

**A STUDY OF POLICY PROCESSES AND  
IMPLEMENTATION OF MALAYSIA'S TELEHEALTH  
INITIATIVE**

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**FACULTY OF MEDICINE  
UNIVERSITY OF MALAYA  
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# **A STUDY OF POLICY PROCESSES AND IMPLEMENTATION OF MALAYSIA'S TELEHEALTH INITIATIVE**

## **ABSTRACT**

In 1997, Malaysia introduced Telehealth as part of the Multimedia Super Corridor (MSC) programme (Telehealth-MSC). The aspiration to transform the national healthcare from illness-focused to wellness-focused by the year 2020 was laid out in the 'Telemedicine Blueprint'. However, implementation progress remains below expectations. In 2012, only about 10% of the government healthcare facilities had some form of Telehealth system in place. This suggests an 'implementation gap', as the policy statements for Malaysia's Telehealth remains unrealised. Literature suggests that implementing large scale Telehealth requires proper planning, supported by well-defined policies, rules and standards across healthcare levels. A deeper understanding for the Telehealth 'implementation gap' provides explanations to be acted upon and renewed inputs for modified strategies for Telehealth policies in Malaysia.

To understand the problems of national Telehealth policy, this thesis examined the policy formulation and the policy implementation from 1995 to 2012. The analysis was guided by a conceptual framework comprised a two-part policy analysis – Kingdon's Multiple Stream Theory for the policy formulation stage and Normalisation Process Theory for the policy implementation stage. The analysis suggested that, since 1985 the Ministry of Health (MoH) began to computerise its hospitals and clinics and had plans to create an integrated electronic network across the country. It was to modernise healthcare delivery and improve health information management to overcome the challenges of increasing healthcare demands with limited resources. When Prime Minister Mahathir introduced MSC in 1995, the Director-General of Health (DG) played an important role as the policy entrepreneur during the policy formulation and setting the agenda for

Telehealth. It was seen legitimate and feasible under the MoH plans, and federal government was prepared to allocate funding and provide various forms of incentives. The DG and his policy community continued to support evidence to implement Telehealth with the introduction of the ‘Telemedicine Blueprint’ congruent with the reform intention of the national political leader.

Implementation was top-down and the federal government appointed two consortia to complete the Telehealth pilot by 2005. It started with four Telehealth components: Lifetime Health Plan (LHP), Teleconsultation (TC), Mass Customised Personalised Health Information and Education (MCPHIE) and Continuing Medical Education (CME). However, there were obstacles encountered along the ‘downstream’ policy implementation processes. Four issues of policy implementation were identified: (1) lack of *coherence* or inconsistent decision-making among MoH’s top-level management officials on Telehealth policy priority; (2) difficulties to maintain *collective action* among the multi-agency partnerships during the system development phase; (3) limited *cognitive participation* or lack of Telehealth adoption among MoH personnel; and (4) limited capacity to conduct evaluation studies to measure Telehealth outcome or effectiveness (*reflexive monitoring*).

This thesis findings have shown complex socio-technical features of Telehealth policy against a backdrop of the wider political and economic uncertainty. Each area is dynamic, and interrelated with others with implications for overall MoH capacity for Telehealth. Given the findings of this thesis, the key influential determinants were identified for an improved Telehealth policy processes and provided invaluable information that will benefit real-world implementation of Telehealth at the national scale.

Keywords: Case study, Health Policy, Implementation, Malaysia, Telehealth

***A STUDY OF POLICY PROCESSES AND IMPLEMENTATION OF MALAYSIA'S  
TELEHEALTH INITIATIVE***

**ABSTRAK**

Pada tahun 1997, Malaysia memperkenalkan Telekesihatan sebagai sebahagian daripada program Koridor Raya Multimedia (MSC) (Telekesihatan-MSC). Pelaksanannya bertujuan untuk menambahnilai perkhidmatan kesihatan kebangsaan daripada bertumpu-penyakit kepada bertumpu-kesejahteraan menjelang tahun 2020. Pelan ini diperincikan dalam '*Telemedicine Blueprint*'. Namun, kemajuan pelaksanaan Telekesihatan tidak mencapai jangkaan. Pada tahun 2012, hanya kira-kira 10% daripada kemudahan kesihatan kerajaan mempunyai sistem Telekesihatan. Ini menunjukkan 'jurang pelaksanaan', kerana pencapaian dasar Telekesihatan masih belum direalisasikan. Literatur mencadangkan bahawa pelaksanaan Telekesihatan berskala besar memerlukan perancangan yang terperinci, disokong oleh dasar, peraturan dan piawaian yang jelas di segenap peringkat organisasi kesihatan. Pemahaman yang lebih mendalam mengenai 'jurang pelaksanaan' Telekesihatan memberikan penjelasan asas untuk bertindak bagi memperbaharui input untuk perubahan strategi dan dasar-dasar pelaksanaan Telekesihatan di Malaysia.

Untuk memahami masalah dasar Telekesihatan kebangsaan, tesis ini mengkaji penggubalan dasar dan pelaksanaan dasar Telekesihatan dari tahun 1995 hingga 2012. Analisis ini dipandu oleh rangka kerja konseptual yang terdiri daripada dua bahagian analisis dasar; iaitu Teori '*Multiple Stream*' Kingdon untuk peringkat penggubalan dasar, dan Teori '*Nomalisation Process*' untuk peringkat pelaksanaan dasar. Analisis menunjukkan bahawa, sejak tahun 1985, Kementerian Kesihatan Malaysia (KKM) telah mula melaksanakan sistem pengkomputeran di hospital dan klinik dan merancang untuk mewujudkan rangkaian kesihatan elektronik bersepadu ke seluruh negara. Ia bertujuan untuk memodenkan penyampaian penjagaan kesihatan dan memperbaiki pengurusan

maklumat kesihatan untuk mengatasi cabaran dalam memenuhi tuntutan penjagaan kesihatan yang semakin meningkat dengan sumber yang terhad. Apabila Perdana Menteri Mahathir memperkenalkan MSC pada tahun 1995, Ketua Pengarah Kesihatan (KPK) telah memainkan peranan penting sebagai usahawan dasar semasa peringkat penggubalan dasar untuk menetapkan agenda Telekesihatan. Ia dilihat sebagai sah, sesuai dilaksanakan di bawah rancangan KKM sedia ada, dan kerajaan persekutuan bersedia untuk memperuntukkan pembiayaan dan menyediakan pelbagai bentuk insentif. KPK dan komuniti dasarnya terus memberi sokongan dengan bukti untuk melaksanakan Telekesihatan dengan melancarkan '*Telemedicine Blueprint*' sejajar dengan niat pembaharuan oleh pemimpin politik kerajaan ketika itu.

Pelaksanaan dasar dilakukan secara atas-ke-bawah dan kerajaan persekutuan telah melantik dua konsortium untuk menyiapkan projek rintis Telekesihatan menjelang 2005. Pelaksanaan bermula dengan empat komponen Telekesihatan: Pelan Kesihatan Sepanjang Hayat (LHP), Telekonsultasi (TC), Maklumat dan Pendidikan Kesihatan Peribadi dan Massa (MCPHIE) dan Pendidikan Perubatan Berterusan (CME). Namun, terdapat halangan yang dihadapi sepanjang proses pelaksanaan dasar secara 'hiliran' ini. Empat isu pelaksanaan dasar telah dikenalpasti: (1) kekurangan *koherensi* atau keputusan yang tidak konsisten dalam kalangan pegawai pengurusan atasan KKM dalam keutamaan dasar berkaitan Telekesihatan; (2) kesukaran untuk mengekalkan *tindakan kolektif* dalam kalangan pelbagai agensi semasa fasa pembangunan sistem; (3) *penyertaan kognitif* yang terhad atau kekurangan penerimaan Telekesihatan dalam kalangan kakitangan KKM; dan (4) keupayaan yang terhad untuk menjalankan *kajian penilaian* untuk mengukur '*outcome*' atau keberkesanan Telekesihatan.

Penemuan tesis ini telah menunjukkan ciri-ciri sosio-teknikal yang kompleks mengenai dasar Telekesihatan yang berlatarbekangkan ketidakpastian politik dan ekonomi yang lebih luas. Setiap bidang adalah dinamik dan saling berkaitan dengan yang

lain dengan implikasi untuk keseluruhan kapasiti KKM untuk Telekesihatan. Penemuan kajian ini membolehkan penentu utama yang berpengaruh dikenalpasti untuk memperbaiki proses dasar Telekesihatan, dan memberikan maklumat yang tidak ternilai dan memberi manfaat kepada pelaksanaan Telekesihatan di dunia sebenar pada skala kebangsaan.

Kata kunci: Kajian kes, Malaysia, Dasar kesihatan, Pelaksanaan, Telekesihatan

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## TABLE OF CONTENTS

Abstract .....	iii
Abstrak .....	v
Acknowledgements .....	viii
Table of Contents .....	x
List of Tables.....	xvi
List of Figures .....	xvii
List of Abbreviations.....	xix
List of Appendices .....	xxi
 <b>CHAPTER 1 : INTRODUCTION.....</b>	<b>1</b>
1.1 Background to the Research Problem: Telehealth Initiative in Malaysia .....	1
1.2 Study Motivation .....	7
1.3 Study Objective .....	10
1.4 Research Questions.....	11
1.5 Operational Definitions .....	12
1.6 Chapter Summary and Outline of Thesis.....	14
 <b>CHAPTER 2 : CONCEPTS AND THEORIES OF POLICY ANALYSIS - ESTABLISHING THE CONCEPTUAL FRAMEWORK FOR TELEHEALTH POLICY ANALYSIS .....</b>	<b>17</b>
2.1 Introduction.....	17
2.2 Defining Telehealth Policies.....	19
2.2.1 Defining Telehealth .....	19
2.2.2 Defining Telehealth Policy .....	21

2.3	Understanding Health Policy .....	28
2.3.1	The concept and theories of health policy .....	29
2.3.2	Framework and theories for health policy analysis .....	30
2.4	The Analytical Framework for the Study .....	44
2.4.1	The First Stage of Policy Process: Kingdon's Multiple Stream Theory as the analytical framework on the agenda-setting and Telehealth Policy formulation.....	46
2.4.2	The Second Stage of Policy Process: Normalisation Process Theory as analytical framework on Telehealth implementation .....	46
2.5	Conclusion .....	47
 <b>CHAPTER 3 : THE STUDY CONTEXT - MALAYSIA'S HEALTH SYSTEM AND TELEHEALTH .....</b>		<b>49</b>
3.1	Introduction.....	49
3.2	Malaysia - Country Profile .....	50
3.2.1	Malaysian economy profile - A paradigm shift from labour-intensive manufacturing economy to knowledge-based economy.....	52
3.2.2	The Multimedia Super Corridor initiative .....	54
3.3	Healthcare in Malaysia .....	59
3.3.1	The healthcare service delivery set up.....	66
3.3.2	The national health planning, policymaking and policy implementation.....	71
3.4	The use of ICT and Telehealth in the Malaysian Healthcare System.....	78
3.4.1	National strategy for ICT and Telehealth .....	78
3.4.2	Chronological Listing of Telehealth key initiatives in Malaysia (1990 – 2012) .....	86
3.4.3	Telehealth in Malaysia – current status .....	91

3.5	Malaysian Healthcare Challenges and the Potential of Telehealth .....	101
3.5.1	Service delivery - Telehealth may improve the coverage and quality of service delivery .....	103
3.5.2	Health workforce - Telehealth contribute to improving a well-performing health workforce and the fair distribution of specialised care .....	104
3.5.3	Health Information Systems - Telehealth enhances the functionality of the existing health information system .....	105
3.5.4	Medical product, vaccine & technology - Telehealth contributes towards assured quality and safety of medical product, vaccine & technology....	109
3.5.5	Health Financing - Telehealth improves the mechanism of health financing control and management .....	111
3.5.6	Leadership and governance - Integrated Telehealth supports the decision- making process by the policymakers .....	112
3.6	Chapter Summary .....	112
<b>CHAPTER 4 : METHODOLOGY .....</b>		<b>115</b>
4.1	Introduction.....	115
4.2	The Study's Knowledge Paradigm .....	116
4.3	Study Design.....	120
4.3.1	Case study as the appropriate methodology .....	122
4.3.2	Selection of case .....	124
4.4	Conceptual framework.....	125
4.4.1	Development and description of the conceptual framework .....	126
4.5	Data Collection .....	132
4.5.1	Procedures for data collection .....	134

4.5.2 Identifying the Key informants.....	135
4.5.3 Key informant interviews and development of interview guides.....	138
4.5.4 Documents review .....	140
4.6 Data Analysis.....	142
4.6.1 The data analysis from document review .....	143
4.6.2 The data analysis of interviews.....	144
4.6.3 The data analysis based upon the developed conceptual framework and research question.....	147
4.7 Validity and Reliability.....	147
4.8 Ethical Consideration.....	148
4.9 Researcher as an ‘Instrument’ .....	149
4.10 Chapter Summary .....	151
<b>CHAPTER 5 : THE TELEHEALTH POLICY FORMULATION STAGE.....</b>	<b>153</b>
5.1 Introduction.....	153
5.2 Sources of data.....	156
5.2.1 Key Documents of Telehealth Policy .....	156
5.2.2 Profile of Key Informants.....	159
5.2.3 Data Triangulation .....	167
5.3 The Policy Formulation for Telehealth Initiatives (1995 – 2000).....	169
5.3.1 Problem stream .....	169
5.3.2 Policy stream .....	180
5.3.3 Politics stream.....	187
5.3.4 Coupling of the three streams and opening of a Policy Window .....	189
5.4 Chapter Summary .....	193

<b>CHAPTER 6 : THE TELEHEALTH IMPLEMENTATION STAGE.....</b>	<b>195</b>
6.1 Introduction.....	195
6.2 The NPT Coding Categories.....	197
6.2.1 Coherence (COH) – Sense-making work .....	198
6.2.2 Cognitive participation (COG) – Relationship work.....	198
6.2.3 Collective action (COL) – Enacting work .....	199
6.2.4 Reflexive monitoring (RM) – Appraisal work .....	200
6.3 Coding Example .....	205
6.4 Data interpretation .....	206
6.4.1 Collective action (CA).....	206
6.4.2 Coherence (COH) .....	235
6.4.3 Cognitive Participation (COG).....	246
6.4.4 Reflexive Monitoring (RM).....	251
6.5 Summary of Telehealth implementation .....	264
 <b>CHAPTER 7 : DISCUSSION AND CONCLUSION.....</b>	 <b>269</b>
7.1 Introduction.....	269
7.2 Understanding the complexity of Telehealth policy.....	270
7.3 Summary of main findings .....	274
7.3.1 The ambition for National Telehealth: the role of policy entrepreneur.....	275
7.3.2 Telehealth implementation: approaches and challenges.....	280
7.4 Lessons learned and policy recommendations .....	290
7.5 Limitations of the study and future research directions.....	295
7.6 Concluding thoughts.....	298
References .....	301

List of Publications and Papers Presented .....	331
Appendix.....	332

University of Malaya



## LIST OF TABLES

Table 2.1: Themes and scope of e-Health policy and issues according to various levels of healthcare. ....	23
Table 3.1: Malaysia, selected health indicators (1980 - 2014) .....	64
Table 3.2: Public and private health facilities, Malaysia (2006 - 2014) .....	69
Table 3.3: Physician density in Malaysia in comparison of averages of countries according to income levels.....	70
Table 3.4: Total MoH Budget Allocation and Expenditure (1997 – 2014). ....	77
Table 3.5: Government Financial Allocation (Development Budget) and Expenditure for ICT Programmes 2001 - 2010.....	80
Table 3.6: Key initiatives for Telehealth strategy in Malaysia, 1985 – 2015. ....	87
Table 3.7: MoH clinics with EMR, from 2000 – 2013. ....	98
Table 4.1: Key elements of knowledge paradigms as applied in Health Policy and Systems Research.....	118
Table 4.2: Examples of meaning units, condensed meaning units, sub-categories, and a main category. ....	145
Table 5.1: List of key documents related to Malaysia’s Telehealth policy analysis included in the study .....	157
Table 5.2: Profile of the key informants. ....	160
Table 5.3: Key Telehealth strategies which the key informants most familiar and have experience with. ....	166
Table 5.4: Summary of data sources .....	168
Table 6.1: Descriptive themes and definitions.....	202
Table 6.2: Normalisation process theory coding frame for promoting and inhibiting factors of Telehealth implementation.....	259

## LIST OF FIGURES

Figure 2.1: Policy Triangle Framework .....	36
Figure 2.2: Constructs of the Collective Action component of NPT .....	43
Figure 2.3: The macro-meso-micro levels of Ministry of Health. ....	45
Figure 3.1: The nine challenges of Vision 2020 .....	55
Figure 3.2: The MSC development plans and proposed achievements 1996 – 2020 .....	57
Figure 3.3: The seven MSC Flagship Applications, which includes Telehealth .....	58
Figure 3.4: Healthcare service provision in Malaysia.....	61
Figure 3.5: Malaysia’s total expenditure on health (THE) as percentage of GDP in comparison with its neighbouring countries .....	62
Figure 3.6: Malaysia total health expenditure (THE) as percentage of GDP and proportion in percent of public and private spending, 1995 – 2014. ....	63
Figure 3.7: Malaysia’s life expectancy (total) in comparison with selected countries. ..	65
Figure 3.8: National referral system for the Malaysian Ministry of Health.....	67
Figure 3.9: The planning horizon for economic and development in Malaysia .....	71
Figure 3.10: Organisational structure of MoH departments at the federal level and its top management officials .....	74
Figure 3.11: A typical State Health Department organisational chart. ....	76
Figure 3.12: MoH operational expenditure by activities assigned to Programmes for the year 2009.....	78
Figure 3.13: The Eight Health Services Goals as outlined in the Malaysian Telemedicine Blueprint.....	82
Figure 3.14: The components of Malaysia’s Telehealth-MSC Initiative, 1997 – 2003..	83
Figure 3.15: The Telehealth implementation for national health transformation was planned to be undertaken in phases from 1997 to 2020.....	84
Figure 3.16: Percentage of MoH hospitals deployed with Hospital Information System. ....	97
Figure 3.17: WHO’s Health System Building Blocks .....	102
Figure 4.1: Outline of study design based on the research question. ....	121
Figure 4.2: The illustration of the conceptual framework. ....	127

Figure 4.3: Examples of Interview Questions derived from the four constructs of the Normalisation Process Theory. ....	131
Figure 4.4: The core topics for interview guides. ....	139
Figure 4.5: The list of search terms used for literature and web search to identify documents relevant to Telehealth Policy in Malaysia.....	141
Figure 4.6: Example of document analysis procedure. ....	144
Figure 5.1: The Triangulation Process .....	168
Figure 6.1: The network diagram of coding framework for Telehealth implementation. ....	201

