Many organisational changes appeared as a consequence of introducing the HMIS. Moreover, perhaps because these changes seemed not to be anticipated, planned, or negotiated with the people concerned, the appropriate training or procedures to facilitate those changes were not undertaken.

One of the most obvious changes concerned the role of DMRO. Prior to the HMIS this person appears to have collated morbidity, immunisation, in-patient and out-patient reports from various health units within the district, and possibly undertook some simple manual processing of data. The role may have included teaching health unit staff to complete forms, but as a detailed job description was not obtained it was difficult to say precisely what the role was. With the advent of the HMIS, however, the role appears to have changed and more responsibility given to the MRO, though the same title was used. The DMRO is now an HMIS Supervisor, and the support supervision method of training means this person has to visit health units and not only instruct the completion of forms, but also introduce management questions, and effectively conduct one-to-one management training. Yet MROs are not clinicians, would not usually have many years of formal education, and occupy low positions in the DHT hierarchy. But it seems that, the Developer had not realised changes were taking place, for his own

one-to-one training with them focused on the completion of forms, not on management questions or data interpretation. In fact, the DHV in one district mentioned the MRO had experienced a job change, but was not trained for this.

The MRO role also changed as the Developer expected him to ensure other DHT members completed several forms, and pass them to him for the District Data-Base. This was difficult because of the MRO's low position in the hierarchy. Therefore, to expect the DHT to, in effect, help the MRO to do his job, is a reversal of existing hierarchy. Similarly, the Developer expected the MRO to pressurise the DMO and other senior staff to interpret the data for the District Annual Report. If these new procedures were successful, there would be a change in the power distribution within the DHT. The HMIS, as well as bringing these changes, also reinforced the DMO's power, as the HMIS financial training allowances were used by the DMO to reward, or motivate workers. Furthermore, the extra HMIS training allowances allowed one particular DHV to do her job more effectively. She felt, before the HMIS existed, she had been inadequately supporting health unit staff, particularly distant ones, but now the HMIS finance facilitated this, as mileage allowances were paid to Supervisors to visit. Changes in staff roles also appeared at health units. For example, a role change was expected of Medical Records Clerks, for now they would be expected to produce statistics for the annual report even though this kind of data processing had not been undertaken before. I do not know if these changes were negotiated in advance by the Developers, but I doubt if they were. The Medical Records Clerk was also expected to demand data from senior staff, and some of the management questions came under his jurisdiction. Thus, a power structure change was unknowingly expected within the health unit.

As well as role and status changes at health unit level, there appeared to be administrative changes with the new HMIS. These were especially prominent in NGO health units and related to collecting money from patients. The forms assumed a certain set of procedures were operating at a particular part of the unit, but in practice this was not always the case, so the forms were moved between sections. This issue was put to the Developer, but he denied administrative changes needed to take place.

New administrative procedures and additional quasi-legal contracts between DHT and MOH were introduced for HMIS training. DHT members were required to sign contracts between the HMIS developers and themselves, relating to allowances and transport finance during training. This situation was not always acceptable to the DHT, who did not want to be responsible in this way, and

favoured existing procedures and contractual arrangements. The Developer and Trainers justified the contracts saying funders demanded it, but privately suggested to me the DMO wanted to control the finance, and was therefore reluctant to sign.

### 8.2.10 Incomplete policy enactment

Other health service changes were supposed to take place in addition to HMIS implementation. In particular, district and health unit roles were changing with decentralisation, but the intentions were not always clear, or enacted. Before decentralisation clinicians, such as medical assistants, midwives, registered nurses or enrolled nurses, were in charge of health units, though in some small isolated units nursing aides were in-charge (and consequently fewer services would be offered). The supervision of staff, control of standards and finance, monitoring and evaluation were not the responsibility of I/Cs at that time. With decentralisation, however, I/Cs became managers with additional responsibilities for decision-making, particularly financial decision-making and health service planning. He or she is supported by a health unit management committee, but it appears clinicians were expected to become managers without extensive training. This was most clearly seen in districts where the DHT were not certain if decentralisation was to district, sub-county or health unit level. Some HMIS implementation problems appear to relate to uncertainty of management's role at health unit, sub-country, district and central level, which indicates uncertainty over the extent of decentralisation. Supervisors and Trainers were supposed to train I/Cs to use information, which implies they have a management role. Yet the actual level of decentralisation was not as extensive in reality as in theory, according to the critique of Archer's (1993) Needs assessment, by Van Damme (1993:2).

Decentralisation appears to have occurred in some districts more than others. This partly concerns individual I/C ability, and being able to make the transition, but there were structural issues as well. For example, decentralisation did not give I/Cs complete control over the drug supply, mainly because the decision over which drugs (and the amount) are appropriate for a certain type of health unit is taken at national level, and Drug Kits are sent at three-monthly intervals. Therefore, I/Cs only control supply, by limited purchase, if the kit is insufficient. Likewise, financial control is limited and this led the HMIS Developer to criticise the new HMIS for not linking health unit tasks to information gathering. He said *"the demands of the HMIS regarding the cost analysis was unrealistic, especially as the majority of their costs were fixed, and thus the information could be used only in a limited way as they controlled only part of the money."*

There was uncertainty regarding the extent of decentralisation amongst MOH personnel, as Supervisors did not always know where responsibility for certain issues lay, as the role of DHT was becoming unclear. This was exacerbated by attempts to move away from the emphasis on vertical programmes, and expecting district personnel to conduct support supervision in specialities outside their clinical area. In fact, the HMIS Developer disagreed with decentralisation to health unit level, especially as this meant the role of DMO was unclear and undermined. Decentralisation also meant the sub-county level was allowed to retain the taxes it raised, whereas these previously went to the district level. Such action was problematical for some DHT members because there was less money to facilitate supervision visits to health units at a time when they saw responsibility was either the same, or increasing.

Other examples, of decentralisation not being enacted, relate to the behaviour of national level MOH staff. The HPU were, in effect, seen by districts to be imposing the HMIS on them, which could be interpreted to be at odds with decentralisation, as the only negotiation with individual districts regarding data collection was with pilot districts. Similarly, it appears donors do not accept decentralisation should affect their own behaviour, for although decentralisation implies donors should negotiate with the DHT regarding their contributions, in practice they do not always do this. It appeared the donors attended one such district meeting, but instead of allowing funding decisions to be made, it was only used to pass on information to health service providers in the district.

The other policy change was cost-sharing. With decentralisation, health units were to become more responsible for finances, and at the same time 'cost sharing' was being imposed. This meant patients were to pay for medication and contribute towards consultation costs. The latter was at a fixed rate, with exemptions for people unable to afford the fee. The extra money was to be spent on resources for the health unit, and for 'motivation', as it is colloquially named. This meant a certain proportion is given to staff to supplement their salaries, thereby encouraging them to improve service quality. Unfortunately, in some districts the money was being collected from patients, but not spent. In Kabale it was not spent because spending guidelines had not been set, according to the DMO.

### **8.2.11 HMIS implementation and concomitant change**

Previous sections have referred to changes taking place due to HMIS implementation, and that intended changes were incomplete. Other changes were

taking place, probably not caused by the HMIS, but affecting it. These included recent changes in attitudes towards patients. At one hospital there had been a recent change in staff attitudes, according to the MO. Before, *“they used to think, oh well, if the patients don’t like it they can go elsewhere. But now they see patients as contributing towards their salaries”*. Other changes of a financial nature were also taking place, for example, national level vertical programmes had been giving incentive payments to complete HIS forms. With HMIS the Developers wanted to bring in completion of monthly reports without payment, and maintained information gathering supported the management role at the health unit, so information giving was essential, and should not receive extra payment. It is uncertain if the main reason for non-payment for form completion was part of a cost-cutting exercise, however.

The influence of vertical programmes was probably changing. In the past nationally-based vertical programmes had exerted considerable influence thus, when supervisors visited health units to provide supervision and support, they delivered according to which programme was paying out-of-office and travel allowances. Thus, if EPI paid, the supervisors would focus on immunisations and not diarrhoea, or HIV/AIDs, because these were the remit of a different visit. This state of affairs had been recognised by some health service developers as a problem and steps were taken to change this. Consequently the three-month management course for DHT members was jointly organised, and all programme subject areas were covered. Moreover, the aim now was for DHT clinical staff to cover more than their own area of expertise. This change from single to comprehensive support supervision was a recent innovation and was being undertaken at the same time as HMIS implementation. As part of the decentralisation process the DHTs had been trained by the HPU, to improve their management skills. This was in addition to the three month training being conducted by the Mbale Institute.

### **8.2.12 Using HMIS implementation to bring in other changes**

The HMIS implementation process was used to deal with other problems and issues in the health service in Uganda, that is, there was a hidden, or not so hidden agenda. These other issues include attempts to reduce the power of the vertical programmes, and integrate the health services they provide. Archer (1993:5) speaks of the need to *“integrate all existing health programmes.”* when assessing HIS problems, which implies she wanted to reduce the influence of vertical programmes. One of the HMIS strategies is to develop a single information database in health units and forms for collection of data, rather than the multitude of forms completed by I/Cs and sent to Ugandan national offices of vertical programmes.



Furthermore, HMIS implementation was used to reduce alleged corruption. Several times during my observations and interviews the issue of suspected misuse of funds, and the need to improve transparency and accounting, was focused on, and in the ‘Sensitisation of In-Charges’ workshop in Mubende this was the reason given by Trainers for the elaborate financial paperwork. Similarly, Trainers suggested private clinical practice at health units was inappropriate, and the Debtors’ Books and accounting system would reduce this.

Finally, it seems that HMIS implementation was being used to increase MOH control over private practitioners and non-governmental health services. Although not mentioned explicitly, if private practitioners and NGO health service providers give information concerning their patient numbers and services offered, this would enable the district to more effectively plan its health services. It could also mean, however, that the DMO would prevent specific medical practices setting up, thereby increasing control.

### 8.2.13 Management problems at district level

From my observations and interviews it appeared there were several management problems preventing HMIS implementation. The HMIS Developer felt the DHT workload was unnecessarily high, saying: *“There are too many reporting demands on the DHT members. They have to do quarterly plans and assessments of whether they have attained them.”* Moreover, he suggested external agencies were having too much influence on the workload of DHTs, and criticised the Burden of Disease Reports to be completed for the World Bank. Several district teams appeared to have communication problems which impacted on the HMIS, for example one District Dental Officer did not know the HMIS was implemented in his district, even though it had been a pilot district and had been operating for three years prior to our conversation. Neither did he realise, until recently, that the District MRO had a huge reservoir of information on health units and the local population.

Lack of leadership appeared to undermine HMIS implementation as well as other services. For example, one DMO’s absence, (he was being investigated for alleged illegal actions), led to problems within the rest of the team. Other problems included lack of co-ordination at district level, for example, different clinical practice between MOH and NGO health units regarding Vitamin A capsule distribution, inability to share workloads amongst the DHT, and non-payment of salaries to some staff.

The other issue appearing to affect HMIS implementation was lack of management skills, such as planning ahead, and target and priority setting, especially amongst the junior team members. According to the Developer, the DHT had problems planning ahead and because of this did not appear able to use the information available to them. This culture of forward planning may not always be present in countries, such as Uganda, where communications are poor and donors impose their own schedules on government health workers. For example, in Mbale District the date for the initial Sensitisation of In-Charge HMIS training had been negotiated in advance with the DMO, but in practice another vertical project later scheduled training for the same time, which meant some I/Cs did not attend HMIS training. Furthermore, DHT members felt there was low pay and inadequate career structure. Finally, the DHT did not always have the technical ability the HMIS Developer considered necessary to conduct comprehensive support supervision.

#### 8.2.14 Health unit management problems

Management problems in health units also affected the HMIS. In some districts standard guidelines on patient treatment and conditions at health units were not always available, and for some diseases no standard guidelines existed. For example, in the identification of malnutrition, the Developer said it was difficult to use information on the percentage of children with protein-energy malnutrition *“as there are no standardised case definitions and it depends upon individuals case definitions.”*, yet the HMIS was designed assuming this type of management tool was in operation. Likewise, the management questions assume guidelines relating to conditions at health units are in operation, but this did not appear to be the case in the units I visited. Finally, the DHV in Kabale District believed there were insufficient staff in some health units, which meant an inappropriate person completed the monthly forms, and did not use the information.

Training in financial management at health unit level was lacking. This is not surprising as health unit managers' obligations to deal with financial issues and cost-sharing came only with decentralisation. This was indicated at one health unit visited in a pilot district. The I/C had developed his own forms for recording and processing financial information, not knowing the HMIS would contain such paperwork. This was three years after the first introduction to HMIS in the district.

Health unit managers' ability and training varied a great deal, and even the best appeared to lack knowledge of management tools, such as job descriptions or

stock control procedures. Some did not conduct monthly meetings, and were not familiar with the language of Archer's (1993) management questions. Others did not appear to plan ahead and there was little evidence of information use, and one did not even see himself as a manager. Others, however, exhibited a desire to be rational managers and had several management questions in addition to those prescribed by Archer (1993). Thus, there was some evidence of planning and monitoring, and the more competent asked management questions similar to those in the HMIS. Communication between health units and the district headquarters was problematical, especially for those rural units which became virtually inaccessible to vehicles during the rainy season. There were few telephones, and although some units did have bicycles these were not always in working order. Furthermore, in several health units equipment was broken or non-existent, therefore essential data gathering, on infants and children's weights, for example, was not possible if no scales were available, making identification of malnutrition difficult. There was also an inability to share work loads in the health units, non-payment or irregular salaries, lack of staff and a lack of management tools.

### 8.2.15 IM problems at district level

Several problems arose in HMIS implementation, related to IM, which developers had not expected. It appeared some health workers did not realise the role data and information could play in their work. The District Dental Officer in one district, claimed: *"Its only since the mid-level managers' course that I know the value of information for planning"*. This man was undergoing the three-month training course at the time, and said he had only just realised the district MRO had lots of useful information.

The HMIS training needed to emphasise use of information, more than it did, for a whole new approach to using data to manage health services was being introduced, which the I/C had difficulty with. The HMIS Developer and his assistant knew some health unit managers were unable to use information, for this was first identified in one pilot district. The former appeared to say that the I/Cs were moving from a situation where they had not been using information from the routine HIS, to a situation where they were now expected to use HMIS information to manage their workload. To facilitate this learning process the Assistant HMIS Developer said *"we emphasise the [management] questions"*, and their aim was to use the questions to focus DHMT supervisory visits. The Developer elaborated, suggesting that in order for on-the-job training to succeed Supervisors must use the information, and there must be frequent visits to conduct training. He appeared to suggest there was insufficient emphasis in the training, on using information to solve problems, and this could be remedied by

utilising a problem solving approach during support supervision. Finally, a pilot district DMO thought there was insufficient feedback from national level regarding HMIS information.

### **8.2.16 HMIS implementation theory and practice are different**

It appears several intended HMIS ideals and aims were not realised in practice. The Developer maintained health units dictated HMIS strategies, but in practice it appears district needs dictated, and several people believed the beneficiaries would be districts, not health units. One DMO felt the HMIS was more useful to the district team than the health units, and when asked, said he used HMIS information *“for the annual Workplan we are doing now, for setting priorities, by knowing the most recurring diseases, for resource calculations, to know the numbers of patients. But I think the HMIS is of more benefit to the district than to the health unit, especially with decentralisation. For Supervisors it provides insight for them to focus their supervision”*. Furthermore, during training, the Developer appeared to promote the HMIS for district support, not health unit support primarily. He introduced the HMIS to a DMO, who mentioned the difficulty of ensuring private practitioners sent completed reports. The Developer, however, said *“it is important to involve them in the HMIS, even if it is only mortality and morbidity for planning purposes”*. This appears to be promoting collection of data not for health unit management, but for national or district level, especially as I know he believes morbidity and mortality change little, so this reporting would not help health units.

Moreover, there is little evidence that the HMIS management questions were known to the I/Cs, who had been trained in the new system, and as mentioned before, the I/Cs I interviewed lacked familiarity with them. Furthermore, only three of thirteen DHT members, and no NGO personnel, were acting as HMIS Supervisors in Kabale, which indicates the intended training process was not being followed.

### **8.2.17 Issues related to organisational culture**

Several issues arose during implementation concerning the organisational culture. For example, inappropriate behaviour was expected of certain people, with the HMIS introduction. Thus, the MRO role, at both district and health unit level changed with the HMIS. This is not traditionally a high-status position, and the incumbent would usually follow senior DHT staff instruction; however, the advent of the HMIS, elevated the position. Now he is expected, by the HMIS Developer, to ask other members of staff to carry out certain tasks which conflict

with the position he holds in their eyes, and they perceive this to be 'clerks pushing managers'. Similarly, support supervision could be transgressing professional boundaries, as comprehensive support supervision assumes the DHT will supervise staff with different professional training, and who are possibly more clinically competent. Thus, a junior DHT member would be expected to conduct supervision of a hospital doctor, not only in HMIS, but in other issues also. To deal with this, careful matching of Supervisors and I/Cs was advocated, and one Trainer asked the EDHT to bear in mind skill levels when allocating Supervisors to particular health units. She believed it was inappropriate for the DHT to supervise at the hospital, but he could at a dispensary with fewer services on offer and less skilled personnel.

There appeared to be manipulation of allowances to motivate workers, even if this meant some of the least able conducted training. In one pilot district only three of the DHT acted as HMIS Supervisors, yet the whole team numbered thirteen. This is strange, as most team members were supposed to play this role. In another district, some Supervisors were given this role to motivate them, or share out 'rewards' even if it was not within their competence. This also could have been the justification in the other pilot district.

Within Ugandan health services there is a very strong hierarchy - national level being high status and health workers in the peripheral health units being low status. This showed itself in a lack of respect for people lower down, and may have been fostered by the highly centralised system which the health service was moving away from. Thus, a national level officer was scathing about the ability of DMO's to be discerning or prioritise their workload, and some DHT members, at times, appeared to have low opinions of some health unit staff. Furthermore, one district MRO appeared to lack respect for Nursing Aide I/Cs, and he did not appear to have realised their role had changed and they were expected to be managers.

Finally, there appeared to be distrust between various levels, with antagonism between national headquarters and districts. Thus, the HMIS Developer and Trainers believed there was cheating and corruption at district and health unit levels. The Trainers believed DMOs wanted inappropriate financial control, and the Developer did not like the DMO distributing financial allowances. This distrust led to additional and unusual negotiations and contracts between national level and the district.

### 8.2.18 Conceptual issues affecting implementation

There were some conceptual difficulties when introducing the HMIS. Problems of terminology and more fundamental problems concerning the links between information and management were apparent. The needs assessment written by Archer (1993) does not clarify her meaning of an 'information system'. Instead she moves from 'information system' to 'information', without identifying the components of an IS and how it is distinct from information. This lack is evident in the I/Cs' training as well. When interviewed, health unit managers were not familiar with or comprehend the phrase 'using information', and lacked understanding of the purpose of information. There is a need for conceptual clarity in order to focus on the use of information. The interface between management information systems and management is also not clear, and there appears to be no focus in the training materials on this. I believe, however, it is important to stress information is to be used in the context of a management tool of some kind.

Additionally, the method of identifying health unit targets assumes patients have a permanent link with one PHC centre, and one hospital. This is not the case, as patients often change, for a variety of reasons, and people attend other district's hospitals or small health units. In fact on a visit to a district bordering Rwanda, in the south-west of Uganda, I discovered patients sometimes went to a different country for their treatment!

Whether the systems framework is appropriate as a planning and monitoring tool for the work of health units is debatable, yet Archer (1993) utilised this to identify indicators for the HMIS. This did not find full support with the Developer. In particular, Archer (1993) maintained specific morbidity and malnutrition rates, and HIV prevalence rates in blood donors, were to be regarded as outcome measures, or impact indicators. Yet the Developer maintained there were no impact indicators in the HMIS, because there is no causal link between inputs, processes and outcome. Rather, he suggested, these indicators track morbidity, and mortality, and he thought the conceptual framework led to excessive data collection. In fact, if the indicators are seen as outcome measures, blame for poor performance would fall unfairly on the health units, as many of the contributing factors are outside their control.

### **8.2.19 Inadequate financing**

Despite finance for HMIS development and implementation being approved and obtained, the practice was different. The Developer budgeted for a vehicle and received it, but it was used for other purposes by the HPU. This was a major problem as Trainers were without transport and they often relied upon district vehicles, which was very difficult, and provoked some antagonism. The two million shillings obtained for continued supervisory visits in pilot districts was also taken for other purposes, therefore Supervisors could not visit as often as the Developer thought was needed. This may have been due to the HMIS lacking support from senior MOH personnel. Furthermore, one pilot district Supervisor believed HMIS training had not planned for sufficient health unit supervisory visits.

Finance was an issue during HMIS introduction in one NGO hospital. The Trainer informed the Medical Superintendent (MS) of the intention to give forms for the first two years, after which time they would be expected to provide them, yet HIS registers were pre-printed and provided by the MOH. The MS was concerned this would mean they would have to pass on those costs to patients.

### **8.2.20 Lack of high level support**

Lack of district level support may have hindered HMIS implementation. The DMO and other health service providers at district level need to support the change to HMIS, or at least not hinder it. Yet the MRO in one pilot district did not have access to a computer and it may be the Developer's approach antagonised the district level, creating reluctant support for the HMIS. It was only when the Developer approached an NGO health service provider in the district, that they agreed for him to use their computers and technical staff. (In practice, however, this did not work out, possibly because the MRO was not fully computer literate, despite training). At one training session, Supervisors in Rukungiri District complained HMIS training conflicted with their work schedules, as it took three consecutive weeks and meant their usual work was interrupted. In addition, they had leave to attend other business during the training. The Developer blamed this on the DMO, as he had negotiated dates with him, and claimed other courses, such as the mid-level managers, took the same amount of time. Finally, the Developer claimed problems implementing the HMIS in Tororo district stemmed mainly from lack of DHT commitment.

### **8.2.21 Developer lacks conviction**

The HMIS Developer appeared to feel no sense of ownership of the HMIS, and several times distanced himself. He believed there were too many indicators within the system which did not meet health unit needs, and thus there was too much data collection and processing. In addition, he had strong views on possible changes, which were extremely radical and would probably have been rejected by donors and other international agencies. Neither did he like the process of continually negotiating with various stakeholders, as he thought some were influencing IM strategies to the detriment of the HMIS.

### **8.2.22 Difficulties in monitoring implementation**

Finally, developers were having difficulties monitoring the implementation process; for example, the Developer indicated that assessing information use was difficult, and said he did not know if I/Cs asked Archers' (1993) management questions. The external evaluation however, did appear to have indicators for monitoring use of information as they had a definition for 'use of information'. Thus, a form or register was considered 'used' if any action or decision had ever been taken to react to some information contained within it (Stefanini, *et al.* 1995). This is a very unusual indicator, but useful to show changes in decision-making practice, or management style.

## **8.3 Conclusion**

This chapter has described the themes arising during my participant observation of the HMIS implementation process in Uganda. The themes cover a wide area and, in order to develop further understanding, existing theory and frameworks will be utilised in the next chapter. Not all the themes are covered in Chapter 9. Those which are similar to issues raised in the PHC MAP case study will be discussed in Chapter 10.



## **Chapter 9**

### **Discussion of HMIS implementation**

# Chapter 9

## Discussion of HMIS implementation

### 9.1 Introduction

The previous chapter described the HMIS implementation process in Uganda. This chapter considers how existing theory and theoretical frameworks can contribute an understanding of the themes identified. Thus, the diffusion of innovation framework and organisational dynamic equilibrium will be discussed, and I will examine to what extent the empirical evidence is similar to, or different from a particular theory or framework, and what areas the theory does not cover.

### 9.2 Diffusion of innovation

The diffusion of innovation framework, as outlined by Rogers (1995), is an approach which can identify problems in a specific situation, or identify in advance, issues inhibiting or facilitating the adoption of the technological change being introduced. By identifying the HMIS, or the information it produces, as an innovation or technological change, it is possible to view the introduction of the HMIS as the diffusion of an innovation. This section will examine the empirical evidence against the two models utilised by Rogers (1995) to understand the diffusion of innovations within organisations. First, the 'Stages in the Innovation Decision model', originally developed to understand individual behaviour, but also utilised to understand organisational behaviour, is discussed. The second, is the 'Five Stages Organisation Innovation Process model'.

The ethnographic case study focused on HMIS implementation, not the stages prior to the decision to adopt the HMIS. This is because it had already been decided at national level to adopt a new IS, and health units, when introduced to the HMIS, were expected to accept it. Thus, the decision to adopt did not appear to be taken at health unit and district level. However, several concepts, used by

Rogers (1995), are useful in interpreting the situation, and these are shown in Figure 9-1. Although 'Prior Conditions' is a concept usually equated with the adoption decision, here it is considered in relation to implementation. Similarly, the concepts of different types of Knowledge, and innovation Attributes, usually associated with the stage prior to the adoption decision, and Form, Function and Meaning, usually associated with analysis of consequences, are also examined here.

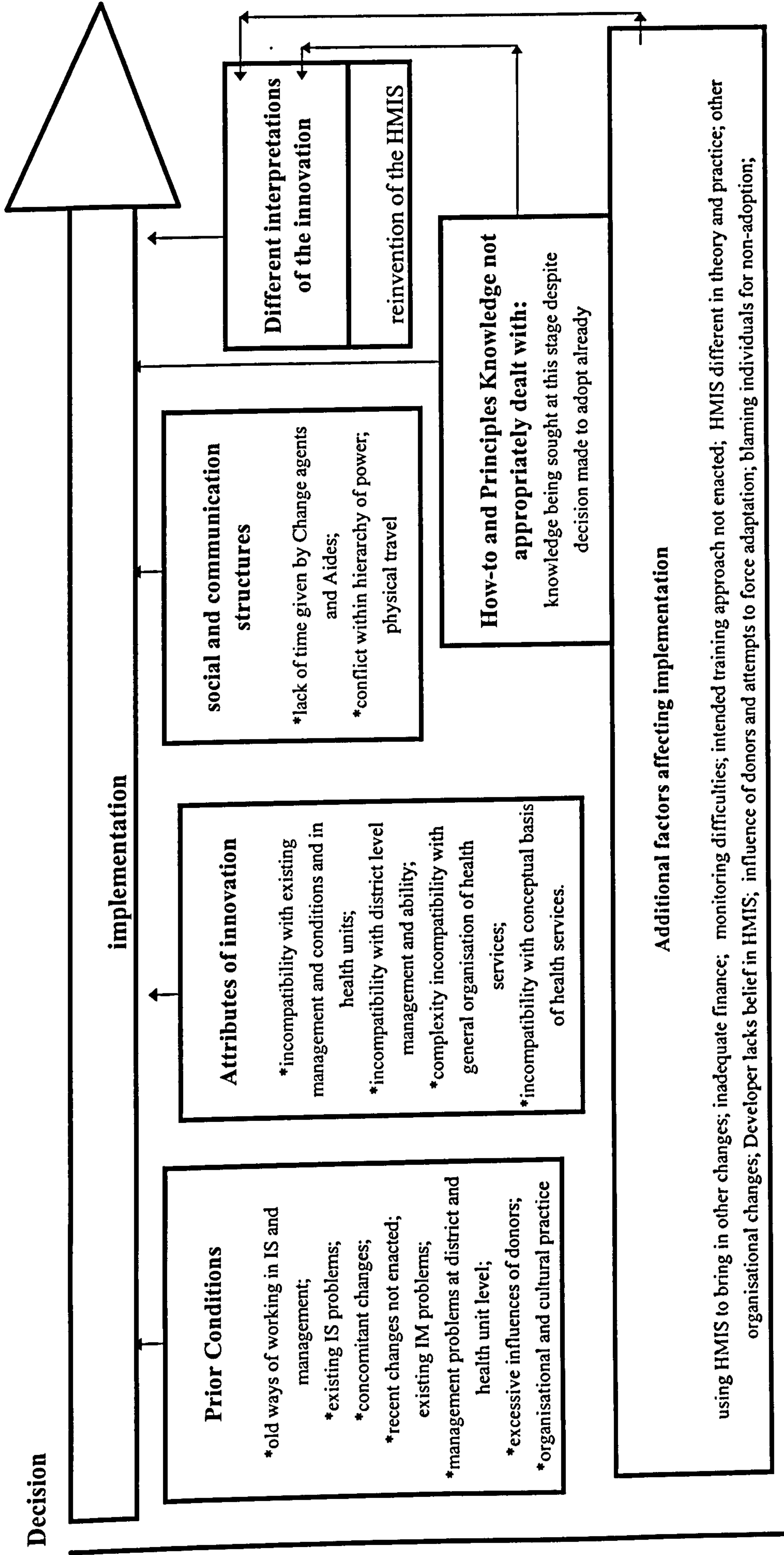
### **9.2.1 Usefulness of the 'Prior Conditions' concept**

Rogers (1995) suggests that four Prior Conditions, including previous practice, felt needs or problems, innovativeness and the norms of the social system affect the diffusion process. With HMIS implementation it appears previous practice, particularly previous IM strategies and the existing managerial approach affected implementation. In fact, existing HIS problems were cited by Archer (1993) as a reason for HMIS development. Problems with managing information affected implementation, and so did the excessive influence of international donors. Innovativeness did not appear to be an issue, but, as indicated in Chapter 8 the existing social system norms were important as organisational and cultural practices were affecting implementation. In addition, concomitant changes, management problems at health unit and district level, and the incomplete enactment of recent policy changes affected implementation.

### **9.2.2 Usefulness of the 'Knowledge' concept**

Rogers (1995) speaks of Knowledge of the innovation affecting the adoption decision. This concept is useful in understanding the implementation process, because there was much confusion over defining the HMIS. As indicated in Chapter 8 different definitions were held by HMIS developers and users, and the view held depended upon their role in the organisation. To some health unit staff and Medical Records Officers the HMIS simply meant new and integrated forms, a reduction in the number of forms and registers, new data flows, new centres for processing forms, new centres for holding information, and the inclusion of logistic and supplies data instead of only data produced through interaction with individual patients. However, developers also appear to have intended to bring in a new management concept and method of decision-making. This could be termed the 'informational approach' or seen as encompassing the 'rational decision-maker', instead of health unit staff taking decisions based on 'gut feeling', or simply doing as they had been ordered by a higher authority.

The HMIS, even as perceived by its Designer and Developers, is a very complex



**Figure 9-1 Evidence for an Innovation-Decision model implementing the HMIS: factors affecting implementation**

innovation not explained clearly to potential users and other involved parties. Rogers (1995) speaks of three types of Knowledge, which include Awareness knowledge, How-to knowledge and Principles Knowledge. Many potential users were aware of the HMIS before they were officially introduced to it on training courses. How-to knowledge was being introduced to some extent during the training, but very little Principle knowledge was offered. In fact, I believe the Principles knowledge was not even acknowledged fully by the HMIS Designer and Developers. Principles knowledge includes the vision of health unit managers as rational decision-makers, and various conceptual frameworks including the systems framework and the assumed link between information and management tools. However, these were not made explicit, thus little effort was put into teaching managers how to use information, and other Principle knowledge. It may be more useful with such a complex innovation to view it as a cluster of innovations, incorporating the rational decision-maker principle, as well as different information management strategies.

### **9.2.3 Usefulness of ‘Form, Function and Meaning’ concepts**

Another useful concept in reviewing this problem is mentioned by Rogers (1995), in connection with innovation consequences. He speaks of Form, Function and Meaning of innovations. Form is the directly observable physical appearance of the innovation which could have been construed by I/Cs to be HMIS forms and registers, considering the emphasis in their training. Function, being the contribution made to the way of life of the individual or organisation, is a little more difficult to ascertain, but could be seen by some I/Cs to be the extra time needed to collect data, and the difficulties with processing. Meaning is the subjective, and frequently unconscious, perception of an innovation, and has many similarities with Principles Knowledge. Thus, the Meaning for I/Cs could be that the HMIS is not different from the HIS, as both could be seen as merely filling forms for others to use. Whereas the meaning intended by the Trainers is information should be used by the I/Cs. Moreover, as the section below will show, there appears to be incompatibility between the HMIS conceptual basis and the conceptual basis of other aspects of the health services. By viewing this as incompatibility in Meaning or Principles knowledge, a refinement of the issue is undertaken which gives clearer direction when contemplating implications for practice.

### **9.2.4 Usefulness of the ‘Perceived Attributes’ concept**

Rogers (1995) speaks of the perceived characteristics of relative advantage, compatibility, complexity, trialability, and observability affecting the decision to adopt an innovation. Although the adoption decision had already been taken at

national level, some of the concepts from this stage were useful, as implementation at district and health unit level appeared to be affected by the innovation's attributes. Perceived relative advantage was not an issue arising, however, as the HMIS information management strategies appeared to be incompatible with existing conditions and management in some health units. There was also incompatibility of some IM strategies with district level management, their abilities, and the general organisation of health services. Incompatibility of the HMIS conceptual basis with the conceptual basis of the perceived causes of ill-health was also an issue, and one DMO said the HMIS needed to be extended to incorporate other information relating to PHC policy. Complexity was an issue as training appeared to focus on the simplest aspects, such as the data collection, forms integration and some data processing, rather than use of information and linking to management.

### **9.2.5 Usefulness of the 'Reinvention' concept**

Innovation re-invention is possible at the Implementation stage, according to Rogers (1995). This was a useful concept as different health personnel appear to have different views of the HMIS. Thus, if one assumes the original innovation was not only the forms, procedures and data flows, but also the informational approach to management at health unit level, then reinvention occurred at district and health unit levels, as well as in the eyes of the national Trainers, to some extent. The Trainers reinvented the HMIS by not focusing their training on information use at health unit level, but concentrating on data collection and processing for I/Cs, and leaving use of information and much processing for district staff. It is not surprising, therefore, that the Supervisors did not concentrate their efforts in teaching information use when they supervised the I/Cs. The health units appear to collect the data daily, and summarise it for monthly and annual reports to some extent, but processing of data and displaying it on graphs was hardly done at all. In some instances this was undertaken by district staff, for health unit staff, which was not the original intention. The same is true for target- setting, which was even difficult for district staff, as well as health unit staff, and in some instances this was done by Trainers. Information use was also an issue because the management tools needed to utilise collected data, were not always known or utilised by health workers. For example, stock control tools, management questions, monthly meetings, records of staff absences and training, job descriptions, standardise procedures and other tools were unknown, or unused at many health units.

The reasons for HMIS reinvention appear to include several also suggested by Rogers (1995), including the desire to simplify a complex and difficult to understand innovation; adopters lacking full knowledge of the innovation;

because the innovation is an abstract concept; and is a tool with many possible uses. However, other reasons for reinvention in this case study include: the 'inventors', (Designer and Developers), and the Change agents, (Trainers and Supervisors) lacking full knowledge of the innovation; and management tools necessary to utilise the innovation, (perceived as the information from data collection and processing) and the decision-making power, was not available. So, in effect, the health system was not ready for this innovation, and steps were not being taken to remedy this.

### **9.2.6 Social and communication structures facilitating diffusion**

Rogers (1995:37) suggests a system's social and communication structures can facilitate or impede diffusion of innovations. Communication regarding the HMIS was by face-to-face training, with some work to be undertaken in the Users' own time. Some Supervisors mentioned there was insufficient time spent introducing the HMIS to I/Cs. Thus, expecting potential HMIS users to understand the new system through only a small amount of contact with Trainers and Supervisors, acting as Change agents, appears to be inappropriate. For as Rogers (1995) has indicated, the more time a Change Agent spends with the potential adopters, the greater the chance of securing adoption.

Constraints to implementation were also the result of the organisations' social structures. The existing hierarchy of power at district and health unit level placed the MRO in a lowly position, usually carrying out clerical duties with decision-making restricted to minor issues. However, the district level MRO was expected to be an HMIS Supervisor, even of clinically-trained staff. Moreover, other DHT members were expected to produce reports which the MRO was expected to file and collate, which meant he had the right to demand reports from these staff. To a lesser extent these changes were also expected at the health unit level as well, but it was clear, from my observations and interviews, the Developers and Trainers were not aware of these constraints.

### **9.2.7 Usefulness of the 'individual-blame' concept**

Rogers (1995) noted that previous research shows blaming individuals for non-adoption is not unusual. The evidence from the HMIS implementation process suggests that the Developer, (who could be considered a Change Agent, as he was presenting the materials to would-be adopters), was blaming health unit and district level staff for their inappropriate use of HMIS data collection, processing and analysis procedures. In his view, the high turnover of staff, slow learning speed, and lack of initiative were the sources of the problems. Using Rogers's

concepts, one could see this mainly blamed the individual, yet a wider view suggests that the tendency for staffing small, rural health units with staff with low levels of formal education; data procedures not being matched to the ability of the staff and resources of the health unit; poorly motivated staff with low, irregular wages; previous expectations of staff; poor teaching; and lack of health worker control over their resources, may have been the sources of the problems.

The idea of individual-blame versus system-blame contributes to interpreting the evaluation process that was part of HMIS development and implementation. As mentioned, the limited HMIS definition appears to have contributed to narrow internal and external evaluations. Both could have been improved if the Designer and Developer had widened their focus and reviewed other factors affecting HMIS implementation. The external evaluation could have investigated, and made recommendations on information needs at health unit level, the extent of decentralisation, and management training for health unit and district level staff. Instead, the evaluators restricted their recommendations, possibly because they accepted the Change Agency definition of the problem, that is senior MOH personnel and, because it was easier, or more acceptable for them, to make recommendations within a narrower remit.

### **9.2.8 Limits to the usefulness of the Innovation Decision model**

As shown by Figure 9-1, the evidence does not fit neatly into the Innovation Decision model, because the Implementation phase is too limiting. Thus, additional factors including: inadequate finance; difficulties in monitoring; other organisational change caused by HMIS introduction; intended training approach not being enacted; the HMIS being different in practice, compared to theory; the Developer lacking conviction in the use of the HMIS; using the HMIS to bring in other changes; and the influence of the international donors, and their attempts to force adaptation, are unaccounted for in the model. The Reinvention concept, concepts from the pre-decision stage, and concepts from the Consequences stage have been useful. The next section reviews the evidence in the light of Rogers's (1995) other model of innovation diffusion within an organisation.

## **9.3 The Innovation Process model: redefining**

In recognition that, even when a decision to adopt has been made, implementation does not automatically take place, Rogers (1995) describes another model of diffusion of innovation within organisations, the Innovation



Process. This can be divided into Agenda Setting and Matching, which takes place prior to the decision to adopt, and Redefining and Restructuring, Clarifying and Routinizing which are part of the Implementation Stage. As the decision had been made to utilise the HMIS at national level, only the Implementation Stage is considered here. Figure 9-2 illustrates the evidence graphically.

Rogers (1995) suggests Redefining and Restructuring take place when the innovation is reinvented to meet organisational needs and structure, and the organisational needs and structure are modified to fit the innovation. Redefining could be considered to have taken place, because, the definition of the HMIS and its purpose were variable. The Developer and Trainers did not adequately explain the Principles knowledge embedded in the HMIS, namely, the anticipated new approach to management and decision-making, based on information. In the absence of complete understanding of the innovation, Redefining probably took place, and was probably dependent upon the individual's ability and role. Thus, some health unit workers probably saw the HMIS as: new and integrated forms; a reduction in the number of forms and registers; new data flows; new centres for processing forms; new centres of holding information; and logistic and supplies data, as well as morbidity data and data produced through interaction with individual patients. I believe in many health units, form integration and reduction in the number of registers was taking place<sup>1</sup>. The principle of the HMIS including logistic and supply information was probably accepted and the Health Unit Database was probably completed. It was also probably true that integration of forms was taking place, thereby reducing duplication of work, at health unit level. The HMIS affected data flows, and monthly reports were going to the district level, and duplicate reports were probably not sent to national level. However, health units did not appear to be processing the information as expected. Graphing of data was often not taking place, as it appeared many health workers could not do this and district staff were undertaking this instead, if it was done at all. Similarly, using information to inform decisions was not obvious at health unit level, and often district or national level staff were setting targets as it was too difficult for I/Cs.