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## LIST OF ABBREVIATIONS

AeHIN	Asia e-Health Information Network
CIS	Clinical Information System
CME	Continuing Medical Education
CPD	Continuous Professional Development
CRFP	Concept Request for Proposal
CSS	Clinical Support System
EHR	Electronic Health Records
EMR	Electronic Medical Records
EPU	Economic Planning Unit, Prime Minister Department, Malaysia
GDP	Gross Domestic Product
GDS	Group Data Service
GNI	Gross National Income
HIS	Hospital Information System
HL7	Health Level Seven
HMIS	Health Management Information System
ICT	Information and Communication Technology
IDS	Information and Documentation System Unit, Ministry of Health
IT	Information Technology
LHP	Lifetime Health Plan
LHR	Lifetime Health Record
LIS	Laboratory Information System
LMIC	Low and middle income countries
MAMPU	Malaysian Administrative Modernisation and Management Planning Unit, Prime Minister's Department, Malaysia
MCPHIE	Mass Customised and Personalised Health Information and Education

MDeC	Multimedia Development Corporation
MNHA	Malaysia National Health Accounts Unit, MoH
MoH	Ministry of Health, Malaysia
MSC	Multimedia Super Corridor
MST	Kingdon's Multiple Stream Theory
MyHIX	Malaysia Health Information Exchange
NCD	Non-Communicable Disease
NHMS	The National Health and Morbidity Survey
NHS	National Health Service, UK
NITC	National Information Technology Council, Malaysia
NPfIT	National Programme for IT
NPM	Normalisation Process Model
NPT	Normalisation Process Theory
PHIS	Pharmacy Information System
PLHP	Personalised Lifetime Health Plan
PPP	Public-Private Partnership
RIS	Radiology Information System
SDLC	System Development Life Cycle
TC	Teleconsultation
THE	Total Health Expenditure
THIS	Total Hospital Information System
TPC	Tele-Primary Care
UK	United Kingdom
USA	United States of America
WHO	World Health Organisation

## LIST OF APPENDICES

Appendix A: List of government health clinics with Teleprimary Care System	332
Appendix B: List of government hospitals with Electronic Medical Records (EMR)	333
Appendix C: The different types of HIS in MoH Hospitals	334
Appendix D: Interview Guides	335
Appendix E: Consent form	343
Appendix F: List of codes and code families	344
Appendix G: Institutional Review Board Ethical Clearance Documentations	347
Appendix H: List of newspaper articles and speeches included in data analysis	349

## CHAPTER 1 : INTRODUCTION

### 1.1 Background to the Research Problem: Telehealth Initiative in Malaysia

Since the early 1980s, computer use has become common in healthcare. Along with the progress in telecommunication technology, the use of computers has radically changed the science and practice of medicine. Since then, improvements in computer efficiency, computer networks and the internet have helped the delivery of healthcare. Interests to integrate Information and Communication Technology (ICT) to facilitate healthcare delivery have grown in the decades that followed and are widely known as ‘Telemedicine’ or ‘Telehealth’ or ‘e-Health’<sup>1</sup>. The ICT integration in healthcare has the potential to improve healthcare quality and address the different problems in healthcare, such as increasing accessibility, utilisation, efficiency and its effectiveness. It allows remote doctor-patient consultation, enhances critical decision-making among healthcare professionals, as well as facilitates healthcare planning and management at different levels of the health system (Mutale et al., 2013; Mutemwa, 2006; Whitten, Holtz, & Nguyen, 2010; Zanaboni & Lettieri, 2011).

Telehealth is a promising means to address the pressing need for equitable, timely, effective and efficient access to health care services. One of the propositions that is frequently raised is that Telehealth will ‘transform’ the delivery of healthcare, helping with cost-containment and making medical care significantly safer and improve its quality efficiency (Blaya, Fraser, & Holt, 2010; Jamal, McKenzie, & Clark, 2009;

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<sup>1</sup> It should be noted that for the sake of consistency and to avoid confusion between naming schemes, the term, “Telehealth” is used for nearly all references to the MoH’s eHealth or health IT program in this thesis. Indeed, the terms associated with ‘Telemedicine’ or ‘Telehealth’ or ‘e-Health’ are varied due to the absence of agreement about the definitions of the concepts (Fatehi & Wootton, 2012) and are often used interchangeably in the literature. Telemedicine is more appropriately used to refer only to the provision of clinical services, whereas the term Telehealth refers to clinical and non-clinical services such as medical education, administration, and research conducted at a distance. The term e-Health is increasingly being used in recent years as an umbrella term that comprises Telemedicine, Telehealth, Health Information System, Health Information Technology, Health Informatics, including Electronic Health Records (Bashshur et al., 2011; Fatehi & Wootton, 2012; Van Dyk, 2014). Although the official policy document was named as the ‘Telemedicine Blueprint’, the term ‘Telehealth’ has been widely used in Ministry of Health Malaysia (refer sub-section 2.2.1 in Chapter 2).

Westbrook et al., 2009). For example, a study by the RAND Corporation in 2005 demonstrated that an effective national Telehealth implementation could save the US healthcare spending more than USD\$81 billion annually, and the net financial benefit could double with Telehealth-enabled prevention and management programmes for chronic diseases (Hillestad et al., 2005). Telehealth was presented as the solution to the multitude of healthcare problems faced by modern healthcare systems including rising healthcare cost, inequities in healthcare access and the increasing consumer expectations towards healthcare quality and safety.

Governments and policymakers are enthusiastic about the potential of Telehealth because it could alleviate some of the problems, addressing some of the health inequity experienced by specific groups, such as people living in the remote and rural areas. It also promised to reduce unnecessary duplication of services, patients' waiting time, administrative and medical errors. Many developed countries such as Australia, New Zealand, the United Kingdom (UK) and several European nations have been at the forefront in Telehealth initiatives. Several authors described how these countries established national programmes, allocating substantial budgets to implement Telehealth solutions to address the major health needs of their countries (Greenhalgh et al., 2010; Z. Morrison, Robertson, Cresswell, Crowe, & Sheikh, 2011; Murray et al., 2011). Many also viewed that investments in Telehealth were increasingly driven by broader political visions of achieving a large scale national Telehealth programme (Greenhalgh, Morris, Wyatt, Thomas, & Gunning, 2013; Greenhalgh, Russell, Ashcroft, & Parsons, 2011; Takian, Petrakaki, Cornford, Sheikh, & Barber, 2012). For example, the UK's National Health Service (NHS) had developed the Care Records Service, creating a national lifelong Electronic Health Record (EHR) systems to enable a patient's medical record to be accessed by the attending healthcare provider from anywhere in the country (K. Cresswell & Sheikh, 2009; Greenhalgh et al., 2010; Z. Morrison et al., 2011; Takian,



Sheikh, & Barber, 2012). In recent years, the trend is increasingly seen in low- and middle-income countries (LMICs), such as Mozambique and Tanzania (Kimaro & Nhampossa, 2005), South Africa (Mars & Seebregts, 2008) and Brazil (Wangenheim, 2009) among others. The benefits claimed for this vision was that by enabling the healthcare provider access to a person's entire medical history would be a way forward, instituting new models of providing integrated, seamless wellness, health, and social care services, so that the healthcare service can be administered more efficiently (Buntin, Burke, Hoaglin, & Blumenthal, 2011; Cockcroft, 2013; Currie & Guah, 2007; Stanberry, 2011; Walker et al., 2005).

However, in spite of these promises, the practical development and implementation of Telehealth frequently encounters difficulties even on a small scale (Gagnon et al., 2009; Joseph, West, Shickle, Keen, & Clamp, 2011; Kimaro & Nhampossa, 2005; J. Liu, Wyatt, & Altman, 2006; Murray et al., 2011). Due to variations in the level of implementation of large-scale National Telehealth programmes, the expected improvements to healthcare remain unrealised (Catwell & Sheikh, 2009; Greenhalgh et al., 2008, 2011; Robertson et al., 2010). International assessments on National Telehealth programmes consistently reported gaps between the expected performance and outcome, resulting in wasted government investments and time. For example, the U.K.'s National Programme for IT (NPfIT), launched by the then Prime Minister, Tony Blair in 2002 with an initial cost estimated at about £6.2 billion over ten years had projected that by the year 2008, everyone in the U.K. will have their EHR (Cockcroft, 2013; K. Cresswell & Sheikh, 2009; Robertson, Bates, & Sheikh, 2011). In 2008, the report from the National Auditor stated that the programme had already cost the government £12.7 billion<sup>2</sup>, and the deadlines for deliverables were consistently not being met by the contractors (see Robertson et al., 2010).

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<sup>2</sup> See report by the Comptroller and Auditor General The National Programme for IT in the NHS: Progress since 2006 available from <http://www.nao.org.uk/wp-content/uploads/2008/05/0708484i.pdf>

Similarly, in Australia, the Commonwealth government lead by the then Prime Minister Kevin Rudd had invested at least AUS\$466.7 million over a two-year period from 2010 to 2011 to implement the Personalised Electronic Health Record (PCEHR). The PCEHR is an integral part of the Australia's national Telehealth project called HealthConnect.<sup>3</sup> The system went live in July 2012 and targeted to achieve 500,000 users within one year of operation. By the end of June 2013, only around 400,000 people (about 80% of the targeted number of users but less than 2% of the population) had signed on for PCEHR.<sup>4</sup> It was reported that among the impediments to PCEHR adoption were concerns for privacy, security, safety and utility (Almond, Cummings, & Turner, 2013). The government is currently reviewing the project, and at the time of writing, the formal report has yet to be publicly disclosed<sup>5</sup>.

Difficulties in National Telehealth implementation have also been observed in Malaysia. Perhaps the most publicised policy for the Malaysia's Telehealth initiative is the 'Telemedicine Blueprint'. Established in 1997, the Telemedicine Blueprint was the roadmap to integrate ICT in the healthcare system that sets the foundation for health system of the future. The Malaysia's National Telehealth initiative was part of the Multimedia Super Corridor Programme (MSC) (Telehealth-MSC). The MSC programme was driven by the federal government's aspiration towards socio-economic development and prosperity by harnessing the potentials of ICTs.<sup>6</sup> In addition, a substantial government investment was made to establish a comprehensive ICT infrastructure and information system in the Ministry of Health (MoH) healthcare facilities. (Merican & Yon, 2002; Noh, 2011)

<sup>3</sup> See <http://www.health.gov.au/internet/budget/publishing.nsf/Content/budget2010-media09.htm> and [http://www.apf.gov.au/About\\_Parliament/Parliamentary\\_Departments/Parliamentary\\_Library/pubs/rp/rp1112/12rp03](http://www.apf.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/rp/rp1112/12rp03)

<sup>4</sup> [https://www.health.gov.au/internet/main/publishing.nsf/Content/DA94DAE992F8CDFDCA\\_257C35001DE1E6/\\$File/PCEHR-System-Operator-Annual-Report-12-13.pdf](https://www.health.gov.au/internet/main/publishing.nsf/Content/DA94DAE992F8CDFDCA_257C35001DE1E6/$File/PCEHR-System-Operator-Annual-Report-12-13.pdf)

<sup>5</sup> See <http://www.health.gov.au/internet/ministers/publishing.nsf/Content/health-mediarel-yr2013-dutton010.htm> and <http://www.health.gov.au/internet/ministers/publishing.nsf/Content/health-mediarel-yr2013-dutton028.htm>

<sup>6</sup> The history of MSC and Telehealth will be explained in detail in Section 3.4 in the context of policy analysis.

In 1999, the MoH launched Selayang Hospital, the first paperless and filmless hospital in Malaysia and equipped with the “Total Hospital Information System (THIS)”. Its estimated cost was RM530 million (*The New Straits Times*, September 20, 1998<sup>7</sup>). Meanwhile, the federal government had allocated an amount of close to RM100 million to develop the Telehealth-MSK project (*The New Straits Times*, January 20, 2000<sup>8</sup>). The MoH had also initiated the Tele-Primary Care system (TPC) to interconnect health clinics (the government establishment of primary care clinics) with hospitals and district health departments, as well as providing Teleconsultation services (Suleiman, 2001; *The New Straits Times*, July 8, 2000).

Malaysia was lauded to have a well-articulated Telehealth programme through the various forms of policy documents, and it seemed that the country was on the cutting edge of the IT boom that had spread worldwide in the 1990s (Mars & Scott, 2010; R. E. Scott, Chowdhury, & Varghese, 2002; Varghese & Scott, 2004). However, the real picture was less than optimal. The Telehealth-MSK projects was greatly delayed and only one of the four Telehealth components was successfully implemented and rolled-out nationwide. Despite the challenges in the beginning of the vision to integrate ICT in the health system, efforts continued to deploy Telehealth across MoH. However, by 2012, only 10% of the government health facilities had some form of Telehealth in place (35 out of 142 hospitals, and 89 health clinics out of 1039)<sup>9</sup>. It was reported that there were problems with the private sector consortia involved in the Telehealth-MSK projects<sup>10</sup>. In fact, many anecdotal evidences reported that the main challenges of Telehealth policy

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<sup>7</sup> Suat-Ling, C. Selayang Hospital dry-run in January (20 September 1998). *The New Straits Times*. Retrieved from <http://blis2.bernama.com/>.

<sup>8</sup> Ghani, R. A. Contract to develop Telehealth components (20 January 2000). *The New Straits Times*. Retrieved from <http://blis2.bernama.com/>.

<sup>9</sup> Personal communication with Dr Fazilah Shaik Allaudin, Telehealth Division, MoH. Further information on Telehealth is described later in sub-section 3.4.3.

<sup>10</sup> The Government ended its concession agreements with one of the two contractors of the Telehealth-MSK. The contract was terminated after it was found that the company was under receivership which is a major breach of contract agreements (in law, receivership is the situation in which an institution or enterprise is being held by a ‘receiver’, a person “placed in the custodial responsibility for the property of others, including tangible and intangible assets and rights,” especially in cases where a company cannot meet its financial obligations or enters bankruptcy) (see Ministry ends Telehealth agreement with MOL (22 May 2004). *Business Times*. Retrieved from <http://search.proquest.com>)

implementation can be attributed to the centrally-driven public-private partnership (PPP) practice in MoH with the existence of large ‘middle-layer implementers’ who carried out the implementation works before these Telehealth systems can be used by the healthcare personnel at the ground level. This ‘middle-layer implementers’ which involved the government and private sector consortia perhaps had differences in their attitudes about the values and opportunities from the Telehealth projects. The government envisaged ‘health gains’ for its citizens as they are responsible and accountable to the society and on the other hand the private sector expects to have a better investment potential and to make a reasonable profit. This illuminates the possibility of an ‘implementation gap’<sup>11</sup> in the National Telehealth programme, as the policy statements and intentions for the Malaysian National Telehealth did not result in the expected performance or outcome.

Evidence have shown that to implement Telehealth for such a large scale, numerous factors influence its success, ranging from technological issues to infrastructure, legislation, change management and financial business models (Agbakoba, McGee-Lennon, Bouamrane, Watson, & Mair, 2016; K. M. Cresswell, Bates, & Sheikh, 2013; Mykkänen, Virkanen, & Tuomainen, 2013). In the Malaysian context, although several authors such as Harum (2004a, 2004b), Mohan & Yaacob (2004) and Bulgiba (2004) discussed the challenges surrounding the Malaysia’s Telehealth initiatives, the intricacies of Telehealth programme implementation have not been fully examined. This study argues that, unless deeper underlying explanations for the “implementation gap” are understood and acted upon, any renewed inputs and modified strategies for the existing Telehealth programme may face the same fate as the ‘Telemedicine Blueprint’ strategies in the long-term. It is critical for the policymakers and the implementers to understand

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<sup>11</sup> Implementation gap refers to the difference between what the policy architect intended and the end result of a policy (Buse et al., 2012). The description of Telehealth policy implementation gap is elaborated further in pages 8-9 and in sub-section 3.4.3.

and manage Telehealth implementation issues to realise the potential benefits of investing in such systems.

## **1.2 Study Motivation**

Experiences from high-income countries that have moved forward in implementing large scale Telehealth programme have identified that the reasons for difficult implementations were typically multi-dimensional, most often resulting from a complex interaction between organisational, social and technical factors. This may include the complexity of meeting with and satisfying multiple interests and logics in the implementation process (Currie & Guah, 2007; Greenhalgh et al., 2010; Heeks, 2006; Murray et al., 2011; Sheikh, Jha, Cresswell, Greaves, & Bates, 2014; van Gemert-Pijnen et al., 2011). Thus, researchers proposed that Telehealth implementation and use within an organisation involves several factors that require proper planning, supported by well-defined policies, rules, standards, or guidelines imposed at the different levels i.e. institutional, national, regional and global (Broens et al., 2007; Greenhalgh et al., 2013; Khoja, Durrani, Nayani, & Fahim, 2012; Z. Morrison et al., 2011; Suter, Oelke, Adair, & Armitage, 2009).

In a review article by Khoja et al. (2012), the author asserted that e-Health policies are a significant determinant to ensure successful adoption which could increase the potential for its successful implementation. Several studies had also found that policy is one of the essential components of Telehealth-enabled health systems. However, the spectrum and complexity of issues surrounding Telehealth policies have not been fully understood (Broens et al., 2007; Khoja et al., 2012; R. Scott, 2004; Stroetmann, 2013; Vest, Campion Jr., Kern, & Kaushal, 2014). Furthermore, literature on health policy suggests that when judging policy outcomes and investigating the “implementation gap”, it is important to assess the content of particular policies as well as understanding the policy implementation process (Grindle & Thomas, 1991; Walt & Gilson, 1994), and policy

implementation relates to how governments put policies into effect, whereby, the programmes or policies are translated into practice (Buse, Mays, & Walt, 2012).

In the context of health policy, the process of making or formulating the policy is complex. This complexity is due partly to the existence of political and technical dimensions in formulating and implementing health policies, as well as to the large number of actors, who may or may not be involved in the policy processes (Buse et al., 2012; Walt et al., 2008; Walt & Gilson, 1994). In this sense, while some decisions have been made on the general shape of a policy, others are required for it to be set into motion. For example, funding must be allocated, personnel assigned, and rules of procedures developed, among others. Therefore, it is assumed that the success or failure in the Telehealth policy implementation was the result from a range of factors including the degree of commitment of the actors involved, the mechanisms put in place to ensure coordination, and the availability of resources, which is determined by the content of the policy itself.

The dimensions of Telehealth policy formulation and implementation have been analysed and debated. However, much of the evidence on the Telehealth policy processes originated from Western high-income countries (Gagnon et al., 2012; McGinn et al., 2012). Thus, there is a question as to whether typical approaches and understanding are valid in the LMICs, considering the different context and circumstances, such as political climate, socio-economic status and culture. There is little knowledge on what factors are important and how these factors influence the Telehealth implementation in LMICs. Also, there is a paucity of evidence to inform the best-practice or strategy about Telehealth implementation especially in these countries.

As mentioned previously, the Malaysia's National Telehealth initiative implementation was initially laid out through policies in various forms along with strong commitment shown by the federal government. However, Telehealth was only deployed

at about 10% of MoH hospitals and clinics. The Telehealth policy implementation progress was far from what was originally planned, resulting in the 'implementation gap'. Thus, the 'implementation gap' which is studied in this thesis refers to the issues concerning the 'middle-layer implementers' as the result of the government decision to implement Telehealth through PPP involving ICT outsourcing. Furthermore, ICT outsourcing is a common practice in the Malaysian public sector. (Arshad, May-lin, & Mohamed, 2007). In addition, at the time this thesis was written, there was limited literature that has taken a closer look at the issues of involving government outsourcing involving Telehealth policy implementation with particular reference to Malaysia. In the literature, experiences of the national Telehealth programme implementation was found mainly from high-income countries in such as by Currie & Guah (2007), Greenhalgh et al., (2010), Heeks (2006), Murray et al., (2011) Sheikh, et al., (2014) and van Gemert-Pijnen et al., (2011).

Of course, it is a well-known fact that in practice, policy processes in health are rarely linear, but more 'messy' and disjointed. Different phases iterate back and forth and are affected by factors in the complex wider socio-political environment. Hence, the motivation for this study is to investigate, understand and identify some of the key factors that pose challenges to the National Telehealth implementation in Malaysia.

While it is concerned with learning what occurred during the formulation and implementation stages of the policy process, this study is not confined to evaluating the Malaysia's Telehealth policy. Rather, it is the analysis of the policy processes to obtain insights into the reasons for differences and conflicts between the government agencies' policy objectives and the outcomes of Telehealth implementation. Especially in terms of the relevance of Telehealth programme with Malaysia's health vision and mission, the efficiency of the government and accountability of government officials throughout the decision-making cycle, and the effectiveness of the plans and policies' structures. This

was achieved by undertaking a literature review, developing a conceptual framework, and examine the various pertinent issues (from the perspective of infrastructure, socio-economic, political and cultural factors), and their interrelationships related to National Telehealth Policy implementation.

This study addresses the under-researched area on matters related to Telehealth implementation at a large scale, particularly in the Malaysian context, as noted by Khoja and colleagues (2012) : “It is important for global forces, governments, and institutional leadership to understand the range of policy issues that must be addressed at different levels and stages of an e-Health program to facilitate its planning and implementation”. The Telehealth initiative is an ideal subject as it stands as a distinctive policy in the provision of healthcare services in Malaysia.

### **1.3 Study Objective**

According to the Telemedicine Blueprint, the objective of Telehealth is to provide ‘virtual’ health services, maximising the benefits of new technology to ensure fast, cost-effective services directly to users regardless of time and place (Ministry of Health, Malaysia, 1997). While Telehealth may be able to address the pressing need for an equitable, timely and effective, and efficient access to healthcare service, it may also raise new problems for the healthcare system. These include cost escalation of the government budget for health, changes in the usual way of clinical practices, data privacy and confidentiality issues and other external factors like rapidly-changing technologies and infrastructure readiness.

Thus, in Telehealth, not only system design is important, but also the implementation of the new policy, which is influenced by the policy actors at every step of the policy processes. Moreover, studies focusing on the policy aspect of Telehealth will provide insightful knowledge on examining the nature of policy processes of the Telehealth



programme, as the absence of the appropriate policies may lead to unintended consequences during the cycle of Telehealth planning and implementation (Khoja et al., 2012). Therefore, this study is targeted to achieve the following objectives:

1. To examine how the Telehealth policy was formulated.
2. To examine the Telehealth implementation - looking at the processes of translating the policy objectives into outcomes as the policies are established.
3. Propose recommendations (based on the findings) regarding the types of measures that could be taken to support Malaysia's Telehealth implementation in the future.

#### **1.4 Research Questions**

Based on the research aims and objectives, this analysis intends to describe the content of the Telehealth policy during the last two decades in Malaysia and how the policy processes were executed. An empirical investigation to achieve the study objectives involves conducting an in-depth study of the policy to explore the processes that have been implemented. To this end, the research seeks answers to the following question regarding Malaysia's Telehealth: Given that the current state of the National Telehealth (as stated in Section 1.1), how can the Telehealth policy processes of Malaysia's Telehealth initiative be better understood?

An in-depth study is most suitably addressed through a qualitative enquiry. According to Miles and Huberman (1994), the research question in the case of a qualitative inquiry has several facets and is commonly surrounded by more questions and sub-questions. Hence, the study examined the Telehealth policy in Malaysia based on the following research questions:

1. How can we understand and explain the policy processes for Telehealth initiatives in Malaysia?

2. To what extent have the policy outputs contributed to the realisation of the policy's objectives?
3. What are the influential determinants of Telehealth implementation that can provide lessons learnt for the ongoing and future National Telehealth programme in Malaysia?

A qualitative case study approach (Yin, 2011) was selected as the methodology for this research. The selection of the study design and methodology was made according to the research philosophy and is discussed in detail in Chapter 4.

## 1.5 Operational Definitions

The following definitions have been applied throughout the thesis to ensure consistency:

**Telehealth:** As described in Section 1.1, Telehealth may be used interchangeably with Telemedicine and e-Health. Reid (1996) defined Telehealth as the use of advanced telecommunications technologies to exchange health information and provide healthcare services across geographic, time, social, and cultural barriers. Reid's definition is adopted as it was the first to acknowledge "crossing" of barriers; noting however that Telehealth uses traditional, not just advanced ICT's. In recent years, the term e-Health is increasingly being used to refer to "health services and information delivered or enhanced through the Internet and related technologies". Eysenbach (2001) referred to e-Health in a broader sense, "the term characterises not only a technical development, but also a "state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology". Referring to the Malaysian Telemedicine Blueprint, Mohan and Yaacob (2004) defined Telehealth as "the integration of information, telecommunication, human-machine interface technologies and health technologies to

deliver health care, to promote the health status of the people and to create health”. Based on this definition, for this thesis, the term ‘Telehealth’ is defined as “the use of ICT in healthcare which includes any health information systems/applications/technology aimed to assist the provision of care, managing information for better decision-making and providing distance education, with the aim to deliver healthcare in a coordinated and effective way”. The case of Telehealth-MSM initiatives, and the introduction of the Total Hospital Information Systems (THIS) in the MoH hospitals and Tele-Primary Care (TPC) in health clinics is indicative of such transformations, and portrays well the issues involved in the re-adjustment of the functions of the Malaysian healthcare system and its transformation towards a ‘seamless and continuity of care’ as advocated by the ‘Telemedicine Blueprint’.

**National Telehealth:** the use of Telehealth aimed to assist the provision of healthcare delivery in a specific country on a nationwide scale.

**Information and Communications Technology (ICT):** The application of electronic and computing capabilities (technology) to the creation and storage of meaningful and useful facts or data (knowledge), and to its transmission to users by various electronic means (communication). The ultimate goal is for ICT to transform data into information, information into knowledge, and knowledge into practice.

**Health informatics:** Health informatics refers to the application of ICT-based innovation to manage health data and information to support a better health-related decision-making for individuals and communities.

**Teleconsultation:** Teleconsultation (TC) refers to the use of information and communication technologies to deliver and manage long-distance clinical health services. It involves the transmission of video images, audio, or any other data over telecommunication networks. In the Malaysian context, Teleconsultation can be operated in either asynchronous mode by using simple store-and-forward public email or dedicated

system or synchronous mode by utilising video-conferencing technology (Maarop & Win, 2012).

**Telemedicine:** Refers to the provision of medical care at a distance with the use of ICT. It is often used interchangeably with telehealth; however, the term telemedicine generally implies a physician-mediated interaction with patients.

**Electronic Health/Medical Record:** Electronic Health Record (EHR) and Electronic Medical Record (EMR) may be used interchangeably in this thesis. In general, EMR refers to the electronic form of patient's medical record, i.e. the record of every episode of medical encounter in a particular hospital or clinic. Meanwhile, the EHR usually denotes a more extensive medical record, which compiles every patient encounter.

**Stakeholders:** In this study, the term stakeholders refers to healthcare professionals, health-related organisation (represented by management level decision-makers – health administrators, policymakers) health industrial players, the patients and the public

**Healthcare Facilities:** A term used to describe any physical entity that employs formally-trained staff to provide healthcare services to the general population at the primary, secondary, or tertiary levels, and in the public or private sectors.

**Healthcare professionals/providers/practitioners:** These terms may be used interchangeably. They refer to the individuals who are directly involved in-patient care and associated with any healthcare facility. They may be doctors, dentists, pharmacists, nurses, health educators, physiotherapists, or technicians (laboratory, radiology).

## **1.6 Chapter Summary and Outline of Thesis**

This chapter provided the background and context of the study of the National Telehealth programmes, by describing issues concerning Telehealth policy implementation in several countries and Malaysia briefly. The study intends to highlight that despite commitments displayed by the governments on Telehealth strategies to improve the

healthcare system, national scale Telehealth implementation remained difficult. This leads to a discussion of the implementation gap in the Telehealth policy over the years, which is the problem being addressed by this study.

**Chapter 2** covers the ideas from a range of literature to arrive at a defensible framework for analysing the policy processes. Definitions for Telehealth, and what defines Telehealth policy for this study were developed. This chapter also discusses literature from policy analysis studies that have informed the design of this study and the choice of using a two-part conceptual framework adapted from the Kingdon's Multiple Stream Theory and the Normalisation Process Theory as the theoretical lens. Although this approach may have its limitations, it did inform the design of this study and provided a manageable analytic framework.

**Chapter 3** serves to introduce the context for which the case study for policy analysis was carried out. It intends to present the narratives of the evolution of Telehealth in Malaysia, looking closely at Malaysia's political and socio-economic background, as well as its formal policymaking set up both at the federal government and the Ministry of Health. It also provides a review of health system developments and performance as a rationale for Telehealth adoption in Malaysia, focusing on the national health policy as well as any other policies related to Telehealth implementation.

**Chapter 4** presents the research philosophy and methodology that guided the conduct of the study. This chapter defines the conceptual framework used and the explanation for the selection of the qualitative case study as the research methodology. The details of the research design are described along with the discussion related to issues in methodology such as the role of the researcher as an instrument, reliability on data collection tools and credibility of the findings.

**Chapter 5** and **Chapter 6** provide the research findings following the two-part conceptual framework developed in Chapter 2. Chapter 5 analyses the agenda-setting

process behind the Telehealth Policy formulation in Malaysia. This chapter examines the Telehealth policy formulation exploring how Telehealth reached the policy agenda in Malaysia between the years 1995 and 2000. Certain factors were identified that could have determined the agenda-setting process. Further, Chapter 6 is the analysis of the policy processes to understand the implementation capacities for Telehealth. The study provided several insights of the delayed Telehealth implementation between the years 2001 and 2012.

**Chapter 7** is the discussion and study conclusion which relates the research findings with the literature review to answer the research questions. First, the chapter discusses the difference in Telehealth between developing and developed countries. After that, the theoretical framework will be used to identify the elements and the key actors involved in the Telehealth policy process, which will be followed by a discussion on appropriate strategy towards scaling up Telehealth services in Malaysia and the developing countries. The thesis concluded with key points from the case study and its implications. This consist of contributions of the study to the body of knowledge and practical implication, and suggestions for further research.

## **CHAPTER 2 : CONCEPTS AND THEORIES OF POLICY ANALYSIS - ESTABLISHING THE CONCEPTUAL FRAMEWORK FOR TELEHEALTH POLICY ANALYSIS**

### **2.1 Introduction**

The primary aim of this chapter is to present the theoretical underpinnings to formulate the conceptual framework for this study. Policy studies in health have been increasing for the last 20 years (Walt et al., 2008). However policy studies in Telehealth or e-Health is an emerging field and as such an established methodology for policy analysis or policy research is still limited (Dixon, Pina, Kharrazi, Gharghabi, & Richards, 2015; Khoja et al., 2012; R. Scott, 2004; R. E. Scott & Lee, 2005). Government policies on e-Health play a significant role in all the matters relating to the design, construction, implementation and continuous maintenance of the e-Health system (Khoja et al., 2012; R. E. Scott et al., 2002; R. E. Scott & Lee, 2005). An e-Health policy needs to be in place before resources can be allocated accordingly, such as funding, the network and technology infrastructure, as well as providing competency and training of personnel involved so that the objectives of implementation shall be met. Government policies on e-Health are considered one of the determinants for its successful implementation contributing to an environment which can enhance e-Health adoption in healthcare organisations (Khoja et al., 2012; J. L. Y. Liu & Wyatt, 2011; Lluch & Abadie, 2013; Qureshi et al., 2013; R. E. Scott et al., 2002; R. E. Scott & Lee, 2005; Shaqrah, 2010).

A review of literature in health policy and Telehealth studies was conducted to define and analyse Telehealth policy to shape the analytical framework for this study. The literature in policy analysis further assisted in framing these areas to analyse Telehealth policies in the context of Malaysia. All three research fields have vast studies and literature to draw upon. This study considers the breadth and depth of these areas and the

researcher has selected literature from the three main subject areas to inform the research design, conceptualisation and analysis of findings.

This chapter reviews the theories relevant on Telehealth policy analysis as the following:

First, in Section 2.2, the focus is on defining Telehealth policy. While there is no single or fixed definition for Telehealth policy, the literature is presented to build a definition of Telehealth policy. First, attention is given to defining the term Telehealth since this term has been interrelatedly used as e-Health, telemedicine or telecare. Then, the various domains of Telehealth policy are described with emphasis on the scope of issues that are faced by the policymaker in the context of a national Telehealth initiative.

Then, Section 2.3 presents the theoretical background on approaches to investigating Telehealth policy. First, the concept of health policy is described. Then, a selection of framework and theories is presented, explaining how these theories are applied to the study and how it is used to answer the research questions. The theories were derived from multiple disciplines - from policy science, health policy studies and social science, and which were considered to be relevant to this study.

Then, Section 2.4 and 2.5 discusses approaches to Telehealth policy analysis used in this study. A conceptual model is introduced with the aims to link the different pieces that constitute critical domains for the Telehealth policy from agenda-setting, policy formulation to policy implementation – in the context of the Malaysian MoH. The argument is that the study approach to analyse Telehealth policy is conducted by applying a two-part conceptual framework from study designs from the field of policy studies, health policy and implementation studies. The first part, Telehealth policy analysis is framed using Kingdons' Multiple Stream Framework to explore and present the historical narrative around the agenda-setting of Telehealth Policy in Malaysia. The second part,



Normalisation Process Theory is applied to investigate factors that facilitate and hinder Telehealth implementation in the MoH at the national scale.

## **2.2 Defining Telehealth Policies**

This section discusses the literature related to the terms Telehealth and policy resulting in a definition for Telehealth policy used in this study. A definition of Telehealth policy serves as a beginning to shape this study and define issues encompassed within its meaning and interpretation. The multiple definitions and interpretations given to Telehealth and what counts as policy are important to delineate so as to understand how the term Telehealth policy is used in this study.

### **2.2.1 Defining Telehealth**

Over time, different terms have been used to refer to ICT applications in healthcare. In the 1970s when the computer technology was introduced for medical data processing, the term “medical informatics” was used. Health applications were known as “health telematics” or “telemedicine” and then “telehealth”. Nowadays, the term e-Health has been widely used due to the extremely rapid development of the technology and Internet in the recent years (Della Mea, 2001; Oh et al., 2005; Pagliari et al., 2005). As technology evolved, the use of mobile technology to provide health related service is known as m-Health (Akter & Ray, 2010; Bashshur, Shannon, Krupinski, & Grigsby, 2011).

In Malaysia, the Telehealth policy document released in 1997 used the term “Telemedicine” (i.e. the Telemedicine Blueprint). The document defined Telemedicine as “the provision of healthcare and health-related services using telecommunications, information and multimedia technologies to link the participants in the healthcare system” (Ministry of Health, Malaysia, 1997). It further details that: “Telemedicine can be used to deliver a range of services: information, education, consultation, diagnosis, treatment,

support and governance. Personal health management and patient care delivery will be aided by a number of network-based intelligent tools that help users access, navigate and interact with services provided on the network.” (Ministry of Health, Malaysia, 1997). Thus, the true meaning of the objective of Telemedicine as stated in the Blueprint was more extensive and not limited to the literal meaning of telemedicine, which is “medicine at a distance”. Hence, in an article published in 2001, Suleiman introduced the term Telehealth, and described Telehealth ‘as the technology enabler to realise the country’s health vision towards the year 2020’, as he wrote an extensive account of the country’s initiative to harness the ICT potential to transform the Malaysian healthcare scenario as defined in the blueprint<sup>12</sup> (Suleiman, 2001). Further, Mohan and Yaacob (2004) defined Telehealth as “the integration of information, telecommunication, human–machine interface technologies and health technologies to deliver healthcare, to promote the health status of the people and to create health”.

According to Bashshur, the term Telehealth was first coined by Bennet et al. in 1978 to describe the extension of the scope of Telemedicine by incorporating a broader set of activities including patient and provider education (Bennet et al. 1978 cited in Bashshur et al., 2011). Therefore, it can be argued that telehealth is seen as an expansion of telemedicine. In other words, Telemedicine is a subset of Telehealth. Telemedicine focuses on the curative aspect, whereas Telehealth includes preventive, promotive and curative aspects.

The study will adopt the Telehealth definition by Mohan and Yaacob (2004), which is “the integration of information, telecommunication, human–machine interface technologies and health technologies to deliver healthcare, to promote the health status of

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<sup>12</sup> The Malaysia’s health vision towards 2020 is described in detail in Section 3.4 of Chapter 3.

the people and to create health”. In their article, Mohan and Yaacob (2004) made specific reference to the Malaysian Telehealth initiatives, which is the main subject of the study.

### **2.2.2 Defining Telehealth Policy**

The term “Telehealth policy” has not been specifically defined in the literature. The earliest definition of policy related to Telehealth can be attributed to an article by Scott et al. in 2002, wherein they refer to the policy as “e-Health policy”. They defined e-Health policy as “a set of statements, directives, regulations, laws, and judicial interpretations that direct and manages the life cycle of e-Health” (R. E. Scott et al., 2002). Further, in a more recent article, Scott iterated the importance of strategies for e-Health policy, which he states, “strategy is the driving force, the first essential ingredient that can place countries in charge of their e-Health destiny and inform them of the policy necessary to achieve it” (R. E. Scott & Mars, 2010).