Thus, there appeared to be partial adoption of the innovation. Moreover, as

---

<sup>1</sup> These conclusions are tentative because not very much in-depth observation and interviewing was undertaken at the health unit level because of lack of time.

Decision Implementation

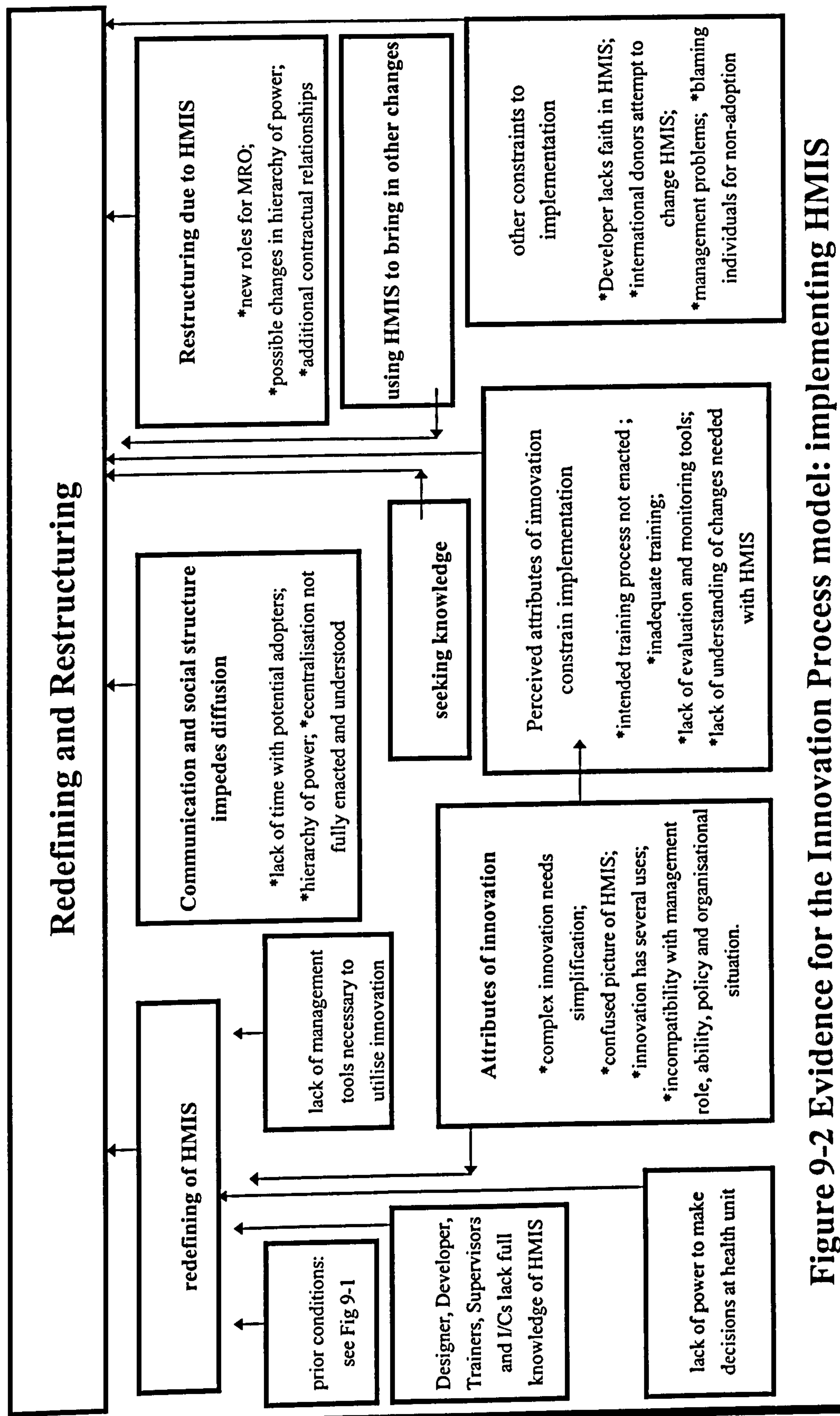


Figure 9-2 Evidence for the Innovation Process model: implementing HMIS

mentioned by one DMO, the HMIS appeared to be serving district needs more than health unit needs, which may indicate redefining had taken place. The district staff were processing the data and the new forms to varying degrees.

### **9.3.1 Reasons for Redefining**

Reasons for HMIS Redefining included: Prior Conditions or existing conditions, which are HIS information strategies and old ways of working; existing IM problems; concomitant changes; recent policy not enacted; management problems at district and health unit level; excessive influence of international donors; and organisational and cultural practices. However, there are other reasons, mentioned already in Section 9.2.1. These include the desire to simplify a complex and difficult to understand innovation; adopters lacking full knowledge of the innovation, particularly the Principles knowledge; and because the innovation is an abstract concept and tool with many possible uses. Other reasons, not mentioned by Rogers (1995) include the 'inventors', Change Agents and Aides lacking full knowledge of the innovation; lack of necessary management tools to utilise the innovation; and the power to take decisions on a variety of issues, (which is a underlying principle of the innovation, but was not available at health unit level). The innovation's perceived attributes, and the incompatibility with management role, ability, policy and organisational situation were probably contributing to redefining, as well.

### **9.3.2 Evidence for Restructuring**

Organisational restructuring was taking place to some extent. There were changes in the MRO role at district and health unit level; attempts to change the power structure within health units and district offices; changes in administrative procedures; additional contractual relationships; and some people who had been constrained in their work previously were able to become more effective because the HMIS training brought extra finance.

### **9.3.3 Social and communication structures impede diffusion**

The hierarchy of power in health units and at district level was constraining HMIS implementation, particularly as the policy of decentralisation was not fully enacted, or understood. Furthermore, although face-to-face training of I/Cs by Supervisors was probably an appropriate Communication strategy, inadequate time was allocated.

### **9.3.4 Constraints to implementation**

Several constraints to implementation related to the HMIS's perceived attributes. The intended training approach was not always undertaken, there was inadequate training and a lack of understanding of the changes needed to accompany the innovation. There was some incompatibility of IM strategies, with ability, the management role, policy and organisational situation in the Ugandan health services. The people being introduced to the HMIS were also seeking Knowledge of various kinds, even at this implementation stage. Finally the Developer appeared to lack faith in the usefulness of the HMIS, and there was a lack of tools to monitor and evaluate the innovation's implementation and use. These constraints may be related to the HMIS definition or managing IS development.

### **9.3.5 Limits to the usefulness of the Innovation Process model**

The Redefining and Restructuring concepts from the Innovation-Process model offered clarification of the situation. However, many concepts from the Innovation-Decision-Process model have been useful, including Prior Conditions affecting implementation, Perceived Attributes, and lack of Knowledge constraining implementation. The Innovation-Process model, as suggested by Rogers (1995), does not appear to utilise significant concepts from the Innovation-Decision Process model. The latter does not include the idea of rejection or discontinuance taking place after a pro-adoption decision, during implementation, even though this is recognised in the Innovation-Process model. Redefining and Restructuring suggest these take place after the decision to implement has been taken. Organisational changes intended to be in place prior to HMIS implementation, including decentralisation and extending the role of health unit clinicians to include more managerial responsibilities, had not been undertaken. Thus, the innovation appears to be incompatible with existing management role, ability, policy, and organisational situation, and this may have led to redefining the HMIS. Furthermore, classifying these as incompatibility of perceived attributes adds to the interpretation. Thus, the Innovation Process model has been the more useful of the two, although additional concepts from the Innovation-Decision process were needed.

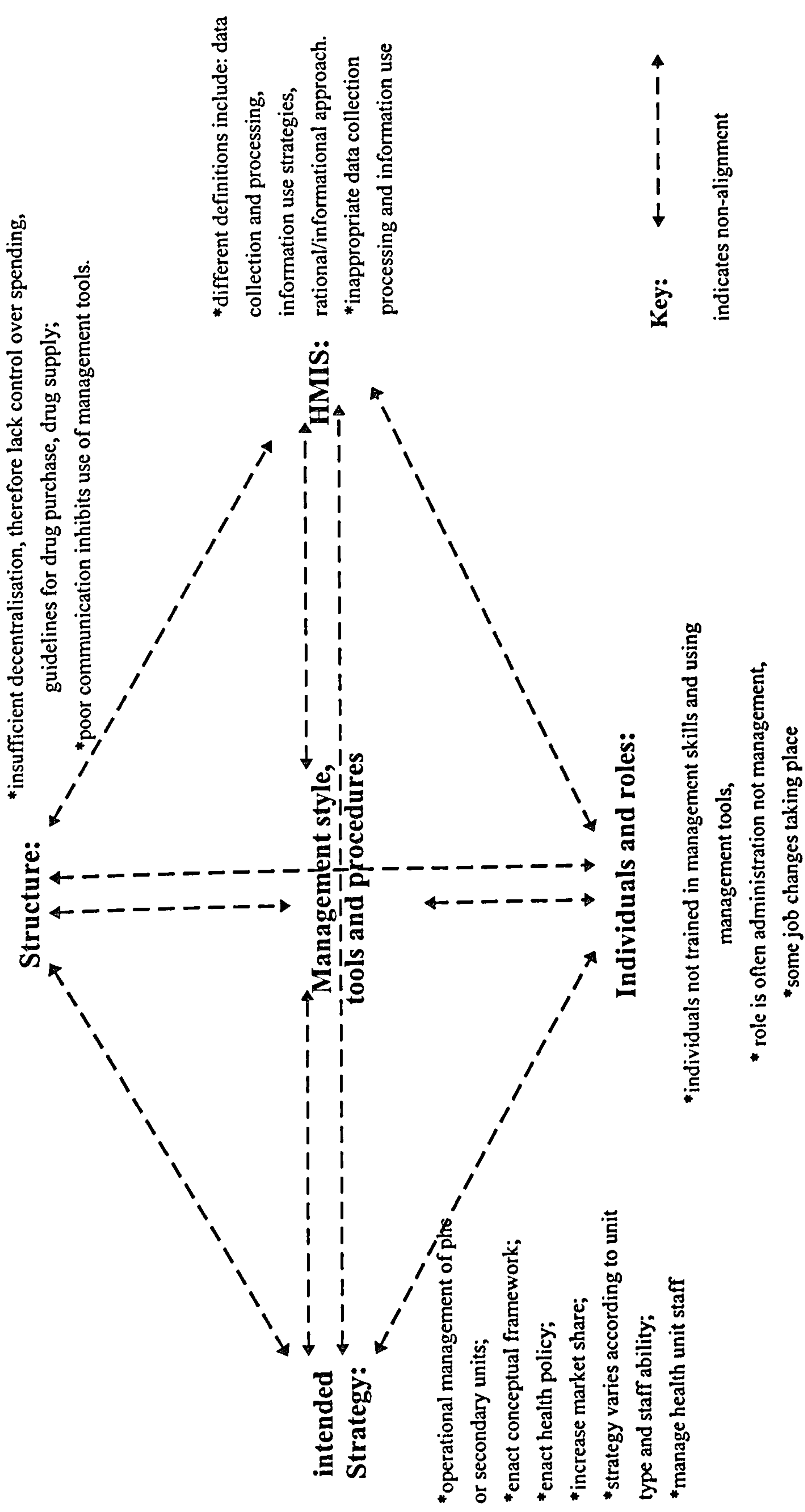
Although both models have been useful, they do not entirely explain the evidence found in this case study. For example, I believe Rogers's (1995) concepts on structural change within an organisation are too limited to understand the issue of different aspects of the organisation changing with the introduction of an innovation. Therefore, it is difficult to predict what needs to change with the introduction of a particular innovation, and to what extent. Consequently, another theory will be considered to discover if it clarifies the situation.

## 9.4 Dynamic equilibrium models of organisational change

Rogers's (1995) models of the innovation process in organisations appear to lack a model of organisational change, therefore Leavitt's concept of the organisation existing in dynamic equilibrium may be useful. The evidence will be considered in the light of dynamic equilibrium existing at health unit level and district level. Leavitt (1965) suggests that an organisation exists in dynamic equilibrium, and if one part of the organisation changes other parts will need to change, or be realigned, in order to achieve equilibrium. The four parts, or forces, within the organisation he defines as Structure, Task, People and Technology. However, Scott-Morton (1991) has changed Task to Strategy, People to Individuals and Roles and added Management. By considering the HMIS as the Technology it is possible to gain further understanding of the Ugandan situation.

### 9.4.1 Non-alignment of organisational forces at health unit level

Figure 9-3 illustrates the usefulness of the dynamic equilibrium model coupled with suggestions of where non-alignment is occurring. The description in Chapter 8 indicated management roles or I/C ability was not always appropriate to the HMIS information management strategies, and vice versa. One could say the management roles were therefore not 'aligned' to the HMIS. For example, the HMIS makes the assumption I/Cs will be managers, indicating they will have responsibility for monitoring, evaluating, controlling and planning. In practice these responsibilities have not been completely devolved, either because it was not government policy to do so, or because the change has not yet been affected. I/Cs do not always have control over drug supply ordering, which the rational decision-maker idea assumes, as this control is exercised by others. For example, drug kits are sent at regular intervals to health units, but the kit contents were pre-defined at national level and non-negotiable. Therefore, I/Cs were limited in the ways they could gain access to drugs for their patients. There is some control over drug supply in the event of minor shortages, but even this was not possible in one district where the spending of 'user fees' was not yet sanctioned, due to lack of spending guidelines. Thus, in one situation, I observed the DMO supplying additional anti-malarial drugs to a health unit, because spending cost-sharing money was impossible. This point was reinforced by the HMIS Developer who said the information from the cost analysis procedures expected at health unit level could not be used because of incomplete decentralisation. This lack of implementation of the cost sharing policy, and incomplete financial decentralisation illustrates the lack of alignment between Structure and IM strategies. Therefore, even if I/Cs wanted to act out the role of rational manager and take an informational approach to decision-making, lack of power prevented this.



**Figure 9-3 Application of dynamic equilibrium model of organisational change in health units: the HMIS is not aligned to Intended Strategy, Structure, Individuals and Roles, or Management process**

The intended Strategy of small health units is to provide PHC services to a specific population. Moreover, as mentioned previously, CPHC is the Ugandan government policy, including equity and community participation. Within their role I/Cs have to monitor, control, and evaluate health centre services and resources, as well as manage staff and provide accommodation. For there to be alignment of these two aspects, the information to support the policy and roles should be produced. However, little data is collected within the HMIS which could indicate if specific groups within health unit catchment areas are in greater need, or accessing more services than other groups. Categories only cover gender, under-five year olds and pregnant and lactating women, (although one health unit I visited devised an extra group of their own, identifying prisoners at a local prison separately from other people, which allowed the I/C to identify an increased incidence of diarrhoeal disease amongst them, necessitating specific actions). Incorporated into CPHC is the idea of health services being only one factor in improving the health of communities. Others include socio-economic factors, access to clean water and sanitation and recognising knowledge of appropriate behaviour does not necessarily lead to changes in attitudes and practice. This Knowledge-Attitude-Practice (KAP) framework was not incorporated into the data collection or management questions of Archer's (1993) design, and the HMIS Developer believed this to be an omission. Thus, there are several examples of non-alignment of Technology with the Intended Strategy of the organisation, because the information to monitor the Strategies was lacking.

One could consider that part of a health unit's Strategy was for I/Cs and other health workers to use specific management tools, procedures and the informational management style, or that the HMIS incorporated those management tools, procedures, and informational management style. Alternatively, it may be more appropriate to consider Management tools, procedures and Management style as an additional force within the organisation as well as Strategy, Structure, Individuals and Roles, and Technology, as Scott Morton (1991) has done. Which ever way, it appears there was non-alignment of health unit IM strategies and the Management procedures and Management tools. HMIS procedures assume I/Cs use specific management tools, such as targets, priority setting, minimum and maximum drugs levels. My observations suggest this was not so, and although some attempt to introduce new management tools was made when introducing the HMIS, it was insufficient. Moreover, it may be that IM strategies are not linked to health unit decision rules. For example, the Developer suggested too much information was collected on events which only changed slowly such as morbidity patterns, and could not become the focus of health unit decisions. Furthermore, he suggested there were other management questions asked by I/Cs which did not appear in Archer's (1993) list, and my own discussions confirmed this. This indicates non-alignment of Strategy and HMIS.

Related to this is the non-alignment of IM strategies and skills of some I/Cs. Nursing aides were not formally trained, but taught on-the-job, by nursing staff. They do not have high levels of formal education, yet many became I/Cs. Therefore, even if Supervisors spend a great deal of time with Nursing Aides, there would be many difficulties to increase their skills. The Developer also thought the skill level of some I/Cs needed to be improved. Thus, 'Individual and Roles' appear to be non-aligned with the HMIS, although some job changes were taking place which appeared to facilitate alignment. Finally, there appeared to be some non-alignment of administrative procedures and IM strategies, although this was denied by the Developer who said form completion did not necessitate any administration change within health units. However, one of the NGO units indicated certain forms assumed specific events took place at specific clinics or on specific wards, when their practice was different.

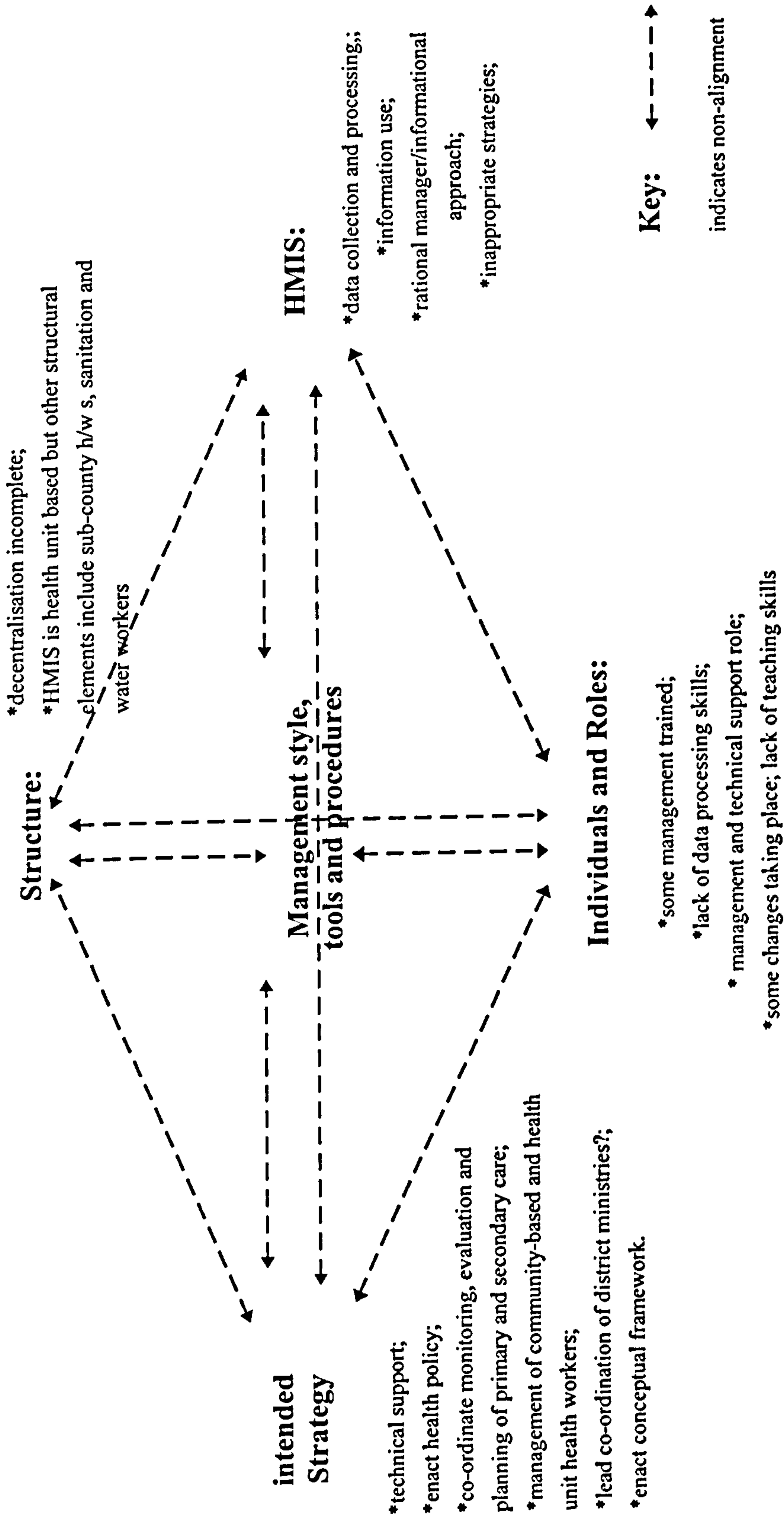
#### **9.4.2 Non-alignment of organisational forces at district level**

Figure 9-4 illustrates the usefulness of the dynamic equilibrium model of organisational change in interpreting the district level situation. The intended Strategy at district level is that mid-level managers co-ordinate monitoring, evaluation and planning of primary and secondary care; provide technical support to I/Cs and other health workers; manage community-based and health unit staff; enact health policy; possibly enact Archer's (1993) systems conceptual framework; and possibly lead co-ordination of other district ministries. However, there appeared to be some non-alignment of the HMIS and intended Strategy of the district. For instance, the DMO felt the HMIS needed to incorporate extra information related to aspects of comprehensive PHC policy, in particular, the idea of socio-economic factors influencing health status. Moreover, as some I/Cs were not able to carry out their intended management role, district managers were undertaking this to some extent.

The informational or rational management approach was not utilised fully at district level, and many DHT members were not able to utilise the management tools, which indicates non-alignment. Furthermore, at district level there was non-alignment of the HMIS and the skill of supervisors (Individuals and Roles), especially as the new system brought the need for new skills. Thus, management training, teaching skills, improved data processing skills, and skills in using information are needed. Some changes in the MRO role were taking place.

Non-alignment of organisational Structure with the HMIS is illustrated by a discussion with the Developer, who felt a lack of district level financial control





**Figure 9-4 District level application of dynamic equilibrium model of organisational change: the HMIS is not aligned to Intended Strategy, Structure, Individuals and Roles, or Management processes**

inhibited information use. For example, international donors were supposed to negotiate with district, as well as national level MOH personnel, yet, when some donors held a district meeting they merely gave information, rather than taking funding decisions. It was also felt the organisational structure prevented implementation in other ways. One DHV believed the HMIS needed a good communication and referral system in order to work, but this was lacking, especially during the rainy season. Furthermore, with decentralisation there had been some redistribution and reinforcement of power at DHT level. DMOs had become more powerful, but the team-working idea proposed by national and international agencies could conflict with this. The description shows that HMIS implementation brought changes in other areas of the organisation, e.g., there were role changes at district level, as seen in the MRO role. This position was viewed as supporting clinical DHT staff, but has expanded, and one pilot district MRO believes he has a supervisory and training role in health units.

The exploration of the change from the HIS to the HMIS, within the Leavitt theoretical framework, reveals other changes need to accompany the HMIS to ensure equilibrium and the proper functioning of the IS. Furthermore, it has proved useful to change Task to Strategy and add Management style, tools and procedures as an additional force within the organisation.

## **9.5 Conclusion**

This chapter has used existing theoretical frameworks to interpret the process taking place when the HMIS was introduced. In particular the diffusion of innovation process, as outlined by Rogers (1995), has helped, and the two models of organisational change were useful. The purpose of theories and theoretical frameworks is not only to describe and model events taking place, but also to predict. However, the diffusion of innovation framework is limited, for the model does not predict the changes needed, when the organisation is restructuring during innovation adoption. Rogers (1995) himself declares one of the intentions of the diffusion of innovation framework is to identify, in advance, the issues inhibiting or facilitating adoption of a specific technological change, and yet, it appears to me, that only when refining Rogers (1995) framework, to include a dynamic equilibrium model of organisational change, is this possible. The next chapter will examine if issues raised during the HMIS development and implementation are supported by other research, and will develop the discussion by bringing in themes from the PHC MAP case study. Implications for practice, are identified.

## **Chapter 10**

**Discussion of both case studies and  
implications**

# Chapter 10

## Discussion of both case studies and implications

### 10.1. Introduction

Previous chapters have shown the usefulness and shortcomings Rogers's and Leavitt's frameworks, therefore this chapter will examine these and bring additional views to further elucidate their strengths and weaknesses. The aim is to identify the findings, refer to the evidence and make suggestions for future action. Where available, existing work supporting the resulting propositions will be referred to. These propositions hold implications for practice which will be identified, addressing the third research question. There are few research papers in the area of national HIS planning and development in low-income countries, thus some reports have been used and research from different fields of enquiry has proved useful. The chapter is structured according to the theoretical perspective under which the issue broadly falls; however, there is much overlap, and this structure is only intended to facilitate understanding, rather than display strict adherence to the perspective.

### 10.2 Diffusion of innovation issues

#### 10.2.1 Clarifying objectives

Previous chapters have presented evidence of a lack of clear aims and objectives for PHC MAP materials, which meant the series was not uniformly presented in original funding proposals, evaluations, publicity material, presentations and the series itself.

Aid agencies developing and presenting tools for strengthening information systems should clarify their aims and objectives and consistently present them.

The evidence suggests if this is not done, confusion will arise, and antagonism from potential users may ensue. With a simple physical innovation, for example a new stove, the understanding of its purpose is easier to impart. However, with a more complex, less tangible innovation, more consideration needs to be given to description. It would have been less confusing if the Developer had said the improvement in the IS and use of information had the potential to improve management, rather than saying PHC MAP would impact on management. Furthermore, the overall rationale and background needs to be presented in the series itself, not just in an introductory workshop.

The change of objectives during innovation development, is not unusual. Rogers (1995:412) refers to the work of Goss (1979) who spoke of the difficulty of determining the original objectives of an innovation, and how such purposes may be partly concealed by subsequent rationalisations. This is similar to the PHC MAP situation.

### 10.2.2 Reinvention prior to adoption

The evidence with regard to PHC MAP shows that reinvention or redefining was occurring in the stage prior to the adoption decision, and not in the implementation stage, as usual.

Innovation reinvention, redefining or adaptation can occur at different stages in the diffusion process. Steps should be taken to facilitate or discourage this, depending upon the Change Agents' aim.

Reinvention prior to implementation is not without precedent, for Buttolph (1992) argues *"if adaptation is an example of generative learning, then it begins sooner than the implementation stage in the diffusion process"*. By generative learning she means the learning process which takes place when the individual relates new information to what is already known. Hence, she suggests individuals may adapt an innovation as they learn about it, and as they relate the innovation to their current needs and familiar setting. This does not conflict with

the other finding of individuals interpreting PHC MAP in the context of their own needs in the absence of a clear definition at the Workshop. It may be redefinition was taking place for reasons identified by Rogers (1995), but redefinition could also be due to developers lacking Principles Knowledge of their innovation.

### 10.2.3 Extent of change may influence adoption decisions

Potential PHC MAP adopters appeared to be considering the extent of the change required, prior to the decision to adopt or reject.

Change agents and others involved in diffusion need to understand whether an innovation implies a radical change or natural extension to an existing system.

This could help promoters when introducing innovations, and implies an in-depth understanding of the situation prior to introducing an innovation. Thus, if PHC MAP tools are regarded as reference materials for the DMO's MSc management training course at IPH, or the Mbale DHT management training, to draw upon, then it could be seen as a incremental change innovation. But if it is regarded as bringing the new 'informational approach' to management, it is more likely to be seen as a radical change.

That the extent of change may influence adoption is not a new idea, Onstrud and Pinto (1991), in a review of how the diffusion of innovation paradigm could fill gaps in knowledge in the field of geographic information systems, advocated research to investigate how the amount of change required in an organisation's structure affects the ability to adopt, or the extent of adoption. Greer (1981), also found this was important in relation to medical technology.

Some authors have chosen to classify different types of change which have occurred when an innovation is adopted and this concept could be useful to practitioners considering introducing an innovation. Greer (1981) speaks of radical change or a natural extension, and Kaluzny and Veney (1977) make a distinction between technical change, which requires only a change in organisational means, compared to organisational adjustment, which requires changes to organisational goals. Orlikowski (1993), in her description of the adoption of an innovation in two organisations, found it was useful to distinguish between incremental change and radical change. She suggests "*Incremental*

*change represents an extension of the status quo, that is, adjustments or refinements in current products, practices, relationships, skills and norms*", thus minor changes are made. However, "... *radical change goes beyond augmenting the status quo, requiring a shift to fundamentally different products, practices, relationships, skills and norms. It involves adopting a different paradigm, a step that typically disrupts the established pattern of understandings and interests*". This classification is supported by Dewar and Dutton (1986); Ettl, *et al.* (1984); and Pennings (1988). Moreover, Orlikowski (1993) used this classification to re-conceptualise her findings of two organisations' experience with the adoption and use of CASE tools over time. The two organisations had vastly different approaches, as one intended to "*enact radical change in both the product and process of systems development*" whilst the other did not. Although many authors have suggested that distinguishing between types of change is useful, Clark and Staunton (1989:Ch 4) maintain it is not always possible to envisage which change will accompany an innovation, even when the situation of the potential user is known.

#### 10.2.4 Compatibility with felt needs and problems

The participants at the PHC MAP workshop were concerned that the innovation should meet existing needs and problems. Hence they raised the issue of obtaining funds to implement existing training, which PHC MAP did not address, and the need to train health workers at health unit and district level in data processing and information use, which was only briefly addressed in PHC MAP. Computers are not generally used to process HMIS data in Uganda at district level or health unit level, thus training materials should be paper-based (although not completely dependent upon computer use, PHC MAP strongly advocates this tool). Furthermore, the Ugandan approach to information management training is to incorporate it into general management training.

To encourage acceptance of new ideas and techniques potential innovators should address the existing problems experienced by potential adopters, and reflect reality.

However, as requested by potential PHC MAP adopters, it may be possible for Change Agents to help potential adopters to integrate innovations into existing systems, by overcoming the complexity.

### 10.2.5 Facilitating observability

The evidence has suggested low observability may affect the decision to investigate, and the perception of what PHC MAP could offer. Participants in the PHC MAP Workshop were very keen to have proof of the consequences or impact of using the series. This could be construed as needing Principles Knowledge, for having an idea of the consequences contributes to a definition of the innovation. It is not only an issue of understanding or complexity, however, but also one of visibility of consequences. Workshop participants were uncertain of the usefulness of PHC MAP, and the description of the Kenyan use of the series served to confuse rather than clarify the audience's view of a complex innovation. Thus, the relative advantage of the series was not apparent and this may be particularly pertinent when the innovation's definition is inconsistent.

The introduction of an innovation should be accompanied by an opportunity to see the innovation in practice or by a clearly reported trial by others.

Rogers (1995) advocates a trial by others when an innovation is first introduced, especially if it is complex. Other researchers have suggested this is essential, and could even overcome doubts associated with a complex innovation. Pandey and Yadama (1992) suggest *"With its concentration on the social-psychological aspects of the diffusion process, the diffusion of innovation theory overlooks that technology is sometimes accepted, even if it is complex, because it works"*. Similarly, Barnett (1990) suggests a technology could be rejected because it did not work, or did not meet the user's perceived need, when speaking of the diffusion of energy technology in low-income countries.

Other authors have focused on having proof of usefulness, thus Trauth, *et al.* (1993), investigating the factors which influenced the diffusion of electronic data interchange (EDI) in the Netherlands state, *"Thus in order for EDI or any new information technology to be accepted, demonstrated benefits must be in evidence"*. Greer (1981) says *"... unambiguous results of efficacy tests would strongly influence leaders for or against adoption"*. Moreover, Kaluzny and Veney's (1977) research on the reasons hospitals choose particular medical innovations, identifies gains in the quality of care, or comprehensiveness of services influenced adoption decisions. This issue was highlighted by Kotch, *et al.* (1993) in relation to the introduction of a management innovation known as Performance-Based Management System. They suggest the more the consequences of an organisational innovation are visible, the greater the possibility for management success in implementing the new idea. Uncertainty of benefits was also found to be a major barrier to the adoption of CASE technology by Sumner (1993), and Ruppel and Harrington (1995), in their investigation of



the obstacles to teleworking found managers were unaware of the benefits of teleworking, or sceptical of their existence. They recommended “... *managers must perceive a clear business benefit before more organisations get on the telework bandwagon.*”

### 10.2.6 Need for methods of evaluation

The issue of visibility of the relative advantage of an innovation is related to the importance of continual monitoring and evaluation of new management approaches and interventions, which is a feature of both case studies. Potential adopters in Uganda needed methods for evaluating the impact of using PHC MAP, and there appeared to be a lack of tools for evaluating the HMIS development and implementation process. Yet little attempt was made to understand the evidence emerging from the external and internal evaluation of the pilot HMIS. Prescribing evaluation methods could clarify an innovation’s purpose, and in Uganda it is the organisation’s policy to evaluate new interventions, even if this is complex.

Aid agencies presenting tools for strengthening information systems should be aware of the context of implementation and provide tools to evaluate the innovation’s use.

Change Agents’ relative success, in securing adoption of innovations by clients, is positively related to increasing clients’ ability to evaluate innovations (Rogers, 1995:369). The problem may also be seen in the context of Iivari’s (1993) view that the most important benefits from adopting CASE systems are synergistic, resulting from the combination of benefits accruing from the internal development process, quality assurance, maintenance development, and project management, as well as CASE tools. He says: “*One problem in CASE adoption is that the tools and their implications are poorly understood in the actual context of use.*” From his view this is a demonstrability and trialability issue, whilst Norman, *et al.* (1989) suggest it is a low-observability issue, as there is a lack of visible benefits from CASE tools. Furthermore, Iivari (1993) states the reasons for the low-visibility are the lack of indicators measuring the impact of the innovation, benefits are not immediate and the difficulty of attributing benefit to the innovation, as there are other confounding factors which may explain the benefits and changes seen. Finally, the “*bottom line assessment of an MIS, if it truly one which is to support managerial decision-making, is improved decision performance*”. (King and Rodriguez, 1978).

### **10.2.7 Two innovation decisions are made**

In the PHC MAP case study, the Decision to Investigate Adoption Feasibility, as well as the Decision to Adopt or Reject is being made.

Change agents should be aware that before the adoption Decision is made a Decision to Investigate Adoption Feasibility may be made, and should facilitate this.

I believe this is not something which has been identified before.

### **10.2.8 Knowledge of the organisational situation and existing practice**

As the PHC MAP introduction description has indicated, potential users suggested developers lacked knowledge of the context of implementation. It was suggested they were unaware of the decision-making process, the important stakeholders, the problems faced with implementing existing training, existing health service practices, and the health workers' abilities.

Change agents and those introducing innovations should be aware of the organisational context and influencing factors into which they are introduced.

Compatibility of the innovation with existing practice should be addressed by Change agents.

This could help in recommending strategies for using the innovation. For example, when introducing training materials, suggestions of how these could supplement or replace existing materials could be made. Lack of awareness of the organisational situation is something other researchers have commented on. Finau (1994), writing about the IS in the Pacific Islands, believes that past information systems have been inappropriate because they were developed by expatriates with little knowledge of the health system.

### 10.2.9 Awareness of personal agendas

The evidence from the case study has suggested the PHC MAP Developer and individuals supporting the series adoption were pursuing personal agendas. The Developer was fulfilling his obligation to USAID, rather than believing Ugandan health services could productively utilise the series, and was promoting an innovation he had a strong ideological attachment to. The MOH Planner was strengthening his own position and career prospects when advocating its use, and the HMIS Designer and Developers had their own personal agendas, as they attempted to reduce the power of external funders over Ugandan health policy and health services.

Potential adopters and Change Agents should be aware that those introducing or facilitating adoption of an innovation have their personal agendas which do not necessarily coincide with the interests of potential adopters.

Mock, *et al.* (1993) also found personal agendas affected implementation, when new IS strategies to reform the HMIS were introduced in Niger. They claimed the committee charged with developing additional management changes was hampered in its work by senior MOH officials who had previously made resource allocation decisions without reliable data, and the new implied transparency meant a potential loss of power.

### 10.2.10 Adoption decision at operational level follows national decision

The evidence suggests individuals are involved in a Decision Process, even after the organisation decided to adopt. Thus, although the HMIS had been developed and piloted in two districts, each time it was introduced to In-Charges in health centres a new diffusion process was being undertaken as potential users met the innovation for the first time and assessed its appropriateness and usefulness.

Change agents should realise innovations are introduced to individuals even after the organisation has adopted, and should conduct the diffusion process accordingly.

Rogers (1995) also refers to adoption decisions made by individuals after the organisation has decided to adopt. He entitled the former a 'contingent-decision',

because an ‘authority innovation decision’ had already been made at national level. It may be by having more in-depth knowledge of the situations in health units I would have deepened by understanding of this issue, and make further use of Rogers’s (1995) framework at this point. However, a contingent-decision to adopt, and possibly a contingent-decision to investigate feasibility, may be made after an authority-innovation decision has been made.

### 10.2.11 Meaning of an innovation

Both case studies have shown that Awareness-Knowledge, How-to-Knowledge and Principles-Knowledge (or Form, Function and Meaning) are useful concepts to understand the complexity of the innovation being introduced. AKF and HMIS Developers failed to clarify and or understand the Principles-Knowledge or Meaning they were introducing, and instead concentrated on Awareness-Knowledge and How-to-Knowledge. This led to confusion and innovation adaptation. Thus, instead of an informational approach to management being introduced, there was concentration on HMIS form-filling.

Change Agents or others introducing an innovation need to know the Meaning or Principle Knowledge implied by an innovation prior to introducing it.

While acknowledging this may be very difficult to do in a different culture, and the full meaning may not be understood until the innovation has been utilised for many years, it is still important to attempt this prior to the introduction. Such clarification should proceed any preparation for introducing an innovation, and may entail assessment within the organisation, society or culture where the innovation is to be introduced. This could entail a detailed anthropological study. The greater understanding of the Meaning or Principles Knowledge to the particular circumstances will impact upon the strategies for action, monitoring and evaluation.

This proposition is supported by the report of HMIS development in Ghana, where Campbell, *et al.* (1996:60) found it was “*easy to fall into the trap of devoting most training time to filling out forms without giving due attention to data use and feedback*”. Unfortunately the Guidelines for the Development of Health Management Information (WHO, 1993b) do not discuss either the tendency to focus on form filling, or ways of counteracting this. It is recognised by De Kadt (1989), however, who says “*Health workers need to be taught not*

*only how to fill forms correctly, but also how the information provided can and does improve the work in which they are engaged”.*

Foltz (1993), recognises there are problems defining IS innovations. She says they are complex combinations of organisation and computer technology, but does not explore this sufficiently in her paper on the new MIS in Chad. Many authors, however, do not acknowledge that defining the innovation is a problem especially in IS and management innovations, and frequently IT, the “*enabling technology*” (Lewis, 1994) becomes the focus even when the intention had been to broaden to an IS focus.