The guideline published by the WHO Global Observatory for e-Health defined e-Health policy as “a framework of strategic plans and policies which lay the foundations for development, and strategic plans for the implementation of e-Health at the national level”. It elaborates that “strategic plans and policies should protect citizens, promote equity, observe cultural and linguistic issues in cyberspace, ensure interoperability (the ability of different technology systems to work together), and allow for capacity development so that all citizens can access e-Health solutions”. (World Health Organisation, 2006)

The above definitions denote that policy not only involves the specific legal and policy mandates for the nation to pursue e-Health initiatives, but also involves the strategies and process of the e-Health technology implementation in terms of technical (i.e. interoperability, linguistic issues) as well as social issues (citizen’s protection, promote equity and considering the cultural and linguistic issues in cyberspace). The emphasis on

strategy in e-Health policy has also been asserted by Scott and Mars (2013): “Strategy is the driving force, the first essential ingredient that can place countries in charge of their own e-Health destiny and inform them of the policy necessary to achieve it”. (R. E. Scott & Mars, 2013).

Therefore, the study of Telehealth policy is considered to be more than just understanding the ‘mechanisms’ to implement Telehealth by the government, but it also examines the influences contributing to the origins, processes and content of these documents from the early planning phase until it is being used by the target users. This provides insight into how resulting policy documents are products of compromises, influences and agendas among a variety of actors in a variety of arenas. This interpretation of Telehealth policy is congruent with the research questions that were presented in Chapter 1.

In an article by Khoja et al. (2012), the authors assert that e-Health policies are a significant determinant to ensure the successful e-Health adoption and increase the potential for successful implementation. They further state that the absence of supportive e-Health policies may cause failures in achieving the intended goals of e-Health resulting in inappropriate gaps in health status and equity for health. The article identified nine themes of e-Health policy that needed to be addressed at the various levels (see Table 2.1)

**Table 2.1: Themes and scope of e-Health policy and issues according to various levels of healthcare.**

Themes	Policy categories / Issues		
	Global	National	Local/institutional
A. Networked care	<ul style="list-style-type: none"> <li>i. Functional and semantic interoperability</li> <li>ii. Standardisation of EHR</li> <li>iii. Intellectual property rights</li> </ul>	<ul style="list-style-type: none"> <li>i. Regulation of appropriate technologies</li> <li>ii. Commitment of funds</li> <li>iii. Standardisation of EHR</li> <li>iv. Sharing of services</li> <li>v. Proper connectivity</li> <li>vi. Control of malpractice</li> <li>vii. Cultural issues in communication</li> </ul>	<ul style="list-style-type: none"> <li>i. Proper distribution of human resources</li> <li>ii. Readiness building and effective change management</li> <li>iii. Deployment of appropriate technologies</li> <li>iv. Meeting the needs of insurance companies</li> <li>v. Reimbursement and remuneration</li> <li>vi. Sharing of patient information</li> <li>vii. Sharing of knowledge</li> <li>viii. Sharing of services</li> <li>ix. Standardisation measures for EHR</li> <li>x. Ensuring integrity and quality of data and information</li> <li>xi. Proper connectivity</li> <li>xii. Risk management</li> <li>xiii. Cultural issues in communication</li> </ul>

**Table 2.1, continued**

Themes	Policy categories / Issues		
	Global	National	Local/institutional
B. Inter-jurisdictional practice	<ul style="list-style-type: none"> <li>i. Policies on managing health information on the Internet</li> <li>ii. Intellectual property rights</li> <li>iii. Complementarity of policies and health care regulations in different regions</li> <li>iv. Sharing of knowledge</li> </ul>	<ul style="list-style-type: none"> <li>i. Accountability/liability of care</li> <li>ii. Licensing</li> <li>iii. Accreditation of services</li> <li>iv. Local, national, and international policies</li> </ul>	<ul style="list-style-type: none"> <li>i. Accountability/liability of care</li> </ul>
C. Diffusion of e-Health/digital divide	<ul style="list-style-type: none"> <li>i. Telecommunication policies allowing increased access</li> <li>ii. Control of technology costs</li> <li>iii. Provision of universal and unlimited access to the Internet</li> <li>iv. Humanitarian vs commercial policies</li> <li>v. Sharing of knowledge and services</li> </ul>	<ul style="list-style-type: none"> <li>i. Increasing focus on open-source technologies</li> <li>ii. Telecommunication policies allowing increased access</li> <li>iii. Control of technology costs</li> <li>iv. Capacity building</li> </ul>	<ul style="list-style-type: none"> <li>i. Capacity building</li> </ul>
D. e-Health integration with existing systems		<ul style="list-style-type: none"> <li>i. Improvement of clinical effectiveness</li> <li>ii. Improvement of quality of care</li> <li>iii. Change in business rules in organisations</li> </ul>	<ul style="list-style-type: none"> <li>i. Redefinition of the roles and responsibilities of different players</li> <li>ii. Wider ethical acceptability</li> </ul>

**Table 2.1, continued**

Themes		Policy categories / Issues		
		Global	National	Local/institutional
E.	Response to new initiatives		i. Definition of stakeholders at different levels	i. Definition of the roles and responsibilities of different players, such as local providers and specialists ii. Change management iii. End-user support iv. Regulation of information technology use v. Maintenance of the doctor-patient relationships vi. Wireless networks and security issues vii. Evaluation of new technologies in local environments
F.	Goal-setting for e-Health policy	i. Integration of e-Health into the overall development effort ii. Funding of e-Health programs	i. Provision of suitable telecommunications infrastructure to promote e-Health ii. Alignment of policies with information technology innovations iii. Innovative and forward-looking policies	i. Standards of care ii. Guidelines for human resources

**Table 2.1, continued**

Themes	Policy categories / Issues		
	Global	National	Local/institutional
		<ul style="list-style-type: none"> <li>iv. Coverage of the opportunity cost of health providers' time</li> <li>v. Timing of government action</li> <li>vi. Development of leadership structures for e-Health programs</li> <li>vii. Development of strategies for e-Health adoption</li> <li>viii. Information governance</li> </ul>	
G. Evaluation and research		<ul style="list-style-type: none"> <li>i. Justification of health providers' time</li> <li>ii. Cost effectiveness</li> <li>iii. Impact of e-Health on health care management</li> <li>iv. Demonstration of health outcomes</li> <li>v. Evidence of clinical effectiveness</li> <li>vi. Progress in learning</li> </ul>	<ul style="list-style-type: none"> <li>i. Provision of simulation environment</li> <li>ii. Encouragement of coordinated research</li> <li>iii. Dissemination for policy making and benefit of others</li> </ul>



**Table 2.1, continued**

Themes		Policy categories / Issues		
		Global	National	Local/institutional
H.	Investment		<ul style="list-style-type: none"> <li>i. Use of e-Health for commercial purposes</li> <li>ii. Public–private partnership</li> <li>iii. Cross-border advertisement and sale of drugs</li> </ul>	
I.	Ethics in e-Health	<ul style="list-style-type: none"> <li>i. Management of health information on the Internet</li> <li>ii. Health information privacy</li> </ul>	<ul style="list-style-type: none"> <li>i. Consent for care in e-Health</li> <li>ii. Liability issues (medical malpractice liability)</li> <li>iii. Medicolegal issues</li> <li>iv. Patients’ right to access information</li> <li>v. Security of information during portability</li> <li>vi. Control of malpractice</li> <li>vii. Cultural issues in communication</li> </ul>	

Source: Scope of policy issues in e-Health: results from a structured literature review (Khoja et al., 2012).

The policy themes in Table 2.1 demonstrate that there is a spectrum of issues that require appropriate policies at the different stages of implementation that needs to be addressed by the decision-makers at the different healthcare levels. Therefore, in the context of Telehealth policy in Malaysia, the scope of Telehealth policies covered in this study includes those policies which originate from entities within the Malaysian government including MoH (that have the authority to establish and amend those policies) as well policies brought about through the legislative process and/or official statements/documents by the federal government and MoH (to address Telehealth implementation and practise at the national and institutional level i.e. hospitals and clinics).

Hence, with reference to Table 2.1, the scope of policies covered in this study is the policies in the national and local categories. The reason to limit the scope of Telehealth policy is to explore the meaning of the relationship between federal government and the levels of healthcare in the MoH. This has kept the study and its analysis within manageable parameters and time constraints. To identify the possible forms of policy, the study adopts Scotts's definition on e-Health policy (R. E. Scott et al., 2002; R. E. Scott & Mars, 2010), which is: "Telehealth policy is referred to any set of statements, directives, strategies, regulation, laws and judicial interpretation that directs and manages the life cycle of Telehealth in Malaysia."

### **2.3 Understanding Health Policy**

To further examine the theoretical underpinnings of the study, sub-section 2.3.1 describes the concept of health policy and its theoretical background. Then, in sub section 2.3.2 the study identifies and discusses theories for policy analysis from the literature. These theoretical underpinnings are essential to examining the policy processes behind Malaysia's Telehealth policy

### **2.3.1 The concept and theories of health policy**

Health policy covers courses of action (and inaction) that affect the set of institutions, organisations, services, and funding arrangements of the healthcare system. (Buse et al., 2012) The theoretical insights of health policy are built from across multidisciplinary areas such as political science, public policy and social science. The value of policy analysis in public health is increasingly being recognised to better understand past policy failures and successes, as well as to plan for future policy implementation that can lead to better health outcomes. (Walt et al., 2008; Walt & Gilson, 1994)

Health policy analysis contributes to understanding how policymakers set priorities in healthcare and plan actions to address health problems (Walt et al., 2008). Studying health policy requires an understanding of policy formulation processes (E. de Leeuw, 2014). However, policymaking in the real world is described as complex and chaotic (E. de Leeuw, 2014; Gilson, Buse, Murray, & Dickinson, 2008). Thus, various researchers developed theories, frameworks and models to find ways of organising their analysis, as well as to improve the methodologies for understanding health policy (Walt et al., 2008).

The application of theories of the policy process would enable an appreciation of the range of stakeholders and determinants of policy choice (E. de Leeuw, 2014). Apart from understanding the policy formulation process, health policy analysis can also contribute to understanding the role of actors and interest groups involved in the health policy process. Health policy analysis describes the contextual factors, including political, economic, socio-cultural and demographic aspects, which affect the health policy process and its health outcomes, either directly and indirectly (Gilson et al., 2008; P. May et al., 2014; Ogden, Walt, & Lush, 2003; Tantivess & Walt, 2008; Walt et al., 2008; Walt & Gilson, 1994).

Sub-section 2.3.2 presents the approaches and concept to studying the health policy processes. Then, the overview of possible criteria to examine the Telehealth policy which serves as a background to develop the conceptual framework used in this study is discussed. The theories selected for this study represent a small but prominent subset of theories used in this study to explain the policy processes for Telehealth initiative in Malaysia.

### **2.3.2 Framework and theories for health policy analysis**

In the previous section, it was pointed out that the theories of health policy analysis were developed from political science, public policy as well as social science. According to Sabatier, a key figure in contemporary political science, evaluating policy requires a framework to simplify the problem to have the chance of understanding it, to be representative of the problem and to create an order for data analysis. (P. A. Sabatier & Weible, 2007). He had also developed a powerful toolbox of theories of the policy process framing, proposing that there is a distinction between conceptual frameworks, theories and models, which operate on a continuum from broadly applicable to any situation to (preferably mathematical) modelling for highly specific situations (P. A. Sabatier, 1991a). A 'good' theory of the political process should explain goals and perceptions, actions and events, among potentially hundreds of stakeholders in the process, leading to specific sets of policy outcomes (Breton & de Leeuw, 2011). The following sub-section is the finding from the study's literature review of the framework and theoretical constructs utilised commonly in health policy studies. Five theories were considered for investigating the health policy processes in the context of the Malaysian healthcare system.

### 2.3.2.1 Stages Heuristic Framework: The policy process is a ‘policy cycle’ with different stages

In their book titled “Making Health Policy”, Buse et al. state that the policy process is a ‘policy cycle’ where policymaking occurs in different stages (Buse et al., 2012). Taken from the ‘stages heuristic’ model popularised by Jones (1970), Anderson (1975), and Peters (1986) (as cited in P. A. Sabatier, 1991a) the model is refined in the work of Sabatier and Jenkins-Smith in 1993 (Jenkins-Smith & Sabatier, 1993). The policy processes are broken down into a series of stages as follows:

- **Problem identification and issue recognition:** explores how issues get onto the policy agenda or agenda-setting, and why some issues do not get discussed;
- **Policy formulation:** explores who is involved in formulating policy (or policy actors), how policies are arrived at, agreed upon, and how they are communicated;
- **Policy implementation:** this is arguably the most important phase of policymaking because if policies are not implemented or diverted or changed at implementation, then presumably something is going wrong – and the policy outcomes will not be those which were sought;
- **Policy evaluation:** identifies what happens once a policy is put into effect – how it is monitored, whether it has achieved its intended objectives or it has unintended consequences. This may be the stage at which policies are changed or terminated and new policies introduced. (Buse et al., 2012).

The ‘stages heuristic’ is a simple and useful model used to understand the policy. However, analysts had recognised the limitations in using this model. First, it looks as if the policy process is linear – it proceeds smoothly from one stage to another, from problem recognition to implementation and evaluation. It looks as if the policy process is carried out in the distinctive elements at each stage (Berlan, Buse, Shiffman, & Tanaka,

2014; P. A. Sabatier, 1991b). In reality, however, policy process is seldom so clear or obvious. Sometimes, problem recognition occurs at the stage of implementation, or policies may be formulated but never reach implementation. The stages heuristic model fails to address the dynamics of multiple, interacting, iterative and incremental cycles of action at many different levels of mutual and reciprocal action at the same time (Breton & de Leeuw, 2011; P. Sabatier, 2005). In other words, it is propositioned that policymaking is seldom a rational process and is described as being more complex and interactive affairs (Breton & de Leeuw, 2011; Buse et al., 2012; Gilson et al., 2008; Walt & Gilson, 1994). The stages heuristic, even though much of its application on policy implementation was quite useful, however it needed to be replaced with a framework that sought to explain an overall policy process within a given policy domain that would usually be composed of a variety of initiatives at different stages of the policy cycle. (P. Sabatier, 2005; P. A. Sabatier & Weible, 2007).

In a review article of health policy analysis in LMICs by Gilson and Raphaely in 2008, it was found that the majority of studies related to health policy had focused on the content of health policies. Only in recent times has research turned its attention to health policy processes (Gilson & Raphaely, 2008). They had also found that agenda-setting, the first stage of the policy cycle, is the most developed and comprehensive related health policy framework (Gilson & Raphaely, 2008). Agenda-setting explains how an issue has received global or national priority. In other words, why governments are paying attention to a particular issue and have placed it on their public agenda or why do some problems or issues get taken up as a priority over others by the government? (Buse et al., 2012). One of the several theories proposed by researchers for explaining the process of agenda-setting is Kingdon's Multiple Stream Theory.

### 2.3.2.2 Kingdon's Multiple Streams Theory

The Kingdon's Multiple Streams approach was originally developed in John Kingdon's *Agendas, Alternatives and Public Policies* first published in 1984. The theory covers both agenda-setting and policy formulation and adoption. It focuses on how and why policies receive attention and come to realisation (Kingdon, 1984). The theory presents a streams metaphor that is flexible and simple to apply and develops concepts that could apply to any case study, including the role of bounded rationality and the process of choice in the face of uncertainty and ambiguity. (Cairney & Jones, 2016).

Kingdon argued that three separate "streams" must come together at the same time and they must do so during a brief "window of opportunity" for policy to change markedly. The three streams are as follows:

- **Problem stream:** Problems or issues identified and recognised by policymakers or citizens. A problem may arise due to the weaknesses of existing policies. When a problem arises, remedial action must be acted on quickly by the policymaker.
- **Policy stream:** This revolves around potential solutions and available solutions to problems. Kingdon describes policy solutions in a "policy primaevial soup," evolving as they are proposed by one actor then reconsidered and modified by others. A process of "softening," takes place, as some issues take time to become accepted within policy networks. To deal with the disconnect between to get attention and slow policy formulation, actors known as "policy entrepreneurs" develop solutions in anticipation of future problems, seeking the right time to exploit or encourage attention to their solution to the problem.
- **Politics stream:** This refers to the broader political context, which is when the policymakers have the motive and opportunity to turn a solution into policy. Policymakers recognise and give attention to the said problems and receptive to

proposed solution. They also consider many factors, such as their beliefs, the feedback they receive from interest groups and political parties. Changes in public disposition, or within government agencies advanced motives and opportunity for such actions. (Kingdon, 1984).

Thus, when the three streams come together, a “window of opportunity” appears resulting in a new policy or policy change (Kingdon, 1984). The ways in which the streams come together may vary from country to country (or in different parts of political systems), but scholars examining different cases have a common language with which to compare them. Therefore, it is not surprising that the Multiple Streams Approach is one of the most prolific and widely recognised approaches for policy studies (Cairney & Jones, 2016).

The Multiple Stream Approach introduced the concept of actors named “policy entrepreneurs”. Actors (or Policy actors) are regarded responsible for developing or altering the existing policy arrangements. Actors can be individuals or organisations, within or outside the institution where the policy is concerned, who have great power or influence and have the right knowledge to produce the proposed solution. The actor has to use the right skills and equipped with the right knowledge to establish a relationship with the policymaker, and take actions to influence the policymaker to adopt and implement the proposed solution (Buse et al., 2012; Tantivess & Walt, 2008). The essential role of actors in the context of health policy is described by the Policy Triangle Framework, as presented in the following section.

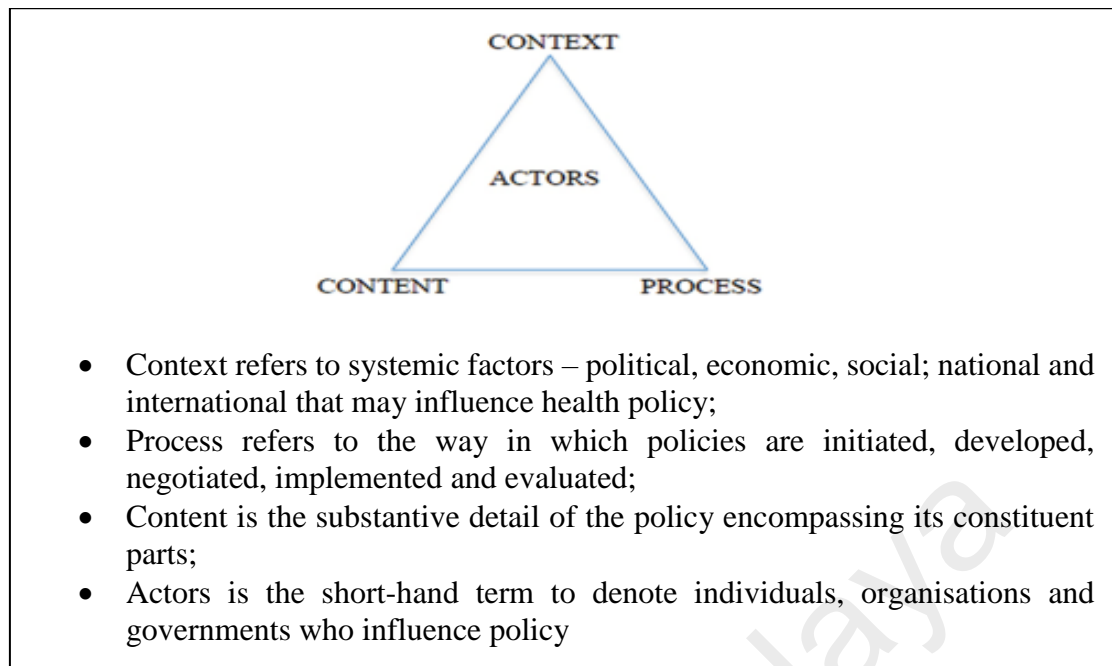
### **2.3.2.3 Policy Triangle Framework**

Walt and Gilson (1994) defined health policy and frame the role of actors as they defined health policy as: “Health policy embraces courses of action that affect the set of institutions, organisations, services and funding arrangements of the healthcare system. It



goes beyond health services, however, and includes actions and intended actions by public, private, and voluntary organisations that have an impact on health.” They further suggested that failure to establish agencies or organisations with authority and adequate budgets after policy decisions to act on problems would suggest that the government is not fully committed to the policy (Walt & Gilson, 1994).

The Policy Triangle Framework proposed by Walt and Gilson (1994) takes a political economy perspective on health policy analysis by considering the importance of looking at the content of policy, the processes of policymaking and how power is used in health policy. This means exploring the role of the state/government, nationally and internationally, and the civil society groups, national and global, to understand how they interact and influence health policy. It also means understanding the processes through which such influence is conducted (e.g. in formulating policy) and the context in which these different actors and processes interact (Buse et al., 2012; Walt et al., 2008; Walt & Gilson, 1994). (refer to Figure 2.1).



**Figure 2.1: Policy Triangle Framework (Buse et al. 2012; Walt & Gilson, 1994)**

The conceptual illustration of the Policy Triangle Framework depicted in Figure 2.1 shows that actors are at the centre of the framework. Actors may refer to individuals (particularly a statesman, such as Trump, the current President of the US), organisations such as the World Bank, or multinational companies such as Shell, or even the state or government. (Buse et al., 2012). In international relations, it is common to talk about state or non-state actors (i.e. actors from or outside the government). Political scientists talk about civil society organisations, which interest or pressure groups, an organisation established outside the government, which had become increasingly prominent policy actors in many LMICs. (Buse et al., 2012; Walt & Gilson, 1994, 2014).

The policy triangle framework has been widely applied in studies for a variety of health policy concerns in many different countries. These policies includes regarding various health systems issues such communicable diseases, reproductive health, tobacco, health financing and primary care (Berlan et al., 2014; Gilson & Raphaely, 2008; Ma et al., 2015; Mc Hugh, Perry, Bradley, & Brugha, 2014; Moshiri, Rashidian, Arab, & Khosravi, 2016; Nguyen Ha et al., 2010; Saito et al., 2014; Sanneving, Kulane, Iyer, & Ahgren,

2013). However, the application of Policy Triangle Framework on policy issues related to e-Health has not been attempted so far. Perhaps because the framework has been applied for health policy analysis inquiry targeted mainly for LMICs (Walt et al., 2008), and efforts to implement such technology like e-Health in these countries are not as advanced as in high-income Western countries, or perhaps the policy focus area is more related to essential health issues/problems which affect the country's health status such as mortality and morbidity levels. This is in accordance with the finding by Erasmus et al.(2014). Erasmus and colleagues reviewed 85 articles on policy analysis literature focusing on LMICs and found that policy analysis in these literature covered mainly on how to improve existing health systems, operationalisation of programmatic policies or discrete health intervention (Erasmus et al., 2014). E-Health, on the other hand, is more of a technology solution in an embedded healthcare system, as part of an enabling tool or infrastructure in providing population healthcare. Furthermore, countries which had instituted a specific policy for e-Health are also limited (Greenhalgh et al., 2013; Jha, Doolan, Grandt, Scott, & Bates, 2008; Z. Morrison et al., 2011; R. E. Scott & Mars, 2013). Thus, the restricted number of cases suitable for policy analysis may have contributed to the lack of studies using Policy Triangle Framework to analyse e-Health policies.

Besides the limited number of studies on e-Health policy, the policy triangle framework and Kingdon's Theory (sub-sections 2.3.2.2 and 2.3.2.3) revolved primarily on agenda-setting, policy formulation and policy adoption. Both Kingdon's Theory and Policy Triangle Framework demonstrated the central role of actors, without which their action policy would not exist. As mentioned in sub-section 2.3.2.2 and 2.3.2.3, the actors may come from someone who is in charge and have power in the institution/organisation. For instance, government ministers, political figure (political elites), who are commonly positioned at the high level of the institution; or the actors are positioned outside of the government organisation, such as interest groups or civil liberties. Therefore, there is a

dynamic ‘flow’ of policy implementation in the hierarchy government institution. Hence, if the policy was formulated from the political elites, who are commonly positioned in the upper levels of the government hierarchy, policy implementation is called “top-down” implementation, whereas if the policy was implemented more democratically, involving parties outside the government, it called “bottom-up” policy implementation. The significance of policy implementation as part of the policy process has also been recognised by researchers as a field of study in public policy, which will be discussed in the next section.

#### **2.3.2.4 Policy Implementation and Implementation Theories**

According to Pressman and Wildavsky, policy implementation may be viewed as a process of interaction between the setting of goals and actions geared to achieve them (J. L. Pressman & Wildavsky, 1973). Policy implementation encompasses both one-time efforts to transform decisions into operational terms. From the words of Mazmanian and Sabatier (P. Sabatier & Mazmanian, 1983, pp. 20–21), “policy implementation is the carrying out of a basic policy decision, usually incorporated in a statute, but which can also take the form of important executive orders or court decisions”. Hence, it can be interpreted that the starting point of a policy implementation is the authoritative decision as well legal objectives. It implies centrally located actors, such as politicians, top-level bureaucrats and others, who are seen as most relevant in producing the desired effects. O’Toole (2003) defines policy implementation as an “intention on the part of a government to do something or stop doing something and the ultimate impact of world of actions”. (O’Toole, 2003). More concisely, he remarks that “policy implementation refers to the connection between the expression of governmental intention and actual result” (O’Toole, 1995).

Harold Lasswell in 1956 originally highlighted the concept of policy implementation. He suggested that policy implementation was one of a number of necessary steps or stages

in the policy process (Lasswell, 1956 cited in DeLeon & DeLeon, 2002). Pressman and Wildavsky embarked on the early implementation research with the distinctive subtitle to their seminal text: *Implementation: "How Great Expectations in Washington are Dashed in Oakland; Or, Why It's Amazing that Federal Programs Work at All"* (J. Pressman & Wildavsky, 1973). As the body of knowledge evolves, researchers have categorised policy implementation research as follows (Nilsen, Ståhl, Roback, & Cairney, 2013; Paudel, 2009):

- **First generation policy implementation research:** The first generation of policy implementation studies in the 1970s was primarily in the inquiry to understand policy implementation process within the stages of the policy cycle. The first generation of research has since been criticised for focusing disproportionately on implementation failures. Implementation failure was described using a top-down approach, which identified factors to explain an implementation gap from the perspective of central government policymakers (Nilsen et al., 2013).
- **Second generation implementation research:** The second generation of studies emerged from the late 1970s to 1980s with the purpose to take the next step in theory development by moving beyond a success or failure perspective by progressing towards analysis of variables that could explain the impact of the implementation process. New analytical models and frameworks were accompanied by a debate between so-called "top-downers" and "bottom-uppers" theorists (Nilsen et al., 2013; Paudel, 2009). The top-down researchers focus on a specific political decision, normally a law. They follow the implementation down through the system, often with special interest in higher level decision-makers. They would typically assume a control perspective of implementation, trying to give good advice on how to structure the implementation process (Hogwood & Gunn, 1984; J. Pressman & Wildavsky, 1973; P. A. Sabatier & Mazmanian,

1978). On the other hand, the bottom-up researcher directs the attention at the formal and informal relationships constituting the policy subsystems involved in making and implementing policies. In this respect, street-level bureaucrats are central in the political process where they are considered to have a better understanding of what clients need as it is they who have direct contact with the public (Lipsky, 1980a). The essential role of local networks is also proposed (Hull & Hjern, 1987). Both the top-down and bottom-up approaches have limitations and criticisms from scholars. Hence, many other researches proposed theories from the synthesis or hybrid approach from the two (e.g., Elmore, 1979, 1985; Matland, 1995). Meanwhile, Grindle and Thomas proposed the alternative interactive model (Grindle & Thomas, 1991).

- **Third generation implementation research:** The third generation of implementation studies improved the previous studies. Research is undertaken to test theories on the basis of more comparative case studies and statistical research designs. The research design is carried out with an explicit theoretical model using defined operational concepts, an exhaustive search for reliable indicators of implementation and predictor variables, and testing theoretically derived hypotheses - with data analysis with the appropriate qualitative and statistical procedures (Goggin, 1990). Several models and frameworks emerged for improved understanding of implementation, including the Integrated Implementation Model (Winter, 2003), the Communication Model of Inter-Governmental Policy Implementation (Goggin, 1990), and the Ambiguity-Conflict Model (Matland, 1995). However, some scholars argue that third generation implementation has not been realised in practice (Paudel, 2009).

O'Toole (2004) suggested that these traditional top-down and bottom-up frameworks may not adequately address the reality of public policy implementation as they do not

take into account societal and contextual barriers to implementation and fail to engage with policymakers adequately. In the 1990s, the emphasis of policy implementation research has shifted to address the effects of institutional and inter-organisational relationships, with governance and policy networks emerging as important research topics (O'Toole, 2000; Saetren, 2005). Many governments subsequently recognised the limits to top-down policymaking and adopted network governance approaches based on the need to consult and collaborate with service providers, interest groups, and the users of services (Newman, 2004). Therefore, researchers (Hupe & Hill, 2015; O'Toole, 2000; P. Sabatier, 2005) have argued that it is more appropriate to develop (and potentially test) different partial theories and hypotheses that address certain implementation aspects. Therefore, for this study, approaches to studying policy implementation aspects in the healthcare sector will be considered. To be more specific, to identify implementation studies approach related to e-Health technology implemented in healthcare organisation setting, several policy implementation studies developed theories and applied them to evaluate e-Health implementation in healthcare settings. One of the prominent theories which match with the aims of this study on Telehealth is the Normalisation Process Theory.

### **2.3.2.5 The Normalisation Process Theory**

The Normalisation Process Theory (NPT) is developed by May and colleagues from the UK (C. R. May et al., 2009; Carl May & Finch, 2009) and has its origins from social science. This theory explains why some new technologies or practices become part of routine practice (or normalised), and some do not. The theory was initially developed as a conceptual model, named the Normalisation Process Model (NPM) in the work undertaken by Greenhalgh et al. (2004) to explain the failure of Telemedicine systems to become routinely incorporated in clinical settings. In fact, much of the early work on NPT was related to the implementation of e-Health applications (Finch, May, Mort, & Mair,

2006; C. R. May et al., 2009). May et al. define normalisation as “the move towards the routinized embedding of telemedicine in everyday clinical practice” (Carl May, Mort, Williams, Mair, & Gask, 2003). It focuses on the work individuals and groups need to undertake for a technology or practice to be implemented and become integrated into everyday use. May and Finch (2009) suggested that NPT has the capacity to explore the wider factors influencing policy implementation (or normalisation) and can also deal with issues relating to changes in policy implementation or normalisation over time (C. R. May et al., 2009; C. R. May, Finch, Ballini, et al., 2011; Carl May & Finch, 2009). Thus, it provides a theoretical framework for understanding the inter-relationship between technology and the social environment for Telehealth implementation.

The Normalisation Process Theory is built based on theoretical constructs as follows:

- **Coherence:** the process and work of sense-making and understanding that individuals and organisations have to go through in order to promote or inhibit the routine embedding of practice.
- **Cognitive Participation:** the process and work that individuals and organisations have to go through in order to enrol individuals to engage with the new practice.
- **Collective Action:** the work that individuals and organisations have to do to enact the new practice. (“Collective Action” was initially referred to as NPM, and consisted of four subcomponents (i.e. Contextual Integration (CI), Relational Integration (RI), Interactional Workability (IW), and Skill Set Workability (SSW)). (Refer to Figure 2.2)
- **Reflexive Monitoring:** the work inherent in the informal and formal appraisal of a new practice once it is in use, in order to assess its advantages and disadvantages, and which develops users’ comprehension of the effects of a practice (C. R. May et al., 2009; Carl May & Finch, 2009).



<b>Interactional Workability (IW)</b> IW refers to the impact that a new technology or practice has on interactions, particularly the interactions between health professionals and patients (consultations).	<b>Skill Set Workability (SSW)</b> SSW refers to the fit between the new technology and existing skill sets. If a technology requires groups of professionals to work either above or below their current skill set (e.g. it requires a clinician to do clerical work or requires an administrator to make clinical decisions) it is unlikely to normalize.
<b>Relational Integration (RI)</b> RI refers to the impact of the new technology or practice on relations between different groups of professionals. A positive impact on RI is more likely if the technology does not disrupt current lines of responsibility and accountability.	<b>Contextual Integration (CI)</b> CI refers to the fit between the new technology and the overall organisational context. This includes the goals of the organization, morale, leadership and resources.

**Figure 2.2: Constructs of the Collective Action component of NPT (C. R. May et al., 2007; Murray et al., 2011)**

Both NPM and NPT have been used to develop other theory-driven implementation tools and frameworks. NPT provides a tool that assists process evaluation in two ways by firstly identifying and describing factors that have been shown to be important in promoting or inhibiting the implementation of complex interventions. Secondly, by providing a basis for assessing the probability that a complex intervention will become routinely incorporated in practice. A review article by McEvoy et al. (2014) on studies that used either NPM or NPT as the analytical tool had found that among 29 peer-reviewed articles, eight studies were on e-Health or Telehealth-care. The studies included Gagnon and colleagues who investigated Telehealth implementation projects in rural Canada (Gagnon, Duplantie, Fortin, & Landry, 2006), Bouamrane and May (2014) who examined the GPs' perspectives on electronic referrals (e-Referral) in Scotland, and Murray (2011) who explored the experiences of the senior managers and other staff charged with implementing e-Health initiatives in UK, among others. In this study, the NPT theory provided a useful framework to understanding the processes that affected the Telehealth implementation in Malaysia. In view of the study objectives, the study shall focus to explore the issues surrounding Telehealth implementations. Hence, using the

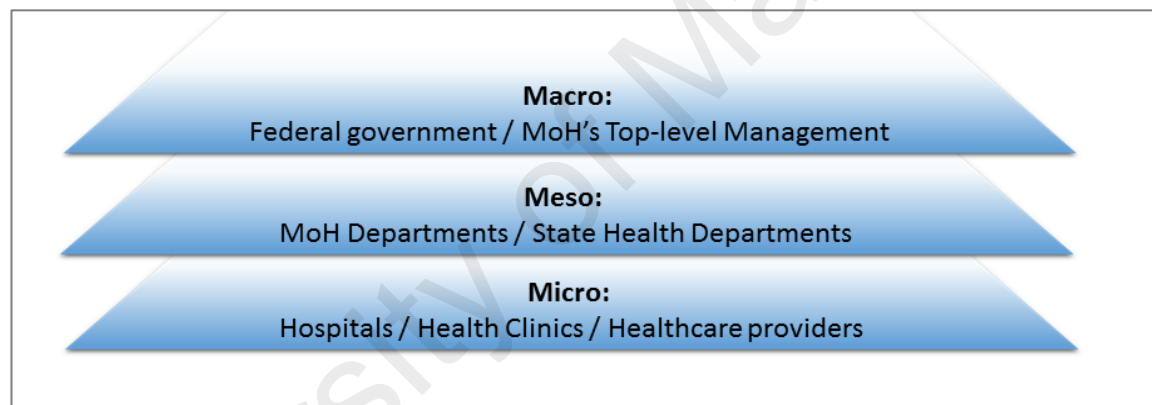
NPT, this study shall identify and describe the factors that facilitate and hinder Telehealth implementation in Malaysia.

## **2.4 The Analytical Framework for the Study**

In the previous introductory chapter, it was highlighted that Malaysia's Telehealth vision was established with strong influence from the government which involved a high financial cost and the ICT industry. Such programmes, built on a vision of a 'modernised' healthcare service that is fully networked, integrated, largely paperless, and technologically advanced for self-empowerment, were seen by policymakers as the key strategy to improve the quality and efficiency of the national healthcare system (Ministry of Health, Malaysia, 1997). Based on the fact that Telehealth was a government initiative, it was the federal government who made the decision. Thus, to explore the aspects of these perspectives, the question that the study began to ask is: "How do we begin to theorise what happens at various organisational levels when the government tries to implement Telehealth?" In other words, the intention is to look not only at the mechanisms by which Telehealth moved from policy idea to programme implementation, but to analyse how the participants at each level framed their understanding of the policy, and to understand the challenges faced by the participants in their efforts to implement Telehealth policy at the healthcare facilities (i.e. government clinics and hospitals).

Recognising the need to investigate Telehealth implementation at multiple organisational levels, the study adopted the framework developed by Caldwell and Mays (2012), which frames the analysis according to macro-meso-micro levels. According to Caldwell and Mays, this approach is a useful way to study the transition of a policy from high-level idea to programme in action (Caldwell & Mays, 2012). The premise behind the macro/meso/micro-level framing is based on the idea that in order to understand the pace, direction and impact of organisational innovation, which refers to Telehealth, requires the study of interconnections between meanings across the different

organisational levels within the healthcare system (Caldwell & Mays, 2012; Pope, Robert, Bate, Le May, & Gabbay, 2006). In this case, the different organisational levels are within the public healthcare sector in Malaysia. In such a system, a national scale programme like Telehealth, policy making usually takes place at the macro (federal/central) level, and then mobilised at the meso (health/Telehealth departments) level and subsequently implementation takes place at the micro (district/local) level. The implementation of the centrally developed plans, supervised by officials who were mainly in charge at the macro and meso level, features a complex interplay of influence, authority, the pursuit of goals, and the allocation of resources within a particular set of social norms, and constraints. (refer Figure 2.3).