### 10.2.12 Timing of Knowledge introduction

The evidence from the HMIS development and implementation, and PHC MAP introduction suggests Principles Knowledge, even when appreciated and understood by the Change Agent or others involved in diffusion, was not introduced at an early stage, but after Awareness and How-to Knowledge. Yet if Principles knowledge is not introduced early on, adaptation and misunderstanding may occur, and Principles knowledge may never be introduced. During HMIS development, form-filling was the initial focus of the training, whilst the management questions which demanded use of information, and was the focal point of Principle Knowledge, were only introduced later, if at all. This may not be the best approach. It may have been more appropriate to train health workers by developing their understanding of the management role expected of them and the management questions prior to, or at the same time, as the data collection and processing.

Change Agents should introduce an innovation’s Meaning or Principles Knowledge prior to, or at the same time as, Awareness- and How-to Knowledge.

A similar situation arose in Ghana where Campbell, *et al.* (1996) reporting on MIS development, learnt by negative experiences, and suggested training should focus on each form to be completed and use of information at the same time. Unfortunately, they recommend that if this is not possible form completion should come first, which I do not support.

### 10.2.13 Blaming people inappropriately

The PHC MAP Developer suggested the Kenyan Trainer had misinterpreted the series purpose, and was using it as part of a management training course, rather than for its original purpose. The HMIS Developer blamed health unit staff and the DHT for inappropriately redefining the HMIS. Furthermore, the HMIS external evaluation was limited, because it took the Change Agency definition of the problem, which is another example of a lack of objectivity.

Change Agencies should reflect upon whether inappropriate individual-blame, rather than system-blame, is constraining implementation of an innovation.

Having established the reason for non-adoption appropriate strategies could be employed to improve the situation.

Inappropriate blame is not unusual. Rogers (1995:114) believes there was a tendency in diffusion of innovation research, especially in the early days, for change agencies to side with the innovation's sponsors rather than the potential adopters. Consequently, there was a large amount of individual-blame, rather than system-blame or in-depth investigation, when adoption was not undertaken. According to Caplan and Nelson (1973) individual blame is *"the tendency to hold an individual responsible for his or her problems, rather than the system of which the individual is a part"*. Therefore system-blame would be the tendency to hold the system responsible for the problems of individuals. Rogers (1995) recognises late-adopters and laggards may be individually blamed by Changes Agents for not adopting an innovations, or being later than others, or not following recommendations. Consequently they may be considered as resistant to change, or non-rational. Yet, in practice, it could be the innovation is not appropriate for certain types of individuals or organisations, and the rational response in non-adoption. Blaming individuals for what, in effect are social problems, has far reaching implications as the recommendations to secure adoption would be different according to where one thought the blame lay.

### 10.2.14 Using knowledge of stages

The Uganda case studies suggests there is some evidence of staged process in innovation adoption, even if this is not exactly as Rogers (1995) describes.

Change Agents should be aware of the adoption stage the organisation is at in order to facilitate the process.

The concept of different stages implies that Change Agents who wish to facilitate adoption of an innovation need to be aware of the stage the organisation is at. For example, Change Agents could help the organisation by identifying the initial problem necessitating an innovation.

### **10.2.15 Widening the Change Agent and Inventor roles**

Many potential users of PHC MAP envisaged a role for AKF to support the use of the materials in Uganda. This was partly because it was perceived to be a complex innovation which needed further explanation and technical support, but also funding for the training was required. The need for additional support may have been an integral part of introducing the innovation, or not (as claimed by the PHC MAP developers). What ever the intention, people introducing innovations should consider their role may go beyond introducing an innovation, to include facilitating adoption or rejection. This implies a moral imperative, especially as low-income countries may not have the finance or technical ability to judge the appropriateness of a complex innovation. Therefore, innovation promoters should consider if it is appropriate to introduce an innovation when they believe it would not be acceptable, or of value to potential users, or may produce detrimental consequences.

In some situations Change Agents and Inventors carry a responsibility which may mean they need to broaden their role.

The idea of the IS analyst as a moral agent, who consciously address ethical issues inherent in their work is advocated, and illustrated, by Walsham (1993b).

## 10.3 Organisation in dynamic equilibrium

### 10.3.1 IS changes and alignment with other organisational forces

The need to consider the introduction of a new HMIS as not merely changes in data flows, collection and processing, but involving wider organisational change is raised by both case studies in Uganda. The discussion relating diffusion of innovation concepts to the empirical evidence in Uganda has focused on how the *perceived compatibility* of the innovation affects the decision to utilise. The concerns of potential adopters focused on the extent to which PHC MAP would be compatible with: the existing HMIS, policy and training approaches; DHT skills; and whether information gathered using PHC MAP tools would conflict with information gathered using different data collection and analysis methods. Thus, although PHC MAP developers envisaged a technical innovation needing implementation, potential users saw the situation as one of organisational change, or implying the need to fit the series to the organisation. This has been discussed in more detail in Chapter 6. During HMIS implementation several changes took place which facilitated utilisation, such as decentralisation, role changes and small adjustments to the status hierarchy in district teams. Extra contractual relationships developed, however, there was some non-alignment which limited HMIS utilisation, including insufficient decentralisation as I/Cs had limited control over drug supply. The Designer however, was using a conceptual framework which excluded an acknowledgement of the many forces within the organisation, as she concentrated only on IM strategies. Therefore, it appears the Designer and Developers envisage the HMIS as a technical innovation needing implementation, whilst in reality it also required organisational change.

To ensure alignment of new IS technology it is necessary to view the introduction as an issue of organisational change and facilitate alignment of all forces within the organisation.

To align information systems development with the business strategy one needs to have an information systems strategy, according to Earl (1989), and Galliers (1993) suggests it is necessary to develop an Information Management, and Change Management strategy prior to the development of the IS. The need for a national Information Management Strategy was voiced by a participant at the PHC MAP workshop in order to have a context in which to consider if the series could be useful within Ugandan health services. Such a strategy was also suggested by those evaluating the introduction of the pilot HMIS, but was not advocated at the beginning of the HMIS development.



The evidence suggests if alignment is not facilitated the innovation will not be adopted. This is not a new idea: Leavitt (1965) suggested that when socio-technological innovations are introduced into an organisation, change occurs in other parts of the organisations, until *re-alignment* has occurred. Hence the idea of organisations existing in dynamic equilibrium with Structure, Task, Technology and People as changeable parts. It may be useful to use the term 'alignment' instead of 'compatibility', as utilised by the workshop attendees, and view PHC MAP as the Technology, but change Task to Strategy as Scott Morton (1991) has done. This is supported by Mckersie and Walton (1991:248-50), who, drawing upon several research studies, suggest, "*Fundamental to effective implementation of IT is the alignment of the technology and the organisation that operates it. ... advanced technology by itself fails to achieve performance gains. Only when innovation in work organisation accompanies technological innovation do we see performance advantages*". Leavitt's (1965) model of organisational change is useful as it increases understanding of the nature of compatibility and the changes potential innovators need to be aware of. Iivari (1992) also recognises the compatibility concept connects diffusion theory with the wider body of research concerning 'fit' in organisation theory. It may be that Rogers's (1995) diffusion of innovation model with regard to the innovation-decision process undertaken by individuals (Figure 3-1) needs to be extended to include a model from organisation theory, such as Leavitt's. Greer (1977) discussing factors influencing adoption of innovations also indicates she perceives the compatibility issue to be very complicated and suggests compatibility with prevailing behaviour patterns, structures of control and privilege are important.

Avgerou (1993) also criticises national development planning IS developers for not seeing organisational change as part of the systems development process in low-income countries, and Mumford (1983a) recognises IS development is not just an issue of technological change. Consequently, she addresses issues including managing change and who would be involved, thereby involving management advisors, clinicians, IS developers and statisticians.

The desire to align different aspects of the organisation suggests potential adopters have a perception of the organisational change needed when adopting an innovation. Furthermore, as the paragraph above suggests, theories of this type of change already exist, and it could be considered unusual for participants to make such comments. However, the idea of practitioners utilising or acting in congruence with theory without realising, is not new. Harper-Howze and Redman (1992) speak of this type of correspondence between published theory and action when they describe the uses of theory in health advocacy by professionals on the Health Promotion and Education Council in Virginia, USA. They suggest "*this correspondence may be explained in part as the subconscious or instinctive use*

*of theory by well-trained professionals and in part by the fact that social science theory is, after all, a precisely formulated, carefully studied summary of individual and collective experience and common sense."*

In the sections below the argument is continued as organisational forces are discussed in relation to each other, using the empirical evidence from this study, and other work.

### **10.3.2 Alignment of technological innovation with organisation strategy**

The issues regarding compatibility are not just with one or two policies, but with many, and at quite a detailed level. This would appear to suggest, when introducing new innovations or developing new IM strategies or systems, alignment with many policies and other issues has to be considered.

Potential adopters' concerns should be addressed.

New information management strategies should be aligned with the organisational strategies they are designed to support.

This would have to acknowledge the strategy or business of the health unit differs according to level in the hierarchy and management ability, and that health policies are broader than one or two formally recognised ones. The latter recognises the agendas of all stakeholders are not necessarily synonymous with the MOH policies.

Comprehensive PHC, one of the two main health policies in Uganda, is a very wide concept, consequently authors have identified a broader MIS than the traditional HIS is needed in recognition of intersectoral determinants of health (Wilson, *et al.*, 1988). Furthermore, Husein, *et. al.* (1993) believe "*there have been few examples of, and insufficient debate on, the practical aspects of managing an MIS that supports the pursuit of equity, effectiveness and affordability*". De Kadt (1989) also believes there is a scarcity of information systems which take into account the intersectoral nature of health, and suggests WHO, who advocate this approach, have underestimated "*the true revolution*

*needed in these systems to provide the data necessary for the monitoring of intersectoral action for health, and for feedback”.*

Therefore, in recognition that organisational strategies are varied and complex, methods of taking those policies and issues into consideration need to be identified and utilised. Having checklists of the IS features which would support PHC, or other polices would be useful. Furthermore, existing tool are available, such as the framework for the alignment of information strategy with business strategy described by Buchanan and Gibb (1998), and Ellis, *et al.* (1993).

### **10.3.3 Alignment of management tools and processes with IM strategies**

The importance of linking data collection, analysis and processing to management tools has emerged as a strong theme in HMIS implementation. Several health units did not understand or use the management tools the HMIS Designer presumed were utilised.

New IM strategies should be aligned with the management tools and processes in the operational units they are designed to support.

Management practice in health units should be matched to the intended IM strategies. Tools and methods for accomplishing this alignment would need to be utilised. For example, a tool to identify whether the information management strategies meet the needs of the operational manager could be used thus: an information audit which focuses on the actual, rather than theoretical needs, would be needed. Furthermore, the management culture within the organisation needs to be acknowledged and taken into consideration when developing the IS. It may be different from that in industrialised countries with regard to planning horizons, leadership style and other practices.

Other IS designers advocate the principle of aligning the management tools with IM strategies, even if they do not specifically use these terms. Campbell, *et al.* (1996), reporting on MIS development in Ghana, state “*From inception onwards, emphasis must be place on developing the simplest system possible: clear criteria for identifying a minimum number of programmatic goals, targets and indicators must be established*”, and they also advocate management team meetings should be utilising information. Their design principles for the MIS, however, do not

clearly indicate that they were intending to align management tools and IM strategies, for only in their review of the lessons learnt did they propose this.

Reynolds (1988), speaking of management information systems not aiding management decision-making, suggests, *“Managers are often left on their own to interpret the information, to see it has any meaning, and to figure out what to do if it is significant”*. Mock, *et. al.* (1993) in Niger, discovered when attempting to change the national HIS, that a different management approach was needed alongside the new IS strategies because *“there was a lack of pre-defined and regular mechanisms for decision-making within the MOH”*.

Wilson, *et al.* (1988) see the need to link the IS with targets and objectives, and Loevinsohn (1994), reporting the results of a survey amongst mid-level health managers in a developing country, speaks of the lack of use of available data and says, *“there was little institutionalised pressure on managers to seriously examine their data. This situation has changed recently with the introduction of an area-based planning approach which forces managers to examine the performance of specific programmes in a particular geographical area”*. This is an original piece of work in that it concludes with some valuable recommendations for utilising information, which other papers take for granted. Furthermore, Crease, *et. al.* (1988), although suggesting it is an IM tool, say as cost analysis is not utilised, existing information is not used effectively, and ill-informed management decisions are made. They believe the management of health services is often characterised by deep and frequently unproductive divisions of responsibility and a fragmentation of management tasks. In their view this is particularly acute in the separation of financial management from services provision responsibility, which has meant the technique is not used, and there are often two IS, one for finance and one for epidemiological and utilisation records.

One of the main strategies in the Ugandan HMIS is the use of critical management questions to guide data collection and analysis. The relevance of those questions has been discussed elsewhere, but the issue here is whether it is appropriate for management questions or management decisions to guide IS development, and if there is any difference. In Ghana the developers state when focusing on the need for a simple system *“Two questions must be asked throughout: what specific decisions can be made at each level, and what specific information is necessary to make each of these decision”* (Campbell, *et. al.*, 1996:60). It may be the HMIS Designer had these types of decision in mind, but her needs assessment and design document (Archer, 1993) did not mention these, and neither did the HMIS manuals. Neither was this an issue raised in the interviews or observations. Hers is an unusual approach and may be based upon

her experience of operational managers in similar situations finding management questions more productive in promoting the use of information, rather than decisions, but nothing in the evidence from Uganda suggests this.

### 10.3.4 Alignment of IM strategies with individual ability and roles

The PHC MAP case study suggests that potential adopters were concerned about the health workers' ability. Furthermore, the evidence suggests the HMIS was not introduced into a homogenous organisation where I/Cs and other health workers have similar levels of ability, education and roles to perform. Moreover, equipment and facilities at health units differ dramatically, and I/Cs in different health units perform the management role to differing extents, which means DHT members undertake part of the management role for some health units. Moreover, as indicated in Chapter 9, redefinition of the HMIS had taken place, as the Developer's intention to process and use the information at health units did not often take place, and only data collection was changing. However, the HMIS features should reflect the tasks to be undertaken, health workers ability, and consequently the availability of materials and resources should reflect this as well.

New IM strategies should be aligned with Individuals and Roles, and the availability of materials and resources should reflect this.

Individuals and Roles should be aligned to Management tools and processes.

There needs to be management training for clinical I/Cs so that they can take on the new role expected of them. The inability of managers to perform a broader role is not new. Loevinsohn (1993) describes, after conducting a survey of the data utilisation and analytical skills of programme managers in a low-income country, that managers appeared not to use, and displayed little familiarity with, the data they received from the HIS. Furthermore, Finau (1994) reviewing the need for improvements in the HIS in the Pacific Island, suggests that health managers are chosen for their professional skill rather than managerial competence and ability to manipulate data.

WHO (1990:38) however, suggest, “*managers must be able to recognise situations where information can realistically be expected to support decision-making*” and WHO (1994 b) recognise that there is often a lack of necessary skills, equipment and trained personnel.

### 10.3.5 Non-alignment of power and organisational structure with management role

Although decentralisation was a government policy, lack of devolution of power constrained health unit management. The inability to conduct the management role of evaluation, planning, monitoring and implementing policy, assumed by the HMIS, was an important issue in Uganda, and was one of the concerns raised by people considering using PHC MAP. The HMIS Developer, and the PHC MAP approach, assume that I/Cs have control of resources, and this is a necessary prerequisite for the rational approach to management. Yet in Uganda there was uncertainty over the intended extent of decentralisation, that is, whether to district, health unit or sub-county level. Furthermore, health unit managers were not exercising full control of resources, and the Designer’s assumption that I/Cs were health unit managers was not always true, for in some instances the DHT took on this role.

Information system strategies should reflect the actual, not assumed power, responsibilities and activities of managers.

The evidence suggests that if IM strategies do not reflect health unit reality, the IS will not be relevant to managers. Furthermore, as other research suggests, data quality is negatively affected if data collectors and processors do not use the information themselves (Finau, 1994; Smith, *et al.*, 1988), therefore quality of data could be at risk.

The need to have an organisational structure which facilitates the IS is mentioned by Nabarro, *et al.* (1988), and Smith, *et al.* (1988). Furthermore, Sandiford, *et al.* (1992a) state: the “*information system should retrace the steps taken in the decision-making process*”, for it would not be useful to have information at a specific level if decisions could not be taken at that level. De Kadt (1989) in recognition of the intersectoral determinant of health, suggests effective decentralisation to the district level, not only of the ministry of health, but other also other ministries which affect health status must be in place. WHO (1994b) suggests insufficient decentralisation of authority to the district level has prevented managers using information to make their own decisions, and compatibility with structures of control and privilege are important when

adopting innovations, according to Greer (1977). After their experience in Niger, Mock, *et al.* (1993) also recommend developing a new IS in the context of developing organisational structures and capacity for planning.

The need for new management roles is highlighted by several authors. Crease, *et al.* (1988) suggest information is not used to compare health need, utilisation and performance, but this can be facilitated by bringing together professional accountability of service providers and financial personnel. Furthermore, I believe in order to utilise information to support PHC it is necessary to have channels of communication and intersectoral committees of the various ministries and other organisations, together with decision making power at appropriate levels and the support of senior officials. Moreover, Reynolds (1988), suggests existing management information systems often do not reflect the job of managers. Thus the problem has been recognised previously.

Lack of, or uncertainty over, devolution of power in decentralised health services, appears to be common in recently decentralised administration in low-income countries. Sandiford, *et al.* (1994) suggest even potential decision-makers in Tanzania did not always know the limits and extent of their power. Mills (1990) indicates the decentralisation situation is not very clear in many countries, and identifies four types, based upon an empirical study. Decentralisation, devolution, delegation and privatisation, reflect different degrees of decentralisation of government authority and different approaches to decentralisation. However, they acknowledge the distinction between the four is a function of the legal context, and in practice many other factors influence the actual discretion available to local bodies. This view is supported by Lee and Mills (1982) who suggest these other factors include: control over resources, their ability to mobilise political support, the perceived legitimacy of their position, and the general climate of rules, regulations and expectations within which they operate. Mills (1990) also suggests: *"The term "decentralisation" is generally used without there being any implication of the level to which authority is decentralised, except that it is understood to be below national level"*. Furthermore, despite recent international promotion of decentralisation, to facilitate PHC, this is not always achieved, as international agencies are rather reluctant to relinquish power, even though their official agenda is to do so (Conn, *et al.* 1996). This mirrors the Ugandan experience, to some extent.

### 10.3.6 Adjustments where alignment does not exist

In some circumstances, alignment of the information management strategies with the existing organisational focus is not possible, therefore it may be necessary to deliberately change the forces in order to seek realignment. For example, in

Uganda I/Cs perform the role of management to different extents, and in some cases the DHT has to undertake some of the management role. In this situation it is necessary to acknowledge this and adapt the strategies. The original intention of the HMIS was for information to be utilised, and data processed in health units, but if staff are poorly educated they may never be able to do this without intensive training. An alternative strategy may be for others, such as the DHT or other In-Charges to generate reports for them which process the data and suggest uses of the information. This could be in the form of a monthly newsletter or verbal feedback. Alternatively DHT members may need to use the information on behalf of the I/C. Resources will need to be differentially deployed to reflect this.

## **10.4 Information systems development methodology issues**

### **10.4.1 Feasibility of bottom-up development**

The intended bottom-up HMIS development did not appear to be achieved in practice, because powerful stake-holders and national requirements for information dictated the data collection and processing strategies. A bottom-up approach uses the method of identifying managers' information needs and developing the IS to meet these. As the system evolves, the modules would be linked through a common database, and then further developed in order to assist with higher level decision-making. By contrast, the top-down approach involves top management involvement in the planning process with a focus on organisational goals, objectives and strategies. This entails a focus on identifying decision areas to determine what information is needed and in what form, which leads to design specifications to meet those needs (Senn, 1990:654).

In effect, in Uganda, there was a conflict between the information required for reporting upwards and information for managing downwards.

The bottom-up development approach requires considerable detailed input from operational health workers, not senior managers assuming they know the requirements of such people.

The feasibility of the bottom-up approach actually working does not appear to be questioned by Senn (1990), or Campbell, *et al.* (1996:16). The latter, although not claiming bottom-up development, states that one of the design principles of the



Ghana MIS is, *“data that can be used at the point of collection is best”*, and assumes *“Data that is relevant at the health centre level can also be expected to be relevant for many of the most critical management issues faced by the health services as a whole”*. They also claimed a participatory approach, although they did not specify who ultimately influenced IS strategies.

Bottom-up planning undertaken by central planners who assume they know the informational needs in the health units appears to rest upon the assumption that it is possible to identify information needs merely by knowing the theoretical function of the health unit. This was the position taken by Keen and Morton (1978) who believed it was possible to categorise information needs according to whether the aim was *“strategic planning, management control, or operational control”*. This was challenged by Wilson (1994), however, who suggested such *“categorisations are much fuzzier in the real world than they are in theory, and the neatness of the classification disappears when one probes into the real information needs of business people”*.

#### **10.4.2 Domination by powerful stakeholders**

The first case study indicated that stake-holders, including donors, international agencies, and actors who envisage personal gains, influenced the non-adoption of PHC MAP. One could view them as Change Agents, but their agendas do not always match those of the organisation. HMIS development and implementation has shown the influence of strong stake-holders, especially from the vertical programmes funded by external agencies. It appears there was insufficient negotiation at the beginning of HMIS development, which meant the most powerful stake-holders were able to dominate the IS development process. It follows, therefore, that rather than trying to ignore, or avoid stake-holder influence it should be acknowledged.

Various stake-holder's views and other political factors need be taken into consideration when designing, facilitating adoption and implementing a new IS.

Thus, if different stakeholders were able to openly identify their business or IS purposes at the start of HMIS planning this conflict may have been resolved. There needs to be a tool to facilitate the development of the features of the IS by taking into consideration all these factors, including those views from different types of health unit. It may be that parts of Soft Systems Methodology could be utilised at this point, as this would develop consensus at an early stage. The idea would be for all stakeholders to openly identify their business strategies, agendas and information management strategies at the start of the HMIS planning, and

then reach a compromise satisfactory to all parties. Though if a compromise could not be reached at least there would be some transparency of agendas.

This approach would mean all stake-holders would need to be able to represent themselves, which may not be feasible. District health teams and operational managers may not have the expertise or infrastructure to do this, so this would need developing. Furthermore, it would be necessary for all important stakeholders to be represented, even if they are geographically isolated from the decision-making process. Another of my concerns regarding this approach is that it demands a great amount of transparency and forward thinking, which may not be acceptable to all the stake-holders in low-income countries. International agencies may find their headquarters' health policies conflicts with MOH policies and strategies, yet find it too difficult to acknowledge this.

Other IS implementation has realised the importance of involving stake-holders. In Uganda vertical programme influence was seen as problematical throughout design and implementation, yet in Ghana it was mentioned only in the implementation phase. The authors state, "*...despite the focus on integration and aggregation of all information at each level, several powerful vertical programmes in Ghana continue to receive their separate individual reports from all of the health facilities and districts across the country. This led to double entry of much information and inconsistency in analysis at all levels*" (Campbell, *et al.* 1996:60). Their recommendations to avoid this problem include ensuring there was a, "*convincing central mandate... to eliminate old redundant reporting system and allow the new MIS to function effectively*". However, they also suggested all the information required by the vertical programmes should be available in the new MIS, and representatives from such programme should be involved in design phases. Yet the situation in Uganda suggests even though the vertical programmes were involved in the design phases the parallel reporting continued to some extent unofficially at first, and later became part of the official system design. This suggests the situation may not have been well managed at the beginning.

The influence of international agencies and donors on health policy and strategies in low-income countries is not new. Bekui (1991), speaking of the lack of integration of information collection, processing and use in Ghana, states "*The main reasons for these multiple information systems are the organisation of the Ministry of Health into various technical divisions with vertical programmes and the requirements of international agencies, each of which demands information according to specific format*". Furthermore, Mock, *et al.* (1993), in Niger, found a lack of integration in the existing national HIS due to it being developed and implemented as a series of unrelated components, heavily influenced by vertical

programmes. Okonzi and Macrae (1995) suggest the process of applying international prescriptions to strengthen the health system is threatening national sovereignty and weakening mechanisms for ensuring accountability in Uganda. They suggest this needs to be changed, and Zaidi (1994) believes the most important factor influencing health planning in low-income countries is the influence of international donors, governments and agencies.

### **10.4.3 Facilitating the participatory approach**

The previous section has focused on bottom-up planning. This is very similar to participatory approaches. Yet users do not necessarily know their needs at the beginning of IS development (Kirkham, 1994). This is likely to be the case in situations, like Uganda, where the management role was not being performed by In-Charges in some health units. Therefore, it is necessary to negotiate with all participants continually, not only in the planning stages, and use open-ended techniques of enquiry rather than those which prescribe the categories, and possibly limit the conceptualisation of the problems and relevant issues. Such an approach could contribute to ensuring the system is relevant to operational managers needs, and facilitate a sense of ownership.

Participatory approaches to IS development need to involve participants at all stages, using a variety of techniques.

### **10.4.4 Lack of high level political support**

In addition to powerful stakeholders dominating HMIS development due to insufficient negotiation at the beginning, the Designer was not able to control the process, because there was no-one at the appropriate political level to manage it, so later stages were also dominated by donors. It needed someone with personal interest in the project at the appropriate level to support it. The unit developing the HMIS was part of the Health Planning Unit of the MOH, and (although I have limited understanding of the national level internal politics of the MOH), it appears that locating the unit within this department was useful as it was seen to be more neutral than if had been located within one of the heavily international-funded programmes, such as Essential Drugs which provided much of the funding. Yet, despite this location there did appear to be a lack of high level support at the national level, and the district level, to the extent that an essential vehicle and some supervision funding was utilised elsewhere.

IS development and implementation should be supported by politically influential persons at the national and district levels.

Therefore, strategies to develop high level support must be put in place at the planning stage. For example, at district level it may be better to attend EDHT district meetings rather than only make arrangements with the DMO when negotiating the training timetable. The involvement of an innovation champion will contribute to the success of an innovation in an organisation (Rogers, 1995).

In Ghana, IS developers had difficulty because the development was led from within the MCH/FP unit, and despite attempts to transfer 'ownership' they were not successful. As a result, there was a lack of central level ownership and responsibility, and the transition from pilot to national implementation was not smooth. They suggest an HMIS must be managed, "*within a division/unit that has strong political backing, enthusiastic staff and is centrally located so that it can provide general technical oversight. A technical unit such as MCH or Epidemiology is unlikely to be able to meet these criteria for an institutional home for an integrated MIS*" (Campbell, et al., 1996:61).

Lack of central or high level support is an obstacle recognised by WHO (1994b), and De Kadt (1989) stresses there must be political arrangements for using intersectoral information.

## **10.5 General IS issues and training**

### **10.5.1 Lack of conceptual clarity**

The evidence from both case studies suggest there was much uncertainty regarding exactly what PHC MAP and HMIS were. In Uganda the former was perceived as a management training programme, as a set of information management tools, the information brought by the tools, and the informational approach to management, that is, a management style. The HMIS was defined by Supervisors according to their role, as some regarded it as a change in data collection, processing and flows, whilst others saw it as new techniques which supported a new management style. As mentioned previously, it is important to clarify the Principle Knowledge an innovation brings prior to introduction, however, it may be there is conceptual uncertainty held by practitioners which results in failure to understand the distinctions.

Materials for strengthening information management should clarify the links between information, management tools and management.

This means the training materials should provide a simple explanation of the terms and make the links, probably using graphical representation. It is also important to define management tools as distinct from information management tools. For example, it may be useful to identify the management role: planning, monitoring, evaluation, implementing policy; and subsequently identify the management tools which facilitate those roles. These would be priority setting, target setting, action plans, planning documents, stock control tools, management decisions or questions. To deepen understanding, the information or individual information management tool to support these management tools could be subsequently identified.

Uncertainty over what is information, management tools or management, is apparent in the report of MIS development in Ghana, by Campbell, *et al.* (1996:15). Although they hoped by presenting analysed data during team meetings they could, "*increase the number of informed decisions*", they did not make the link between information, management tools and management explicit in their report, or see it as an important issue. Thus, it appears specific information was not linked with a specific management tool. The other papers on IS development in low-income countries mentioned in Section 2.6, and the PHC MAP series, do not explain the link between these three areas, or acknowledge it is problematical.

### 10.5.2 Need to focus on information use

The introduction to PHC MAP and the HMIS development and implementation have focused on data collection and processing, yet it is apparent that use of information is a major issue for managers. One DHT member, with many years experience, said he had only recently understood the usefulness of information since attending a management training course. But, PHC MAP does not substantially focus upon this.

HMIS improvement should focus on utilising information as well as data collection and processing.

The evidence suggests if improvements do not focus on information use, the needs of managers will have not been addressed. Not understanding the value of information was an issue raised by Mock, *et al.* (1993) regarding IS development

in Niger, who state: “*MOH personnel had little experience in planning and did not understand the usefulness of the health and management information*”.

Non-utilisation of information has been identified as problematical by many authors, including Husein, *et al.* (1993), Ferrinho, *et al.* (1991), Van Hartvelt (1993), Wilson (1988), WHO (1994b), De Kadt, (1989), Smith, *et al.* (1988), Loevinsohn (1994), Finau (1994), Reynolds (1988).

### 10.5.3 Not understanding an informational approach is advocated

Both case studies suggest managers and developers either interpret or desire to have an informational approach to management, though this is not always made explicit. It is difficult to know whether PHC MAP developers realised the series advocated this approach.

Materials aimed to strengthen HMIS should make explicit that the information management strategies are intended to support a particular management style, that is the informational management approach, and put strategies in place to support this.

If the developers and implementers acknowledge a new management style is being introduced, it follows I/Cs and other senior health workers in each health unit would have to undergo management training. The costs of developing an IS which utilises an informational approach to management, would therefore be much greater than merely implementing a change of forms and data flow.

In Ghana, Campbell, *et al.* (1996:15), when reporting on the development of a HMIS, acknowledge they wanted to increase the number of ‘*informed decisions*’. They make the assumption that having more objective empirical information, would lead to more effective and consistent health system management, although they realised political and personal factors are involved.

Not understanding the significance of what they were introducing was an error made in Niger. Mock, *et al.*, (1993), as IS developers, believed they were introducing statistical techniques, and only later realised they were introducing a new management approach with wider organisational consequences. Furthermore, even though Hansen and Echols (1988) realised information use

was a problem when reviewing IS development in four individual health projects, they did not make suggestions of how to promote an appreciation of the utility of information.

#### 10.5.4 Managers lack conceptual frameworks

Managers lacked a conceptual framework to facilitate understanding of their activities. In Kenya this was apparent because the systems framework of input, processes, outputs and outcomes, which was introduced by PHC MAP, was highlighted by the Management Trainer as one of the most useful parts. Furthermore, the HMIS Developer utilised this framework to identify the new HMIS information needs and the inadequacies of the old HIS, yet this was not focused upon by Supervisors when training managers.

Efforts to improve health information systems in low-income countries should prioritise the conceptual frameworks which describe their understanding of the factors affecting health status, and which are utilised in planning and monitoring health services.

This may include the systems framework, or another which does not make a causal link with outputs and impacts, which would be more in keeping with CPHC. PHC MAP recognises the need for a framework<sup>1</sup>. Furthermore, Bertrand (1988) suggests there is a need for a methodology to define indicators in order for the IS to be designed locally, and I believe he had the systems framework in mind for this purpose. The Ghanaian IS development also focused on this, as the authors, (Campbell, *et al.* 1996), appeared to be using the conceptual framework of inputs-process-outputs to develop indicators, but decided not to use impact indicators. Instead, they focused on intermediate variables, on the basis that these reflected PHC programme activity. This information strategy is supported by Schrettenbrunner and Harpham (1993), who believe the use of impact indicators should be part of the evaluation of integrated development and research programmes, and not the ongoing monitoring activity of health services.

De Kadt (1989) also believes a conceptual framework needs to be specified to show the links between interventions and outcomes, and is concerned about the ability of managers to understand, and use certain indicators. He says: "*in*

---

<sup>1</sup> The systems framework mentioned is not necessarily the framework used by health workers in practice, even though it is identified in PHC MAP. This is because the link between output and outcomes is acknowledged by several authors to be overly simplistic and does not reflect the CPHC approach.

*relation to the use of socio-economic indicators in health measurement, that implies a theory of health and development, or at the very least explicit fragments of theory. Without such an analytical approach indicators cannot really provide feedback into policy-making and management”.*

### 10.5.5 Lack of understanding of IS change

As indicated, the HMIS development and implementation process lacked an in-depth systems analysis and had a narrow view of the issues which would arise. Furthermore, the PHC MAP case study indicates the developers did not consider they were changing the MIS. This lack of understanding had repercussions, as the problems which arose were often not understood, or acknowledged, to be within the developers’ brief. It appears there is a lack of recognition that changes to data collection and processing should be viewed in the broader context of IS and organisational change.

Recommendations for changing health information management should take into consideration that these are part of the information system, not isolated issues, and need to be seen in the wider IS and organisational context.

The narrow focus found in these two case studies is not unusual when authors are identifying the problems in information management in low-income countries, and is reflected in their recommendations for change. Sharma and Dutt (1994) suggest the answer to excessive time spent in data collecting and processing is computerisation. Changawongse and Singhadej (1988) suggest the lack of appreciation of data, and poor quality data could be resolved by instilling a sense of ownership by encouraging community involvement, and linking with policy. Keller (1991) advocates training and an increase in personnel who operate the MIS, as well as extra resources such as computers and vehicles. Smith, *et al.* (1988) when discussing the issue of available information being late, incorrect, incomplete or missing suggest, *“the prominent causes are the inadequate perception of health workers of the usefulness of their information collection activities, the limited feedback they receive concerning the information reported to higher levels, and the lack of training, follow-up and supervision concerning their own use of information”*. These papers also focus on limited management skills, but do not broaden their perspective.

Even amongst those authors who provide a description of HIS development there is an emphasis on information technology, data flows, data processing and some



analysis of information need, but little attempt to bring in the organisational context (see Nabarro, *et al.* 1988; Ferrinho, *et al.* 1991; Campbell, *et al.* 1996).

### 10.5.6 Preconceived problem definition limits understanding

As indicated in Chapter 7 preconceived ideas of the problems limited the problem definition and strategies for improvement.

IS developers should not narrow their conception of the problem too early, but allow adequate time for investigation using exploratory methods.

### 10.5.7 Lack of an ISDM

Many of the problems arising during HMIS have been identified in existing ISDM, and if a well-known methodology had been utilised from the beginning some of the problems could probably have been prevented or reduced.

HMIS development in low-income countries could benefit by using existing information systems development methodologies.

This may be able to preserve the intention of the IS being for collectors and immediate users of the material, even when stake-holders are involved in development. For example, SSM recognises the power of stake-holders, and suggests ways of managing different view points. This could have facilitated the agreement, at an early stage, to conduct *ad hoc* surveys to answer particular questions which would not be answered by using routinely gathered data from interaction with patients or health unit activity. Furthermore, Mumford and Weir's (1979) ETHICS approach deals with participation, and there are various planning approaches which provide tools for linking IM and business strategies (Earl, 1993).

### 10.5.8 Need for an IM strategy

Both case studies feature a request for a national IM strategy.

Consideration should be given to developing an IM strategy prior to strengthening HMIS.

Other authors call for an IM strategy, though some use different terms. WHO (1990) called for a national health informatics policy and appropriate strategies to guide the establishment of managerial mechanisms for information in the health care system. Van Hartevelt (1993) believes IS introduction is only successful when implemented as part of an information strategy leading towards integrated IM which supports the organisations' objectives, rather than as an objective in itself.

### 10.5.9 Lack of expertise and use of IS research

Even though the needs assessment was narrow, possibly through lack of time, Archer (1993) did not appear to draw upon existing research to identify HIS problems in low-income countries to supplement her knowledge. Furthermore, although the Developer knew of the existence of guidelines for IS development he did not appear to utilise some aspects, and neither he or the Designer appeared to realise the enormity of the IS change task. This and the major changes to the IS development approach during implementation, could indicate a lack of expertise in IS development in low-income countries.

IS developers should draw upon existing experience and research when developing health management information systems

The non-use of existing research in planning IS development is also indicated in the work of Ferrinho, *et al.* (1991), who admit initially when they were developing a new HIS for a PHC centre in South Africa that "*they failed to acknowledge three issues of extreme importance*" which affected the participation of health workers collecting data. These include: "*they should feel they own the system; the system should not involve them in extra work; and it should be perceived as useful*", which are issues already mentioned in ISDM literature.

### 10.5.10 Sense of ownership

The HMIS Developer appeared to lack a sense of ownership regarding the process he was involved in, partly because he felt international donors were hijacking the process. This may also have arisen because he was not the initial designer and his views had not been taken into consideration. Alternatively it appears some pilot district DHT members felt a very strong sense of ownership.

IS designers should facilitate a sense of ownership in the minds of IS developers and users.

This issue, in relation to IT, has been recognised by Scott Morton (1991:21). He suggests that changing the way people work can be extremely threatening and therefore takes a great deal of investment, including the need to develop psychological ownership of the change process. It is also important to recognise ownership is difficult to engender, especially amongst those who make little contribution. Participatory ISD approaches are intended to facilitate a sense of ownership. However, in recognition that a participatory approach may not always lead to the less powerful influencing the agenda, or ease the implementation process, Markus (1983) states: *“User participation in the design process ... is clearly contraindicated in cases where the powerful authorities have decided that a specific change, unpopular with users, will take place ... In such situations, users are likely to resent strongly a tactic that is meant to make them feel as though they have some say in the matter, when they obviously do not”*. Moreover, Walsham (1993a:20) when identifying a similar concern, warns *“against the naive view that user participation in the design process is a panacea for implementation”*.

### 10.5.11 Culture of forward planning

As previous sections have indicated, planning ahead was difficult to achieve, as often senior figures did not respect the right of district or health unit staff to set their own priorities. This created problems during implementation.

Change management facilitators and IS developers should aim to understand the management culture prevalent within the organisation.

Planning horizons, and other management practices, in low-income countries are different than those in industrialised countries (Yavas, *et al*, 1985). This idea is extended by Lu and Farrel (1990) to include cultural, political, legal, educational national infrastructure, social and economic conditions, all of which affect IS development. Furthermore, the lack of a long-term outlook by management contributes to non-use of information (WHO, 1994b).

### 10.5.12 Lack of training in data processing, analysis and information use

As indicated during HMIS implementation the emphasis in training was in data collection, rather than in processing, analysis and information use.

Training of health workers should focus on data processing, analysis and use of information, not just on data collection

Insufficient training at district level in data analysis and information use has been identified as a serious problem by WHO (1994b), De Kadt (1989:507), Smith *et al.* (1988) and Loevinsohn (1994). Husein, *et al.* (1993), recognising the complexity of issues, point to the lack of tools to utilise information and acknowledge that an informational approach to management is not automatic, even when information is available, citing the rejection of this implied approach by supervisors of community health workers in Pakistan, as an example.

### **10.5.13 IS developers unaware they are facilitating organisational change**

At times the HMIS Developer was not only making the changes intended for the HMIS, but was also carrying out other training in different, but linked, subject areas. For example, teaching DHT members to deal with health unit management problems during HMIS feedback sessions, although he maintained when asked that it was not part of his role to conduct management training. Similarly Trainers were also teaching management skills to Supervisors. Neither of these activities was formally recognised, thus it appears there is either an inability to reflect upon actual events or an unwillingness to acknowledge these wider organisational issues are arising during implementation.