**Figure 2.3: The macro-meso-micro levels of Ministry of Health.**

The interrelated aspects of macro, meso and micro levels of analyses which is an integral part of this study examined the global, national and local influences on the origins, processes and content of Malaysia's Telehealth policy. Although this approach may have limitations to account for all aspects of Telehealth policy, it provides an organisational and analytical framework to examine the complexity of interconnections and interrelationships among agenda-setting, policy formulation, implementation, the actors who may or may not be involved, and how decisions are made and by whom.

Furthermore, since investment decisions made by the federal government directly influence the choice of Telehealth technologies available to healthcare providers at the

clinics and hospitals, conversely, healthcare providers may refuse to use technologies if they see the technology is not suitable for the purpose. Thus, the macro and micro levels are closely and reciprocally related. The meso-level structures in this study, identified as the MoH departments, mediate the relationship between the micro and macro and may allow particular actors greater or lesser influence in particular situations.

Therefore, the study uses Kingdon's Theory as the analytical framework for the first stage of the policy process to analyse the agenda-setting of Telehealth Policy which mainly occurred at the macro level. Meanwhile, to investigate Telehealth implementation at the district health departments, hospital and clinics (meso- and micro-level), the study used the implementation science approach using the NPT as the analytical framework. The following sub-sections (2.4.1 and 2.4.2) discuss briefly the reasons for the selection of the two theories used in this study.

#### **2.4.1 The First Stage of Policy Process: Kingdon's Multiple Stream Theory as the analytical framework on the agenda-setting and Telehealth Policy formulation**

The focus for the first part analytical framework is on understanding the process of the policy formulation and the agenda-setting. Thus, the analysis followed the elements of the three stream that is the problem, policy and political stream. The study shall identify the 'policy window', by which the Telehealth policy was set as a national health policy in Malaysia in 1997 at the macro level. In addition, elements in the Multiple Stream Theory like 'policy actors' and 'policy entrepreneurs' is determined.

#### **2.4.2 The Second Stage of Policy Process: Normalisation Process Theory as analytical framework on Telehealth implementation**

The second stage focused on exploring the facilitating and hindering factors of the Telehealth implementation. Using the operational terms for Telehealth policy defined in

sub-section 2.2.2, the analysis uses the historical approach, starting from mid-1997 onwards, when the Telehealth implementation commenced after the introduction of the Telemedicine Blueprint. Based on the elements of the collective action construct of NPT: Interactional Workability (IW), Relational Integration (RI), Skill Set Workability (SSW), and Contextual Integration (CI) (C. R. May et al., 2009; C. R. May, Mair, Dowrick, & Finch, 2007; Carl May & Finch, 2009; Murray et al., 2011) (Figure 2.2 and sub-section 2.3.2.5). The decision to concentrate on an analytical framework to the selected construct was based on the notion that the collective action construct is relevant to “implementers” that mainly occurred at the meso- and micro- and micro-level.

Therefore, the analytical framework focuses on the following:

- a) **Assessment of Normalisation:** The degree to which Telehealth technology had become “normalised” in the healthcare setting.
- b) **Interactional workability:** What is the impact of Telehealth technology on the daily tasks and activity in the hospital/clinics? Has it been positive or negative; and why?
- c) **Relational Integration:** What is the impact of Telehealth technology in terms of peer-to-peer or professional relationship in the working environment?
- d) **Skill set workability:** Does Telehealth technology “fit” with the users’ skill sets, or are the users required to learn the requisite skills?
- e) **Contextual Integration:** Does telehealth technology match with the overall organisational context, such as organisational goals, quality of leadership within the organisation, infrastructure readiness, and patient’s expectation, etc.

## 2.5 Conclusion

Selected literature in policy studies, health policy and implementation science studies have informed the design of this study. Among the approaches that were examined to analyse policy processes of stages heuristic framework (Buse et al., 2012; Jenkins-Smith

& Sabatier, 1993; P. A. Sabatier, 1991a) and Multiple Streams Theory (Kingdon, 1984); Policy Triangle Framework which emphasise the role of actors, context, content and process in health policy (Walt & Gilson, 1994) and the Normalisation Process Theory (C. R. May et al., 2009; Carl May & Finch, 2009) from the field of implementation science to analyse Telehealth implementation in a complex setting like healthcare. The literature informed the study where a two-stage analytical framework was used to investigate Telehealth policy from a top-down perspective. The framing of analysis to macro-, meso- and micro levels of analysis, was also explored and found to be a useful analytical framework for this study. This offered a dynamic and comprehensive means to analyse and interpret the data.

While recognising that the approach used in this study may have limitations in accounting for all aspects of the multi-facets nature of Telehealth policymaking in Malaysia, it was, however, a useful tool for its application from the multidisciplinary field of study for policy implementation. As stated by Nilsen et al. (2013): “We believe there is an important learning for implementation science researchers to be derived from several aspects of policy implementation research and from associated research into various implementation and/or policy issues in political science - ultimately, a broad, multidisciplinary research enterprise is needed to realise the ambitions of improved implementation of research findings in healthcare and achieving a more research-informed clinical practice”. In Chapter 3, this thesis shall describe the research methodology and design of this study.

## **CHAPTER 3 : THE STUDY CONTEXT - MALAYSIA'S HEALTH SYSTEM AND TELEHEALTH**

### **3.1 Introduction**

The analysis of Telehealth policies in Malaysia requires an understanding of the background information pertaining to the subject. The aim of this chapter is to provide the contextual background of the Malaysian healthcare system. The context of the study is discussed with emphasis on the broad socio-economic and political environment of Malaysia particularly its healthcare system – its structure, policy planning and funding mechanism, as these areas are likely to influence health policy processes. The chapter will also examine the context where Telehealth policy is formulated - identifying how a problem is defined and why Telehealth was considered to be of potential benefit to the country's health.

The chapter begins by describing Malaysia's country profile, providing a general background of its geography and socio-economic status. Then, the characteristics of the government institutions that shape policy decisions are presented, providing an understanding of how policies were made or changed with an emphasis on healthcare. It discusses the role and relationships between the federal government, the ministries, as well as other agencies with regards to the administration and operation of the healthcare system. Then, a brief description of policies related to Telehealth is given. A summary of the development of Telehealth systems is provided and discussed as the basis of the context of policy analysis. This is followed by a discussion of the potential role of Telehealth in the context of reforming Malaysian healthcare.

Accordingly, this Chapter is presented in four sections.

Section 3.2 provides an account of the socio-demographic, political, and economic background of Malaysia as a middle-income country. The overview of the Malaysian Government system and its institutional setup, and the institutional roles and its relationship in policymaking are discussed.

Section 3.3 presents the review of the healthcare system in Malaysia. It discusses Malaysia's health status, its administrative structure and the healthcare services delivery setup briefly.

Section 3.4 examines the development of Telehealth in Malaysia, including policies, strategies and action plans related to the concept of Telehealth. A summary of Telehealth systems in Malaysia is provided, and the performance of Malaysia's Telehealth is presented.

Section 3.5 discusses the contribution of Telehealth to ongoing reforms of Malaysian healthcare system, where the issues and challenges of Malaysian healthcare system are presented, and what is the potential of Telehealth to overcome those challenges. The chapter then concludes with the summary of the contexts in which this study is drawn.

## **3.2 Malaysia - Country Profile**

Malaysia is a country in Southeast Asia, bordered by Thailand in the north and Singapore in the south with a total area of approximately 330,803 km<sup>2</sup>. It is a federation of 13 states and three federal territories which are divided into Peninsular Malaysia and East Malaysia. Malaysia is characterised by its ethnically, culturally and linguistically diverse population and its varied geography. It has a population of nearly 32 million<sup>13</sup> and the

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<sup>13</sup> Source: Malaysia Statistics Department at <https://www.statistics.gov.my/> accessed on 29 February 2016.



capital city of Malaysia is Kuala Lumpur. The country's federal administration centre is located in the Federal Territory of Putrajaya.

The country's economy has transformed since five decades ago - from being agriculturally based to a broad-based economy driven by industrial and service sector activities. The World Bank classifies Malaysia as an upper middle-income country<sup>14</sup>, with its gross national income (GNI) per capita is at US\$10,570 which ranks globally at 87<sup>th</sup> among 217 countries in 2015<sup>15</sup>. The achievements in managing and restructuring its socio-economic status to where it is today are attributed to the adoption of several economic development strategies introduced by the Malaysian government since her independence in 1957.

The Malaysian government practices parliamentary democracy with constitutional monarchy, with Yang Di-Pertuan Agong (the King) as the head of the state<sup>16</sup>. The legislative practices at the federal level are similar to the Westminster parliamentary system, a legacy of more than 100 years British colonial rule. The executive is led by the Prime Minister, which appoints the cabinet from among the members of parliament with the consent of the Yang Di-Pertuan Agong.

The Federal Constitution of Malaysia divides the power of government into Legislative, Executive and Judiciary which applies to both federal as well as the state. The distribution of powers is elaborated in the Ninth Schedule of the Malaysian Federal Constitution, which provides the general distribution of legislative powers between the

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<sup>14</sup> Source: <http://www.worldbank.org/en/country/malaysia/overview#1> accessed on 29 February 2016.

<sup>15</sup> Source: World Development Indicators Database, World Bank, 17 February 2016 from <http://databank.worldbank.org/data/download/GNIPC.pdf> accessed on 25 April 2017.

<sup>16</sup> The Yang Di-Pertuan Agong (the King) is elected for a 5-year term among the nine hereditary Sultans of the Malay states. The other states are ruled by the Yang Di-Pertua Negeri or Governor.

federal and state governments into three: Federal List; State List and Concurrent List<sup>17</sup>. Thus, the policy formulation lies under the purview of the federal government and state government. However, Yusof and Bhattasali (2008) had suggested that, in addition to the federal and state government, the various ministries as well as the government-linked companies (GLCs), and the private sector have also influenced some policy decision-making in the country.

As defined in the Ninth Schedule of the Malaysian Federal Constitution, the federal government has the obligatory functions of health and medicine, and the public health is a shared function of the federal and state governments. The federal government ministry, the Ministry of Health (MoH) is primarily responsible to manage and administer health-related issues nationwide. The local government, such as city council, municipal council or district council is empowered to perform some obligatory and discretionary functions related to health, particularly on public health<sup>18</sup>. The MoH as the primary organisation responsible for the national health affairs including national health planning and health policymaking is discussed further in Section 3.3.

### **3.2.1. Malaysian economy profile - A paradigm shift from labour-intensive manufacturing economy to knowledge-based economy**

Since independence in 1957, Malaysia has achieved impressive economic performance. The country's economy moved from being primary commodity and agricultural-based in the post-independence era to a manufacturing base in the 1980s, and has focused on export-driven, high-technology and capital-intensive industries since the 1990s

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<sup>17</sup> The relations between the Federation and the states is governed by Part VI of the Federal Constitution. Article 74 together with the Ninth Schedule of the Constitution deals with the distribution of legislative powers between federal and state governments, and provides the Federal, State and Concurrent Legislative Lists. The Federal List covers 25 headings which include external affairs, defence, internal security, civil and criminal law and procedure, finance, commerce, industry, communication and transport, surveys, education, and medicine and health. The State List has 11 headings and includes Islamic law, land, agriculture, forestry, local government, and water. The Concurrent List (shared functions) covers 12 headings such as social welfare, public health, drainage and irrigation, and housing (Constitution of Malaysia, Ninth Schedule in Sundaram & Wee, 2013b, p. 138).

<sup>18</sup> The local government have obligatory functions in public health such as the control of communicable diseases and matters related to sewerage and cleaning. Some local authorities had also physical setup to offer subsidized healthcare service, however, majority of public health service delivery is by the federal government i.e. Ministry of Health.

(Economic Planning Unit (EPU) Prime Minister's Department, 2001, 2006; Jomo, 2013).

The World Bank's 2008 Growth Report recognised that Malaysia had recorded economic growth of more than 7% average for thirty years from 1967 to 1997 (Commission on Growth and Development World Bank, 2008). Also, despite the Asian financial crisis in 1997-1998, which resulted in negative Gross Domestic Product (GDP) growth of -7.4%, the country was able to gain solid growth rates, averaging 5.5% per year from 2000 – 2008<sup>19</sup>. The country's achievements were attributed to the leadership of the fourth Prime Minister, Dr. Mahathir Mohamad<sup>20</sup> who had introduced several successive policies under his regime to transform Malaysia into an industrialised high-income country (Bunnell, 2002a; Jomo, 2004; J. J. Lepawsky, 2005; Sundaram & Wee, 2013a).

In 1991, Dr. Mahathir Mohamad proposed a bold aspiration to Malaysia, referred to as the 'Vision 2020'. The vision states a 30-year master plan to accelerate Malaysia to be a fully developed country by the year 2020, using Information and Communication Technology (ICT) as the catalyst for the transformation of the Malaysian into a developed high-income nation<sup>21</sup> (Economic Planning Unit (EPU) Prime Minister's Department, 2001; Vicziany & Puteh, 2004). Vision 2020 had envisaged that the incorporation of ICT-led and knowledge-economy (k-economy) would have a prominent role in driving productivity and sustaining economic growth, leading to sustainable GDP growth rates in the long run. It was projected that level of the country's GDP to increase fourfold within

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<sup>19</sup> The Asian Financial crisis started as a financial crisis in Thailand, with the collapse of Thai Baht on 2nd July 1997 when its value fell 60% overnight. The currency instability then spread to the neighbouring countries in the Southeast Asian region, and developed into an economic crisis of serious proportions. It caused the currency, the Malaysian Ringgit (RM), to depreciate by 48 percent to the USD. The stock market decreased by 62 percent and the real property market almost collapsed (Doraisami, 2014; Dornbusch, 2002; Rasiah, 1998). In response to the crisis, Malaysia undertook several capital controls (Doraisami, 2014; Dornbusch, 2002; Mitchell & Joseph, 2010).

<sup>20</sup> Dr Mahathir Mohamad was the longest-serving Prime Minister of Malaysia. He governed the country for 22 years, from 1982 until October 2003.

<sup>21</sup> The 'Vision 2020' was unveiled during the Prime Minister Dr Mahathir's speech titled 'Vision 2020 – A Way Forward' presented at the inaugural meeting of the Malaysian Business Council held in Kuala Lumpur on February 28, 1991. The "Vision 2020" is Dr Mahathir's long-term vision, believed to lead Malaysia towards 'becoming a fully developed, matured and knowledge-rich society by year 2020'. In essence, the vision calls for the country to evolve into 'information-rich' and 'knowledge-based' society, capable to for a sustained, productivity-driven growth, which will be achievable only with a technologically literate, critically thinking workforce prepared to participate fully in the global economy of the 21st century (Mohamad, 1991; Vicziany & Puteh, 2004).

20 to 25 years, reaching a prosperous society at par with the other high-income nations (Mohamad, 1991).

### **3.2.2 The Multimedia Super Corridor initiative**

The concept of Vision 2020 provides an impetus for the country's economic development and promoting social justice towards becoming a developed country. As the former prime minister, Dr Mahathir Mohamad envisioned in his speech:

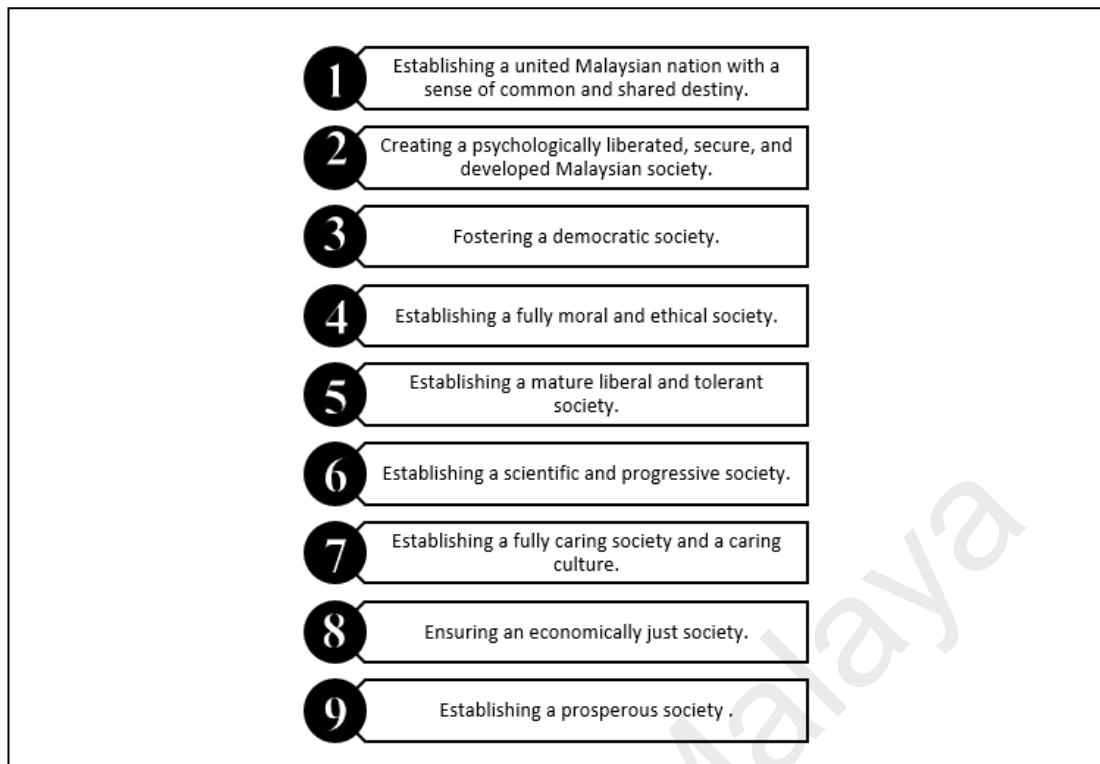
*“Malaysia can be a united nation, with a confident Malaysian society, infused by strong moral and ethical values, living in a society that is democratic, liberal and tolerant, caring, economically just and equitable, progressive and prosperous, and in full possession of an economy that is competitive, dynamic, robust and resilient.”*

*(Mohamad, 1991)*

Further, he promoted the creation of an ‘information-rich’ society, describing how ‘information’ will become a source of the country's prosperity:

*“In the information age that we are living in, the Malaysian society must be information-rich.....no wealthy developed country that is information-poor and no information-rich country that is poor and undeveloped” (Mohamad, 1991)*

The Vision not only outlines Malaysia's ambition to be developed in the ‘material’ sense of economy but also to be fully developed in the sense of political, social, spiritual and cultural sense. Mahathir proposed that there were nine strategic challenges to be overcome in order to achieve the country's target to become a developed high-income nation (Mohamad, 1991). (Refer to Figure 3.1: The Nine Challenges of Vision 2020).