HMIS developers and implementers should be encouraged to reflect upon their experiences of IS development and acknowledge the wider changes which take place, or are needed at the same time.

The non-acknowledgement or unwillingness to reflect upon the changes which accompany HMIS development is not new. Nabarro, *et al.* (1988) describing the development of an IS to support MCH/FP staff in Nepal, produce guiding principles for computerisation, and ignore the broader picture, although clearly some changes in management tasks and responsibilities were taking place.

Foltz (1993), however in her paper of technological transfer in Chad does reflect upon the IS development and suggests the IS reinforced the administrative structure, which made for less disruptive implementation. Similarly, Mock, *et al.* (1993) retrospectively focus on developing information-based planning, rather than simply the IS itself.

## 10.6 Management issues

### 10.6.1 In-Charges and the management role

The HMIS implementation case study provides several examples of I/Cs not performing the management role expected by the HMIS Designer. Some did not see themselves as managers; others had a broader perception of the management role and saw themselves in competition with other health units. The decentralisation policy had also left some I/Cs uncertain of the management role they were supposed to perform.

In-Charges and the DHT must be trained in, and undertake the management role expected of them in a decentralised health system

This idea is supported by other authors who link the problems of data collection to issues of management, suggesting IS do not meet managers' needs due to: the changing role of managers (Wilson, 1988); the expansion of the roles for technical and clinical personnel, to include health facility management (Finau, 1994); lack of training for the management role (Smith, *et al.*, 1988; Finau, 1994); and the non-alignment of the IS to the management role (Reynolds, 1988).

### 10.6.2 Management training

The external and internal HMIS evaluations recognised there were management problems at health unit level which affected information use. Yet the recommendations do not include management training for I/Cs.

Management training needs to be advocated, and conducted at the same time, or prior to the implementation of a HMIS.

Lack of willingness to advocate management training was also apparent in the four case studies which investigated MIS problems in Aga Khan PHC projects in Bangladesh, Kenya and Pakistan (see Hansen and Echols, 1988). The senior managers in these projects identified the problems to be: *“limited appreciation of the utility of management data at all levels; insufficient definition of programme objectives and activities; lack of proper designation of targets and indicators and*

*poor quality, regularity and completeness of data collection*". Their suggestions for improvement, however, focused on data management, rather than management training.

### 10.6.3 Strategies to encourage use of management tools

This research has identified that information use is problematical, and some health workers were not using the management tools expected by the HMIS Designer. The developers assumed that teaching the management questions would encourage use of information, especially when promoted by the Supervisors. However, in practice very little teaching of the questions took place.

Strategies should be developed to encourage use of management tools and information.

To facilitate this process it may be necessary to use several strategies. Keller (1991) discussing MCH/FP information systems, found some people believed *"there was little incentive to implement information systems that routinely report needs and track available supplies/equipment ... [when] financial restraints in most programmes do not allow obtaining adequate quantities of anything"*. It follows that financial and other decisions should take place at the health unit level, as mentioned in relation to alignment above. For example, Loevinsohn (1993) argues that district-wide planning should be in operation, rather than leaving that role to the national planners. This would encourage use of information by the DHT, and if planning was to be undertaken at health unit level, information use would be facilitated there.

However, other strategies could be utilised to encourage information use, for example, making managers show their use of information in planning documents, action plans, priority setting, applications for additional stock, meetings or other decision-making venues. This need for institutionalised pressure was advocated by Campbell, *et al.* (1996:62) who, despite their assumption that the availability of information would ensure utilisation in Ghana, acknowledged post-development, that *"the link between MIS and resource allocation has often not been made; for example there is little evidence that rationalisation of staffing patterns or reallocation of vehicles based on MIS information"*. Their recommendation was that, *"some portion of the resources allocation decisions must be linked with the MIS"*.

Linking a specific event with a required action is a management tool which demands the use of information, and this type of tool has been in operation for several years in Uganda and other countries. Thus, if  $n$  number of cases of a notifiable disease, such as meningitis or cholera, are found the health unit has to inform the district level who will carry out a particular set of instructions. 'Non-use of management tools' is a problem identified by Reynolds (1988), Bertrand, *et al.* (1988), and Crease, *et al.* (1988) who investigated why data and information was not being utilised to inform management decisions. However, they do not necessarily use this phrase.

## 10.7 Organisational culture and power

### 10.7.1 Organisational culture

There are strong cultural traditions within any organisation, and the Ugandan HMIS development and implementation conflicted with some of these. For example, travel and other financial allowances were utilised by the DMO to motivate the DHT, yet HMIS Developers did not appreciate this, and tried to reduce the DMO's power by making individual DHT members accountable to the national office.

It is important for IS developers to realise that the changes they bring may conflict with organisational culture and these changes will need to be carefully negotiated.

Greer (1977) suggests that compatibility with prevailing values is important in the adoption of innovations. This is supported by the work of Wielicki (1987) regarding microcomputer use in Somali Airlines, Tricker (1988), Aitken (1994) in Nepal, and More (1990).

### 10.7.2 Changes in power relationships

Some of the HMIS development and implementation strategies appeared to demand changes to the hierarchy of power, a process that was also being undertaken due to decentralisation. These shifts met with resistance, not least from the HMIS developers and international donors.

Designers need to realise during the early IS planning stages that it may be necessary to make changes in status and power hierarchy. These should be planned and negotiated.

As mentioned previously, Greer (1977) suggests that compatibility of the structures of control and privilege are important in the adoption of innovations.

### 10.7.3 Using IS development to reinforce other changes

The HMIS Designer and Developer were attempting to control the power of vertical programmes, albeit in a hidden way. In addition the Developer was trying to reinforce additional unpopular changes which had been taking place in Uganda.

IS developers should avoid implementing unpopular changes which may be taking place within the organisation, but are not caused by, or directly related to the IS. However, if this situation is impossible to avoid it should be anticipated, planned for and negotiated.

Other HMIS developers have also indicated they were using IS development to try to bring about, or reinforce other changes. The case study in Ghana (Campbell, *et al.* 1996) implies that by aggregating information from all sources at each administrative level the old vertical programmes would be brought within the framework of integrated district and regional management, which is similar to the Ugandan situation.

## 10.8 Other implications for practice

The empirical evidence has identified several constraints to implementation. These point to implications for practice, and further implications are identified below.



### **10.8.1 Broad Needs Assessment**

The need to consider the organisational setting at all stages of the process when introducing new information strategies and approaches, and to align organisational forces has major implications for IS development. Thus, an implementation strategy based on a broad needs assessment would need to be developed. This approach is sanctioned by Walsham (1993a:21), who suggests the best prescription for an IS implementation strategy will follow from a thorough diagnosis of the organisational setting in which the system will be used. The needs assessment should not simply focus on data collection, processing and information use, but needs to broaden its mandate to cover the skill levels and roles performed, actual organisational structure, organisational strategies, management tools and processes in operation. An audit of all these areas would need to be undertaken, as part of this process. This would have to focus on the actual, rather than theoretical needs, and would have to acknowledge the strategy or the business of the health unit differs according to the levels in the hierarchy and management ability. Furthermore, Foltz and Foltz (1991:153) suggest there is a need to understand the political factionalism in the existing system before reforming, which would be accomplished by a political risk or resource analysis as part of the preparatory work. They were focusing generally on health sector reform, but this may apply to IS in particular.

### **10.8.2 Different strategies for monitoring and evaluation**

One of the PHC principles is recognition of the intersectoral determinants of health. Therefore, it follows that the ongoing monitoring of health services activity should utilise different indicators than those necessary for the evaluation of non-integrated development programmes. Routine data from interaction with patients could be used for monitoring by using intermediate or process indicators, but special surveys would need to be conducted if impact indicators were to be utilised. Thus, community-based fertility, morbidity and mortality indicators would be used to measure the latter. Monitoring of any national objective could be undertaken by survey, rather than routine collection and analysis.

### **10.8.3 Open development approach**

It is important for IS developers to not narrow their conception of the problem too early, but allow time for investigation using exploratory methods.

### **10.8.4 Personal agendas**

It is important to acknowledge IS developers should be treated as any other stakeholders as their personal agendas will influence development.

### **10.8.5 Adequate funding for support supervision**

In-Charge and Supervisor training to some extent in Uganda, is through 'support supervision', a type of one-to-one training where the trainer or supervisor conducts training in the learner's workplace. It is intended to transfer skills by using the practical problems of the learner's workplace. This method is utilised not only for the HMIS, but other subjects as well. In Uganda a DHT member would visit a health unit, many of which are several miles from the district headquarters, in isolated areas, by relying upon a DHT car or motorbike as public transport is very poor. This is especially difficult in the rainy season as some roads and tracks are virtually impassable, even on foot, and there is limited access to vehicles and fuel finance. Moreover, because the DHT member is leaving his or her usual workplace an allowance is paid, which adds to costs. The poor communications within the district will often mean the DHT member arrives unannounced and inevitably patients have a longer wait whilst the supervision session is conducted.

The support supervision method of training is good in principle, but in practice many problems hinder it. In addition to those issues mentioned above, some of the HMIS visit funding was redirected for other purposes, and I believe there was inadequate funding requested initially. Two supervisory visits to each health unit are insufficient to train health workers, many of whom have little formal education and take a long time to absorb new information and skills. Consequently, Support Supervision is not a cheap way to train health workers, and sufficient funds should be made available to facilitate this type of training.

### **10.8.6 EDHT training**

There appear to be many ill-founded assumptions within the HMIS. One of these is that the EDHT could perform a teaching and supervision role, without being trained to do this. The cascade method of training utilised in several low-income countries in management and information management training means teaching skills should be an integral part of Supervisors' training.

### **10.8.7 Information users should receive management training**

This does not have to be very broad, but should relate to the workers' role.

### **10.8.8 Management training**

In-Charges and the DHT must be trained in, and undertake the management role expected of them in a decentralised health system. Such training should be in place prior to, or at the same time as, the change to HMIS. In Uganda the DHT were supposed to conduct support supervision of In-Charges, not only regarding HMIS training, but in other subjects as well. Difficulties arose when the MRO, who was not clinically trained, was asked to supervise those with clinical training, even if this was not extensive. Thus, the type of management training non-clinicians can conduct for clinicians should be discussed on management training courses. Similarly, the I/Cs and senior health unit workers were supposed to make and use graphs, but most did not. The feasibility of teaching these techniques to health workers, particularly nursing aides with little formal training may need to be reconsidered.

### **10.8.9 Training schedules**

The issue of taking DHT members away from their posts for substantial periods of time arose during the PHC MAP workshop and the three week HMIS training. Ideally, replacements should be available during that time, but this was not the case in Uganda. This situation was exacerbated in Uganda as many changes were taking place which necessitated several training episodes. Allowing health workers to plan their own training timetable may help minimise disruption and facilitate co-ordination. This is an issue focused upon by other authors.

### **10.8.10 Financial implications**

The costs of developing an HMIS which utilises the alignment of organisational forces concept, and a participatory ISDM, will be much greater than the approach utilised to-date.

### **10.8.11 Development and implementation time**

In Uganda it appears that the pace of HMIS development was too rapid. The time taken to develop and implement a new HMIS according to the principles mentioned in this chapter would be much longer, than that specified originally in

Uganda. The chances of success would be higher, however, and recognising the extent of the change needed allows the developers to plan for that change.

### **10.8.12 Need to improve communications**

This research has indicated that poor communications adversely affect the management of health services and HMIS implementation. I/Cs found it very difficult to pass information concerning notifiable diseases to district headquarters, especially if they lived in isolated rural areas easily cut-off in the rainy season. Moreover, the support supervision training method relies heavily on having regular access to health units either to conduct the one-to-one training or pass messages to arrange meetings. This problem needs to be attended to.

### **10.8.13 Presenting overall rationale**

Materials and training courses to strengthen health information management should present the overall rationale for the changes. In particular training materials, such as PHC MAP, should provide that rationale in the materials themselves, as well as it being presented verbally. The PHC MAP workshop and the materials themselves could have been improved by specifying that improvements in the MIS and use of information had the potential to improve management, rather than simply saying the series would improve management and was about data management.

### **10.8.14 HMIS training evaluation**

As indicated, in Chapter 1, there is no independent evaluation which focuses on the applicability, utilisation or impact of PHC MAP use, and this research has only covered consideration of the series' use. Evaluation of this series, or similar training materials, should cover: the necessary conditions and support for utilisation of the modules; problems arising during training in the series, and whether the series reaches its target clients; whether the materials can help to move a organisation's central reporting system to an MIS and facilitate use of information by local managers; whether the materials meet the data-collection, processing and information needs of district- and health-unit managers; the consequences of using the materials and whether use of the modules led to improved management and use of information; and, finally, whether there has been any impact on the decisions concerning management of health services and resources which can be traced to the series. There also needs to be an in-depth investigation of how the series is viewed and used by health workers. This could include an in-depth review of how the modules were used to set-up or change an existing HIS.

### **10.8.15 Language ability and training**

As indicated in the HMIS implementation process, the English and technical language ability of health workers was not sufficiently considered. Although English is the medium used within the Ugandan health system it is not the first language of many health workers and the HMIS manuals and forms were too complicated for many people. This should have been dealt with at the beginning. Moreover, the technical language needed to be simplified as there are many words which were not sufficiently explained, or consistently utilised, by people involved in HMIS development.

### **10.8.16 Guidelines on managing change**

The IS development process is one of considerable organisational change, and it is important that guidelines for managing that change are developed. This should cover timing and sequence of changes; establishing ownership; identification of expected problems; planning for a change-over phase; and other issues. This would mean management advisers as well as clinicians, statisticians and IS developers are involved.

### **10.8.17 Need for feedback**

It was originally intended that the HMIS should include feedback to data collectors at health unit level, particularly within district comparisons. However, this appeared to be missing from HMIS in practice.

### **10.8.18 Strategies to overcome lack of IM skills**

In many health units it was apparent that health workers could not process the data collected into graphs and interpret this into useful information. This is a problem in other countries where the educational level is not high. Thus, it may be appropriate for the DHT to process and interpret the data, giving regular written comments, possibly as a type of news-letter for less able I/Cs to use.

## **10.9 Conclusion**

This chapter has made many recommendations based upon the findings in Uganda. It has shown there are existing research papers or reports which support individual findings. However, although research and reports from low-income

countries suggest some IM problems have been recognised in the past, IS developers or advocates of a particular approach have not taken a holistic view. Few authors attempt to systematically review the situation holistically (e.g., Van Hartevelt, 1993; WHO, 1994b) and even these do not appear to use a model, such as Leavitt's dynamic equilibrium to identify the organisational forces which need to be aligned when change is occurring.

Many of the propositions given here are, in effect, recommendations for practice, and many of the suggestions imply the people involved in moving a HIS to a HMIS should come from a wide variety of professional backgrounds. People skilled in change management, statisticians, organisational anthropologists, clinicians, and information systems specialists all have a role to play.

This chapter has drawn out the implications of the findings of the two case studies. These are extensive and will be relevant to other situations, in varying degrees, depending upon whether the intention is to develop a completely new management style, such as the 'informational management approach', provide reference materials for a training course, or develop a new IS. This is discussed in the Chapter 12, along with the general conclusions from the research. Prior to that Chapter 11 examines the contribution to theory of the two case studies.

# **Chapter 11**

**Contribution to theory**

# **Chapter 11 Contribution to theory**

## **11.1 Introduction**

The two case studies have described the complex process of strengthening HMIS in Uganda. This complexity has been clarified and an interpretation gained by making use of Rogers's (1995) and Leavitt's (1965) conceptual frameworks, although changes to both were needed to reflect the processes in Uganda. Chapters 6 and 9 have discussed the evidence from each case study within the context of these conceptual frameworks, and Chapter 10 has drawn on other research which has also benefited from Rogers's and Leavitt's frameworks.

This chapter combines the theoretical frameworks of this research, as described in earlier chapters, but without the originally cited evidence. Consequently a more explicit depiction is given. Section 11.2 focuses on PHC MAP's introduction. It describes the process in terms of Rogers's and Leavitt's frameworks, and indicates where the differences lie. Section 11.3 describes my contribution to theory in relation to that case study. Section 11.4 considers the HMIS implementation in terms of Rogers's and Leavitt's work and indicates where the differences are. My contribution to theory is described in Section 11.5 in relation to this case study. Section 11.6 discusses my contribution in relation to concepts that have arisen in both case studies. Other research which complements these frameworks has also been useful in interpreting the processes and this is referred to throughout the chapter.

## **11.2 Models of the introduction to PHC MAP**

Rogers's (1995) staged models of the innovation process, although useful do not adequately describe the process I observed when PHC MAP was introduced. Of the two models, the Innovation Decision Process has been the most useful, although I have utilised concepts from the Innovation Process. It is suggested by Rogers (1995) that organisations take part in the Innovation Process, which consists of agenda setting, matching, redefining and restructuring, clarifying and routinizing. The evidence from the PHC MAP introduction case study only covers the early stages of considering whether to use an innovation, however, multiple complex pictures of the Innovation Process emerge. These are portrayed graphically in Figures 11-1, 11-2, 11-3 and 11-4, which are simplified versions of



Figures 6-2, 6-3, 6-4 and 6-5 in Chapter 6. The simplification is intended to improve clarity by removing some of the evidence and detail. First is the rational model of the stages in the Innovation process, as portrayed by the MOH Planner who submitted the funding application to AKF; second is my interpretation of the same process which is a result of drawing upon additional evidence. The third picture is one where the MOH planner is not the main focus, and the purpose of PHC MAP is more confused. All three situations took place at the same time and were highly dependent upon different perceptions of PHC MAP.

### **11.2.1 Rational model of the Innovation Process**

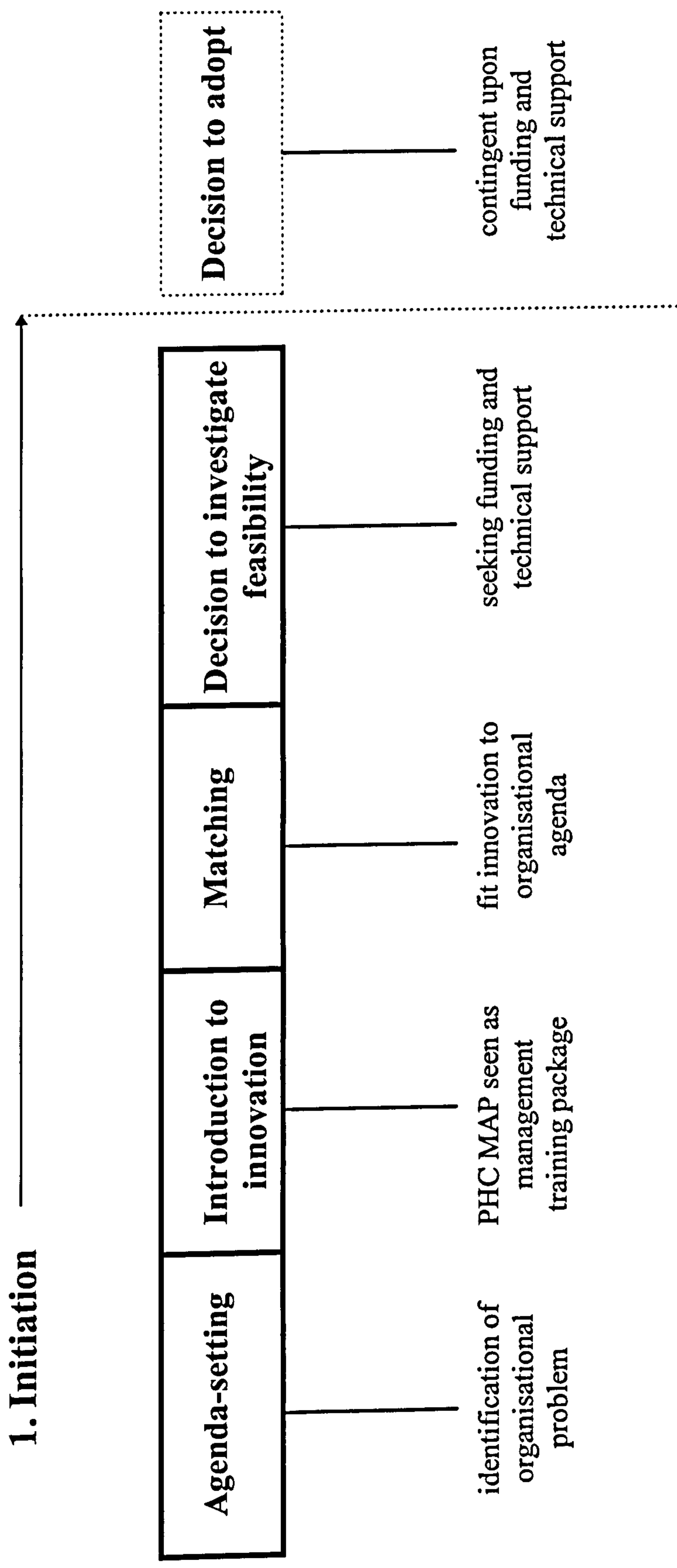
Figure 11-1 describes the process whereby the MOH Planner maintains he identified that weak management systems needed improvement, that PHC MAP could play a part in such improvement and consequently he sent a funding proposal to AKF. This was the Initiation process prior to the organisational decision to use the innovation, and as such mirrors the rational approach described by Rogers (1995) and depicted in Figure 3-2, Chapter 3. However, Figure 11-1 indicates there is a difference compared with Rogers's (1995) model, as the Adoption Decision in Uganda appears to be contingent on external funding, and does not automatically follow from Agenda Setting and Matching alone. Instead a Decision to Investigate the Feasibility of Adoption is made prior to the Adoption Decision. The latter decision is shown in a dotted line box in Figure 11-1 because the decision to adopt or reject had not been made even one year after the proposal was submitted, as the funders had not give an answer on this.

The complexity of the decision process, although not mentioned in Rogers's (1995) Innovation Process model, is recognised in the Innovation Decision Process, even though the issues are different to those observed in Uganda. These will be discussed later in this section in relation to Figure 11-3.

This rational model, projected by the MOH Planner when seeking funding, envisages PHC MAP as a management training package, not an information management training programme or the informational approach to management.

### **11.2.2 Alternative model of the Innovation Process**

As can be seen in Figure 11-1, the model suggests the priorities of the organisation match the priorities of the individuals within the organisation.



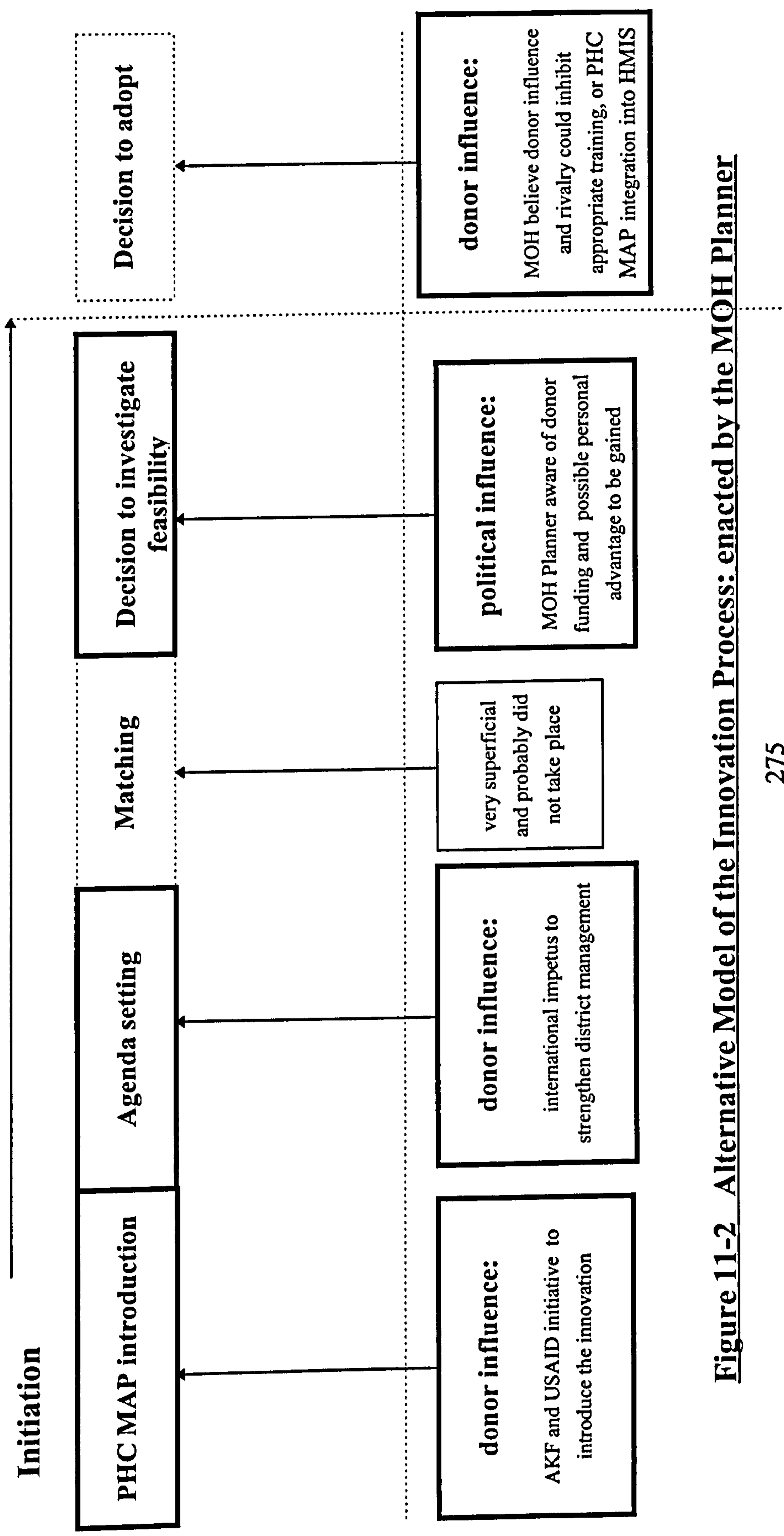
**Figure 11-1 Rational Model of the Initiation stage in the PHC MAP  
Innovation Process: claimed by the MOH Planner**

However, an alternative model of the process (Figure 11-2) shows that this was not the case, and with other evidence points to a more complex picture. Both these models assume that PHC MAP is a management training package, rather than a training package to strengthen information management. (The latter definition implies additional material is needed.) Figure 11-2 describes the Innovation Process enacted by the MOH Planner, and acknowledges that Agenda Setting is preceded by an external innovation being introduced to the organisation. Moreover, lip service is paid to Matching, but it is the MOH Planner's personal agenda which appears to heavily influence the Decision to Investigate Feasibility, rather than the organisational agenda. As mentioned in Chapter 6 donor influence was very strong at all stages of this Initiation process, an outside influence which Rogers (1995) does not acknowledge.

### **11.2.3 Model of the process when the innovation definition is unclear**

The two models in Figures 11-1 and 11-2 have focused particularly upon the MOH Planner and the definition of PHC MAP as training materials for district management. However, a third model emerges whereby the innovation's meaning is not clear and involves other people as well as the MOH Planner. In this model (Figure 11-3) there was very little evidence that the decision to adopt or reject PHC MAP was affected by a prior consideration of organisational need, that is Agenda Setting. PHC MAP's existence appears to have pre-dated the organisation's Innovation Process. The Matching process was being enacted at the Workshop to some extent, but was widened, compared with Rogers's (1995) approach, to include consideration of whether parts of the organisation were compatible with the innovation. As part of this stage Redefining was also taking place, as is discussed in detail in Chapter 6, Section 6.3.4. The next stage in the process was not the Adoption decision, but the Decision to Investigate feasibility as mentioned earlier in this chapter. All three of these stages were heavily influenced by donors and personal career advancement. The Redefining of the innovation was helped by the Kenyan Management Trainer. Finally, although the Decision to Adopt or reject was not made, it appears that this would be contingent upon many factors as mentioned in Figure 11-3.

Figures 11-1, 11-2 and 11-3 have depicted the Decision as a process rather than as a one-off event as in Rogers's (1995) *Innovation Process* model. This shows that Rogers's model lacks clarity and is in need of refinement. Taking the Decision process concept from the classical *Innovation-Decision* model is useful, even though the issues raised were not the same.



**Figure 11-2 Alternative Model of the Innovation Process: enacted by the MOH Planner**

### 11.2.4 Combining Rogers's two models

The three models have so far been developed by asking if the themes found in Uganda fit the Innovation Process model described by Rogers (1995). Figure 11-1, the rational approach projected by the MOH Planner was utilised when searching for funding, but Figure 11-2 is a more realistic interpretation of events. Figure 11-3 has brought in the broader picture which acknowledges that several interpretations of the innovation have been made. However, neither of these three reflect the usefulness of the concepts from Rogers (1995) Innovation Decision Model, which is the classical version, or fully represents the situation observed in Uganda. Consequently, Figure 11-4 has combined Rogers's two models, although in order to ensure clarity I have left out much detail.

At the Knowledge stage Awareness Knowledge was given, whilst How-to-Knowledge and Principles Knowledge was also sought. There were different and confused perceptions of PHC MAP, and that perception depended upon individual's roles as well as the descriptions given by presenters. A description of the successful Kenyan adoption of the series had been given, although this was not in keeping with the PHC MAP Developer's definition of the series. The next stage, Attitude Formation, took place when perceived attributes of the innovation affected the Decision to Investigate Adoption. The third stage was Redefining and Matching, and some people adapted PHC MAP to fit a perceived need for a management training package. However, when Matching, little attempt was made to integrate with existing management training and HMIS development; no review committee was formed to establish if the innovation met existing needs; and no detailed matching took place, although matching to an international agenda was paramount. The Decision to Investigate Adoption Feasibility was affected by the availability of technical advice, evaluation tools, the possibility of adoption and integration, the degree of change required and knowledge of a performance gap. Political interests and personal gain also affected the Decision to Investigate, as did the ability to deal with other management and organisational factors. The stages have been pictorially described as different stages, yet in reality these merge into one another, hence the placing of Redefining and Matching both before and after Decision to Investigate. Finally, there was no evidence that an Adoption or Rejection decision was made by the MOH during my field work because they had not received a reply from AKF even one year after a request for funding and technical assistance had been made. Donor influence was obvious at most stages of the process described, as were Prior Conditions. The latter have been described in Chapter 6 and include: the new

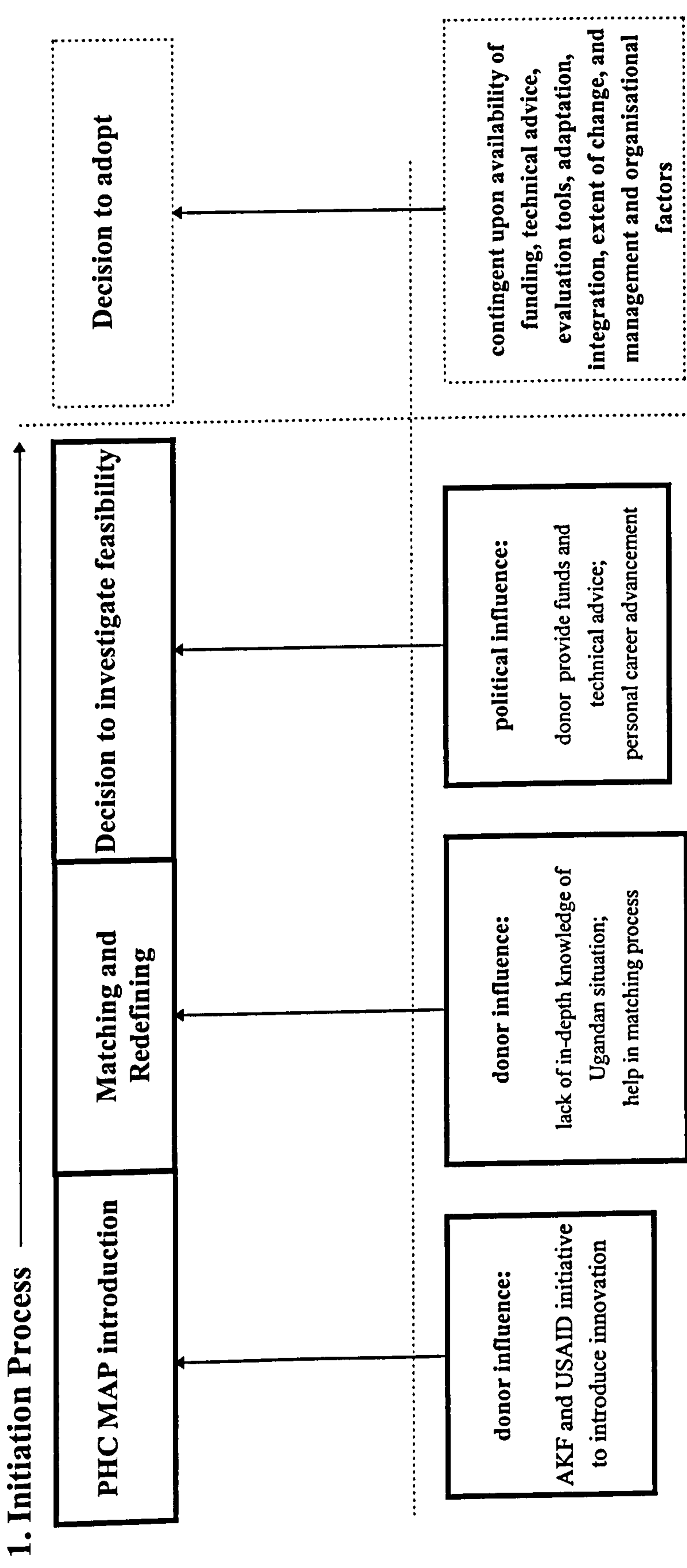
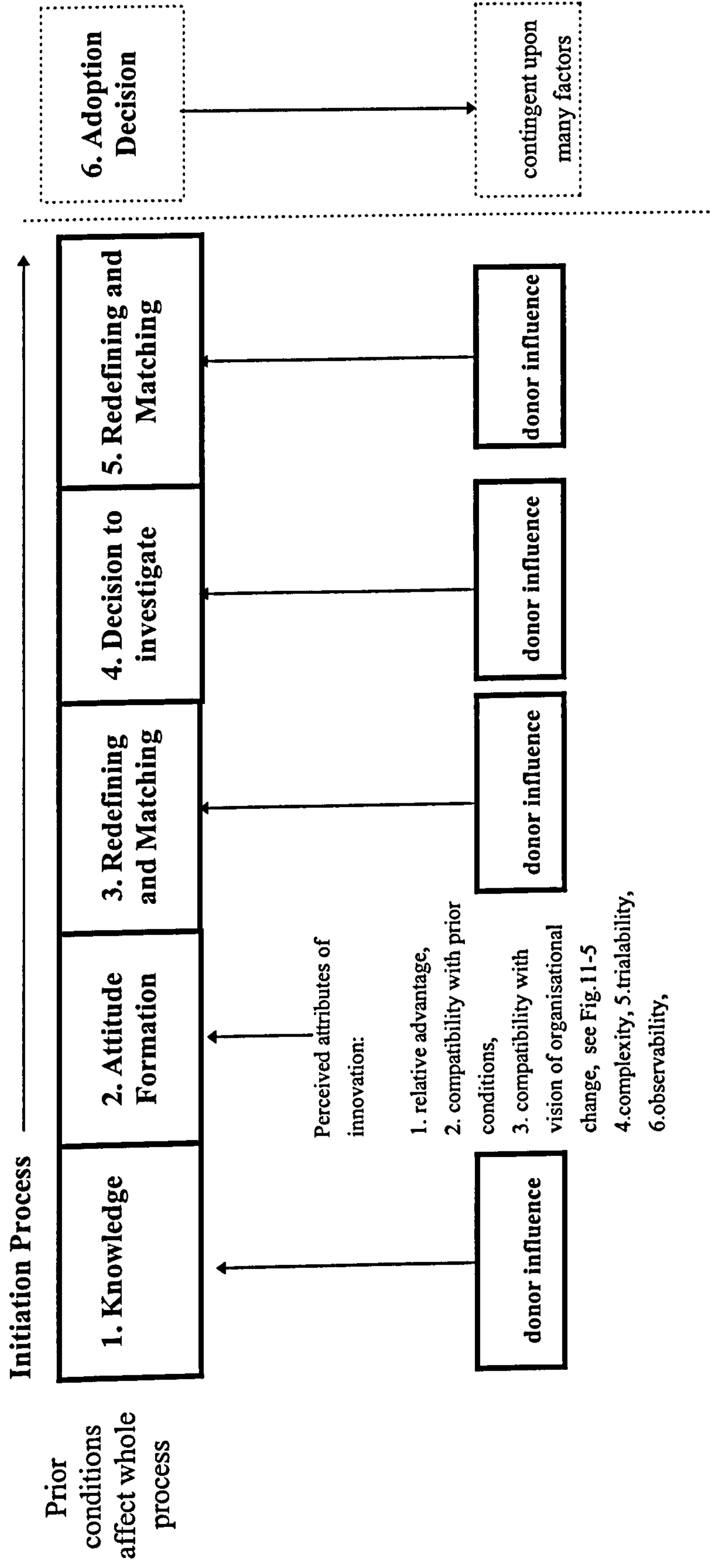


Figure 11-3 Model of the stages in the Innovation-Process when perception of PHC MAP is unclear



**Figure 11-4 Model of considering PHC MAP adoption: combining Innovation-Decision Process and Innovation Process**

HMIS; a management training emphasis; a specific management training style; the belief that health workers need training in data processing and information use; a non-computer focus; lack of DHT time; lack of DMO management skills; need for logistic, supply and financial information; recently changed norms and structure and a willingness to use innovations.

As mentioned above compatibility with a vision of organisational change affected Attitude Formation, as Workshop participants appeared to believe that training and knowledge alone do not bring organisational change. Rather, they appeared to be drawing upon a conceptual model of organisational change, developed from experience or a theoretical knowledge, when identifying factors inhibiting implementation. Leavitt's (1965) model of an organisation existing in dynamic equilibrium has been useful here. Assuming 'Technology' is PHC MAP, it is productive to change 'Task' to Strategy', add 'Management Processes' as an additional force, and change 'People' to 'Individuals and Role' as Scott Morton (1991) recommended. Figure 11-5 depicts the five forces and issues raised, thus, although PHC MAP developers envisage a technical innovation needing implementation, potential users saw the situation as one of organisational change. The Workshop participants questioned that PHC MAP was aligned to the intended strategy of the health services in Uganda or the existing organisational Structure. It was thought that PHC MAP would be inappropriate because the DMT lacked skills in management and information use on which they assumed the package depended. Moreover, some believed the existing management style and procedures were at odds with those portrayed in PHC MAP.

### **11.3 The PHC MAP case study and evaluation of existing theoretical frameworks**

The complexity of the situation in Uganda when PHC MAP was introduced has been clarified using Rogers's (1995) and Leavitt's frameworks. Rogers's work has been particularly useful, but there were limitations which have necessitated the development of a model which combines his two models and expands upon them. Figure 11-4 most adequately describes the situation found. This study has demonstrated that the diffusion of innovation framework is applicable to the introduction of new IM strategies and management approaches in low-income countries. Some refinements to the models described by Rogers (1995) and Leavitt (1965), have been made.