**Figure 3.1: The nine challenges of Vision 2020 (Mohamad, 1991, pp.24)**

The strong aspiration towards achieving k-economy resulted in the inclusion of ICT agenda for the first time into the federal government five-year national development plan, the Sixth Malaysia Plan (1991 – 1995)<sup>22</sup>. (Economic Planning Unit (EPU) Prime Minister's Department, 1991; Harris, 1998).

It was also during this period when the government established the National ICT Agenda (NICTA) which served as an important thrust for the diffusion and integration of ICT in all sectors of the country's economy (Kuppusamy & Shanmugam, 2007), followed by the announcement of the "Multimedia Super Corridor" (MSC) initiative by Dr Mahathir Mohamad in August 1995 (Harris, 1998). Various national strategies were also implemented to promote national and international ICT investments, and RM50 billion

<sup>22</sup> The Malaysia Plan is a cyclical five year national socio-economic development planning mechanisms for the whole nation. It was first started for the period of 1966-1970 – the First Malaysia Plan, and continued as the following: Second Malaysia Plan (1971-1975); Third Malaysia Plan (1976-1980); Fourth Malaysia Plan (1981-1985); Fifth Malaysia Plan (1986-1990); Sixth Malaysia Plan (1991-1995); Seventh Malaysia Plan (1996-2000); Eight Malaysia Plan (2001-2005); Ninth Malaysia Plan (2006-2010); Tenth Malaysia Plan (2011-2015). It provides an important direction and strategies that fundamentally restructured the economy in the modern Malaysian economic history since the last 30 years (Z. A. Yusof & Bhattasali, 2008).

was allocated to establish the required infrastructure in the following year (Sundaram & Wee, 2013a).

In line with this project, the Malaysian government established the Multimedia Development Corporation (MDeC) to develop, facilitate and oversee the MSC initiative. Inspired by the California-based 'Silicon Valley', the Government declared a geographical space, hence the term 'corridor', which covers an area of 50 x 15 km<sup>2</sup> zone, stretching from the PETRONAS Twin Towers in Kuala Lumpur (also referred to as the Kuala Lumpur City Centre, KLCC) to the Kuala Lumpur International Airport in Sepang. This 'corridor' includes Putrajaya (the new federal administrative centre), Cyberjaya (the national hub for ICT and R & D centre), Multimedia University, MSC Central Incubator (focusing on IT and multimedia) and Technology Park Malaysia (focusing on ICT and biotechnology). The development of the MSC plan was spread out over three phases covering a period of 25 years from 1996 to 2020. (Figure 3.2)

	Phase I (1996 – 2004)  Create Multimedia Super Corridor	Phase II (2004 – 2010)  Link MSC to other cyber cities in and outside of Malaysia	Phase III (2010 – 2020)  Transform Malaysia into Knowledge-society
Target Milestone	<ul style="list-style-type: none"> <li>• 1 corridor.</li> <li>• 50 world-class local companies.</li> <li>• Launch 7 flagship applications.</li> <li>• World leading framework of Cyberlaws.</li> <li>• Cyberjaya as world-leading intelligent city.</li> </ul>	<ul style="list-style-type: none"> <li>• Web of corridors.</li> <li>• 250 world-class companies.</li> <li>• Enhance current flagship applications and introduce new one.</li> <li>• Harmonisation of global framework of Cyberlaws.</li> <li>• Enhance local ICT industry.</li> <li>• Link 5 intelligent cities to other global intelligent cities.</li> </ul>	<ul style="list-style-type: none"> <li>• 500 world-class companies.</li> <li>• Global test-bed for multimedia application.</li> <li>• International Cybercourt of Justice in MSC.</li> <li>• 12 intelligent cities linked to one another.</li> </ul>
Achievements to-date	<ul style="list-style-type: none"> <li>• Build a corridor ranging from KLCC to KLIA.</li> <li>• 742 companies (10 strong performers and 50 foreign and local MNC's were awarded MSC Status).</li> <li>• 7 flagship applications were launch before end of Phase I.</li> <li>• Comprehensive set of Cyberlaws were enacted but Personal Data Protection Act are still pending</li> <li>• More focused on development of physical infrastructure in Cyberjaya while social infrastructure was not at the same pace</li> </ul>	<ul style="list-style-type: none"> <li>• 7 Cybercities and 8 Cybercentres have been created while southern and eastern corridors are still undergoing development</li> <li>• As of October 2008, 2173 companies in total have been awarded MSC Malaysia status while 9% from this number were inactive.</li> <li>• Flagship applications that were launched are still in enhancement process of its potential (Electronic Government, MyKad, Smart School and Telehealth) and there have been no new flagship launched.</li> <li>• ICT related laws especially IP-protection right have yet be adequately enforced</li> </ul>	<ul style="list-style-type: none"> <li>• In the hope by end of Phase III Malaysia will be transformed into Knowledge society</li> </ul>

**Figure 3.2: The MSC development plans and proposed achievements 1996 – 2020 (Source: MSC Malaysia website [www.mscmalaysia.my](http://www.mscmalaysia.my) and the National IT Council)**

The idea behind MSC was to be the world's "Multimedia Utopia" becoming the test bed for all sorts of new multimedia and ICT applications, positioning Malaysia as a competitive player in the global economy (Huff, 2002; Z. A. Yusof & Bhattasali, 2008). The growth in the ICT sector industry would generate a spill-over effect to the rest of the country to spearhead the socio-economic development towards a developed nation by 2020, transforming Malaysian society into a k-economy in the various commercial and socio-economic areas (Harris, 1998; Huff, 2002; Sundaram & Wee, 2013a). The

government had identified seven key initiatives, named the ‘MSC Flagship Application<sup>23</sup>’ to accelerate the growth of MSC, which includes Telehealth (Figure 3.3).



**Figure 3.3: The seven MSC Flagship Applications, which includes Telehealth**  
(Source: MSC Malaysia website [www.mscmalaysia.my](http://www.mscmalaysia.my) and Suleiman, 2001)

The ‘MSC Flagship Applications’ strategy was to encourage private sector involvement, offering the title of ‘MSC-status companies’ which entitled them for incentives for national and foreign investment in Malaysia (Bunnell, 2002a, 2002b; Davidson, 2002; Economic Planning Unit (EPU) Prime Minister’s Department, 2006; Kuppusamy & Shanmugam, 2007; J. Lepawsky, 2005). In addition, lucrative procurement contracts were offered by the government to spur new development activities as an effort to promote investment opportunities (Greg Felker & Sundaram, 1999).

<sup>23</sup> The ‘MSC Flagship Applications’ were introduced as the ‘catalyst’ to establish the basic foundations of the aim k-economy, such as networks infrastructure, human resource development, science and technology investments, strong financing mechanisms, equity matters, research and development and bridging the digital divide between the urban and rural population (Malaysia Economic Planning Unit, 1996, 2001a).



There were four key MSC Flagship Applications led by the government i.e.: (1) Electronic Government; (2) Government Multipurpose Card (MyKad); (3) Smart Schools; and (4) Telehealth (NITC Malaysia, n.d.). According to Ramasamy et al. (2004), the Government's role in these flagships, was (1) as the 'rule-maker' – by instituting appropriate policies and regulation to encourage industrial and business development; (2) as the 'output demander' – acting as the major buyer or user of the services/products; and (3) as the 'financier' – by allocating funds during the initial setup in the form of venture capital. The MoH, being the federal government agency responsible for the country's health affairs assumed the responsibility to embark on the Telehealth Flagship (Mat Som, Norali, & Megat Ali, 2010; Suleiman, 2001).

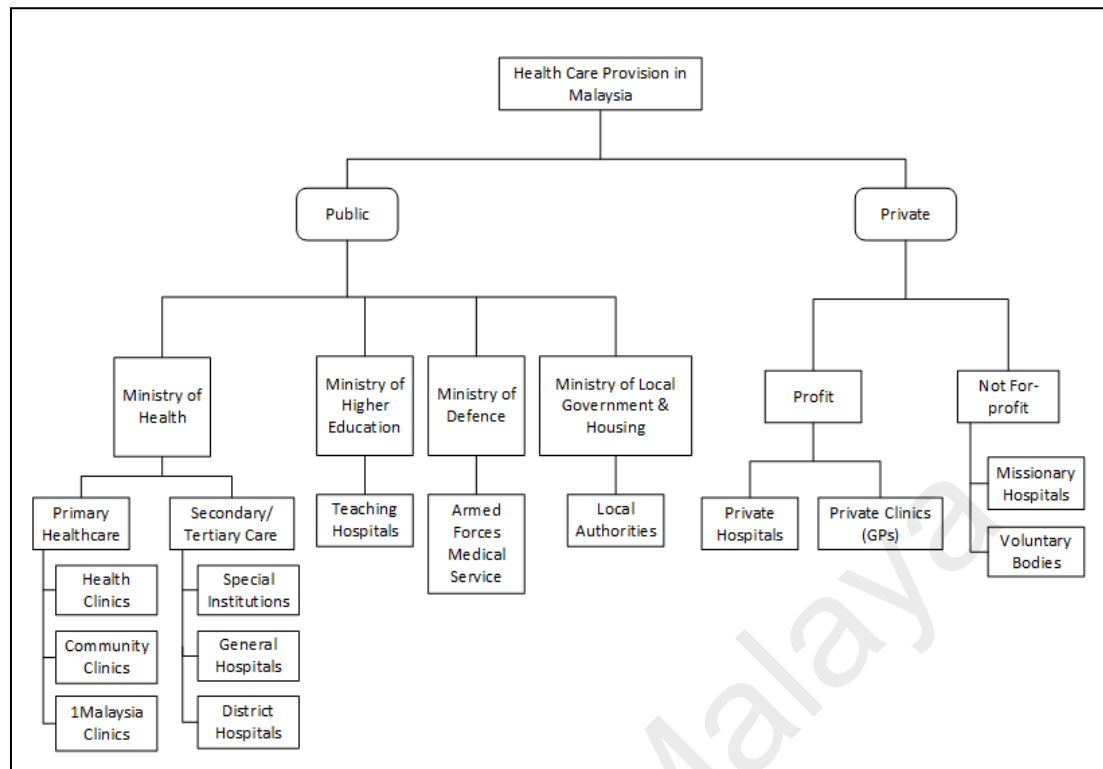
However, even before the 'Vision 2020', government policies on innovation in science and technology for economic and social benefits had been introduced since the 1980s (Greg Felker & Sundaram, 2007). The 1980s-1990s was an era where there was a global trend of major reforms of the public service in the high-income as well as the middle-income countries to develop a public services system that are dynamic, mission-oriented and efficient in the delivery (Siddiquee, 2002, 2006). The advancements in ICT offered prospects to transform public service provision to meet the high citizens' expectations for a more efficient and responsive public services delivery, and that includes healthcare. The public healthcare sector had also adopted the use of ICT since the 1990s, as reported by Merican and Yon (2002), Bulgiba (2004), and Mohan (2010). To further discuss the development of the ICT initiatives in the health sector including Telehealth, the thesis shall continue description of the background of the Malaysian healthcare system, the sector which is very much concerned with Telehealth.

### **3.3 Healthcare in Malaysia**

The analysis of the study context continues on the Malaysian healthcare system. It begins with the general descriptions of the health system, the institutions for administrative

function, and the setting up for services delivery. Then, the context for change is discussed, explaining the issues and challenges of the healthcare system and how the adoption the ICT initiatives (including Telehealth) was incorporated in the national health strategy to overcome the country's healthcare challenges.

The provision and financing of the Malaysian healthcare service is a combination of public and private. As stated in the Federal Constitution, the government is responsible for the country's overall health affairs, and the Ministry of Health is the main ministry responsible the aspects of service provision, financing, regulatory and the overall planning and management of the national population health. MoH is organised under a civil service structure and assumed direct responsibility for the provision and development of health services throughout the entire country which plans and regulates the public-sector health services as well as other government agencies, the private sector, and non-government organisations (NGOs). (refer to Figure 3.4)

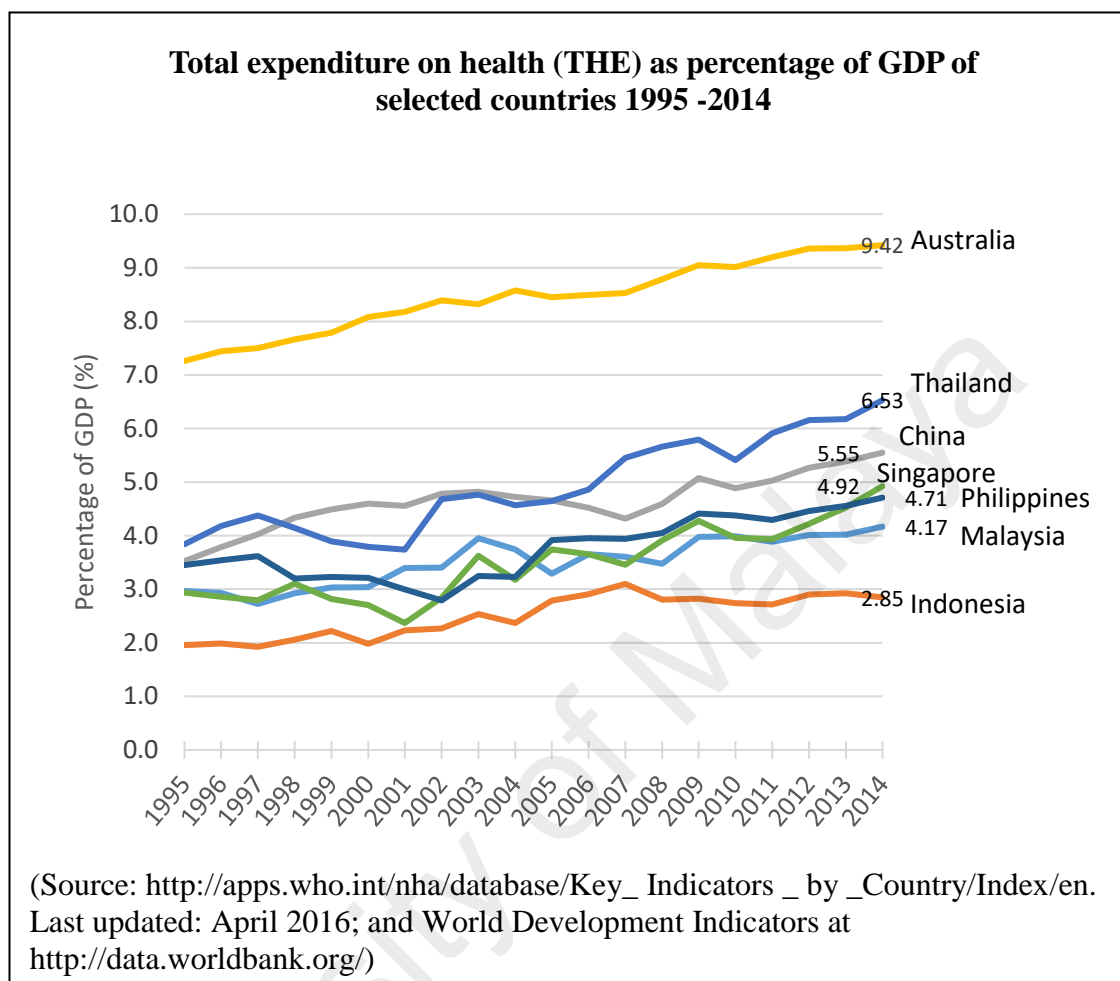


**Figure 3.4: Healthcare service provision in Malaysia (Adapted from Ghani & Yadav, 2008)**

The public-sector healthcare facility provides an almost universal healthcare coverage across the entire population through a heavily subsidised financing mechanism at a nominal cost fee or for free (Safurah et al., 2013). The healthcare financing is from general taxation and funding is allocated by the Ministry of Finance (the Treasury) to the MoH through the annual federal budget. The national health expenditures are low by comparison with countries at similar levels of economic development. In 2014, the total expenditure for health (THE) was at 4.17% of GDP when the average for upper-middle-income countries is at 6.3%<sup>24</sup>. Nevertheless, the Malaysia health expenditure has been on an upward trend for the past 20 years. When compared to selected countries in the Western Pacific Region, Malaysia's total health expenditure (THE) as a percentage of GDP recorded higher than Indonesia, which was 2.85% in 2014, while expenditure for

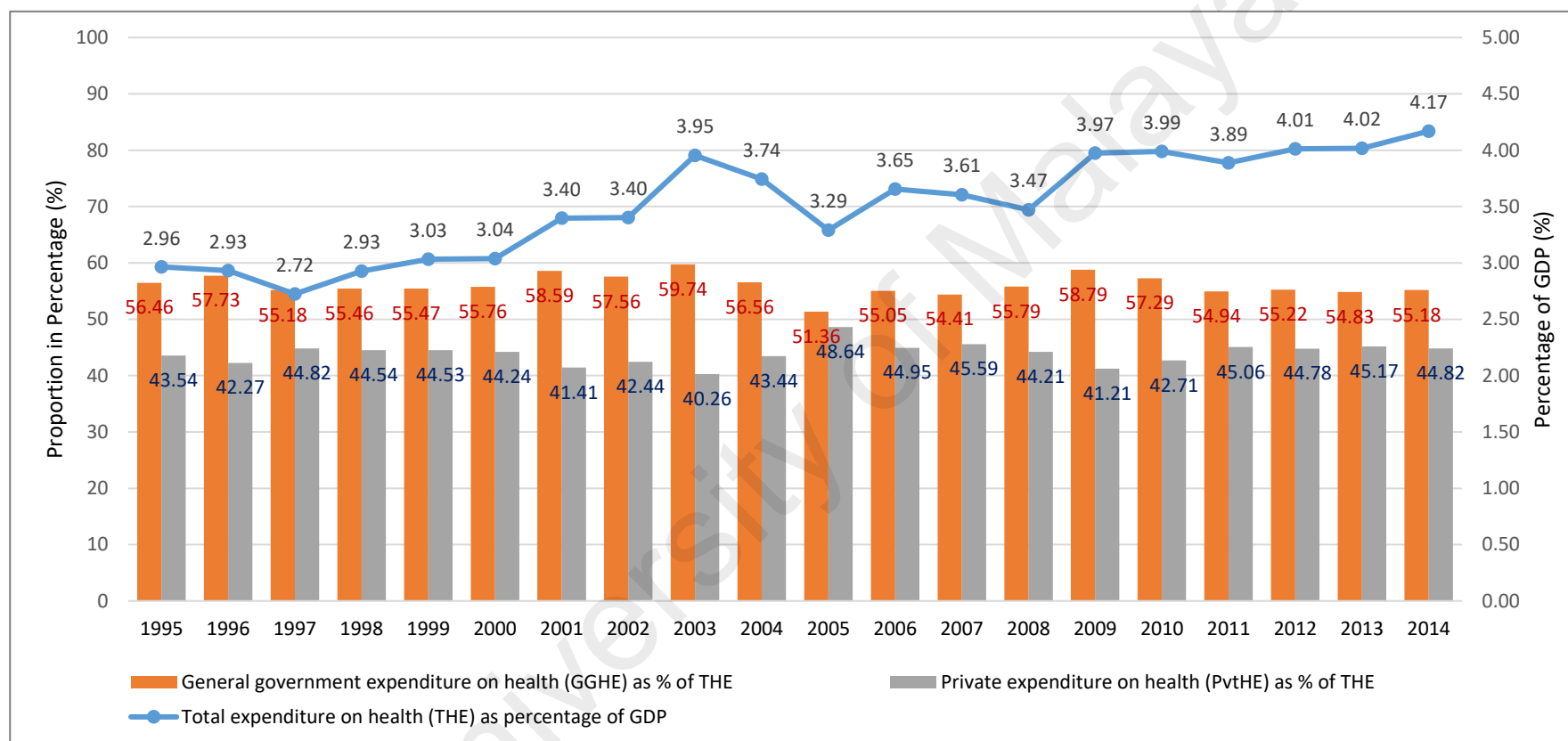
<sup>24</sup> Source: <http://data.worldbank.org/income-level/UMC> accessed 29 February 2016.

neighbouring countries like Thailand, Singapore and Philippines were 6.53%, 4.92% and 4.71% respectively (Figure 3.5).