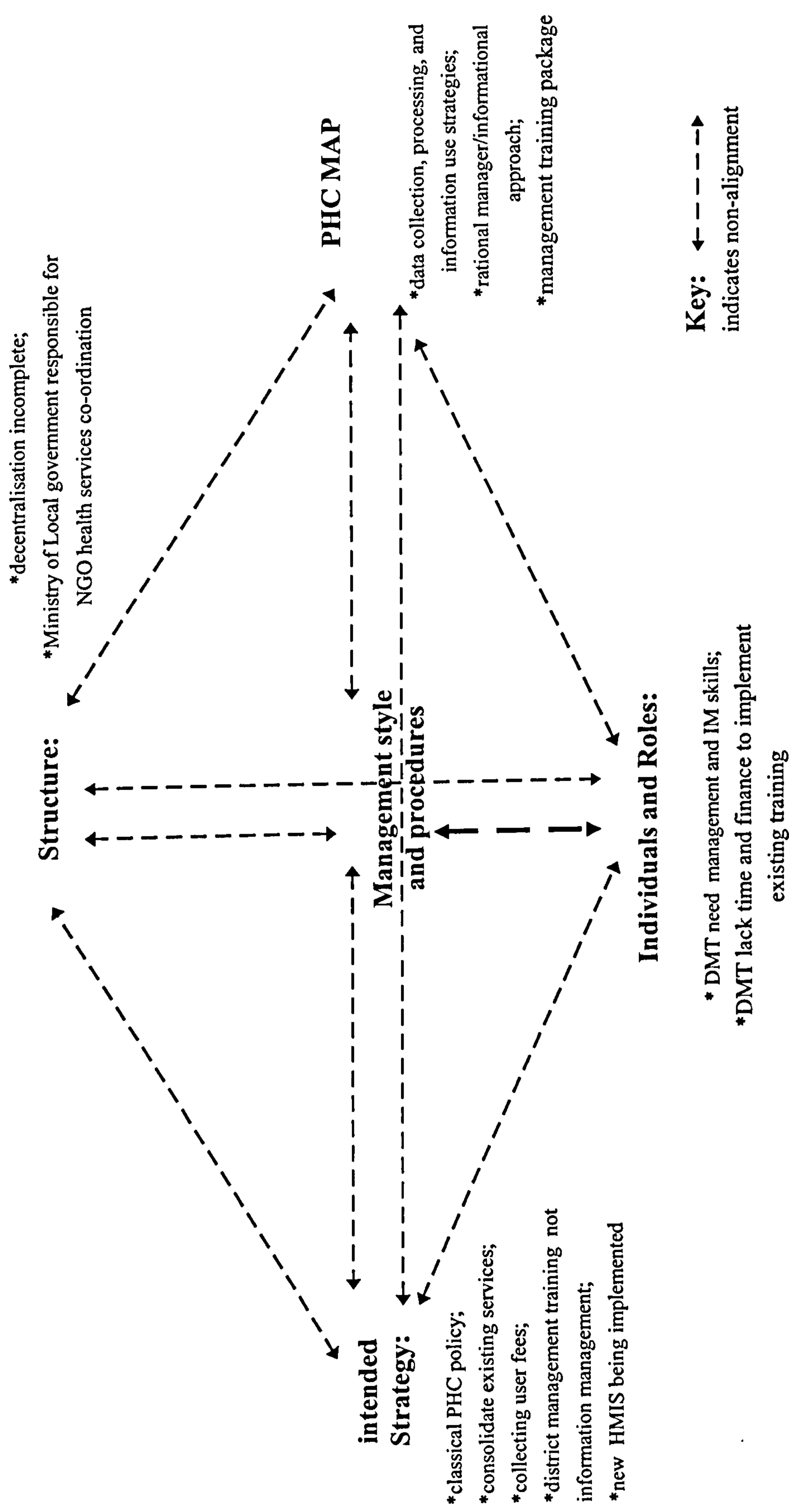


Figure 11-5 Application of dynamic equilibrium model of organisational change: PHC MAP is not aligned to intended Strategy, Structure, Individuals and Roles, or Management processes 280

The Innovation-Process model of organisational change, has been the most useful, although I have utilised concepts from the Innovation-Decision model. The initial stages of the Innovation-Process model were useful in understanding the 'claimed behaviour' of the MOH Planner to support his funding application, but as I believe his personal interests did not coincide with those of the organisation, and other political interests were influencing events, the model in Figure 11-2 is more realistic. This is a deviation from Rogers's (1995) model.

As mentioned, uncertainty of what the innovation, PHC MAP was, caused much confusion. The definition employed by the MOH Planner was not shared by everyone, and a broader view of the events in Uganda is depicted in Figure 11-3. Again this shows that the Innovation Process model is useful to understand the process, but even this is not sufficiently comprehensive. Therefore I have effectively combined Rogers's (1995) two models. However, even this was insufficient to clarify my findings.

The Knowledge-Stage was a useful concept as it allows the analyst to indicate that Awareness Knowledge was given, but How-to-Knowledge and Principles Knowledge was lacking and sought. Consequently I suggest, in Chapter 10, Section 10.2.12, that Principles Knowledge should be introduced prior to, or at the same as, Awareness or How-to Knowledge. This is not something mentioned by Rogers (1995), although Campbell, *et al.* (1996) suggest that training in new form completion and use of information should be conducted at the same time, when strengthening information systems. They did not draw upon Rogers's work to develop their ideas, however.

I found the Second stage can be more aptly entitled 'Attitude formation', instead of Persuasion, and that this stage was even more complex than Rogers (1995) describes. The change of the term 'Persuasion' to 'Attitude Formation' has developed an improved understanding of the process, and projects a potential User perspective, rather than the Change Agents view.

Potential PHC MAP adopters appeared to be considering the extent of the change required, prior to the decision to adopt or reject. This is not a new idea, though it is not discussed by Rogers (1995). Section 10.2.3 in Chapter 10 illustrates that several authors make the distinction between radical change and incremental change (Onstrud and Pinto, 1991; Greer, 1981; Kaluzny and Veney, 1977; Orlikowski, 1993; Dewar and Dutton, 1986; Etlie *et al.*, 1984; and Pennings, 1988) when trying to understand their evidence.

Rogers's (1995) Perceived Compatibility is a limited concept, because it does not clarify all the compatibility issues relevant to this case study. In particular, a vision of organisational change was held by potential Users and was influencing their attitude towards the innovation. This vision is similar to the theoretical framework proposed by Leavitt (1965), though it includes the extra organisational force identified by Scott Morton (1991). Further discussion is in Section 11-6.

During the Initiation process I observed a Redefining and Matching Stage. This has some similarities with the Matching in Rogers's model, but includes Redefining, which Rogers (1995) suggests occurs after the Adoption Decision. In this case Redefining took place before any Decision. Reinvention prior to implementation is not without precedent, for, as shown in Section 10.2.2, Chapter 10, Buttolph (1992) suggests individuals may adapt an innovation as they learn about it, and relate the innovation to their current needs and familiar setting.

The Decision to accept or reject PHC MAP in Uganda was more complicated than the Innovation-Decision Process indicates for it appeared to be contingent upon many issues which do not concern Prior Conditions, Knowledge or Persuasion. Instead a Decision to Investigate Feasibility was made, with the anticipation that an Adoption or Rejection decision would be made later, after funding was provided or not, as the case may be. This is not something that has been found before. Furthermore, the strength of external donor influence at all stages of the process is apparent and yet external influences are underplayed in Rogers's (1995) work. This research has contributed to existing diffusion of innovation research by refining the two models. Two decisions were identified in an adoption process, the Decision to Investigate the Feasibility of Adoption, and later the Decision to Adopt or Reject. Distinguishing the two has implications for practice as Change Agents can target their efforts more specifically.

Leavitt's work has been useful in understanding the situation regarding PHC MAP in Uganda, though Scott Morton's (1991) adaptation more thoroughly describes the evidence. This led into the recommendation that the organisational situation needs to be fully appreciated by Change agents when introducing innovations. This was not fully understood by Rogers (1995) though has been commented upon by Finau (1994). Writing about past IS developments in the Pacific Islands, he suggests they were not appropriate because they were conducted by people who had little knowledge of the health system.

The evidence from the case study has suggests the PHC MAP Developer and individuals supporting the series adoption were pursuing personal agendas, yet

Rogers's (1995) work does not take this into account. However, Mock *et al.* (1993) also found personal agendas affected implementation of new IS strategies to reform the HMIS in Niger.

The consideration of PHC MAP within the ministry of health in Uganda is unusual, because it describes a situation where the innovation has not been adopted. Other studies have shown the adoption process being undertaken, to some extent, that is with varying degrees of success, but this field work has described a rejection of an innovation in its very early stages.

This section has focused on the findings from the PHC MAP case study, however, several similar theoretical issues were identified in both case studies. These will be discussed in Section 11.6, but before this the theoretical contribution of the HMIS implementation case study will be described.

## **11.4 Modelling HMIS implementation**

As in the first case study, the HMIS implementation study yielded themes and relationships which have been considered in terms of Roger's two models concerning innovation adoption in organisations. Chapter 9 has examined these in detail using the evidence, and the focus is on the Implementation stage. This is because it had already been decided, at national level, to develop and adopt a new IS, therefore health units and districts were expected to accept when introduced to the HMIS. Thus, the Adoption Decision had already been made, and did not appear to be taken at those levels.

### **11.4.1 HMIS implementation using the Innovation-Decision model**

The evidence from my research, regarding HMIS implementation, does not fit neatly into the classical model, that is the Innovation-Decision Process model, particularly because the Implementation phase is too limiting. Although the idea of stages is useful it is of limited use, however, many of the associated concepts were valuable. Figure 11-6 graphically displays the events using this model. This can be compared to Figure 3-1 in Chapter 3.

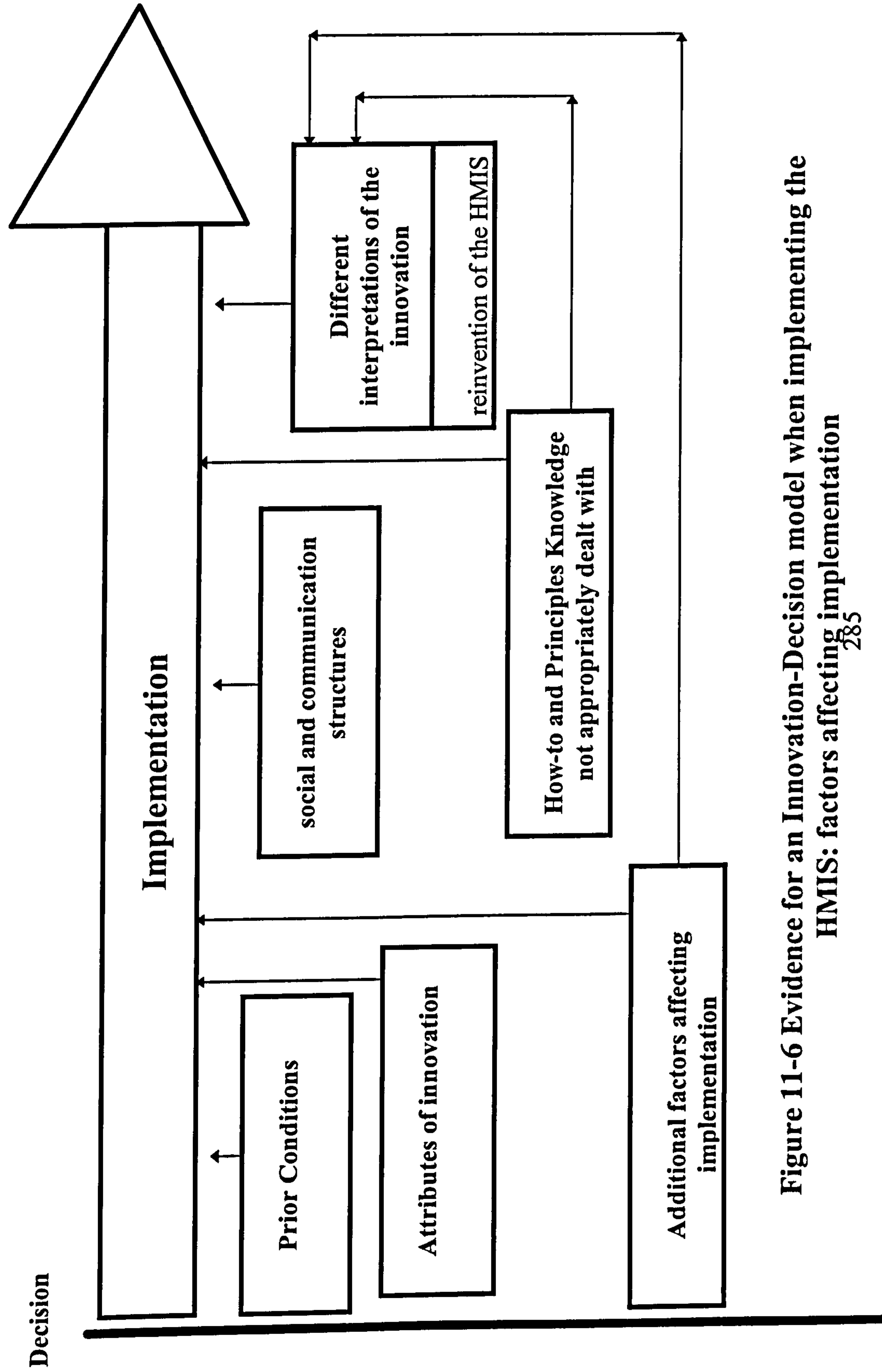
Prior Conditions affected HMIS Implementation, as shown also in Figure 3-1, and these include existing conditions, which are: HIS information management strategies and old ways of working; existing IM problems; concomitant changes; recent policy not enacted; management problems at district and health unit level; excessive influence of international donors; and organisational and cultural practices. However, unlike Rogers's (1995) Innovation-Decision model it appears that several concepts, which would usually be important at earlier stages in the process, were important in the Implementation stage. These include the idea of several types of Knowledge; the innovation's Attributes; and the Form, Function and Meaning concepts as discussed in Section 9.2 in Chapter 9. Reinvention of the innovation during Implementation is possible according to Rogers (1995) and this took place during HMIS Implementation. Various social and communication structures were affecting diffusion, as Rogers suggests, and his individual- versus system-blame concept was also useful in understanding the process observed.

However, the evidence does not neatly fit into the Innovation-Decision model because Rogers's (1995) Implementation phase is too limiting. Additional factors affecting HMIS implementation in Uganda included: inadequate finance; difficulties in monitoring; other organisational change caused by HMIS introduction; intended training approach not being enacted; the HMIS being different in practice, compared to theory; the Developer lacking conviction in the use of the HMIS; and using the HMIS to bring in other changes. It would be unrealistic to expect one model to account for all the themes and relationships I found. Furthermore, some of these are common to IS development generally and have been discussed in other Chapters. However, the Innovation Process model has been utilised to provide a deeper understanding, as the next section shows.

#### **11.4.2 HMIS implementation using the Innovation-Process model**

In recognition that, even when a decision to adopt has been made, implementation does not automatically take place, Rogers (1995) describes another model of innovation within organisations, the Innovation Process (see Figure 3-2 in Chapter 3). Here implementation is seen as much more complex. Agenda Setting and Matching takes place prior to the Adoption Decision, whilst Redefining and Restructuring, Clarifying and Routinizing are part of the Implementation stage. Figure 11-7 illustrates my use of the Innovation Process model coupled with concepts from the Innovation Decision model. This model has proved more useful in understanding the HMIS implementation process.

Rogers (1995) suggests Redefining and Restructuring take place when the organisation is reinvented to meet organisational needs and structure, and the



**Figure 11-6 Evidence for an Innovation-Decision model when implementing the HMIS: factors affecting implementation**

organisational needs and structure are modified to fit the innovation. Redefining could be considered to have taken place, because, the definition of the HMIS and its purpose were variable. This is discussed in more detail in Chapter 9, as is the evidence for Restructuring.

The many reasons for HMIS Redefining include: Prior Conditions, and many others mentioned by Rogers (1995) including the desire to simplify a complex and difficult to understand innovation; adopters lacking full knowledge of the innovation, particularly the Principles knowledge; and because the innovation is an abstract concept and tool with many possible uses. Other reasons, which are not mentioned by Rogers are that 'inventors', Change Agents and Aides lacked full knowledge of the innovation; there was a lack of the necessary management tools to utilise the innovation; and the power to take decisions on a variety of issues. (Power at health unit level is an underlying principle of the innovation, but was not available in practice.) The innovation's perceived attributes, and the incompatibility with management role, ability, policy and organisational situation were probably contributing to redefining, as well. That the innovation was organisationally inappropriate and constrained implementation was shown by the intended HMIS training not being enacted, the intended training was inadequate, there was a lack of tools to monitor and evaluate the innovation's implementation and use' and a lack of understanding of changes needed with the HMIS.

Organisational restructuring was taking place to some extent, as described in Chapter 9, and social and communication structures were impeding diffusion. Moreover, there were several constraints to implementation related to the HMIS's perceived attributes, and even at this late stage people being introduced to the HMIS were also seeking Knowledge of various kinds. Finally, the Developer appeared to lack faith in the usefulness of the HMIS. These constraints may be related to the HMIS definition or managing IS development.

### **11.4.3 Limits to the usefulness of the Innovation Process model**

The Redefining and Restructuring concepts from the Innovation-Process model offered clarification of the situation. However, many concepts from the Innovation-Decision-Process model have been useful, including Prior Conditions affecting implementation, Perceived Attributes, and lack of Knowledge constraining implementation. The Innovation-Process model, as suggested by

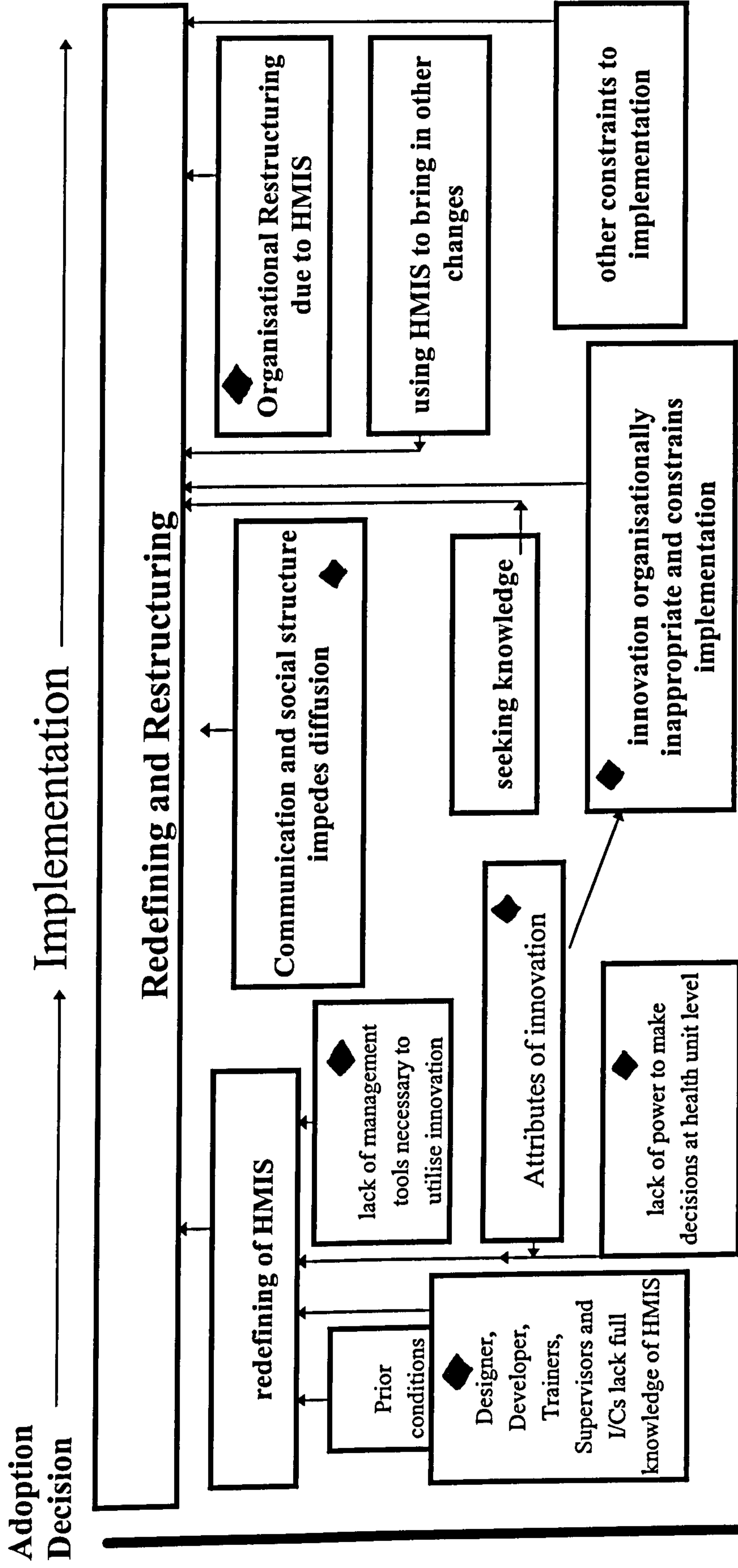


Figure 11-7 Evidence for the Innovation Process model: implementing HMIS



Rogers (1995), does not appear to utilise significant concepts from the Innovation-Decision Process model. The latter does not include the idea of rejection or discontinuance taking place after a pro-adoption decision, during implementation, even though this is recognised in the Innovation-Process model. Redefining and Restructuring suggest these take place after the decision to implement has been taken. Organisational changes intended to be in place prior to HMIS implementation, including decentralisation and extending the role of health unit clinicians to include more managerial responsibilities, had not been undertaken. Thus, the innovation appears to be incompatible with existing management role, ability, policy, and organisational situation, and this may have led to redefining the HMIS. Furthermore, classifying these as incompatibility of perceived attributes deepens understanding. Thus, the Innovation Process model has been the more useful of the two, although additional concepts from the Innovation-Decision process were needed.

Although both models have been useful, they do not entirely explain the evidence found in this case study. For example, I believe Rogers's (1995) concepts on structural change within an organisation are too limited to understand the issue of different aspects of the organisation changing with the introduction of an innovation. Therefore, it is difficult to predict what needs to change with the introduction of a particular innovation, and to what extent. Consequently, another theory was considered to discover if it clarified the situation.

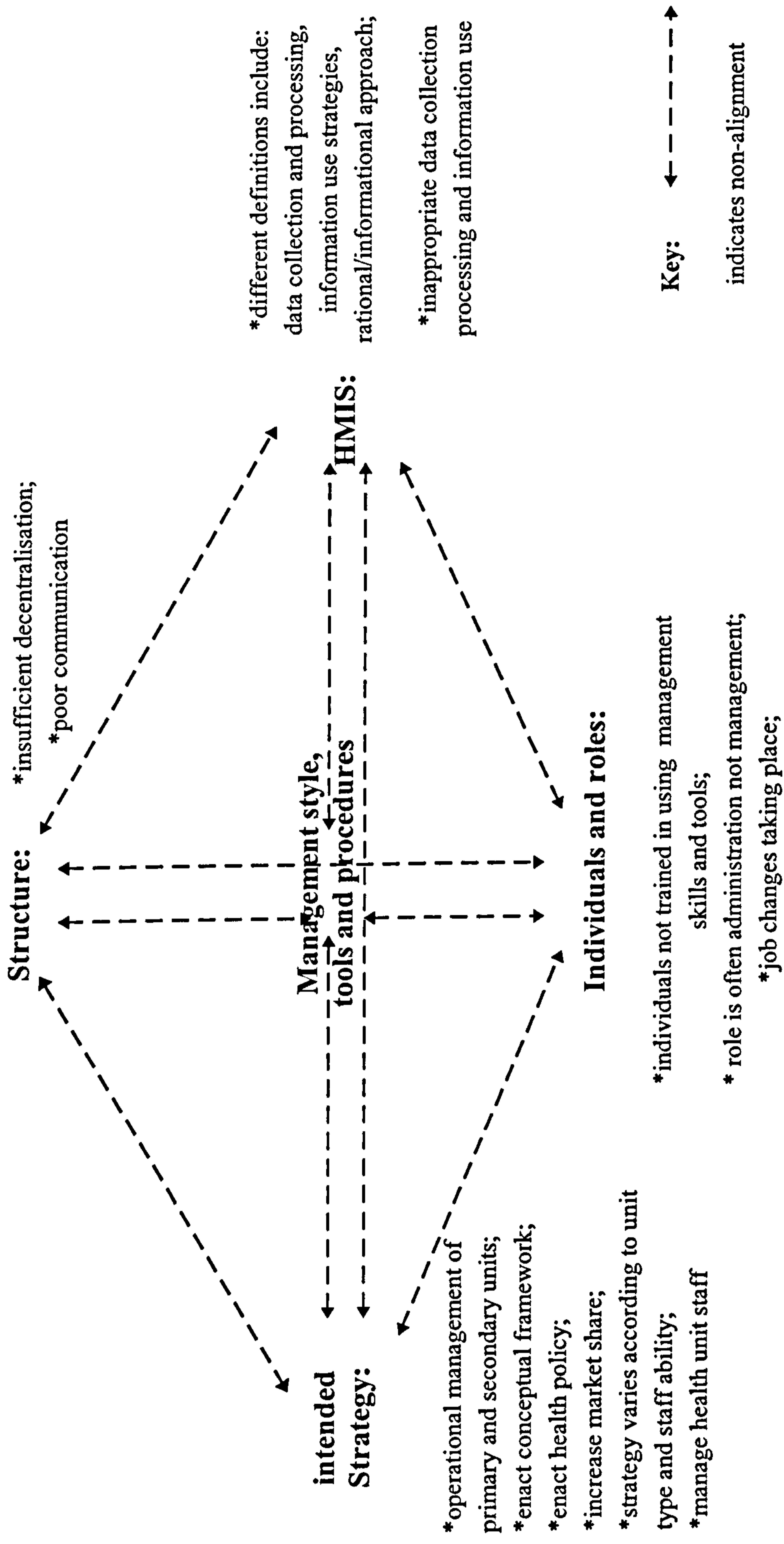
#### **11.4.4 Dynamic equilibrium models of organisational change**

Rogers's (1995) models of the innovation process in organisations lacked a model of organisational change, and Leavitt's concept of the organisation existing in dynamic equilibrium proved useful. The evidence was considered in Chapter 9 in the light of dynamic equilibrium existing at health unit level and district level, and the outcome is described here.

Leavitt (1965) suggests that an organisation exists in dynamic equilibrium, and if one part of the organisation changes other parts will need to change, or be realigned, in order to achieve equilibrium. The four parts, or forces, within the organisation he defines as Structure, Task, People and Technology. However, Scott-Morton (1991) has changed Task to Strategy, People to Individuals and Roles and added Management. By considering the HMIS as the Technology it has been possible to gain further understanding of the Ugandan situation.

Figure 11-8 illustrates the usefulness of the dynamic equilibrium model coupled with suggestions of where non-alignment is occurring. The description in Chapter 8 indicated management roles or I/C ability was not always appropriate to the HMIS information management strategies, and vice versa. One could say the management roles were therefore not 'aligned' to the HMIS. For example, the HMIS makes the assumption I/Cs will be managers, indicating they will have responsibility for monitoring, evaluating, controlling and planning. In practice these responsibilities have not been completely devolved. Furthermore, the patchy implementation of the cost-sharing policy, and incomplete financial decentralisation illustrates the lack of alignment between Structure and IM strategies. Therefore, even if I/Cs wanted to act out the role of rational manager and take an informational approach to decision-making, lack of power prevented this. The intended Strategy of small health units is to provide PHC services to a specific population. Moreover, as mentioned previously, CPHC is the Ugandan government policy, including equity and community participation. Within their role I/Cs have to monitor, control, and evaluate health centre services and resources, as well as manage staff and provide accommodation. For there to be alignment of these two aspects, the information to support the policy and roles should be produced. However, as described in Chapter 9, this was often not the case, and there are several examples of non-alignment of Technology with the organisational Intended Strategy, because the information to monitor the Strategies was lacking. One could consider that part of a health unit's Strategy was for I/Cs and other health workers to use specific management tools, procedures and the informational management style, or that the HMIS incorporated those management tools, procedures, and informational management style. Alternatively, it may be more appropriate to consider Management tools, procedures and Management style as an additional force within the organisation as well as Strategy, Structure, Individuals and Roles, and Technology, as Scott Morton (1991) has done. Which ever way, it appears there was non-alignment of health unit IM strategies and the Management procedures and Management tools. Moreover, previous examples indicate that IM strategies were not linked to health unit decision rules, and the non-alignment of Strategy and HMIS. 'Individuals and Roles' appear to be non-aligned with the HMIS, although some job changes were taking place which facilitate alignment. Finally, there appeared to be some non-alignment of administrative procedures and IM strategies.

Figure 11-9 illustrates the usefulness of the dynamic equilibrium model of organisational change in understanding the district level situation. The intended Strategy at district level is that mid-level managers co-ordinate monitoring, evaluation and planning of primary and secondary care; provide technical support to I/Cs and other health workers; manage community-based and health unit staff; enact health policy; possibly enact Archer's (1993) systems conceptual framework; and lead co-ordination of other district ministries. However, there appeared to be some non-alignment of the HMIS and intended district Strategy.



**Figure 11-8 Application of dynamic equilibrium model of organisational change in health units: the HMIS is not aligned to Intended Strategy, Structure, Individuals and Roles, or Management process**

The informational or rational management approach was not fully utilised at district level, and many DHT members were not able to use the management tools, which indicates non-alignment. Furthermore, at district level there was non-alignment of the HMIS and the skill of supervisors (Individuals and Roles), especially as the new system brought the need for new skills. Thus, management training, teaching skills, improved data processing skills, and skills in using information are needed. Some changes in the MRO role were taking place.

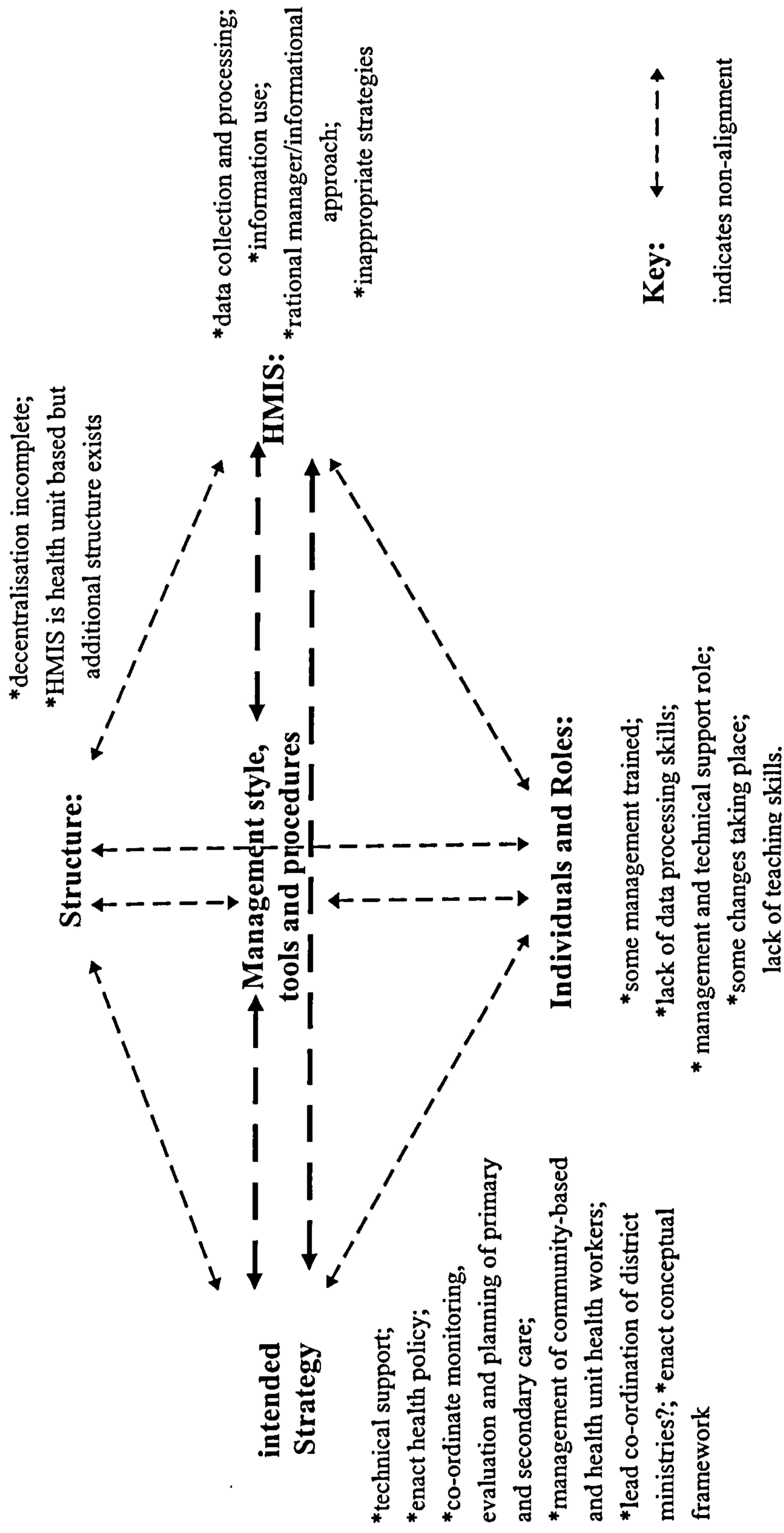
Non-alignment of organisational Structure with the HMIS has been shown in a previous chapter, as has the non-alignment between the HMIS and Individuals and Roles at district level.

The exploration of the change from the HIS to the HMIS, within the Leavitt theoretical framework, reveals other changes need to accompany the HMIS to ensure equilibrium and the proper functioning of the IS. Furthermore, it has proved useful to change Task to Strategy and add Management style, tools and procedures as an additional force within the organisation. However, the organisational change model has only been useful as an adjunct to the Innovation Process model. To clarify this synthesis graphically, diamonds should be placed within the Redefining and Restructuring Stage (Figure 11-7) in order to complete ones' understanding of the processes when the HMIS was introduced in Uganda.

## **11.5 HMIS implementation and evaluation of existing frameworks**

This second case study, like the first, has also demonstrated that the diffusion of innovation framework is applicable to the introduction of new IM strategies and management approaches in low-income countries. However, some refinements to the models described by Rogers and Leavitt have been made. Figure 11-7 most adequately depicts the process that was taking place in Uganda.

Classical diffusion theory (the Innovation-Decision Process) does not take into account organisational theory in the study of organisational adoption of an innovation (Greer 1977:506). Consequently, Hage and Aiken (1967), Rogers (1962), and Zaltman, *et al.* (1973) proposed schemes to differentiate stages in



**Figure 11-9 District level application of dynamic equilibrium model of organisational change: HMIS is not aligned to intended Strategy, Structure, Individuals and Roles, or Management processes**

the innovation process within organisations, thereby further developing the diffusion framework so that it brought in organisational theory. Rogers's (1995) review of diffusion research includes a description of the five stage Innovation Process in organisations, as well as the Innovation-Decision process undergone by individuals. The evidence from my research, regarding HMIS implementation, does not fit neatly into this classical model, because the Implementation phase is too limiting. The Innovation-Process model of organisational change, has been more useful, although I have utilised concepts from the Innovation Decision model. However, even the Innovation-Process model is not sufficiently comprehensive. I found Matching the innovation to an organisational problem, and even Perceived Compatibility are limited concepts, because they do not clarify all the themes, and compatibility issues in this case study. Furthermore, there were more constraints to Implementation than Rogers recognised.

An innovation's Perceived Attributes is a concept that is important all the way through the diffusion process in an organisation, not just prior to the organisation's adoption decision. For each time individuals meet the HMIS as new (i.e., as an innovation), they consider its attributes even though they may have no control over the organisation's adoption decision. Different attributes may be relevant at different phases of the diffusion process, depending on whether the adopter is a decision-maker, and how wide those decisions are, (that is to what extent the adoption decision may affect others).

Seeking Knowledge at many stages, not just the first stage, was also a feature of HMIS introduction. Even after the adoption decision had been made knowledge was being How-to and Principles Knowledge was being sought, and all parties to the process lacked full knowledge of the HMIS. Many of the refinements to theory implied by the HMIS implementation case study are also relevant to the PHC MAP case study. These are considered in the next section.

## **11.6 Evaluation of existing frameworks and both case studies**

### **11.6.1 Linking diffusion theory and organisational theory**

Although the evidence from my research shows both Rogers's models have been useful for both case studies they are limiting. My research has indicated that

organisational theory can further contribute to the diffusion of innovation framework. It has yielded an integration of Rogers's (1995) diffusion of innovation framework and the concept of organisational forces in dynamic equilibrium. The diffusion framework describes the process, but the organisational model has given the context and reason for aspects of that process. The diffusion model does not predict what needs to change within the organisation when a particular innovation is introduced, or to what extent. However, the addition of the organisational model has helped to do this. The research has also confirmed Scott Morton's refinement of Leavitt's original idea is useful. Other situations may benefit from the idea of organisational forces being in equilibrium with one another.

This is not the first time the dynamic equilibrium model of organisational change has been linked to the diffusion of innovation framework and information systems research, although Rogers's (1995) description does not include it. Iivari (1992) discussing the concept of organisational fit and information systems suggests Leavitt's (1965) framework is one of several conceptual frameworks with the *"governing idea that an organisation consists of interacting subsystems, dimensions or sets of factors between which there should be a certain congruence as a condition for high performance. Consequently these frameworks include the idea of 'fit', even though it may be explicitly stated"*. Furthermore, Iivari suggests these type of frameworks are conceptual, because most of them have not been empirically validated, yet this research has empirically validated the idea of organisational fit. Iivari suggests Leavitt's ideas have widely influenced organisation-oriented IS research including Hedberg and Mumford (1975); Keen (1981); Mumford (1983a); and Davis and Olson (1985). This is an important organisational theory, which also influences practice.

### 11.6.2 Uncertainty of innovation purpose

Both case studies have shown there were problems in defining the innovation, yet other research does not focus on this. Rogers (1995) perceives that single innovations are introduced, which have the potential to bring about social change and several consequences. Unintended consequences have been described, but not uncertainty of the definition of the innovation. Rogers (1995) speaks of innovations bringing additional consequences, when he cites Pelto's (1973) study of the introduction of the snow-mobile to a reindeer-herding people in Northern Finland. The investigator argues the introduction of the snow-mobile brought a shift in energy sources from the local and autonomous, (the reindeer sleds), to the external in the form of snow-mobiles and oil-based fuel. Another example is the adoption of new hybrid varieties of rice and wheat in low-and middle-income countries, bringing higher crop yields and increased farm income, but also leading to fewer farmers, migration to urban slums, higher unemployment rates

and political instability (Rogers, 1995). Finally, the introduction of the steel axe, by missionaries, into Yir Yoront society is said to have led to the disruption of status relations, prostitution and breakdown of customs (Sharp, 1952).

These additional changes are considered as consequences (Rogers, 1995), however, it may be more useful to classify them as part of the cluster of changes the innovation brings, or as the innovation itself. Thus, in Uganda one could suggest that PHC MAP was not a management training programme, or a set of information management tools, but the information brought by the tools or the informational approach to management, plus organisational change. This idea of not knowing what the innovation is, also arises with the HMIS introduction.

The issue of an innovation bringing concomitant changes or a cluster of innovations is something which has been remarked upon by other researchers, though not in so many words. Bonair, *et al.* (1989) in a historic review of the transfer of medical technologies to low-income countries said: "*Transfer of foreign medical technology to developing countries means not only transfer of drugs and equipment, but also transfer of a foreign cultural perception of disease, the so called western medical paradigm.*" This recognises not only one innovation is being transferred. Alternatively, one could use the concept of Principles Knowledge, as mentioned by Rogers (1995), and view the cultural perception of disease accompanying the medical technologies as one of the functioning principles. The Meaning of the innovation, as opposed to its Form or Function, is also a useful concept, but the cluster of innovations approach may be more productive in suggesting implications for practice. The concept of cluster of innovations is useful because the description of the innovation could also include the organisational forces compatible with the innovation, or the changes needed in the organisational structure and norms to ensure successful adoption.

Other studies could have benefited from reviewing the definition of the innovation. For example, Pearcey and Draper (1996), although not stating there were problems in defining the innovation in their paper on using the diffusion model to influence nursing practice, suggested the innovation was "*the idea of writing down or formulating a protocol [for pre-operative information-giving] with research findings as its base*". By research findings they meant the action research they had conducted amongst the nurses, had produced the finding that pre-operative information giving was of variable quality. However, the paper appears to muddle the issue of whether the innovation was the action-research method to establish areas for improvement, or the written protocol for pre-operative information giving. It is a very complex area and indicates the researcher, participants, change agents and innovation developer/inventor may have different opinions of what the innovation is.



Foltz (1993), however, does recognise the problem of defining the innovation -a new MIS in Chad-, when she says this is a complex combination of organisation and computer technology. But it is not explored sufficiently in her paper.

### **11.6.3 Lack of political theory**

Greer (1977:506) criticises the diffusion of innovation framework because it does not take into account political theory. This criticism still holds, for themes of a political nature, which arose in the two case studies, were not explained within the framework. Consequently they have been displayed graphically as additional issues in Figures 6-3, 6-4, and 9-2. In particular the MOH Planner, a senior management figure, wanted to be seen as projecting a rational approach to innovation adoption, as this is his role. But politics (defined by Knights and Murray (1994) to include personal career advancement) may also be a strong motivating factor affecting decision-making. Figure 6-2 describes the rational approach presented by the MOH Planner and fits Rogers's (1995) diffusion framework. Figure 6-3 however, describes my observations, yet the diffusion framework does not adequately portray these events. That civil servants pursue personal rather than organisational goals, which constrains rational decision-making is not a new concept (see Hyden, 1983:29; Montgomery 1987:914; Gyimah-Boadi and Rothchild, 1990:52). Furthermore, Waddington (1992) claims that a recognition of the difference between private and publicly stated goals was crucial to understanding the constraints to rational decision-making at district level in Ghana, and she suggests personal goals may have a stronger impact within those organisations which do not provide reasonable remuneration, job satisfaction and fair treatment.

### **11.6.4 Other theoretical issues raised**

The Innovation-Process model does not include the idea that after the Adoption decision, rejection or discontinuation could take place during implementation, although this is recognised in the Innovation-Decision Process. This research has shown its relevance to the Innovation-Process model. Furthermore, these case studies have shown that social structure affects not only the decision to adopt (as the Innovation- Decision process suggests) but also the implementation process and consequences, yet Rogers (1995) does not clarify if this is the case in the graphics he produces.

## **11.7 Conclusion**

**This thesis has made contributions to theory by showing that Rogers's concepts and models of diffusion of innovation are relevant to the introduction of new health IM strategies and management approaches in low-income countries. However, the purpose of theories and theoretical frameworks is not only to describe and model events taking place, but also to predict. The diffusion of innovation framework is limited, for the model does not predict the changes needed when the organisation is restructuring, during innovation adoption.**

**Rogers (1995) himself declares one of the intentions of the diffusion of innovation framework is to identify, in advance, the issues inhibiting or facilitating adoption of a specific technological change, and yet, it appears to me, that only when refining Rogers's (1995) framework, to include a dynamic equilibrium model of organisational change, is this possible. This research has thus yielded a synthesis of the diffusion of innovation and dynamic equilibrium models of organisational change. It has empirically validated the idea of organisational fit, which Iivari (1992) suggests was needed as this type of framework has existed conceptually for a while.**

**Although Rogers's frameworks have been useful, this research has suggested several areas where refinements were necessary to reflect the situation in Uganda.**

**The final chapter will summarise this theoretical contribution, along with the implications for practice, and identify the general conclusions to the thesis.**

# **Chapter 12**

## **General Conclusions**

# Chapter 12 General Conclusions

## 12.1 Introduction

This research has followed the HMIS planning process in Uganda, and explored the evidence by utilising the diffusion of innovation model and systems development models. Both sets of models have guided previous research and practice in the diffusion of innovations and IS development, as the literature review describes.

The evidence suggests, however, that neither of the two perspectives guided the HMIS development and implementation process in Uganda. Instead, a series of planning decisions were made that were not affected by an IS development or planning approach. If there was a well-known planning methodology utilised it was ill-defined and not generally understood by those conducting it. Furthermore, as indicated in Chapter 7, technological issues dominated the planned change to the HMIS, and did not focus on the wider organisational issues. The need to consider the organisational context when changing IS suggests the process is more complex than some practitioners, attempting to understand the causes of IM problems and developing HMIS in low-income countries, have realised. By following the HMIS planning process and discovering the issues arising it has been possible to identify implications for practice.

The study also followed the introduction of externally developed materials, intended for IS strengthening, to Uganda. Again the findings were explored in the context of the diffusion of innovation framework, and it appears that this well-known model was not utilised by the series developers and promoters. Furthermore, this study has raised the issue of whether training materials, not developed in the country of utilisation, and thus not reflecting the particular policy, organisational and management issues of that country, are useful.

One of the major issues that arose in this research was that IS developers and implementers had not really acknowledged that they were promoting an

informational approach to management when they promoted a change from a centralised reporting system to an MIS supporting use of information at the level of collection. Consequently, strategies to facilitate this approach were not advocated. Other HMIS developers do not always realise this, either. In Ghana Campbell, *et al.* (1996:15), reporting on HMIS development, acknowledge they were wanting to increase the number of 'informed decisions'. They make the assumption that having more objective information, based in the reality of the situation would lead to more effective and consistent health system management, but they do not acknowledge that a different management approach is needed. Although they also realise it is necessary to have appropriate data analysis tools and some management tools, there appears to be a lack of management questions or decisions associated with the data, and no training in management tools. Furthermore, they do not provide the conceptual framework to link information, management tools and management.

Diffusion of innovation and organisational change models were not utilised to help develop and implement new health IM strategies in Uganda, yet this research has found them useful. However, some refinements have been needed and the contribution to theory made by this research is summarised in Section 12.2. Many of the issues arising have yielded implications for practice, which are detailed in Chapter 10, and summarised in Section 12.3. Some of the implications for practice can be further developed to identify criteria for assessing the quality of future training materials. These are also described in Section 12.3.

This research has also made a methodological contribution, as described in Section 12.4. The limitations of this research are detailed in Section 12.5 and suggestions for further research are in Section 12.6.

## **12.2 Summarising the contribution to theory**

This study has demonstrated that the diffusion of innovation framework is applicable to the introduction of new IM strategies and management approaches in low-income countries. However, some refinements to the models described by Rogers (1995), have been made, including linking diffusion and organisational theories, questioning the rationalistic Innovation-Process model, combining the Innovation-Decision process with the Innovation-Process model, identifying that the framework lacks political theory, and introducing new concepts. The case studies have also demonstrated the usefulness and changes needed in some model's concepts and relationships.

### **12.2.1 Linking diffusion theory and organisational theory**

Classical diffusion theory (the Innovation-Decision Process) does not take into account organisational theory in the study of organisational adoption of an innovation (Greer 1977:506). Consequently, Rogers (1962), proposed a scheme to differentiate stages in the innovation process within organisations, thereby further developing the diffusion framework so that it brought in organisational theory. Rogers's (1995) review of diffusion research includes a description of the five stage Innovation Process in organisations, as well as the Innovation-Decision process undergone by individuals. The evidence from my research does not fit neatly into this classical model, that is the Innovation-Decision Process model. However, the Innovation-Process model of organisational change has been more useful, although I have utilised concepts from the Innovation-Decision model. Despite this combination, even the Innovation-Process model is not sufficiently comprehensive, and I found Matching the innovation to an organisational problem, Redefining and Restructuring, and even Perceived Compatibility are limited concepts, because they do not clarify all themes, and compatibility issues relevant to this case study.

My research has indicated that organisational theory can further contribute to the diffusion of innovation framework. It has yielded an integration of Rogers' (1995) diffusion of innovation framework and the concept of organisational forces in dynamic equilibrium. The diffusion framework describes the process, but the organisational model has given the context and reason for aspects of the process. The diffusion model does not predict what needs to change within the organisation when an particular innovation is introduced, or to what extent. However, the addition of the organisational model has helped to do this. The research has also confirmed Scott Morton's refinement of Leavitt's original idea of organisational forces existing in dynamic equilibrium is useful. Other situations may benefit from the idea of organisational forces being in equilibrium with one another.

Although this is not the first time the dynamic equilibrium model of organisational change has been linked to the diffusion of innovation framework and information systems research, Rogers' (1995) description does not include it. Iivari (1992), discussing the concept of organisational fit and introducing new information systems, suggests such combinations of frameworks are only conceptual, because most of them have not been empirically validated, yet this research has empirically validated the idea of organisational fit when introducing new IM strategies.

### 12.2.2 Questioning the rationalistic Innovation-Process model

The PHC MAP study demonstrated that the Innovation-Process model was useful in interpreting the events, although it was the official version (as declared by the MOH Planner) which appeared to be most similar to Agenda Setting and Matching. This rationalistic model was in conflict with the process I observed after delving more deeply. It may be that this discrepancy arose because previous researchers have not used appropriate methods for investigation, and that by obtaining various viewpoints of the same situation, (rather than accepting the “official” version of events), researchers obtain a richer picture. In fact, Rogers (1995:109-111) suggests *“diffusion researchers placed an over reliance upon methods of diffusion that are too rationalistic”* and he advocates an increased understanding of the motivations for adoption.

### 12.2.3 Combining the Innovation-Decision Process and the Innovation-Process

This research found that by combining Rogers’s (1995) two models a useful interpretation of the introduction to PHC MAP was accomplished (see Figure 11-4 in Chapter 11). The stages observed include Introduction to the innovation, which is the Knowledge stage, and Attitude Formation, both of which appear within the Innovation-Decision Process. Next, as in the Innovation-Process, is a Matching stage, although unlike either model, Redefining took place before any decision was made. A Decision to Investigate (not Adopt or Reject) was made and Prior Conditions and Donor Influence affected the whole process.

Combining Rogers’s (1995) two models was useful in the HMIS implementation study as well. As depicted in Figure 11-7, an Adoption Decision had been taken, but the Redefining and Restructuring was more complex than the Innovation-Process model describes. Prior Conditions, Knowledge concepts, Communication and Social Structure and Attributes of the Innovation were usefully integrated (from the Innovation-Decision model) to give an improved interpretation. However, even this combination was inadequate to explain all the themes and relationships which arose.

### 12.2.4 Lack of political theory

Greer (1977:506) criticises the diffusion of innovation framework because it does not take into account political theory. This criticism still holds, for themes of a political nature, which arose in the two case studies, were not explained within the framework. Consequently they have been displayed graphically as additional issues in Figures 6-3, 6-4, 9-2, 11-2,11-3,11-4, and 11-7.

### **12.2.5 Uncertainty of innovation purpose**

In Uganda PHC MAP was seen as a management training programme, a set of information management tools, the information brought by the tools or the informational approach to management, plus organisational change. This idea of not knowing what the innovation is, also arises with the introduction of the HMIS. Thus, both case studies have shown there were problems in defining the innovation, yet other research does not focus on this. Rogers (1995) perceives that single innovations are introduced, which have the potential to bring about social change and several consequences. Unintended consequences have been described, but not uncertainty of the definition of the innovation. It maybe useful to envisage the innovation as a cluster of innovation, as this may be more productive in suggesting implications for practice. The concept of cluster of innovations is useful because the description of the innovation could also include the organisational forces compatible with the innovation, or changes which need to be made in the organisational structure and norms in order to ensure successful adoption. Whether, one uses the cluster of innovations concept or not, the idea that the definition of the innovation is uncertain is a major contribution to theory which has implications for practice.

### **12.2.6 Other concepts and terminology**

Several existing concepts from Rogers's (1995) work were useful in interpreting the processes taking place. However, some had to be expanded or placed within different stages of the diffusion process in order to further understanding.

- Perceived Attributes of the innovation is a concept that is important all the way through the diffusion process in an organisation, not just prior to the organisation's adoption decision. For each time individuals meet the HMIS as new (i.e., as an innovation), they consider its attributes even though they may have no control over the organisation's adoption decision. Different attributes may be relevant at different phases of the diffusion process, depending on whether the adopter is a decision-maker, and how wide those decisions are, (that is to what extent the adoption decision may affect others).
- Seeking Knowledge at many stages, not just the first stage was also a feature of HMIS introduction.
- Two decisions were identified in the PHC MAP adoption process, the Decision to Investigate the Feasibility of Adoption, and later the Decision to Adopt or Reject. Distinguishing the two has implications for practice as Change Agents can target their efforts more specifically.



- The change of the term 'Persuasion' to 'Attitude Formation' has developed a deeper understanding of the process, and projects a potential user perspective, rather than the Change Agents view.
- The consideration of PHC MAP within the ministry of health in Uganda is unusual, because it describes a situation where the innovation has not been adopted. Other studies have shown the adoption process being undertaken, to some extent, that is with varying degrees of success, but this field work has described a rejection of an innovation in its very early stages, and has thus shown the process is not always the same.
- Social structure affects not only the decision to adopt (as the individual diffusion process suggests) but also the implementation process and consequences, yet Rogers (1995) does not clarify if this is the case in the graphics he produces.

The usefulness of these existing theoretical frameworks and my refinements, to introducing new IM strategies and the informational approaches to management, is of value in itself. However, as demonstrated previously, there are also implications for practice, and my approach has made a contribution to methodology.

### **12.3 Summarising the implications for practice**

Although this research study has demonstrated that the diffusion of innovation framework and the dynamic equilibrium approach to organisational change are applicable to the introduction of new IM strategies and management approaches in low-income countries this is more than an academic exercise. These frameworks can also facilitate the introduction of such innovations. Chapter 10 has identified more than fifty implications for practice which emerge from consideration of the two theoretical frameworks and other themes which have emerged during the study. These are summarised in the sections which follow. Attempts have been made to prioritise these recommendations, however, this was not the aim of the study and the order below only implies tentative suggestions of priority.

### **12.3.1 Defining the innovation**

This research has highlighted that potential adopters often had a different perception of the innovation from the Change Agents and others introducing new IM strategies. In both case studies an informational approach to management was being introduced, not only new ways of collecting, processing and using information. It follows that there is a need to clarify the Principles knowledge implied by the innovation, or understand likely meanings for potential adopters, before introducing it. Moreover, Principles knowledge should be introduced at the same time as, or prior to, Awareness and How-to Knowledge.

Furthermore, Change Agents, and others involved in diffusion, need to understand whether an innovation implies a radical change or natural extension to an existing system. This distinction needs to be conveyed to potential adopters and the aims and objectives of tools for strengthening IS should be consistently presented verbally and within written material.

### **12.3.2 Understanding the potential adopter's situation**

The idea of distinguishing types of change is useful because it could help promoters when introducing innovations, as it implies the need to have an in-depth understanding of the situation prior to introducing the innovation. PHC MAP tools as reference materials for the Masters degree in health management or for DHT management training could be seen as an incremental change innovation. Bringing the informational approach to management is a radical innovation in Uganda.

To encourage acceptance of new ideas and techniques potential innovators should address the existing problems experienced by potential adopters, and reflect their reality. Furthermore, they should be aware of the organisational situation and influencing factors into which new ideas are introduced; that way it is more likely they will be able to address the innovation's compatibility with existing practice.

An understanding of the decision-making process, or the important actors in that process would help Change Agents identify those people to whom they should direct their efforts. It would also be advantageous for tools to evaluate the use of the innovation to be identified and introduced by innovation presenters. This could help clarify Principles Knowledge, and demonstrate the potential benefits of using an innovation.

### **12.3.3 Perceiving IM innovations involve organisational change**

To facilitate acceptance of new IS technology it is necessary to view the introduction of an IM innovation as an issue of organisational change and facilitate alignment of all forces within the organisation, including: organisational policy; management tools and processes; Individuals and roles; and the actual power, responsibilities and activities of managers. If that alignment does not exist adjustments will need to be made. For example, data collection should be linked with decision-making, thus in some situation where the diagnosis is limited to symptom diagnosis, rather than illness diagnosis, symptom identification should be the basis of decision-making. The HMIS is there to serve the organisation not vice versa.

Recognising that the IS development process is one of considerable organisational change means that guidelines for managing that change need to be developed. These should cover timing and sequence of changes, expected problems and planning for a change-over phase. Moreover, attention needs to be paid to communication as this can adversely affect the management of health services. In-Charges need to have efficient means of communication information to district offices, and support supervision requires regular access to reliable transport.

### **12.3.4 Training**

It follows, therefore, that management training needs to be conducted at the same time as introducing the IM innovation; strategies need to be developed to encourage use of management tools and information; and that the IM strategies support a particular style of management needs to be made explicit. Health worker training should focus on data processing, analysis and use of information; and the cascade method of training, utilised in several low-income countries for management and IM training, means teaching skills should be an integral part of Supervisor's training.

Furthermore, if the educational level in some health units is such that health workers cannot handle the data and processing expected of them, this needs to be acknowledged at the planning stage, rather than blaming individuals after the process has begun. Acknowledging this is a system-fault, or a non-aligned organisational force, will facilitate greater understanding. Thus, temporary strategies, such as the DHT processing and interpreting data, with regular written comments given, possibly via a news letter for less able In-Charges, could be identified.

Consideration also needs to be given to which language the training materials, forms and other paperwork are written in. Moreover, technical language needs to be consistently explained and utilised, and simplified.

### **12.3.5 Broad needs assessment, monitoring and evaluation**

Acknowledging that implementing new IM strategies is not only an issue of technological change, but also one of organisational change, implies that needs assessments, monitoring and evaluation of the changes needs should be very broadly based. These should cover data collection, processing and information use, skill levels and roles performed, actual organisational structure, organisational strategies, management tools and processes in operation. It will also mean greater expense and use of time at all stages of the process.

In addition, evaluation and monitoring should focus upon whether there has been any impact upon health management decisions, and an in-depth investigation into how the health workers view the changes. All intended IM changes need to be monitored and evaluated. The failure to adopt a particular IM strategy may signal the inappropriateness of an important aspect of the new system, for example, insufficient change in other organisational forces.

Care should be taken not to proceed with the HMIS implementation too rapidly, as developing according to the principles mentioned is very time consuming, particularly at the planning stage. However, the chances of success will be higher. Moreover, IS developers should not narrow their conception of the problem too early, but allow adequate time for investigation using exploratory methods.

### **12.3.6 Utilising a staged process in innovation adoption**

This research has indicated that, as with Rogers's (1995) observations, a staged process is undergone when an innovation is introduced. The idea of different concepts applicable to different stages implies Change Agents, who wish to facilitate adoption, need to be aware of the stage in the innovation process of the organisation to facilitate the process.

Furthermore, the introduction of an IM innovation should be accompanied by an opportunity to see the innovation in practice or by a clearly reported trial-by-others. Change Agents should also be aware that before the Adoption Decision is

made a Decision to Investigate Adoption Feasibility may be made, and should facilitate this. As indicated in this research, innovation reinvention, redefining or adaptation can occur at different stages in the diffusion process. Therefore, steps should be taken to facilitate or discourage this, depending upon the Change Agent's aim.

Considering the organisation as several forces seeking equilibrium, and the innovation as one of those forces, implies that all stages of adoption and diffusion should consider this and facilitate alignment. Furthermore, Change Agents should realise that innovations are introduced to individuals after organisational adoption (which implies another diffusion process), and should conduct the diffusion process accordingly.

### **12.3.7 Utilising existing expertise and research**

HMIS development and implementation in low-income countries would benefit from the application of an Information System Development Methodology. Such methodologies have developed techniques for dealing with issues highlighted in this research, such as participation, bottom-up development, stake-holder conflict and domination by the most powerful stakeholders. In particular an approach which focuses on the wider organisational issues and not the technological issues alone would be useful, for example Checkland's SSM, or Mumford's ETHICS ISDM. Perceiving the issue to be one of managing organisational change will deepen the understanding of the process, and allow appropriate strategies to be developed.

It is important to realise that the ISDM needs to be fully implemented, rather than only taking the technological aspects and ignoring the organisational or 'softer issues' which are often more difficult to implement. For example, the bottom-up approach requires considerable detailed input from operational health workers, not senior managers assuming they know the requirements of such people. Moreover, political factors can both positively and negatively influence IS development, and this needs to be handled carefully so that various political groups are not alienated from the process, but develop a sense of ownership.

Drawing upon IM research conducted in other countries would also benefit low-income countries, although it is acknowledged that the country situations and management cultures are not always the same, which means an imposed solution will not be as appropriate as participation by all stake-holders. Using existing expertise and research does not mean accepting an imposed solution. Expatriate

advisers can only be useful in this process if solutions are developed via participation. Moreover, a national Health Information Management strategy would be beneficial when developing national information systems.

### **12.3.8 Adopting conceptual frameworks**

The research has indicated that various conceptual frameworks (which imply strategies for change and practice) can be useful when strengthening health information management in low-income countries. In particular the introduction of new IM strategies (whether developed in-country or externally) could be improved by utilising the diffusion of innovation framework as mentioned here. This would allow practitioners to see the introduction of innovations as a staged process which needs to be managed. Leavitt's notion of forces being in dynamic equilibrium has been of benefit, as well.

However, other conceptual frameworks could be useful. Managers would benefit from being shown the input-process-output systems conceptual framework to help them understand their activities, as this would point to the information needed at each stage. Although, if managers utilised a different, more relevant conceptual framework for understanding the factors affecting health status, and planning and monitoring health services, this framework should be incorporated into the HMIS.

Clarifying the links between IM tools and management would also further that understanding. Furthermore, recommendations for changing IM should acknowledge this is part of the IS, not an isolated issue, and needs to be seen in the wider IS and organisational context.

### **12.3.9 Understanding the cultural and political issues**

This research has highlighted that expatriate advisers often spearhead national health information systems development. The case study of the introduction of PHC MAP questions whether this is an appropriate approach, especially when no needs assessment has been carried out in-country. It would be beyond the recommendations of this research to state that advisers should be from the country of implementation, however, it is important to develop a deep understanding of the country and organisation when developing new IS. Including one person on the advisory team from the country of implementation could facilitate this. Solutions need to be developed via participation rather than imposition.

IS developers need to realise that the changes they bring may conflict with organisational culture and these changes will have to be planned and carefully negotiated, for example, changes in power and status. It could be argued that in some situations (maybe when using public funds) innovation developers or inventors carry a responsibility which means they need to broaden their role. Thus, it may be appropriate for them to give further explanation and technical support if a complex innovation is being introduced, rather than only introducing the innovation.

Finally, potential adopters and Change Agents should be aware that those introducing or facilitating adoption of an innovation have their own personal agendas which do not necessarily coincide with the interests of potential adopters.

### **12.3.10 Appropriate IM strategies and general features**

HMIS improvement in low-income countries should focus upon utilising information as well as data collection and processing. Furthermore, there should be different IM strategies for monitoring and evaluation. Routine data from interaction with patients could be utilised for monitoring using intermediate or process indicators. However, special surveys need to be conducted if a community-based evaluation is being undertaken. The data from the HMIS is intended to be for operational management, not broader evaluation.

### **12.3.11 Requirements for materials development**

Some of the more than fifty implications and propositions identified in Chapter 10 can be used to set criteria by which health managers can examine future training packages which purport to strengthen health information systems. One could define the innovation in PHC MAP as: a set of training materials which deliver management tools to managers; training materials to improve information management by managers; information strategies for strengthening information systems; the informational approach to management; or as enabling the production of information as a management tool. Various criteria are suggested below, depending upon the purpose of the training package.

If the intention is to produce a set of training materials to improve the management of information by health managers, these would need to include:

1. a conceptual model which relates IM tools and management tools;

2. a conceptual model which links IM and management generally;
3. an explicit rationale, which is explained in the text;
4. a practical manual which identifies common problems and solutions, for example, stating poor data quality can be improved by ensuring data collectors are also data users;
5. case studies in how materials have been utilised and the benefits obtained;
6. a description of the other organisational changes which are needed to facilitate the introduction of IM tools in practice, for example, decisions concerning staffing levels need to be taken at a particular level;

and it should:

7. be based on a detailed needs assessment in the country of use, and not only on the general needs in several counties. This implies training materials should be developed in the country of utilisation, in order to relate the country situation; and
8. reflect the training approach, policy, organisational, management and presentational style utilised in a particular country.

If the innovation is a way of developing the district level IS, the:

1. perceived problems in the particular countries district level HMIS should be addressed by the innovation;
2. benefits of utilising the innovation should be apparent;
3. vision of how the tools will fit with existing national IS development should be described;
4. ISDM should be clearly portrayed;

and it should be:

5. based on a detailed needs assessment in the country of use, and not only on the general needs in several counties. This implies training materials should be developed in the country of utilisation, in order to relate to the country situation.
6. Moreover, it should explain why the intention is to develop a IS at district level rather than developing a country wide HMIS, which probably can not be justified!



If the innovation is an informational approach to management, in addition to those factors mentioned above:

1. there should be training in the new management style;
2. it should make explicit that the information strategies are intended to support this management style; and
3. identification of how the innovation fits with existing organisational focus.

Many of the recommendations for practice imply the people involved in moving an HIS to an HMIS should come from a wide variety of professional backgrounds. People skilled in change management, statisticians, organisational anthropologists, clinicians and information systems specialists all have a role to play.

Finally, the evidence indicates that any assessment of the IM problems in health units and districts should not only enumerate the problems, but also investigate the reason for their occurrence. That assessment should also be broadened to review the compatibility of IS features with other organisational forces.

If some of the implications in Section 12.3 appear “common-sense” to some practitioners this does not negate the need to state them, as the evidence from the case studies has indicated that putting “common-sense” or guidelines into practice is not easy. Moreover, this research has indicated that Rogers’s (1995) diffusion framework was relevant to the introduction of new IM strategies and management approaches. His eighty-seven generalisations, which have implications for practice, are therefore, also relevant here.

While it is not the function of the dissertation to be used as a tool for dissemination to practitioners and advisers, the author is using the material presented here to produce papers in journals that are expected to reach that audience in low-income countries, and in so doing attempting further dissemination. Hence, “Strengthening health information management in an East African country using external materials” (Gladwin, *et al.*, in press) will appear in the March 2000 copy of *Health Informatics*, and “Rejection of an innovation: health information management training materials in East Africa”, by Gladwin, *et al.*, (submitted), has been submitted to *Health Policy and Planning*. Both these papers focus on the PHC MAP case study and identify detailed implications for practice, and it is intended that a paper, drawing upon the same case study but

emphasising IM recommendations rather than organisational policy, will be submitted to *Information Research*. Others papers, drawing upon the HMIS case study, will also be submitted to these three journals. *Health Policy and Planning* is produced by the London School of Hygiene and Tropical Medicine and is aimed at practitioners and academics with an interest in low-income countries. The electronic journal *Information Research*, freely available on the Internet, is produced by the Department of Information Studies, University of Sheffield. My aim in publishing in these particular journals is to make the work accessible to those working in low-income countries.

## 12.4 Contribution to methodology

This research has contributed to process research, particularly within the diffusion of innovation framework, which involves data gathering and analysis that seeks to determine the time-ordered sequence of a set of events. In his review of the diffusion of innovation research, Rogers (1995:202) indicated this style of research was needed as much of the “*past diffusion has been variance research concentrating on data gathering and analysis that consists of determining the covariance among a set of variable but not their time order*”. Moreover, because the ethnographic case studies are not retrospective, but have followed events as they have take place it has not suffered heavily from the recall problem, which has hampered other research (Rogers, 1995).

Furthermore, Rogers (1995) suggests that, because individuals are more accessible than systems, and research tools are individual, rather than system-focused, (for example surveys or individuals, rather than in-depth participant observation), inappropriate research findings are identified. In particular he is referring to the inappropriate individual blame, rather than system blame. By using participant observation this research has overcome some of this criticism.

This research has also been useful because, rather than setting out to prove or disprove the relevance of diffusion concepts and relationships, this researcher entered the field without that restriction. Therefore, themes and relationships have arisen and the complexity has been demonstrated, whereas restrictions could have resulted by only taking the existing elements and relationships in the model, which could have inhibited understanding. This type of exploratory study is needed prior to large scale tests of existing organisational innovation theory (Greer, 1977). An example of the early restriction of elements, can be found in one study which led to problems in Nepal. The researchers (Pandey and Yadama, 1992) tested the diffusion of innovation framework using the adoption of their

different wood-fuel stoves. They imposed their own interpretation of compatibility prior to conducting a quantitative study, which aimed to examine factors affecting failure to adopt and discontinuance of innovation use. Whereas, if they had initially conducted a qualitative study without pre-determining the compatibility factors, they would have probably realised cultural and social compatibility were more complex than they envisaged. Their results indicated they did not take all the compatibility factors into account, yet an initial qualitative investigation focusing on perceptions of compatibility amongst potential users, could have improved the following quantitative study, or even removed the necessity for it.

As mentioned earlier, several authors have utilised diffusion of innovation in IS research to identify variables prior to the empirical study, or to discuss the development of a new central reporting computer-based IS. But to my knowledge, no one has followed a national HMIS implementation process, which aims to support operational management, and consequently drawn upon the diffusion of innovation framework to interpret events.

## **12.5 Limitations of this work**

There is, within this research, a tension between the desire to only utilise the inductive approach in identifying the process of introducing innovations in health information systems in low-income countries, and the desire to give a complete picture in order to identify the issues and produce useful recommendations for the future. The shortage of time in the field made this a particularly pertinent issue.

It would have been useful background to have developed a full picture of the IM needs of the DHT in Uganda. The lack of time and funding meant that I was unable to carry out the in-depth empirical study in Uganda that I originally intended. I would have liked to spend much more time in individual health units, unaccompanied by district level personnel, in order to understand the roles of health unit personnel and their use or non-use of information. Moreover, I also wanted to spend more time with the district level staff as they went about their normal day-to-day work. The description, obtained from the empirical evidence, of the needs and roles of managers I obtained is not as rich as I would have liked.

Similarly, I have not developed a full understanding of the organisational process that took place when introducing information management innovation in Uganda.

I would have liked to spend more time at the HMIS training and supervision sessions, and during the day-to-day activities at district and health unit level when these changes were being introduced. Furthermore, I believe there is a lack of in-depth qualitative descriptions of the roles performed by district health unit managers in low-income counties, and description of the introduction of IM innovations in such situations. This needs be further researched.

## **12.6 Future research**

### **12.6.1 Diffusion of innovation**

This research has suggested that innovation adaptation can occur before the implementation stage, thus to obtain a richer fuller view it is necessary to begin the investigation in the very early stages of introducing the innovation, rather than waiting until the implementation stage. This is supported by Buttolph (1992).

Future research could be undertaken to test if similar models are applicable to the decision to adopt PHC MAP in other countries, and if it is different, to investigate why. The same applies to HMIS development and planning. It would also be useful to retrospectively review other documented situations, in the light of diffusion of innovation concepts to see if the framework offers anything. For example, would the problems identified after the study have been predicted if a diffusion of innovation analysis had been undertaken initially?

Furthermore, as identified in Section 12.3.2, there is a need for further research which, utilising an ethnographic methodology, focuses upon why innovations are adopted or rejected, as this can elaborate upon and move away from rationalistic models of diffusion.

### **12.6.2 Health management information systems**

It would be useful to develop a checklist of the data collection, processing, analysis and use of information features, of a HMIS based on the primary health care concept. This could be utilised as an ideal type to compare with existing practice. Similarly it would be useful to develop a checklist of the data collection, processing, analysis and use of information features of a HMIS consistent with the role of operational and district managers in low-income countries. This again

could be used as an ideal type for comparison with existing practice. Both should clarify the rationale when presented to practitioners.

This study has suggested it may be useful to utilise SSM as part of the HMIS development methodology in low-income countries, but if there are limits to its usefulness this needs to be investigated. The situation in Uganda is one where external agencies are dominating the scene, and there is little representation of district and health unit management. This tool may not be successful where there is a discrepancy in power, and dissipated stake-holders. Maybe it is more useful in a situation where communication is the issue, rather than power struggle? Furthermore, SSM demands a high level of transparency which may be difficult to achieve in a service-oriented organisation where dominant stake-holders are international and supranational agencies. Cultural differences have affected the SSM process during the introduction of new technology into a Research and Development Institute in Japan or Indonesia (Kartowisastro and Kijima, 1994). They found they had to modify the debate stage because the communication demanded by SSM was not in keeping with cultural practice.

Therefore it would be useful to test if it is possible to fully utilise the SSM approach in a low-income country where there is a huge disparity of power, dissipated stake-holders, lack of transparency of management, and within a service-oriented organisation where stakeholders may find it difficult to accept that they have world views which do not prioritise the health status of the population.

### **12.6.3 Organisational change**

It would be useful to retrospectively review other situations which have been documented, using the dynamic equilibrium framework, to see if a more useful interpretation of the process is gained.

### **12.6.4 PHC MAP evaluation**

As mentioned in Chapter 1, the three studies conducted on PHC MAP have not been independent, not have they focused on the type of evaluation I believe is necessary. Such evaluations should cover: the necessary conditions and support for utilisation of these modules; problems arising in the training of the series, and whether the series reaches its target clients; whether the materials can help to move a organisation's central reporting system to an information system intended and facilitate use of information by local managers; whether the materials met the

data-collection, processing and information needs of district- and health-unit managers; the consequences of using the materials and whether use of the modules has led to improved management and use of information; and whether there has been any impact on the decisions concerning management of health services and resources can be traced to PHC MAP. There also needs to be an in-depth investigation of how the series is viewed and used by health workers. This could also include an in-depth review of how the modules are used to set-up or change an existing health information system. Finally there is a need to examine the background to the decision to utilise PHC MAP. These findings could contribute suggestions for improvements, corrections or revisions to these and other similar materials.

### **12.6.5 Operational level investigation needed**

As mentioned above no participant observation was conducted in health units to discover which attributes of innovations affected implementation after the organisation has taken the decision to utilise, was conducted. No observation was undertaken at the health units at all, yet I believe this could have enriched this study even if it meant broadening the research questions. This could be another piece of work.

## **12.7 Conclusion**

The implementation of health management information systems in low-income countries is a little researched area, although there has been a considerable amount of implementation. The literature indicates only Foltz (1993), and Mock, *et al.*, (1993) are research related papers, as most are reports, for example, Nabarro, *et al.*, (1988), Hansen and Echols (1988), Ferrinho, *et al.*, (1991), Chanawongse and Singhadej (1988), and Campbell, *et al.*, (1996). My research suggests previous research and practice has failed to apply existing research. This has meant that simplistic ideas of IS implementation have been applied, as technological applications rather than technological innovation.

An innovation perspective, as outlined in Chapters 7, 8, and 9, reveals that key considerations for IS implementation in low-income countries are:

- a) the need to consider the dynamic equilibrium of the main organisational factors arising out of my research when implementing information systems in low-income countries;

- b) the model suggests that tensions should be adequately assessed, and where feasible dealt with;
- c) the implications for change include not only training in new skills, but changes to organisational power structures;
- d) supra-national organisations (aid agencies and other funders) can bias the implementation process and management problems in these circumstances;
- e) unless the ISDM engages with these issues overall systems design is likely not to be tuned to the organisation's needs;
- f) the ISDM in Uganda did not take the broader organisational needs into consideration (as far as I know). Difficulties and confusion during implementation and the continuing problems can be traced back to the use of mechanistic systems design models;
- g) the need to appreciate that an HMIS brings a new management approach, that is the informational approach to decision-making.

Finally, information systems designers in low-income countries need to ensure substantial involvement of all stakeholders, including in-country personnel.



## **Reference list**



# Reference List

- Abel, A. (1993). Business Link Herefordshire, *Business Information Review*, 10 (2), 48-55.
- Aga Khan Foundation (1993a). *Primary Health Care Management Advancement Programme*, Washington DC; Geneva: Aga Khan Foundation.
- Aga Khan Foundation (1993b). *Annual report to the United States Agency for International Development on a Matching Grant for 'Strengthening the effectiveness, management and sustainability of primary health care/mother and child survival programs in Asia and Africa' for the fiscal year ending June 30, 1993. Co-operative Agreement number: PDC-0158-A-00-1102-00*. Washington DC: Aga Khan Foundation.
- Aitken, J.M. (1994), Voices from the inside: managing district health services in Nepal, *International Journal of Health Planning and Management*, 9, 309-340.
- Alder, P.A. & Alder, P. (1994). Observational techniques, *in: Handbook of qualitative research*, edited by N.K. Denzin & Y.S. Lincoln, USA: Sage Publications, 377-392.
- Altheide, D.L. & Johnson, J.M. (1994). Criteria for assessing interpretative validity in qualitative research, *in: Handbook of Qualitative Research*, edited by N.K. Denzin & Y.S. Lincoln, CA. USA: Sage Publications Inc. 485-499.
- Archer, L.H. (1993). *A needs assessment for health management information in Ugandan health facilities 18 June 1993*, Entebbe: Health Planning Unit, Ministry of Health and Essential Drugs Management Programme.
- Avgerou, C. (1993). Information systems for development planning, *International Journal of Information Management*, 13, 260-273.
- Avison, D.E. (1985). *Information Systems Development: a Database Approach*, Oxford: Blackwell Scientific Publications.
- Avison, D.E. & Fitzgerald, G. (1988). *Information systems development: methodologies, techniques and tools*, Oxford: Blackwell Scientific Publications.
- Avison, D.E. (1990). *A contingency approach to information systems development*, Birmingham: Aston University. (PhD Thesis)
- Avison, D.E. & Wood-Harper, A.T. (1990). *Multiview: an exploration in information systems development*, Oxford: Blackwell.

- Barnett, A. (1990). The diffusion of energy technology in the rural areas of developing countries: a synthesis of recent experience, *World Development*, 18, (4), 539-53.
- Baszanger, I. & Dodier, N. (1997), Ethnography: relating the Part to the Whole, *in: Qualitative Research*, edited by D. Silverman, London: Sage Publications, 8-23.
- Bekui, A.M. (1991). *A health management information system for district health services in Ghana: improving the current system*, Leeds: Leeds University. (MSc Dissertation).
- Bertrand, W.E., Echols, B.E. & Husein, K. (1988). Microcomputers and alternative data management techniques, *in: Management information systems and microcomputers in primary health care*, edited by R.G. Wilson, J.H. Bryant, B.E. Echols & A. Abrantes, Geneva: Aga Khan Foundation, 123-134.
- Best, D.P. (1996). *The Fourth Resource: information and its management*, Aldershot: Aslib/Gower.
- Boaden, R. & Lockett, G. (1991). Information technology, information systems and information management: definition and development, *European Journal of Information Systems*, 1, (1), 23-32.
- Bonair, A., Rosenfield, P. & Tengvald, K. (1989). Medical technologies in developing countries: issues of technology development, transfer, diffusion and use, *Social Science and Medicine*, 28, (8), 769-781.
- Burrell, G. & Morgan, G. (1979). *Sociological paradigms and organisational analysis: elements of the sociology of corporate life*, UK: Arena.
- Buttolph, P. (1992). A new look at adaptation, *Knowledge: Creation, Diffusion, Utilisation*, 13, (4), 460-470.
- Bryant, J.H. (1988). Management information systems for primary health care: hopes and cautionary notes, *in: Management information systems and microcomputers in primary health care*, edited by R.G. Wilson, J.H. Bryant, B.E. Echols & A. Abrantes, Geneva: Aga Khan Foundation, 27-30.
- Buchanan, S. & Gibb, F. (1998). The information audit: an integrated strategic approach, *International Journal of Information Management*, 18, (1), 29-47.
- Buckingham, R.A., Hirschheim, R.A., Land F.F. & Tully, C.J (editors). (1987). *Information systems education: recommendations and implementation*, Cambridge: Cambridge University Press.

- Campbell, B., Adjei, S. & Heywood, A. (1996). *From data to decision making in health: the evolution of a health management information system*, Amsterdam: Royal Tropical Institute.
- Caplan, N. & Nelson, S.D. (1973). On being useful: the nature and consequences of psychological research on social problems, *American Psychologist*, 28, 199-211.
- Chae, Y.M., Kim, S.I., Lee, B.H., Choi, S.H. & Kim, I.S. (1994). Implementing health management information systems - measuring success in Korean health centres, *International Journal of Health Planning and Management*, 9, (4), 341-348.
- Chanawongse, K. & Singhadej, O. (1988). From primary health care to basic minimum needs and quality of life: the challenge for MIS in Thailand, in: *Management information systems and microcomputers in primary health care*, edited by R.G. Wilson, J.H. Bryant, B.E. Echols, & A. Abrantes, Geneva: Aga Khan Foundation, 31-40.
- Checkland, P. (1981) *Systems Thinking, Systems Practice*, Chichester: John Wiley and Sons.
- Checkland, P.B. (1982). Soft systems methodology as process: a reply to M.C. Jackson, *Journal of Applied Systems Analysis*, 9, 37-39.
- Checkland, P. & Holwell, S. (1998). *Information, Systems and Information Systems: making sense of the field*, Chichester: John Wiley & Sons.
- Chin, W.W. & Gopal, A. (1995). Adoption intention in GSS: relative importance of beliefs, *Database Advances*, May/August 26, (2 and 3), 42-64.
- Clark, P. & Staunton, N. (1989). *Innovation in technology and organisation*, London and New York: Routledge.
- Conn, C.P., Jenkins, P., & Touray, S.O. (1996). Strengthening health management: experience of district teams in The Gambia, *Health Policy and Planning*, 11, (1), 64-71.
- Crease, A., Phillips, M., Rawji, A., (1988). Cost analysis in primary health care management information systems, in: *Management information systems and microcomputers in primary health care*, edited by R.G. Wilson, J.H. Bryant, B.E. Echols & A. Abrantes, Geneva: Aga Khan Foundation, 111-122.
- Crystal, S., Sambamoorthi, U. & Merzel, C. (1995). The diffusion of innovation in AIDS treatment: Zidovudine use in two New Jersey cohorts, *Health Services Research*, 30, (4), 593-614.

- Davis, G.B. & Olson, M.H. (1984). *Management Information Systems: conceptual foundations, structure and development*, Second edition, New York, London: McGraw-Hill.
- De Kadt, E. (1989). Making health policy management intersectoral: issues of information analysis and use in less developed countries, *Social Science and Medicine*, 29, (4), 503-14.
- Denzin, N.K. & Lincoln, Y.S. (1994). Introduction: Entering the field of qualitative research, in: *Handbook of qualitative research*, edited by N.K. Denzin & Y.S. Lincoln, USA: Sage Publications, 1-18.
- Dewar, R.D. & Dutton, J.E. (1986). The adoption of radical and incremental changes: an empirical analysis, *Management Science*, 32, (11), 1422-1433.
- Earl, M.J. (1989). *Management Strategies for information technology*, Prentice Hall, New York and London.
- Earl, M.J. (1993). Experiences in Strategic Information Systems Planning, *MIS Quarterly*, 17, (1), 1-24.
- Editorial (1998). The debate on selective or comprehensive primary health care, *Social Science and Medicine*, 26, 877-878.
- Ellis, D., Barker, R., Potter, S. & Pridgeon, C. (1993). Information audits, communication audits, and information mapping: a review and survey, *International Journal of Information Management*, 13, 134-151.
- Ettlie, J., Bridges, W. & O'Keefe, R. (1984). Organisation Strategy and structural differences for radical versus incremental innovation, *Management Science*, 30, 682-695.
- Evaluation Team, Ministry of Health (1995). *Summary findings from the evaluation of the health management information system in two pilot districts (Kabale and Mukono) in Uganda*, Ministry of Health, Uganda.
- Ferrinho, P.D., Buch, E., Robb, D. & Phakathi, G. (1991). Developing a health information system for a primary health care centre in Alexandra, Johannesburg., *South African Medical Journal*, 80, (8), 400-3.
- Finau, S.A. (1994). National Health information systems in the Pacific Islands - in search of a future, *Health Policy and Planning*, 9, (2) 161-170.
- Flood, R.L. & Jackson, M. (1991). *Creative problem solving*, Chichester: Wiley.
- Foltz, A. & Foltz, W.J. (1991). The politics of health reform in Chad, in *Reforming economic systems in developing countries*, edited by D.H. Perkins & M. Roemer, USA: Harvard Institute for International Development, 137-158.

- Foltz, A.M. (1993). Modelling technology transfer in health information systems. Learning from the experience of Chad, *International Journal of Technology Assessment in Health Care*, 9, (3), 346-59.
- Galliers, R.D. (1993). Towards a flexible information architecture: integrating business strategies, information systems strategies and business redesign, *Journal of Information Systems*, 3, 199-213.
- Galliers, B. (1995a). Re-orienting information systems strategy: integrating information systems into business, *in: Information Systems provision*, edited by F. Stowell, Berkshire: McGraw-Hill Book Company, 51-74.
- Gladwin, J., Dixon, R.A. & Wilson, T.D. (in press). Strengthening health information management in an East African country using external materials, *Health Informatics*.
- Gladwin, J., Dixon, R.A. & Wilson, T.D. (submitted). Rejection of an innovation: health information management training materials in East Africa. Submitted to *Health Policy and Planning*.
- Glaser, B.G. & Strauss, A.L. (1967). *The discovery of grounded theory*, New York: Aldine de Gruyter.
- Goss, K.F. (1979). Consequences of the Diffusion of Innovations, *Rural Sociology*, 44, (4), 754-772.
- Greer, A.L. (1977). Advances in the study of diffusion of innovation in health care organizations, *Millbank Memorial Fund Quarterly*, 55, (4), 505-32.
- Greer, A.L. (1981). Medical technology: assessment, adoption, and utilisation, *Journal of Medical Systems*, 5, (1/2), 129-145.
- Grunden, K. (1986). Some critical observations on the traditional design of administrative information systems and some proposed guidelines for human-oriented system evolution, *in: Quality of Work versus Quality of Information Systems*, edited by H.E. Nissen & G. Sandstrom, Sweden: Lund University.
- Guba, E.G. (1990). *The paradigm dialog*, Newbury Park, CA: Sage.
- Guba, E.G. & Lincoln, Y.S. (1989). *Fourth Generation Evaluation*, Newbury Park, CA: Sage Publications.
- Gyimah-Boadi, E. & Rothchild, D. (1990). Ghana, *in: Public Administration in the third world - an international handbook*, edited by Subramaniam, V., New York: Greenwood Press.
- Hage, G. & Aiken, M. (1967). Program change and organizational properties: a comparative analysis, *American Journal of Sociology*, 72, 503-519.

- Halpern, E.S. (1983). *Auditing naturalistic inquiries: the development and application of a model*, Indiana: Indiana University. (doctoral dissertation)
- Hammersley, M. & Atkinson, P. (1995). *Ethnography: principles in practice*, second edition, London: Routledge.
- Hansen, H. & Echols, B.E. (1988). Analysis of four case studies on management information systems and microcomputers in primary health care: Aga Khan Network experience in Bangladesh, Kenya and Pakistan, *in: Management information systems and microcomputers in primary health care*, edited by R.G. Wilson, J.H. Bryant, B.E. Echols, & A. Abrantes, Geneva: Aga Khan Foundation, 59-66.
- Heiby, J. (1991). Process and outcome evaluation: experience with systems analysis in the PRICOR project, *Progress in Clinical and Biological Research*, 371, 395-410.
- Hepworth, J.B., Vidgen, G.A., Griffin, E. & Woodward, A.M (1992). The enhancement of information systems through user involvement in system design, *International Journal of Information Management*, 12, (2), 120-129.
- Harper Howze, E. & Redman, L.J. (1992). The uses of theory in health advocacy: policies and programs, *Health Education Quarterly*, 19, (3), 369-383.
- Hedberg, B. & Mumford, E. (1975). The design of computer systems: Man's vision of man as an integral part of the system design process, *in: Human Choice and Computers*, edited by E. Mumford & H. Sakman, Amsterdam: North-Holland. (31-59).
- Hirschheim, R., Klein, H.K. & Lyytinen, K. (1995). *Information systems development and data modelling: conceptual and philosophical foundations*, Cambridge: Cambridge University Press.
- HIS Section, Health Planning Unit, Ministry of Health (1995). *The pilot HMIS: background and review June 1995*, Uganda: Ministry of Health.
- HIS Section, Health Planning Unit, Ministry of Health (1996a). *Feedback Report from the Abridged Workshop for the selection of essential health indicators, 28 February 1996*, Uganda: Ministry of Health.
- HIS Section, Health Planning Department, Ministry of Health (1996b). *Final Report: The documentation of essential health indicators for Uganda March 1996*, Uganda: Ministry of Health.
- Holtham, C. (1996). Resolving the imbalance between information and technology, *in: The fourth resource: information and its management*, edited by D.P.Best, Aldershot: Aslib/Gower, 41-56.

- Huberman, A.M. & Miles, M.B. (1994). Data management and analysis methods, *in: Handbook of qualitative research*, edited by N.K. Denzin & Y.S. Lincoln, USA: Sage Publications, 428-444.
- Husein, K., Adeyi, O., Bryant, J. & Cara, N.B. (1993). Developing a primary health care management information system that supports the pursuit of equity, effectiveness and affordability, *Social Science and Medicine*, 36, (5), 585-96.
- Hussain, T.M. (1999). Everybody's business, *The Health Exchange*, February, 14-15.
- Hyden, G. (1993). *No shortcuts to progress. African development management in perspective*, London: Heinemann.
- IBM (1975). Business Systems Planning, *in: Advanced Systems Development/Feasibility Techniques*, edited by J.D. Cougar, M.A. Colter & R.W. Knapp, New York: John Wiley, (however, this book was published in 1982).
- Iivari, J. (1986). An innovation research perspective on information system implementation, *International Journal of Management Research*, 6, 123-144.
- Iivari, J. (1989). A methodology for IS development as organisational change: a pragmatic approach, *in: Systems development for Human Progress*, edited by H.K. Klein and K. Kumar, Amsterdam: North Holland.
- Iivari, J. (1992). The organisational fit of information systems, *Journal of Information Systems*, 2, 3-29.
- Iivari, J. (1993). From a macro innovation theory of IS diffusion to a micro innovation theory of IS adoption: an application to CASE adoption, *in: Human, organisational and social dimensions of information systems development*, edited by D. Avison, J.E. Kendall & J.I. DeGross, Netherlands: Elsevier Science Publishers B.V. (North-Holland), 295-320.
- Jackson, M.C. (1982). The nature of "soft" systems thinking: the work of Churchman, Ackoff and Checkland, *Journal of Applied Systems Analysis*, 9, 17-29.
- Kaluzny, A.D. & Veney, J.E. (1977). Types of change and hospital planning strategies, *American Journal of Health Planning*, 1, (3), 13-19.
- Kanga, G.J., Ahmed, A.M. & Sandiford, P. (1992). Staff maldistribution between health facilities in Tanzania: can health information systems effect change?, *in: Fifth International Conference on System Science in Health Care*, edited by M.K.Chytil, G.Duni, W.VanEimeren, & ChD. Flagle, Prague: Omnipress Publishing, 1306-1316.

- Kaplan, B. (1985). Barriers to medical computing: history, diagnosis, and therapy for the medical computing "lag"., *in: The Ninth Annual Symposium on Computer Applications in Medical Care*, edited by M.J. Ackerman, Silver Spring, MD: IEEE Computer Society, (400-404).
- Kaplan, B. (1987). The influence of medical values and practices on medical computer applications, in *Use and Impact of Computers in Clinical Medicine*, edited by J.G. Anderson & S.J. Jay, N.Y.: Springer-Verlag, 39-50.
- Kaplan, B. (1991). Models of change and information systems research, *in: Information Systems Research: Contemporary Approaches and Emergent Traditions*, edited by Nissen, H.R., Klein, H.K. & Hirschheim, R., Netherlands: Elsevier Science Publishers B. V. (North-Holland), 593-611.
- Keen, P.G.W. (1981). Information systems and organisational change, *Communications of the ACM*, 24, 24-33.
- Keen, P. & Morton, M.S. (1978). *Decision support systems: an organizational perspective*, Reading, MA.: Addison-Wesley.
- Keller, A. (1991). Management information systems in maternal and child health/family planning programs: a multi-country analysis, *Studies in Family Planning*, 22, (1), 19-30.
- King, W.R. & Rodriguez, J.I. (1978). Evaluating management information systems, *MIS Quarterly*, September, 43-51.
- Kipp, W., Kielmann, A.A., Kwered, E., Merk, G. & Rubaale, T. (1994). Monitoring of primary health-care services - an example from western Uganda, *Health Policy and Planning*, 9, (2), 155-160.
- Kirkham, S. (1994). Effective information delivery systems- what's the secret?, *Electronic Library*, 12, (3), 177-181.
- Knights, D. & Murray, F. (1994). *Managers divided: organisation politics and information technology management*, England: John Wiley and Sons,.
- Kotch, J.B., Veney, J.E., Kaluzny, A.D., Stephenson, R.E., Alexander, B., Knopf, D, Wisseh, F.S. (1993). Performance-based management in local health departments: measuring the success of implementation, *Journal of Medical Systems*, 17, (5), 317-325.
- Kwon, T.H. (1990). A diffusion of innovation approach to MIS infusion: conceptualisation, methodology, and management strategies, *in: Proceedings of the Eleventh International Conference on Information Systems*, edited by J.L. DeGross, M. Alavi, M. & H. Oppeland, Copenhagen, Denmark: International Conference on Information Systems.



- Leavitt, H.J. (1965). Applied organisational change in industry: structural, technological and humanistic approaches, *in: Handbook of organisations*, edited by J.G. March, Chicago: Rand McNally, 1144-1170).
- Leavitt, H.J., Dill, W.R. & Eyring, H.B. (1973). *The organisational world, USA*: Harcourt Brace Jovanovich, Inc.
- LeCompte, M. & Goetz, J. (1982). Problems of reliability and validity in ethnographic research, *Review of Educational Research*, 52, (1), 31-60.
- Lee, K. & Mills, A. (1982). *Policy making and planning in the health sector*, London: Croom Helm.
- Leininger, M. (1994). Evaluation criteria and critique of qualitative research studies, *in: Critical issues in qualitative research methods*, edited by J.M. Morse, Thousand Oaks, CA.: Sage Publications, 95-115.
- Lewis, P.J. (1994). *Information-Systems development*, UK: Pitman Publishing.
- Lincoln, Y.S. & Guba, E.G. (1985). Establishing trustworthiness, *in: Naturalistic inquiry*, edited by Y.S. Lincoln & E.G. Guba, Beverly Hills, CA.: Sage, 289-331.
- Loevinsohn, B.P. (1994). Data utilization and analytical skills among mid-level health programme managers in a developing country, *International Journal of Epidemiology*, 23, (1), 194-200.
- Lu, M.T. & Farrel, C. (1990). Information systems development in developing countries: an evaluation and recommendations, *International Journal of Information Management*, 10, 288-296.
- Lyytinen, K. (1987). A taxonomic perspective of information systems development: theoretical constructs and recommendations, *in: Critical issues in information systems research*, edited by R.J. Boland Jr, & R.A.Hirschheim, John Wiley and Sons Ltd., UK, 3-41.
- Lyytinen, K. & Hirschheim, R. (1987). Information systems failures - survey and classification of the empirical literature, *Oxford Surveys in Information Technology*, 4, 257-309.
- MacDonald, K.H. (1991). Business strategy development, alignment, and redesign, *in: The Corporation of the 1990's*, edited by M.S. Scott-Morton, New York: Oxford University Press, 159-187.
- Maclaren, R. Hornby, P., Robson, J. O'Brien, P. Cleg, C. Richardson, S. (1991). *Systems design methods - the human dimension*, London: DTI Project, 1ED/4/1249.
- Makumbi, I. (1994). Basics of decentralisation and its implications to health sector in Uganda, *Medical Bulletin of Uganda*, 1, (2) 28-30.

- Malcolm, L. (1989). Developing a national primary health care management information system [see comments], *New Zealand Medical Journal*, **22**, (102(880)), 611-3.
- Markus, M.L. (1983). Power, politics and MIS implementation, *Communications of the ACM*, **26**, (6), 430-445.
- Mckersie, R.B. & Walton, R.E. (1991). Organisational Change, *in: The Corporation of the 1990s*, edited by M.S. Scott Morton, New York: Oxford University Press, 244-278.
- Meyer, A.D. & Goes, J.B. (1988). Organisational assimilation of innovations: a multilevel contextual analysis, *Academy of Management Journal*, **31**, (4), 897-928.
- Miles, M.B. & Huberman, A.M. (1994). *Qualitative data analysis*, second edition, USA: Sage Publications.
- Mills, A. (1990). Decentralisation concepts and issues: a review, *in: Health System decentralisation: concepts, issues and country experience*, edited by A.Mills, J.P.Vaughan, D.L.Smith & I.Tabizadeh, Geneva: WHO, 11-42.
- Mingers, J. & Taylor, S. (1992). The use of soft systems methodology in practice, *Journal of the Operational Research Society*, **43**, (4), 321-332.
- Ministry of Health (1990). *Rehabilitation and Development Plan 1991/2 to 1994/5*, Uganda: Ministry of Health.
- Ministry of Health (1993a). *The Three Year Health Plan Frame: 1993/94-1995-96*, Uganda: Ministry of Health.
- Ministry of Health (1993b). *White Paper on Health Policy Update and Review (1993)*, Uganda: Ministry of Health.
- Ministry of Health December (1994). *HELP: Health Evaluation and Planning Manual Volume 1 Description of collection and reporting formats, Pilot version 2.1*, Uganda: Ministry of Health.
- Ministry of Health (1995a). *HELP Health Evaluation and Planning Manual Volume 3: The health unit data base, Pilot version 2.1*, Uganda: Ministry of Health.
- Ministry of Health (June 1995b). *District level HELP Health Evaluation and Planning Manual Volume 2: Management of the District Health services, version 1.1*, Uganda: Ministry of Health.
- Ministry of Health (March 1995c). *District level HELP: Health Evaluation and Planning Manual Volume 1: Description of collection and reporting formats, Pilot version 1.0*, Uganda: Ministry of Health.

- Ministry of Health (June 1995d). *District level HELP Health Evaluation and Planning Manual, pilot version 1.1*, Uganda: Ministry of Health.
- Ministry of Health (1995e). *Report on workshop to review HMIS operation in the pilot districts of Mukono and Kabale 29 May-2 June*, Uganda: Ministry of Health.
- Ministry of Health (1995f). *HMIS Brief*, Uganda: Ministry of Health.
- Ministry of Health (1996a). *The Health Management Information System: Health Unit Data Base, December 1996*, Uganda: Ministry of Health.
- Ministry of Health (1996b). *The Health Management Information System: District Data Base, December 1996*, Uganda: Ministry of Health.
- Ministry of Health (1996c). *The Health Management Information System Manual Volume 1: The Health Unit Level*, December 1996, Uganda: Ministry of Health.
- Ministry of Health (1996d). *The Health Management Information System Manual Volume 2: The District Level*, December 1996, Uganda: Ministry of Health.
- Mock, N., Setzer, J., Sliney, I., Hadizatou, G. & Bertand, W. (1993). Development of information-based planning in Niger, *International Journal of Technology Assessment in Health Care*, 9, (3), 360-368.
- Montgomery, J.D. (1987). Probing managerial behaviour: image and reality in Southern Africa, *World Development Movement*, 15, (7), 911-929.
- Morse, J.E. (1994). Designing funded qualitative research, *in: Handbook of qualitative research*, edited by N.K. Denzin & Y.S. Lincoln, USA: Sage Publications Inc., 220-235.
- Mumford, E. (1983a). *Designing Participatively*, Manchester: Manchester Business School.
- Mumford, E. (1983b). *Designing Secretaries*, Manchester: Manchester Business School.
- Mumford, E. & Weir, M. (1979). *Computer Systems in Work Design- the ETHICS Method*, New York: Wiley.
- Nabarro, D., Annett, H., Graham-Jones, S. & Nabeta, E. (1988). Microcomputers in developing country programmes: valuable tools or troublesome toys? Experience from Uganda and Nepal, *in: Management Information Systems and Microcomputers in primary health care*, edited by R.G. Wilson, J.J. Bryant, B.E. Echols, & Abrantes, A. Geneva: Aga Khan Foundation, 41-52.
- Ndwiga, N.K. (1996). *PHC-MAP Presentation Kampala, Uganda*, African Medical and Research Foundation.

- Newell, K. (1989). The way ahead for district health systems, *World Health Forum*, 10, (1), 80-7.
- Norman, R.J., Corbitt, G.F., Butler, M.C. & McElroy, D.D. (1989). CASE Technology transfer: a case study of unsuccessful change, *Journal of Systems Management*, 40, 5, 33-37.
- O'Hicks Jr, J. (1984). Management Information Systems Concepts, in: *Management Information Systems: a user perspective*, Minnesota, USA: West, 20-38.
- Okoth, O. (1994). Public health manpower needs, *Medical Bulletin of Uganda*, 1, (2), 21-24.
- Okuonzi, S.A. (1994). Information systems development for tropical diseases control and monitoring the impact of MANTEAU, *Uganda Medical Bulletin*, 1, (2) 1.
- Okuonzi, S.A. & Macrae, J. (1995). Whose policy is it anyway? International and national influences on health policy development in Uganda, *Health Policy and Planning*, 10, (2), 122-132.
- Onstrud, H.J. & Pinto, J.K. (1991). Diffusion of geographic information innovations, *International Journal of Geographical Information Systems*, 5, (4), 447-467.
- Orlikowski, W.J. (1993). Case tools as organisational change: investigating incremental and radical changes in systems development, *MIS Quarterly*, September, 309-340.
- Pandey, S. & Yadama, G.N. (1992). Community Development programs in Nepal: A test of diffusion of innovation theory, *Social Science Review*, December, 583-597.
- Pearcey, P. & Draper, P. (1996). Using the diffusion of innovation model to influence practice: a case study, *Journal of Advanced Nursing*, 23, 714-721.
- Pelto, P.J. (1973). *The Snowmobile Revolution: Technology and Social Change in the Arctic*, Menlo Park, CA.: Cummings.
- Pennings, J. (1988). Information technology in production organisations, *International Studies of Management and Organisation*, 17, (4), 68-89.
- Perkins, D.H & Roemer, M. (1991). *Reforming economic systems in developing countries*, USA: Harvard Institute for International Development.
- Pettigrew, A.M. (1990). Longitudinal field research on Change: theory and practice, *Organization Science*, 1, (3), 267-292.

- Platt, J. (1988). What can case studies do?, *Studies in Qualitative Methodology*, 1, 1-23.
- Premkumar, G. & King, W.R. (1994). The evaluation of strategic information-system planning, *Information and Management*, 26, (6), 327-340.
- Prescott, M.B. (1995). Diffusion on innovation theory: borrowings, extensions, and modifications from IT researchers, *Database Advances*, 26, (2-3), 16-19.
- Phillips, E.M. & Pugh, D.S. (1994). *How to get a PhD: a handbook for students and their supervisors*, second edition, Buckingham: Open University Press.
- Raho, L.E., Belohlav, J.A. & Fiedler, K.D. (1987). Assimilating new technology into the organisation: an assessment of McFarlan and McKenney's model, *Management Information System Quarterly*, March, 47-57.
- Remenyi, D.S.J. (1991). *Introducing Strategic Information Systems Planning*, Oxford: Blackwell.
- Reynolds, J. (1988). Overview: current perspectives on management information systems in primary health care, *in: Management Information Systems and Microcomputers in primary health care*, edited by R.G. Wilson, J.H. Bryant, B.E. Echols & A. Abrantes, Geneva: Aga Khan Foundation, 67-72.
- Rifkin, S.B. & Walt, G. (1986). Why health improves - defining the issues concerning comprehensive primary health -care and selective primary health-care, *Social Science and Medicine*, 23, (6), 559-566.
- Rogers, E.M. (1962). *Diffusion of innovations*, New York: The Free Press.
- Rogers, E.M. (1983). *Diffusion of Innovations*, Third Edition, New York: The Free Press.
- Rogers, E.M. (1995). *Diffusion of Innovations*, Fourth Edition, New York: The Free Press.
- Rojas, Z., Sandiford, P., & Martinez, J. (1993). Training health managers for developing countries in developed countries-fish out of water?, *in: Strategic Issues in Health Care Management*, edited by M. Malek, J. Rasquinha & P. Vacani, John Wiley and Sons Ltd, 65-77.
- Rowley, J.E. (1993). Information-systems methodologies - a review and assessment of their applicability to the selection, design and implementation of library and information-systems, *Journal of Information Science*, 19, (4), 291-301.
- Ruppel, C.P. and Harrington, S.J. (1995). Telework: an innovation where nobody is getting on the bandwagon? *Database Advances*, 26, (2 and 3), 87-104.

- Sandiford, P., Annett, H. & Cibulskis, R. (1992a). What can information systems do for primary health care? An international perspective, *Social Science and Medicine*, 34, (10), 1077-87.
- Sandiford, P., Kanga, G.L., Rojas, Z. & Ahmed, A.M. (1992b). Using lot quality assessment sampling to monitor an immunisation programme in Kisarawe District, Tanzania, *in: Fifth International Conference on System Science in Health Care*, edited by M.K.Chytil, G.Duni, W.VanEimeren, & D. Flagle, Prague: Omnipress Publishing, 402-409.
- Sandiford, P., Kanga, G.J. & Ahmed, A.M. (1994). The management of health-services in Tanzania - a plea for health sector reform, *International Journal of Health Planning and Management*, 9, 4, 295-308.
- Schrettenbrunner, A. & Harpham, T. (1993) A different approach to evaluating PHC projects in developing countries, *Health Policy and Planning*, 8, 2, 128-135.
- Schwandt, T.A. (1994). Constructivist, Interpretivist approaches to human inquiry, *in: The Handbook of Qualitative Research*, edited by N.K. Denzin & Y.S. Lincoln, CA.: Sage Publications Inc., 118-137.
- Schware, R. (1988). Management information systems and microcomputers in primary health care: issues and challenges, *in: Management Information Systems and Microcomputers in primary health care*, edited by R.G. Wilson, J.H. Bryant, B.E. Echols & A. Abrantes, Geneva: Aga Khan Foundation, 17-20.
- Scott Morton, M.S. (1991). Introduction, *in: The Corporation of the 1990's*, edited by Scott Morton, M.S. New York: Oxford University Press.
- Senn, J.A. (1990). *Information systems in management*, fourth edition, California: Wadsworth Publishing Co.
- Scott Morton, M.S. (editor). (1991). *The Corporation of the 1990s*, New York and Oxford: Oxford University Press.
- Sharma, R.C. & Dutt, S.C. (1993). Time spent on primary health records and reports in India [letter], *World Health Forum*, 14, (2), 177-8.
- Sharp, L. (1952). Steel Axes for Stone Age Australians, *in: Human Problems in Technological Change*, edited by E.H. Spicer, New York: Russell Sage Foundation.
- Shrivastava, P. & Souder, W.E. (1987). The strategic management of technological innovation: a review and a model, *Journal of Management Studies*, 24, (1), 25-41.
- Smith, D.L., Hansen, H. & Karim, M.S. (1988). Management information support for district health systems based on primary health care, *in: Management*

*information systems and microcomputers in primary health care*, edited by R.G. Wilson, J.H. Bryant, B.E. Echols, & A. Abrantes, Geneva: Aga Khan Foundation, 89-110.

Somboon Vacharotai Foundation, (1995). *Report on survey of the PHC Management Advancement Programme Modules*, Bangkok, Thailand.

Spradley, J.P. (1980). *Participant Observation*, New York: Holt, Rinehart and Winston.

Stefanini, A., Lainjo, B., Mwesugye, F., Odong, T., Oketho-Okoth, V., Rockhold, P. & Tumusiime, P. (1995). *Evaluation of the pilot Health Management Information System in Uganda 26 June-21 July 1995*, Uganda.

Sumner, M. (1993). Factors influencing the adoption of CASE, *in: Computer-Aided Software Engineering*, edited by T.J. Bergin, Harrisburg, PA.: Idea Group Publishing.

Thomas, M. (1997). *Thailand Trip Draft Trip Report June 17*, Aga Khan Foundation, Geneva.

Thorne, M.C., Bowes, C., Brenzel, L., Ochola, N., Jafarey, N. & Hussain, Z. (1994). *Evaluation report of the 1991-94 AKF/US AID Matching grant "Strengthening the effectiveness management and sustainability of PHC/mother and child survival programmes in Asia and Africa" May-Oct 1994*. Washington DC: USAID.

Trauth, E.M., Derksen, F.E.J.M. & Mevissen, H.M.J. (1993). The influence of societal factors on the diffusion of electronic data interchange in the Netherlands, *in: Human, organisational and social dimensions of information systems development*, edited by D. Avison, J.E. Kendall & J.I. DeGross, Elsevier Science Publishers B.V. (North-Holland), Netherlands, 323-337.

Tricker, R.L. (1988). Information resource management - A cross-cultural perspective, *Information and Management*, 15, 37-46.

Unger, J.P. & Killingsworth, J.R. (1986). Selective primary health-care - a critical review of methods and results, *Social Science and Medicine*, 22, (10), 1001-1013.

UNICEF (1998). *The State of the World's Children 1998*, New York: Oxford University Press.

USAID (1991). *Strengthening the effectiveness, management and sustainability of Primary Health Care/Mother and Child Survival Programs in Asia and Africa. Co-operative Agreement no. PDC-0158-A-00-1102-00 1991-9430 September 1991*. Washington DC: USAID.

- VanDamme, D. (1993). *Comments of the Needs Assessment of Health Management Information in Uganda*, Uganda: Ministry of Health.
- Van de Ven, A.H. & Rogers, E.M. (1988). Innovations and organisations: critical perspectives, *Communication Research*, 15, (5), 632-651.
- Van de Ven, A.H. & Drazin, R. (1985). The concept of fit in contingency research, *Research in Organisational Behaviour*, 7, 33-365.
- Van Hartevelt, J.H.W. (1993). Information management in international development as an area for information -services with a case in the field of health-care in Ghana, *International Forum on Information and Documentation*, 18, (3-4), 32-36.
- VanNorren, B., Boerma, J.T. & Sempebwa, E.K. (1989). Simplifying the evaluation of primary health care programmes, *Social Science and Medicine*, 28, (10), 1091-7.
- Waddington, C.J. (1992). *Health economics in an irrational world - the view from a regional health administration in Ghana*, Liverpool: Liverpool School of Tropical Medicine.(PhD Thesis).
- Walsh, J.A. (1986). Prioritizing for primary health care: methods for data collection and analysis, *in: Strategies for primary health care: technologies appropriate for the control of disease in the developing world*, edited by J.A. Walsh, & K.S. Warren, 5th, Chicago and London: The University of Chicago Press, .
- Walsh, J.A. & Warren, K.S. (1979). Selective primary health care: an interim strategy for disease control in developing countries, *New England Journal of Medicine*, 301, (18), 967-74.
- Walsham, G. (1993a). *Interpreting Information Systems in organisations*, Chichester: John Wiley and Sons.
- Walsham, G. (1993b). Ethical issues in information systems development: the analyst as moral agent, *in: Human, Organisational and Social Dimensions of Information Systems Development*, edited by. D. Avison, J.E. Kendall, J.I. DeGross, Elsevier Science Publishers B.V. (North-Holland), Netherlands, 281-337.
- Ward, J. & Griffiths, P. (1996). *Strategic Planning for information systems*, second edition, Chichester: John Wiley and Son.
- Warren, K.S. (1988). The evolution of selective primary health-care, *Social Science and Medicine*, 6, (9), 891-898.



- Werner, O. & Schoepfle, G.M. (1987). *Systematic fieldwork: foundations of ethnography and interviewing Vol.1*, Newbury Park, CA.: Sage Publications.
- Wielicki, T.R. (1987). Micro-computers in developing countries: Case of the Somali Airlines, *Proceedings of the Decision Science Institute*, 242-244.
- Wilson, B. (1984a). *Systems: concepts, methodologies and applications*, Maidenhead: John Wiley and Sons.
- Wilson, R.G. (1988). Meeting the challenge to improve health care programme management and efficiency, *in: Management information systems and microcomputers in primary health care*, edited by R.G. Wilson, B.E. Echols, J.H. Bryant & A. Abrantes, Aga Khan Foundation 1988, Geneva, 9-16.
- Wilson, R., Echols, B., Smith, D. & Bryant, J. (1988). Fresh approaches and new tools to improve management of health information systems based on primary health care, *in: Management information systems and microcomputers in primary health care*, edited by R.G. Wilson, J.H. Bryant, B.E. Echols & A. Abrantes, Aga Khan Foundation, Geneva, Switzerland, 147-162.
- Wilson, T.D. (1984). The cognitive approach to information-seeking behaviour and information use, *Social Science Information Studies*, 4, 197-204.
- Wilson, T.D. (1994b). Tools for the analysis of business information needs, *Aslib Proceedings*, 46, (1), 19-23.
- Wilson, T.D. (1995). [t.d.wilson@sheffield.ac.uk] (November 1995) *Modelling the information user: the wider perspective*, [www.shef.ac.uk/uni/academic/I-M/is/lecturer/klpaper.html]. Site visited at: 11/5/97.
- Wood-Harper, A.T., Antill, L. & Avison, D.E. (1985). *Information Systems Definition: The Multiview Approach*, Oxford: Blackwell Scientific Publications.
- Wood-Harper, A.T. (1989). *Comparison of information systems definition methodologies: an action research-multiview perspective*, Norwich: University of East Anglia. (PhD Thesis).
- World Bank (1993). *Uganda: growing out of poverty*, Washington: The World Bank.
- World Health Organisation and UNICEF (1978). *International Conference on primary health care 1978 Alma Ata- Primary Health Care: a joint report by the Director General of the World Health Organisation and UNICEF*, Geneva: UN.
- World Health Organisation (1987). *Evaluation of the strategy for health for all by the year 2000: seventh report on the world health situation*, Geneva: WHO.

World Health Organization (1990). *The role of research and information systems in decision making for the development of human resources for health, WHO Technical Report Series 802*. Geneva: WHO.

World Health Organisation (1993a). *Implementation of the Global Strategy for Health for ALL by the year 2000. Second evaluation. Eighth report on the world health situation. Vol. 1 Global review*, Geneva: WHO.

World Health Organisation (1993b). *Guidelines for the development of Health Management Information Systems*, WHO Regional Office for the Western Pacific, Manila: WHO.

World Health Organisation (1994a). *Implementation of the Global Strategy for Health for all by the Year 2000: second evaluation. Eighth report on the world health situation: Volume 2 Africa Region*, WHO Regional Office for Africa, Brazzaville: WHO.

World Health Organisation (1994b). *Information support for new public health action at district level. Report of a WHO Expert Committee, WHO Technical Report Series 845*, Geneva: WHO.

World Health Organisation (1996). *Essential Health Indicators for the Health Management Information system in Uganda and tentative country-wide implementation plan February 16-March 3 1996*, Uganda: WHO.

Yavas, U. Kayak, E. & Dilber, M. (1985). The managerial climate in less developed countries, *Management Decisions*, 23, (3), 29-40.

Yin, R.K. (1994). *Case study research: design and methods*, second edition, USA: Sage.

Zaidi, S.A. (1994). Planning in the health sector: for whom, by whom, *Social Science and Medicine*, 39, (9), 1385-1393.

Zaltman, G., Duncan, R. & Holbeck, J. (1973). *Innovations and Organizations*, New York: Wiley.

## **List of Appendix**

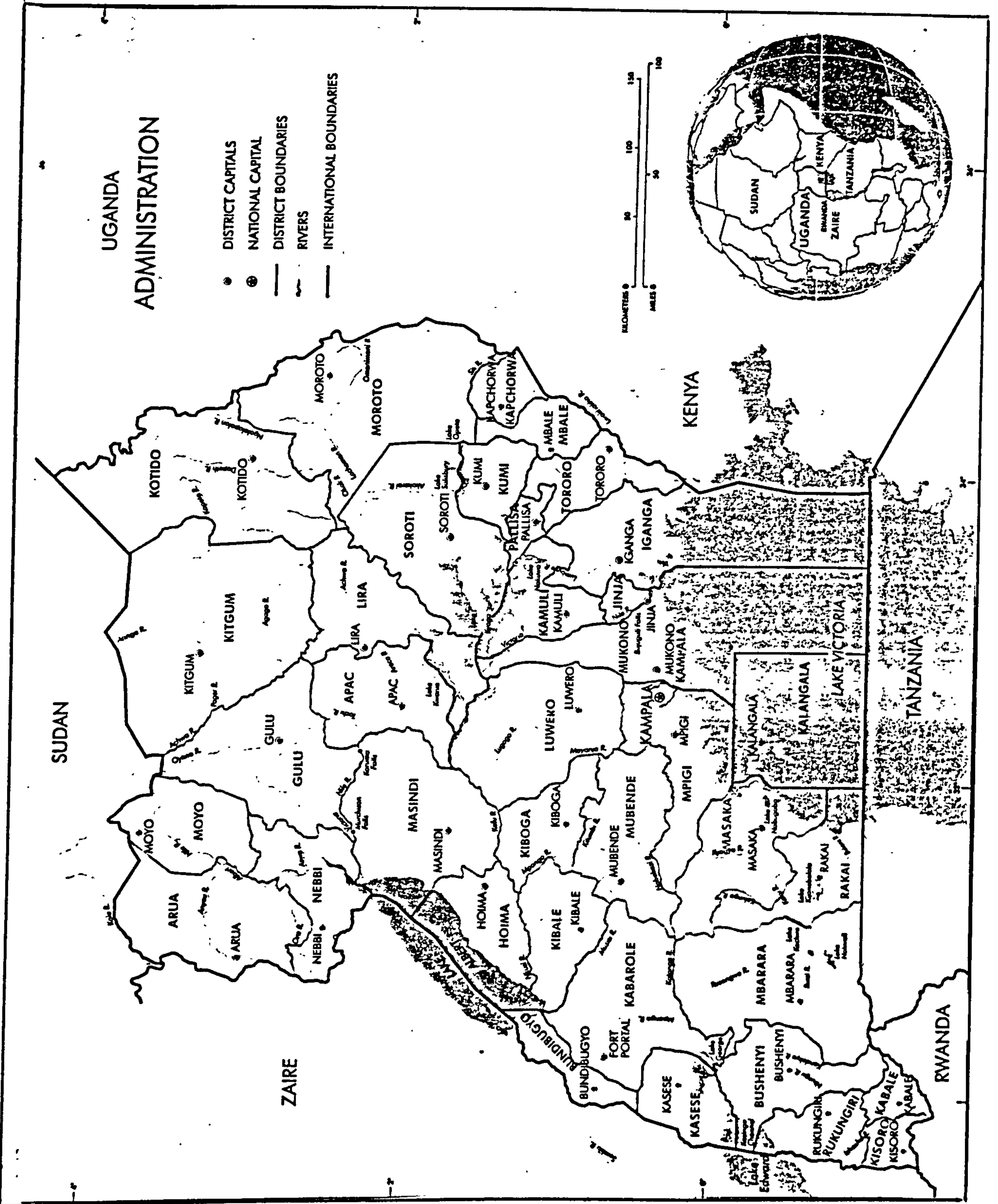
<b>term</b>	<b>explanation</b>
Aga Khan Network	includes the Aga Khan Foundation, Aga Khan Health Services and the Aga Khan University
aid-post	smallest health unit in Uganda offering very few services and probably not open full time
AMREF	a non-governmental organisation operating in East Africa
CATWOE	one of the tools utilised in SSM
Centre for Human Health Services	part of the University Research Corporation, USA. It played a role in developing PHC MAP
Change Agent	“an individual who influences clients’ innovation-decisions in a direction deemed desirable by a change agency” (Rogers, 1995a:335)
Community-based information system	the data and information from sources other than the health unit. Includes data from TBAs, and water and sanitation workers
comprehensive primary health care	the term given to the form of primary health care that corresponds to the principles set at Alma Ata in 1978
Cultural studies	“a complex, interdisciplinary field that merges critical theory, feminism, and poststructuralism” *
data	a neutral concept suggesting no meaning is attached to data (this makes it different to information)
district	administrative unit which is probably responsible for approximately 300,000 people
district health team or district health management team	group of people who work out of the district office of the ministry of health. It includes the district medical officer, district health visitor,
dispensary	a medium sized health unit, staffed with a Registered nurse, and other health workers

ETHICS	an information system development methodology developed by Mumford which emphasises participation
extended district health team	the district health team plus the Medical Officers from the hospitals or other very large government health unit. It also includes the senior staff from any non-governmental health unit or agency working in the district.
health information system	term often used to describe an IS handling data produced by health service providers, which is intended to support policy making and monitoring, rather than operational management
health management information system	term usually used to describe a health information systems which aims to support operational management
health unit	this is the general term for the place where various health services are provided. There are various types depending upon the level of health service provision. Often also given the title health centre.
hermeneutics	is an interpretative approach to “the analysis of texts that stresses how prior understanding and prejudices shape the interpretive process” *
HMIS Designer	the term given in this thesis to indicate the person who led the design of the HMIS
HMIS Developer	the term given in this thesis to the person who led the HMIS development after the Designer had suggested the features
In-charge	the health unit manager. Health units vary in size, and level of services provided, thus this person could be a Nursing Aide, State Enrolled Nurse, State Registered Nurse, Midwife, Medical Assistant or Medical Officer
information	data plus the meaning ascribed to it
information system	<p>a set of people, data and procedures that work together to provide useful information (Senn, 1990).</p> <p>the term which describes the data collection, data pathways, storage, processing and dissemination, as well as the information pathways and information use in an organisation. It describes human activity, which may not involve the use of computers (my definition)</p>
innovation	idea, practice or object perceived as new

interpretative paradigms	a group of research theoretical perspectives which attempt to make sense of, or interpret, phenomena in terms of the meanings people bring to them. Hermeneutics, structuralism, semiotics, phenomenology, cultural studies and feminism have been described as interpretative perspectives by Denzin and Lincoln, (1994:2).
Knowledge, Attitude Practice	a method for assessing the impact of health interventions, particular health promotion. Knowledge, Attitude and Practice of people is assessed in recognition that behaviour does not change simply because people have knowledge of an intervention
management information system	an information system which usually supports operational management as opposed to strategic management
Multiview	an information systems development methodology which combines analysis of human activity systems, socio-technical analysis, data analysis and structured analysis
norms	established behaviour patterns for the members of a social system
positivism	a research theoretical paradigm that “asserts that objective accounts of the world can be given” *
post-positivism	a research theoretical paradigm that “holds that only partially objective accounts of the world can be produced, because all methods are flawed”. *
primary health care	two types have been defined: selective and comprehensive
PHC MAP Developer	the term given in this thesis to indicate the person who played a role in developing PHC MAP and presenting the series in Uganda
PHC MAP Initiator	the term given to the person who began the development of the PHC MAP series
PHC MAP Trainer	the term given to describe the person from Kenya who had used PHC MAP to conduct management training
phenomenology	“a complex system of ideas associated with the works of Husserl, Heidegger, Sartre, Merleau-Ponty, and Alfred Schutz” *

selective primary health care	the type of primary health care that generally only focuses on the eight services identified at Alma Ata in 1978. It does not include the main principles of: the strive towards equity, inter-sectoral action, community participation, though there is some attention paid to the latter two principles.
semiotics	this is the science of signs or sign systems *
soft systems methodology	an information systems development methodology developed by Checkland
SSADM	a hard systems information system development methodology that involves computers
stake-holder	individuals or groups who have a stake in a project rather than, or as well as, a financial commitment
State Enrolled Nurse	a nurse with approximately two years of both classroom and on-the-job training
State Registered Nurse	a nurse with approximately three years of both classroom and on-the-job training
Strategic Information System Planning	an information systems development methodology which takes into consideration an organisations strategic plan
Structuralism	an interpretative perspective that "asserts that any system is made up of a set of oppositional categories embedded in language" *
Sub-dispensary	one of the smaller health units in Uganda, offering fewer services and probably staffed by nursing aides rather than a Registered nurse or other clinicians
vertical programmes	programmes such as AIDS/HIV, EPI, CDD, TB Control and MCH that dominate the management structure within a ministry of health service to the extent that there is a lack of integration of management and information systems. This situation may be due to an emphasis on SPHC, and individual programmes being externally funded.

\* these definitions and descriptions are taken from Denzin and Lincoln (1994:14)





## Appendix 3

### Description of the PHC MAP modules given by developers

**Module 1: Assessing information needs.** This module helps managers to identify information needs, set priorities and determine which PHC MAP modules are likely to be of most use to them.

**Module 2: Assessing community health needs and coverage.** This module provides PHC managers with simple tools to gather required data on community health needs for programme planning strategies and resource use. The managers can use the same instruments later to assess program effects on health knowledge, behaviours and coverage, as well as program impact on morbidity and mortality.

**Module 3: Planning and assessing health worker activities.** A module that supervisors and other managers can use to help field workers and clinic staff plan their work better. It shows how to identify individuals in need of services, set realistic targets, assess individual performance and take corrective action, if warranted.

**Module 4: Surveillance of morbidity and mortality.** The module describes the basic indicators or morbidity and mortality included in a PHC surveillance system. It discusses how to set up a surveillance system, how to monitor the occurrence of diseases, how to identify cause of mortality and morbidity, and how to use that information to improve program planning and implementation.

**Module 5: Monitoring and evaluating programs.** List of indicators and guidelines that managers can use to monitor PHC and management activities for short periods. Managers can also use them to construct a project specific 'mini-MIS'.

**Module 6: Assessing the quality of service.** Simple, but comprehensive discussion guides and checklists of essential service resources and processes. Supervisors can use these to assess the quality of care provided and to set priorities for improving service delivery.

**Module 7: Assessing the quality of management.** Discussion guides and checklists for assessing PHC management services (planning, training, supervision, etc.).

**Module 8: Cost Analysis.** This module can help PHC managers to set up simple systems to monitor costs themselves. They can make projections about future revenues and expenses.

**Module 9: Sustainability analysis.** Guidelines and tools that managers can use to

*develop and analyse alternative strategies for sustaining health improvement, service coverage, and the PHC services and resources needed to do so.*

*Better management -100 tips. A helpful hints book that describes ways to help managers improve what they do.*

*Problem solving. A guide to help managers deal with common problems.*

*Computers. A guide book providing useful hints on buying and operating computers, printers, other hardware and software.*

*The computerised PRICOR thesaurus. A compendium of PHC indicators.*

## Appendix 4

### List of people<sup>1</sup> consulted (using pseudonyms), with role descriptions, source of evidence, time taken and dates (ordered according to first contact)

Name in thesis	Role or title	source of evidence (mins)	date
PHC MAP Initiator	former Director: Health Programmes in AKF Geneva; initiator and main developer of PHC MAP	correspondence	several
	lecturer	observation (420) <i>group</i> <sup>2</sup> informal interview (10) formal interviews (20)	7/3/96 4/3/96 26/3/96
	university lecturer and researcher	observation (420) <i>group</i> informal interview (30) formal interview (20)	7/3/96 28/2/96, 4/4/97
AKF Uganda Representative	AKF Uganda	observation (420) <i>group</i> informal interviews formal interviews x2	6/3/96 29/2/96,4/3/97 20/3/96,6/4/97
DMO	DMO, Mukono District	informal (20) formal interview (40),	6/3/96 15/3/96
Assistant DMO	Mukono District	informal interview (30)	15/3/96

<sup>1</sup> In order to ensure confidentiality and conceal the identity of specific informants, pseudonyms have been used and job titles obscured.

<sup>2</sup> The word group indicates that the observation or interview was conducted with more than one person at the same time. If this word does not appear the observations or interviews were individual.

	university lecturer and MOH employee	observation (420) <i>group</i> formal interviews (40, 50)	7/3/96 4/3/96, 26/3/96
I/C	Mukono district, hospital	observation (30) <i>group</i> formal interview (30) <i>group</i>	6/3/96
University Management Trainer	from Makerere University	observation (420) <i>group</i> formal interviews (60, 50, 40) informal interviews (20, 30, 10, 25, 30, 15)	7/3/96 4/3/96, 12/3/96, 18/3/96 4/3/96, 10/3/97, 14/3/97, 3/4/97, 14/4/97 9/5/97
Trainer	HMIS Trainer	observation (180,60) <i>group</i> informal interview (30, 40, 40) formal interview (60)	6/3/96, 18/3/97 6/3/96, 18/3/97 19/3/97, 6/3/96
I/C	Mukono district, dispensary	observation <i>group</i> informal interview <i>group</i>	6/3/96
I/C	Mukono district, sub-dispensary	observation <i>group</i> informal interview <i>group</i>	6/3/96
Workshop participants	PHC MAP Workshop participants (59 people)	observation (420) <i>group</i> informal interviews (60)	7/3/96
PHC MAP Developer	former Director: Health Programmes in AKF Geneva; one of PHC MAP Developers	observation (420) <i>group</i> formal interviews (230)	7/3/96 8/3/96
Kenyan Management Trainer	Kenyan management trainer with AMREF, Kenya	observation (420) <i>group</i> formal interview (70)	7/3/96 8/3/97

NGO Management Trainer	AMREF, Uganda	observation (320) <i>group</i> formal interview (90, 75) informal interview (100)	7/3/96 14/3/96, 6/4/97 17/3/96
	UNICEF employee	observation (420) <i>group</i> formal interview (20)	7/3/96 20/3/96
	university lecturer	informal interviews formal interview	1/3/96, 13/3/97, 26/3/97, 10/5/97 11/3/97
Technical Adviser	Technical adviser to MOH at national level	observation (420) <i>group</i> formal interview (40) informal interview (20)	7/3/96 21/3/96 21/3/96
HMIS Developer	WHO technical advisor to MOH whose role is to develop the HMIS	formal interviews, (55, 30, 40, 30, 60)  observation (60, 200, 100, 180, 140, 140), <i>group</i>  informal interviews (60, 80, 50, 100, 30, 120, 40, 200)	25/3/96, 20/3/97, 18/4/97, 29/5/97 30/5/97, 9/5/97,  17/3/97, 18/3/97, 19/3/97, 20/3/97, 29/4/97, 30/4/97  13/3/97, 17/3/97, 18/3/97, 19/3/97, 29/4/97, 30/4/97, 29/4/97, 30/4/97
HMIS Developer	Statistician, Health Planning Unit	formal interview (55) informal interview (60)	25/3/99 13/3/97
MOH official	Project Manager: District Health Services Project at national level MOH	observation (420) <i>group</i> formal interviews (35, 30)	7/3/96 25/3/96, 9/5/97
MOH official	Acting Commissioner: PHC at national level MOH	observation (420) <i>group</i> formal interview (25)	7/3/96 25/3/96

MOH official	MOH national level	observation (420) <i>group</i> formal interview (20)	7/3/96 25/3/96
University Researcher	Centre for Health and Child Development, Makerere University	observation (420) <i>group</i> formal interview (55)	7/3/96 26/3/96
NGO Manager	Uganda Red Cross: NGO Manager and IS Co-ordinator	observation (420) <i>group</i> formal interview (40)	7/3/96 26/3/96
MOH Planner	in 1996, AMREF:Kenya  in 1997, Health Planning and Policy in MOH, Uganda	observation (420) <i>group</i>  formal interview (15)	6/3/96  28/4/97
	Italian management trainer	informal interview (15) <i>group</i>	10/3/97
DMO	Bushenyi	observation (20, 80) <i>group</i> informal interview (40)	17/3/97 18/3/97 18/3/97
Trainer		observation (60, 120) <i>group</i>  informal interview (40) <i>group</i>	17/3/97 18/3/97  18/3/97
Trainer		observation (60)  informal interview (30) <i>group</i>	17/3/97 18/3/97  18/3/97
Trainer		observation (60)  informal interview (10)	17/3/97 18/3/97 18/3/97
Supervisor	Bushenyi	observation (120) <i>group</i> informal interview (20)	18/3/97
Supervisor	Bushenyi	observation (120) <i>group</i> informal interview (30)	18/3/97

Supervisor	Bushenyi	observation (30) <i>group</i>	18/3/97
MS:NGO	Medical Superintendent of an NGO hospital Bushenyi	observation (30) <i>group</i> informal interview (15)	18/3/97
	senior staff NGO hospital Bushenyi	observation (150) <i>group</i> informal interview (20) <i>group</i>	18/3/97
Records Officer	NGO hospital records officer	observation (40) <i>group</i> informal interview (10) <i>group</i>	18/3/97
DMO	in Rukungiri	observation (20, 30) <i>group</i> informal interview (10, 5)	18/3/97 19/3/97 18/3/97 19/3/97
Trainer	HMIS Trainer	observation (60), (240), (60), (70) (100) <i>group</i> informal interview (20, 30, 20, 30, 40) <i>group</i> formal interview (30)	18/3/97 19/3/97 4/5/97, 5/5/97, 6/5/97 18/3/97 19/3/97, 4/5/97, 5/5/97, 6/5/97 6/5/97
Trainer	HMIS Trainer	formal interview (20) observation (50, 20, 50, 80) <i>group</i> informal interview (20, 40, 10) <i>group</i>	6/5/97 19/3/97, 4/5/97, 5/5/97, 6/5/97 4/5/97, 5/5/97, 6/5/97
Trainer	HMIS Trainer,	formal interview (15) observation (120) <i>group</i> informal interview (10)	19/3/97
Supervisors	extended DHT Rukungiri district, 12 people	observation (360) <i>group</i> informal interviews (100) <i>group</i>	19/3/97

I/C	international NGO Representative (health service provider) Rukungiri	observation, (120) <i>group</i> informal interview (15)	19/3/97
senior health worker	midwife with NGO health unit, Rukungiri	observation (45) <i>group</i>	19/3/97
Storeman	storeman in NGO health unit, Rukungiri	observation (40) <i>group</i>	19/3/97
Dispenser	Dispenser, NGO health unit, Rukungiri	observation (40) <i>group</i>	19/3/97
lab technician	in NGO health unit, Rukungiri	observation (50) <i>group</i>	19/3/97
Trainer	HMIS Trainer	observation (60, 30, 60, 35, 50) <i>group</i>  formal interview (20)  informal interview (10, 20, 25) <i>group</i>	19/3/97, 20/3/97 4/5/97, 5/5/97, 6/5/97,  5/5/97  4/5/97, 5/5/97 6/5/97
Trainer	HMIS Trainer	observation (60, 180) <i>group</i>  formal interview (10)  informal interviews (20, 40) <i>group</i>	19/3/97, 20/3/97  20/3/97  19/3/97 20/3/97
Trainer	HMIS Trainer	observation (200 ) <i>group</i>  formal interview (10)  informal interview (20,10) <i>group</i>	19/3/97 20/3/97  20/3/97  19/3/97 20/3/97
DHT	DHT, Nutangamo	observation (180) <i>group</i>  informal interview (30) <i>group</i>	20/3/97



MRO/ HMIS Supervisor	District DHT	observation (70, 120, 120, 60, 50, 30) <i>group</i>  informal interview (100), <i>group</i> , (50, 40, 100, 60)  formal interview (30, 50)	20/3/97, 21/3/97, 22/4/97, 23/4/97, 24/4/97, 25/4/97  22/4/97, 23/4/97, 24/4/97, 25/4/97  24/4/97, 24/4/97
DHV/HMIS Supervisor	... District DHT	informal interview (20)  formal interview (60)  observation (60, 30) <i>group</i>	21/3/97  25/4/97  21/3/97, 22/4/97
	AMREF local staff one district	observation (20) <i>group</i>	21/3/97
	CARE local staff in one district	observation (40) <i>group</i>	21/3/97
	District Population Officer	observation (20) <i>group</i>  interview (20)	21/3/97
PHC MAP Promoter	present Director: Health Programmes in AKF Geneva.	correspondence  formal interviews (60, 50)  informal interviews (45)	25/3/97 x 2
	MSc Health Management trainee	informal interviews	7/4/97, 8/4/97, 9/4/97, 10/4/97, 11/4/97
DTB/L Co-ordinator	Rakai District Health Team	formal interviews (50,40)	8/4/97
DMO	Rakai	informal interview (10)	
I/C	I/C ... health unit, Rakai	formal interview (90) <i>group</i>  observation (20) <i>group</i>  informal interview (60) <i>group</i>	9/4/97

I/C	I/C ... health unit, Rakai	formal interview (80) <i>group</i>  observation (30) <i>group</i>	9/4/97
I/C	I/C ... health unit, Kabale	formal interview (100) <i>group</i>  observation (40) <i>group</i>	22/4/97
I/C	I/C ... health unit, Kabale	formal interview (90) <i>group</i>  observation (30) <i>group</i>	22/4/97
I/C	I/C ... health unit, Kabale	formal interview (100)  observation (40)	23/4/97
I/C	I/C ... health unit, Kabale	formal interview (95) observation (30) informal interview (20)	23/4/97
I/C	I/C ... health unit, Kabale	formal interview (110 ) observation (30) informal interview (20)	23/4/97
DMO		formal interview (50) observation (50) informal interview (40)	25/4/97
District Dental Officer		observation (100)  informal interview (50 )	22/4/97
District Sanitation Officer	is this DHI?	formal interview (15)	25/4/97
	Director: Mbale Management Training Institute	formal interview (20)	30/4/97

I/Cs	50 I/Cs and senior health workers in Mubende district	observation (100, 360, 240) <i>group</i> informal interviews (80) <i>group</i>	4/5/97, 5/5/97, 6/5/97 5/5/97, 6/5/97
DHT	DMO, and other DHT members Mubende	observation (200), <i>group</i> informal interviews (100) <i>group</i>	5/5/97
AKF Representative	AKF East Africa Rep.	formal interview (50)	29/7/97
Thomas	PHC MAP evaluator	formal interview (45)	18/7/97

## Appendix 5

### List of people consulted in this research with the themes arising and questions focused upon

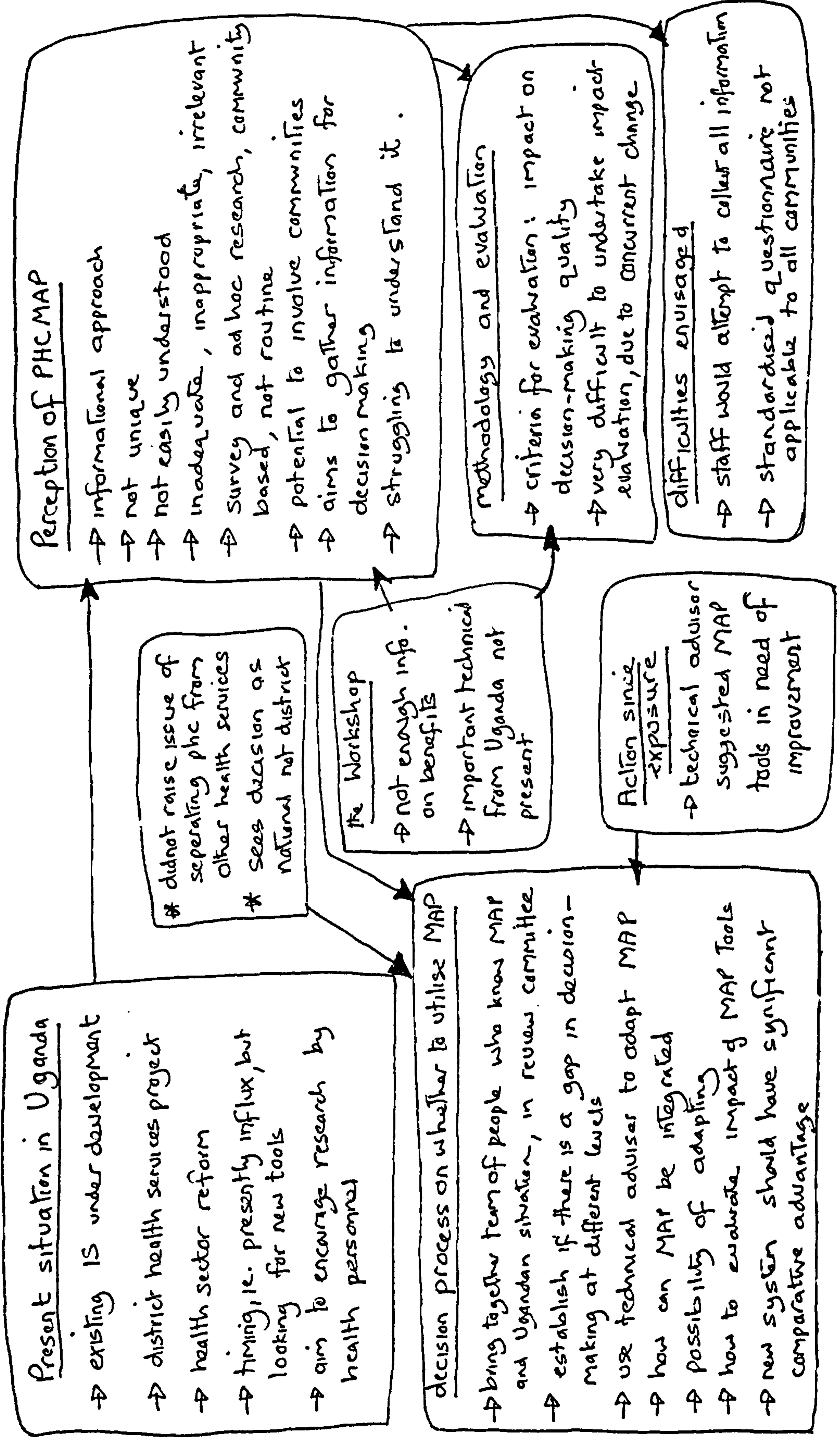
Role (number of people)	Themes from observation, correspondence, and interview
MOH central office (4)	1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19
Supervisors and other EDHT members (37)	3, 18, 19, 20, 26, 28, 36, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 51, 52, 53, 54, 55, 56, 57, 61
I/Cs and other health workers (74)	3, 18, 19, 26, 28, 38, 39, 40, 45, 46, 47, 48, 49, 51, 52, 53, 54, 55, 56, 57, 61
Trainers (10)	3, 18, 19, 26, 28, 38, 39, 40, 44, 45, 46, 47, 50, 51, 53
HMIS Developers (2)	1, 2, 3, 4, 6, 7, 8, 14, 15, 16, 18, 19, 20, 23, 24, 25, 26, 28, 29, 30, 32, 36, 38, 39, 40, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 55, 56, 57, 58, 59, 60, 61
PHC MAP Developer (1)	1, 2, 5
PHC MAP Initiator (1)	5
PHC MAP promoter (1)	2
PHC MAP Workshop participants (59)	1, 2, 4, 6, 7, 8, 10, 13
AKF East Africa representative (1)	2, 4, 6
Kenyan Management Trainer (1)	5, 6, 13
university staff (7)	2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16
NGO national staff (3)	2, 3, 6, 7, 8, 9, 11, 12, 13, 16
AKF Uganda representative (1)	1, 2, 3
PHC MAP evaluator (1)	2

**Key: themes and questions from observation and interviews**

- 1: introduction to PHC MAP
- 2: response to PHC MAP
- 3: description of health services
- 4: prior knowledge of PHC MAP
- 5: different & confused presentations of PHC MAP
- 6: Workshop participants confused as to purpose of PHC MAP and interpret according to their own role
- 7: compatibility of PHC MAP with existing strategies
- 8: compatibility of PHC MAP training approach
- 9: PHC MAP seen as competitive
- 10: perception of PHC MAP and needing to know the advantages tools bring
- 11: perception of PHC MAP and need to know if there is 'gap'.
- 12: potential users suggest PHC MAP developers lack knowledge of context of implementation
- 13: potential users envisage role for AKF to help utilise PHC MAP
- 14: external funders and agencies influence
- 15: personal agendas
- 16: proposed strategies for considering utilisation of PHC MAP series
- 17: perceived managerial ability would affect utilisation
- 18: features and strategies of the HIS
- 19: features and strategies of the HMIS
- 20: problems in the HIS
- 21: limited view of the problems in the HIS
- 22: pre-pilot assumptions made by Designer
- 23: pre-pilot issues

- 24: problems in MOH affecting development of HMIS
- 25: Developer believes the Needs assessment misconstrued the situation in Uganda
- 26: issues in defining the HMIS
- 27: areas not addressed in Needs Assessment
- 28: issues that arose concerning system development in pilot stage
- 29: final IM strategies and indicators reflect power of specific stake-holders
- 30: internal evaluation conducted by pilot district teams and Developers, not all stake-holders
- 31: internal evaluation recommendations focus upon the technology and not the wider organisational issues
- 32: TOR given to External evaluation team is too limited
- 33: external evaluation widens its remit so that it reviews beyond the IM strategies in the HMIS
- 34: external evaluation team does not widen its remit sufficiently to investigate why some of the problems identified at h/u level with HMIS were occurring
- 35: lack of guidelines for action from the external evaluation team
- 36: problems with terminology
- 37: evaluation appears to prioritise IS for district purposes
- 38: different definitions of the HMIS
- 39: IM strategies in HMIS are inappropriate for the existing conditions in some health units
- 40: HMIS information management strategies inappropriate for existing operational management of some health units
- 41: IM strategies inappropriate for existing district level management
- 42: IM strategies are inappropriate for general organisation of health services
- 43: excessive influence of international agencies
- 44: intended training approach
- 45: actual training conducted
- 46: difficulties conducting the training and issues arising
- 47: lack of perception of other organisational changes accompanying HMIS

- 48: recent intended changes in the health sector had not taken place, and inhibits implementation
- 49: concomitant changes at district level affects implementation
- 50: using HMIS implementation to bring in other changes
- 51: management problems at District level influencing HMIS implementation
- 52: management problems at health unit level affecting HMIS implementation
- 53: IM problems which arose in districts with HMIS
- 54: HMIS implementation process in theory and practice different
- 55: Issues relating to organisational culture
- 56: conceptual issues affecting implementation
- 57: inadequate financing
- 58: lack of high level support
- 59: Developer lacks conviction in HMIS
- 60: difficulties in monitoring implementation
- 61: traditional ways of working



Appendix 6 Conceptual Map of the story of interview with MOH official



## Appendix 7

**Matrix developed to aid analysis of PHC MAP case study**

category	concept	data
different & confused presentations of PHC MAP	Developer presents PHC MAP as a package to strengthen IS, but confuses the audience	MAP tools developed due to problems in district IS world-wide. Different view to initial developers who focused on management. Purpose of PHC MAP is not to directly improve management, but to improve data management. Confused the audience by offering a definition of PHC MAP that included IS development and management strengthening without clarifying the link between the two. Purpose of PHC MAP in Kenya was to generate information for decisions. Focus of the presentation was on physical material not on the information strategies and management tools.
	Kenyan Management Trainer presents PHC MAP as management training package	PHC MAP part of training materials for district level managers not for IS development. PHC MAP brings new conceptual frame-work for managers to identify information needs. Presentation in the Workshop of the purpose PHC MAP criticised by participants. In Kenya had to add supplementary material to the series. Revision of the PHC MAP should strengthen the management training purpose of the series. PHC MAP too difficult for some DHT.
	Kenyan management trainer emphasises consequences for management	Evaluation of use of series focused on management, not information management
Workshop participants confused as to purpose of PHC MAP and interpret according to their own role	MOH officials seek clarity and interpret PHC MAP according to the perceived benefits to themselves	Seeking clarity of purposes of PHC MAP tools: many interpretations of purpose: eg a) IS strengthening; b) other thought it brought management tools as well as information management tools; c) Some thought PHC MAP focused on surveys, not routine information; d) PHC MAP brings informational approach; e) training materials for management. Appeared to interpret according to what their role in MOH was. When seeking clarity asked 'What is the effect of using MAP tools?
	PHC MAP perceived as useful where IS does not exist by technical advisor to MOH	PHC MAP perceived as lacking overall rationale. Appropriate mainly for situation where there is no IS. May be useful to use module 1 in own work

	academic management trainer does not know reason for PHC MAP development	Some uncertainty of developers' purpose in producing PHC MAP, wants to know the 'gap' the series is supposed to fill. PHC MAP brings different approach to decision-making, ie. need to have data to inform decisions
	University-based needs assessor seeks to clarify definition and purpose	Does not know what to do with PHC MAP material as it is difficult to understand. Thinks PHC MAP is intended to improve IS and managers use of information. Positive response to the series
	NGO management trainer	PHC MAP is a set of management training manuals. They also provide training in survey and rapid assessment tools
	Ugandan NGO manager and IS co-ordinator appreciates PHC MAP, but has difficulty knowing how to utilise them	PHC MAP has a conceptual framework for managers to identify information requirements which is useful. Need assistance to know how to use PHC MAP. Defined PHC MAP in terms of his own background not the developer's definition
compatibility of PHC MAP with existing strategies	compatibility with general health policy	to support PHC principles and decentralisation; cost-sharing by consumers
	compatibility with PHC principles	interested in benefit to consumers of health services, i.e. impact on community involvement; Inter-sectoral approach; Intra sectoral approach; decentralisation
	compatibility with existing tools and concepts	Those brought by UNICEF eg networking.
	compatibility with existing information from HMIS and strategies	Does not want information collected by different means, ie routine clinic-based information, to conflict with that produced by PHC MAP tools which they assume is community-based survey information. HMIS is clinic-based data
Compatibility of PHC MAP training approach	with existing training courses	Uganda has centralised training, therefore PHC MAP training model not appropriate, if based on the Kenyan model; Could use modules within existing training materials; Presentation of material not appropriate for use in Uganda. Focus of the consideration of compatibility appeared to be on compatibility of modules i.e., the physical material, not on information strategies or management tools.

	with training approach	Support supervision is mode of teaching here and that is at odds with PHC MAP approach.
	with educational and training level of DHT	DMO can not prioritise their needs and would take all questions in a questionnaire and not be selective according to MOH official. Not all the DHT could understand the modules; Tools too basic for DMOs. If DMOs have not been trained to the level of PHC MAP tools they should attend university Masters course.
	with existing policy of management and IS	Ugandan approach is to integrate IS and management training and not see the two as separate. Priority for health development in Uganda is not IS but district management.
	with training strategy	In Uganda trainers would not use fully prepared material as in PHC MAP but would assume that managers were capable for developing their own once equipped with basic concepts. Existing presentation of training materials very simple but PHC MAP is too sophisticated and may alienate potential users.
PHC MAP seen competitive	competes with management training materials	according to NGO Management Trainer and Academic Management Trainer
Perception of PHC MAP and needing to know the advantages tools bring	impact	Does PHC MAP lead to redirecting of resources? What comparative advantage does PHC MAP bring? Need illustration of how PHC MAP tools have benefited the community
Perception of PHC MAP and need to know if there is 'gap'.	gap	What gap in Ugandan system exists? Can PHC MAP fill that gap? How do we get the series to the district level?
	establishing the gap	Who will identify if PHC MAP could fill an existing gap? PS-headed committee would be appropriate; AKF should help Focus should be if there is gap in decision-making
Potential users suggest PHC MAP developers lack knowledge of context of implementation	administrative set-up and likely decision-making process	Ministry of local government was not represented at the workshop. AKF did not comprehend the extent of decentralisation, and that the decision on utilisation of the tools was likely to be made at national not district level

	inappropriate needs assessment:	Need training in use of information not collection and processing at district level. Need training in use of information, collection and processing at health unit level. If DHT not equipped with the tools of data collection and processing then should learn at a training institute not with PHC MAP series in the field. Needs assessment should be internal
	developers assume Ugandans are incapable	What needs assessment had developers undertaken that led them to assume the material would be useful in Uganda?
	problems experienced in health system at moment	lack of motivation of health workers; lack of finance; health service not computer-based; supplies and logistics information needs to be part of IS; difficulties of assessing training needs; communities contributing to financial stability of health services.
	difficulties of putting training into practice	Ugandan management trainers believe districts do not have time to utilise existing training in information management. District team do not have time to digest all the modules. Problem is to put existing training into practice through lack of time and finance. Need to deal with the wider management and organisational issues
	Ugandan managerial approach	MOH have emphasis on evaluation. Participants wanted to know how the developers proposed to evaluate the use of PHC MAP tools. What impacts were to be expected from using the tools?
Potential users envisage role for AKF to help utilise PHC MAP	academic researcher	would like AKF to provide support in how to use PHC MAP tools in a pilot project
	NGO manager	would like AKF to provide funds and trainers to help people understand how to use PHC MAP tools.
	MOH	AKF should take lead in ensuring committee is formed to review use of PHC MAP in Uganda. Would like AKF to fund the use of PHC MAP tools in specific districts, and provide technical support.
	NGO management Trainer	AKF to help integrate PHC MAP tools into existing training programme
External funders and agencies influence	AKF has own agenda for introducing PHC MAP	Developer was fulfilling funding objectives by conducting Workshop. PHC MAP developer did not appear to be strongly promoting the series for use in Uganda. Developer was possibly using the Workshop to convince his own organisation to continue promoting the series.

	MOH Planner	believed would need to have external funding to utilise PHC MAP within Ugandan health services; believed competition between external funders affected funding of health services; district management, and information system strengthening has been one of general international strategy for low-income countries for several years, especially influence by WHO, USAID.
Personal agendas	MOH Planner	possibly aware of personal advantage as, he is returning to a senior position in Ugandan MOH, with an in-depth knowledge of PHC MAP utilisation in Kenya. He is the one who submits the funding proposal to AKF.
	PHC MAP Developer	wishes to convince his organisation to continue supporting PHC MAP which he has invested emotional energy and professional reputation into
	Ugandan academic Management trainer	dislikes wealthy countries dictating the policy agenda in low-income countries
Proposed strategies for considering utilisation of PHC MAP series	Need to adapt and integrate PHC MAP tools into existing system	HMIS Developer says have HMIS already so need to take some of the PHC MAP tools, but not all. NGO management trainer suggest need to integrate into existing management training programmes. MOH technical advisor feels do not need all modules in entirety and envisages selected modules being used to complement existing materials
Perceived managerial ability would affect utilisation	MOH officials believe DMO not capable of prioritising their needs	DMO would use all questions in a questionnaire without discriminating according to need

## Appendix 8

### Chronology of events regarding HMIS development

Date	Publication or Action	Comment
1993	MOH policy document	identifies the need to improve information for district management
June 1993	Needs assessment for HMIS by L. Archer	reviews existing HIS and proposed IM for a HMIS which support health unit management
June 1993	Plan of Action by L Archer	presumably an operational document to develop and implement the HMIS, but this document is not available.
uncertain	HIS Steering Committee created	devised terms of reference for new IS
uncertain	Meeting of HIS steering committee, representatives from all health programmes and Archer	revision of terms of reference for new IS
uncertain	formation of Counterpart Internal Consultant team, consisting of statistician, 3 senior medical management and planners, and WHO Technical Assistant with experience in information systems who is a medical doctor.	aim to carry out terms of reference for new IS
Autumn 1993	drafts of collection formats and management questions discussed with selected health units, DHTs and national programme managers	this appears to indicate the health units information needs were primarily determined by others
Autumn 1993	comments on the drafts were discussed with HIS steering Committee and formats revised	
Dec. 1993	Comments on the Needs assessment of Health management information in Uganda by Dr Van Damme	critique of the Archer report and some alternative suggestions. But I am not certain if these comments were incorporated into the HMIS at this stage
January 1994	Workshop to review proposed format and management questions at health unit level, and identify information to be reported from h/u.	attended by national level Programme managers, NGO and donors, and h/u and district representatives.

spring 1994	selection of pilot districts, development of manuals for health unit level, identification of national Trainers and development of training manual.	decision to separate training on collection and processing of data from information use ie management questions
July 1994	Workshop to train district Supervisors in two districts	
July 1994- May 1995	operation of pilot HMIS in 2 districts	
August 1994	HMIS training in 2 pilot districts- first phase: the collection of data	training of health unit staff, plus allocation of funds for two follow-up visits to each unit
Nov. 1994	HMIS training in 2 pilot districts- second phase: use of information to answer the management questions, and feedback of problems regarding initial phase	training of health unit staff and allocation of funds for follow-up visits
Dec. 1994	printing of revised health unit manuals	
March 1995	pilot districts receive the District HMIS manuals	
April 1995	the 'Brief of the HMIS' and 'Terms of Reference' for the external evaluation team were written and distributed to the HIS Steering committee	
June 1995	internal evaluation Workshop to review HMIS operation in the pilot districts, led by HPU, plus writing of Report on workshop	written by extended DIT members from two pilot districts. Report had heavy focus on forms, and gives recommendations. Positive reaction to HMIS
May 1995?	HMIS brief prepared by HPU	
June 1995	The Pilot HMIS: background and review	internal evaluation document prepared by the Developer for the evaluation team
June-July 1995	external evaluation of the pilot HMIS in Uganda,	carried out by a team under leadership of Dr A Stefanini It advocated the central level HMIS needed to be further developed as well as improvements made at district and health unit level

July 1995	summary findings of the evaluation HMIS	short document written for public distribution
late 1995	revision of health unit and district manuals	
Feb. 1996	Essential health indicators for the HMIS in Uganda and tentative country-wide implementation Report of WHO mission	outside consultant facilitated and reported this one day event
February 1996	Feedback report from the abridged workshop for the selection of essential health indicators	document incorporating post-workshop ideas on identifying essential health indicators
March 1996	Final report: the documentation of essential health indicators for Uganda (WHO, 1996)	identification of country-wide implementation strategy, indicators and funders that was the final outcome of the Feb. WHO mission and subsequent input from relevant parties
Dec. 1996	another revision of HMIS manuals to incorporate findings of March report	
January 1997	training twelve people to become national Trainers for the HMIS	
January 1997	began the HMIS training in all other districts	this training was intended to take approximately thirteen months