**Figure 3.5: Malaysia's total expenditure on health (THE) as percentage of GDP in comparison with its neighbouring countries (Source: WHO Global Health Expenditure Database, 2016 and World Bank, 2016)**

Throughout the years, the government has been the major financier for health with the share of health expenditure greater than the private expenditure by about 51 – 59% (Figure 3.6).



Note: Throughout the years, the public spending surpassed the private spending, causing the increasing burden of government spending for the country's population health.

**Figure 3.6: Malaysia total health expenditure (THE) as percentage of GDP and proportion in percent of public and private spending, 1995 – 2014.**

Despite having a comparatively low THE as a percentage of GDP, the quality of the Malaysian healthcare system has improved to become close to that of high-income countries as evidenced by several health indicators. For example, throughout the 1990 to 2014 period, life expectancy at birth had increased significantly (males from 69.0 years to 72.4 years, females from 72.6 years to 77.1 years), the infant mortality rate fell (from 14.3 to 6.2 per 1,000 live births), whilst the maternal mortality ratio had dropped substantially (from 45 in 1990 to 25 per 100,000 live births in 2013) (see Table 3.1). (Ministry of Health, Malaysia, 2015; Safurah et al., 2013).

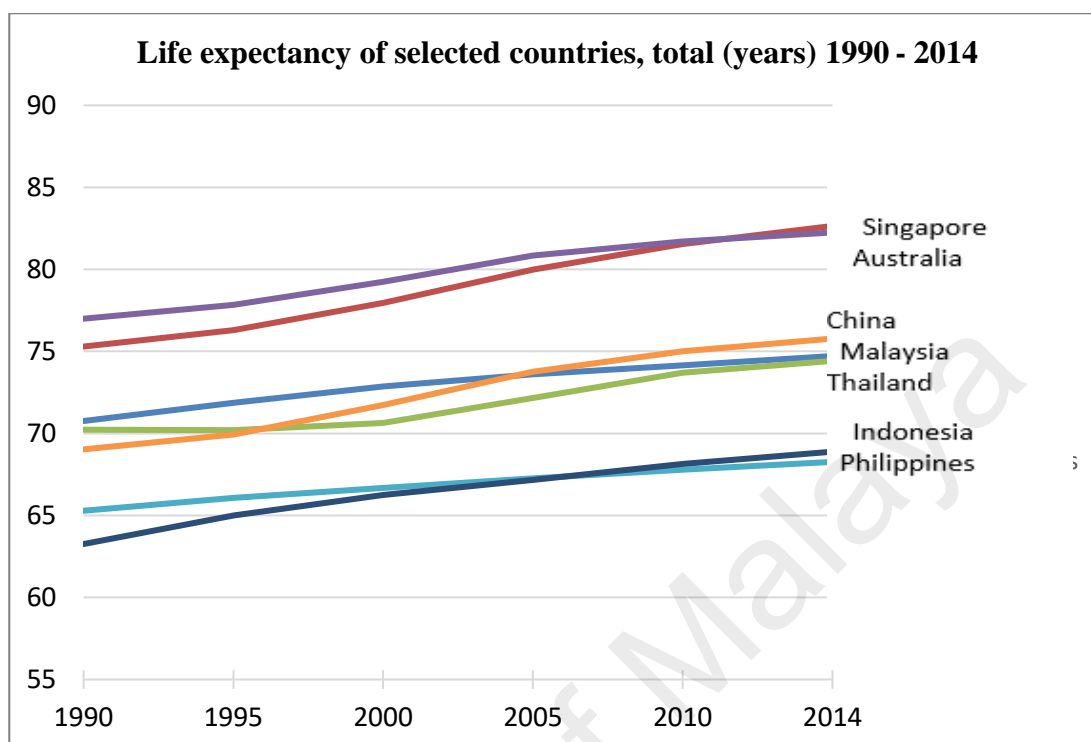
**Table 3.1: Malaysia, selected health indicators (1980 - 2014)**

Health status indicator	1980	1985	1990	1995	2000	2005	2010	2014
Life expectancy at birth, female (years)	69.6	71.2	72.6	73.9	75.0	75.8	76.5	77.1
Life expectancy at birth, male (years)	66.6	67.9	69.0	70.0	70.9	71.5	71.9	72.4
Birth rate, crude (per 1,000 people)	29.4	29.2	28.2	26.7	22.5	18.0	16.8	16.8
Maternal mortality ratio (national estimate, per 100,000 live births)	90.0	60.0	45.0	40.0	30.0	28.0	28.0	(25*)
Mortality rate, infant (per 1,000 live births)	25.4	18.6	14.3	11.5	8.7	7.0	6.8	6.2
Mortality rate, under-5 (per 1,000)	30.5	21.8	16.6	13.3	10.2	8.2	8.0	7.2
Death rate, crude (per 1,000 people)	5.8	5.2	4.9	4.6	4.4	4.5	4.7	4.9
Hospital beds (per 1,000 people)	(NA)	2.6	2.1	2.0	(NA)	1.8	1.8	(1.9*)
Physicians (per 1,000 people)	0.3	0.3	0.4	0.5	0.7	(NA)	1.2	1.5
Rural population (% of total population)	58.0	54.1	50.2	44.3	38.0	33.4	29.1	26.0
Urban population (% of total)	42.0	45.9	49.8	55.7	62.0	66.6	70.9	74.0

Source: Health Nutrition and Population Statistics, available at [www.dataworldbank.org](http://www.dataworldbank.org) and Malaysia Health Facts 2015 (Ministry of Health, Malaysia, 2015).

Note: NA – Data not available; (\*) data for 2013

The Malaysia's life expectancy (total) in comparison with its neighbouring countries is shown below as in Figure 3.7



**Figure 3.7: Malaysia's life expectancy (total) in comparison with selected countries (Source: World Development Indicators from [www.data.worldbank.org](http://www.data.worldbank.org)).**

Nevertheless, while common infectious and malnutrition diseases are declining, the prevalence of non-communicable diseases (NCD) is increasing. Findings from the recent Malaysian National Health and Morbidity Survey (NHMS) in 2015<sup>25</sup> had suggested that the prevalence of Type 2 diabetes for adults above the age of 18 years has increased from 15.2% in 2011 to 17.5% in 2015, and the prevalence of hypertension remains high at 30.3%. The survey also indicated that there is an alarming trend in national prevalence of obesity in adults, from 4.4% in 1996 to 15.1% in 2011 and 30.6% in 2015 (Institute for Public Health MoH Malaysia, 2015). The Malaysian MoH had recognised the significance of the increasing NCDs burden and had taken the necessary actions to

<sup>25</sup> The Malaysian National Health and Morbidity Survey is a national survey by the Institute of Public Health, Ministry of Health. The latest survey was conducted in 2015. The survey was first conducted in 1986 to collect self-reported information on health status from the Malaysian population.

respond the problem and to improve population health status in general. These strategies are implemented throughout the existing healthcare delivery infrastructure as well as involving multi-sectoral approaches. (Mustapha et al., 2014; Noh, 2011; Safurah et al., 2013).

### **3.3.1 The healthcare service delivery set up**

As stated at the beginning of Section 3.3, the healthcare delivery system is a dual system comprising public and private (refer to Figure 3.4). Public healthcare service is mainly delivered by the MoH. Others include the hospitals and clinics owned by the public universities, Ministry of Defence and the local authorities. Comprehensive healthcare service is offered to the population, ranging from primary, secondary and tertiary care. The public-sector has provided a balanced programme for population health development including health promotion, preventive, curative and rehabilitative service (Noh, 2011; Safurah et al., 2013).

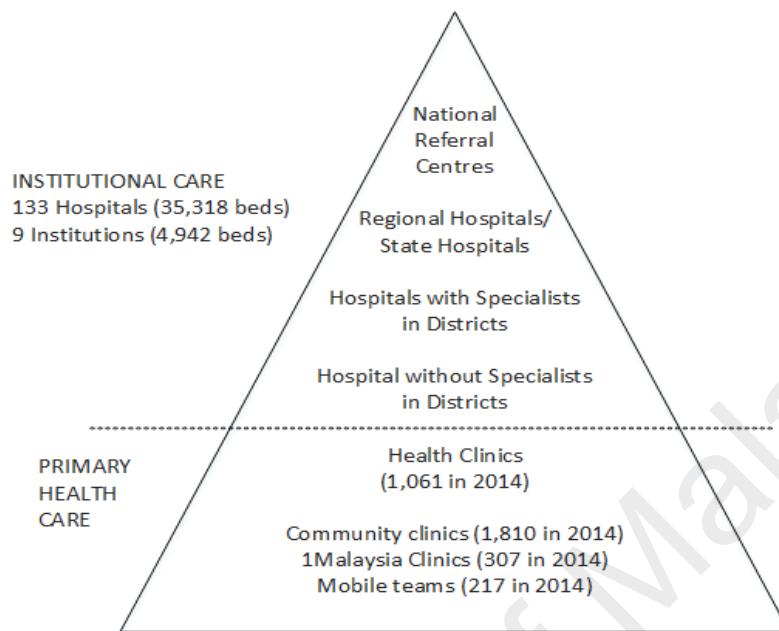
As for the public healthcare delivery system by the MoH, the national setup for healthcare facilities is organised with three levels of services according to a hierarchical pyramid concept: the primary care service (through the health clinics and community clinics), the secondary care (hospitals with or without specialists) and the tertiary care (specialised hospitals and the university hospitals). This hierarchical setup, named the “National Referral System” (as shown in Figure 3.8) allows patients from anywhere in the country to be referred to the appropriate hospital and to access and visit several healthcare facilities through a nationwide network of clinics, hospitals and other health programmes in a convenient manner (Merican & Yon, 2002). In 2014, there were 1,061 health clinics, 1,810 community clinics, and 307 1Malaysia clinics<sup>26</sup> spread out

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<sup>26</sup> 1Malaysia Clinic was introduced in 2010, as part of the government “political marketing” campaign of 1Malaysia. It provides basic medical services targeted for urban poor population. Clinics were set up at urban dwellings and offer treatment for mild illnesses and injuries (Sani, 2015).



throughout the country, and there were 133 hospitals with the total of 35,318 beds (Ministry of Health, Malaysia, 2015).



**Figure 3.8: National referral system for the Malaysian Ministry of Health (Adapted from Merican & Yon, 2002 and Health Facts 2015, Ministry of Health, Malaysia, 2015)**

The government considered primary healthcare as the thrust of the country's healthcare system (Merican & Yon, 2002; Noh, 2011). Thus, to provide effective primary care services nationwide, the government set up healthcare facilities with one health clinic for every 20,000 population, and one community clinic for every 5,000 people (Hazrin et al., 2013). The health clinics also act as the gatekeeper if a patient needs to be referred to the appropriate specialist care in the hospital or the tertiary centre (Merican & Yon, 2002; Noh, 2011; Safurah et al., 2013). It was to ensure an integrated healthcare service provision to the population, ensuring greater equity, accessibility and better resource utilisation (Merican & Yon, 2002).

As to the private sector, the number of private clinics and hospitals in Malaysia has been increasing since the 1980s (Merican & Yon, 2002). As shown in Table 3.2, there is an increasing trend in the number of private health facilities being set up over the years. In

2014, there were 184 private hospitals (with a total of 13,038 beds), and approximately 7,000 private general practitioners in Malaysia (Ministry of Health, Malaysia, 2015). The development of the private health sector was to cater the demands of the affluent (Manaf, 2005). Further, the introduction of the Privatisation Policy by the federal government and several other policies which promote the relationship between public-private initiatives further enhances the mushrooming of private for-profit clinics and hospitals<sup>27</sup>. (Rasiah, Abdullah, & Tumin, 2011; Rasiah, Noh, & Tumin, 2009).

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<sup>27</sup> Privatisation in health care refers to the transfer of ownership from public (government) to private owners – either from previously government-held properties or from the introduction of new private properties. The privatization policy was first introduced by the government in 1983 with the concept of ‘Malaysia Incorporated’. However, the formal inclusion of the health care sector was formally announced when the government launched the Privatization Master Plan (PMP) in 1991 (other sectors include public utilities such as power, water, postal service, telecommunication and among others). In the PMP, twelve public hospitals were among 149 agencies identified for privatization in the Peninsular Malaysia. Several other policies related to the privatization of the health sector include: 1) encouragement for private hospital and private medical insurance business; 2) corporatization of government hospital, such as the National Health Institute (IJN) and the teaching hospitals belonged to the public universities; 3) introduction of full payment system in the public hospitals (Full Paying Patient); 4) setting up of private wing or commercial accounting department in the government hospitals; and 5) contracting out non-medical services, such as medical store and health support services (see Gomez, 1997; Rasiah et al., 2011, 2009).

**Table 3.2: Public and private health facilities, Malaysia (2006 - 2014)**

Year	Hospitals		Beds		Bed: Population Ratio	Primary care clinics	
	Public	Private	Public	Private		Public*	Private
<b>2006</b>	128	232 <sup>+</sup>	30,969	11,637 <sup>+</sup>	1 : 530 <sup>+</sup>	895	NA
<b>2008</b>	130	209	33,004	11,689	1 : 520 <sup>+</sup>	897	6,371
<b>2010</b>	131	217	33,211	13,186	1 : 515 <sup>+</sup>	917	6,442
<b>2012</b>	132	209	38,978	13,667	NA	1,025	6,675
<b>2014</b>	133	184	40,260	13,038	NA	1,061	6,978
Note: (*) including Maternal and Child Health Clinics. NA = Data not available							
(Source: Ministry of Health, Malaysia. <i>Health Facts</i> and (+) <i>National Health Indicators</i> . Health Informatics Unit, Planning Division, Ministry of Health, Malaysia. Accessed from <a href="http://www.moh.gov.my">www.moh.gov.my</a> )							

The private providers are reimbursed by fee-for-service and financed mainly through out-of-pocket payments (Chua & Cheah, 2012; Ng, 2015; Safurah et al., 2013). Private facilities are monitored and regulated by the Malaysian government to ensure the quality of service and standardisation of fee structures. The regulatory environment was strengthened by the implementation of a Private Healthcare Facilities and Services Act 1998 (Act 586) and Private Healthcare Facilities and Services (Private Hospitals and Other Private Healthcare Facilities) Regulations 2006 [P.U. (A) 138/2006].

In the private sector, patients have reasonably free access to specialists depending on the ability to pay directly or through a system of medical insurance. This has given rise to the issues concerning efficiency and health equity. With regards to ‘mal-distribution’ of specialist medical manpower, a study by Wong and colleagues has found that specialist in the private sector managed only a small proportion of complex cases requiring specialist expertise (19.1%), and specialists serving in the public-sector handled a higher proportion of complex cases, 69.8% and 73.5% in the MoH and public universities respectively. (Wong, Mohan, & Suleiman, 1998).

The growth of the private sector had also influenced the healthcare financing arrangement. According to the Malaysian National Health Account Report, there has been an increasing trend for out-of-pocket (OOP) share, from 75% in 1997 to 82% in 2014. The OOP expenditure has also increased from RM2,930 million in 1997 to RM19,544 million in 2014, equates to a nearly fourfold increase in per capita OOP health spending in absolute value from US\$42.1 in 1997 to US\$160.9 in 2014 (National Health Accounts (MNHA) Unit Ministry of Health Malaysia, 2011). The increasing trend of OOP spending and the escalating healthcare cost for health has raised the concern whether the existing health financing mechanism is able to sustain the three dimensions of universal coverage: breadth and depth of coverage, and the levels of financial risk protection for the population (Chua & Cheah, 2012; Yu, Whynes, & Sach, 2011).

Concerning human resources for health, the ratio of medical personnel to the population has risen over the years. However, the physician density is still low in Malaysia in comparison to the averages for high, upper middle, as well as lower-middle-income countries. In 2010, the physician density was 1.2 per 1,000 people (refer to Table 3.3).

**Table 3.3: Physician density in Malaysia in comparison of averages of countries according to income levels**

	Physician density (number per 1,000 population)
<b>Malaysia</b>	<b>1.2 (2010)</b>
Average for high-income	3.1 (2011)
Average for middle-income	1.2 (2011)
Average for upper middle income	1.8 (2011)
Average for lower middle-income	0.8 (2011)

(Source: data.worldbank.org)

### 3.3.2 The national health planning, policymaking and policy implementation

The national health policymaking in Malaysia is undertaken centrally at the federal level largely under the responsibility of the MoH (Chee & Barraclough, 2007a; Merican & Yon, 2002). In general, the national health policy formulation, planning and implementation are incorporated in the centralised national development policies, working at three horizon levels: (1) the long-term planning; (2) the medium-term planning; and (3) the short-term planning (Merican, Rohaizat, & Haniza, 2004; Merican & Yon, 2002). (Figure 3.9).



**Figure 3.9: The planning horizon for economic and development in Malaysia**  
(Source: Economic Planning Unit, Malaysia at <http://www.epu.gov.my/en/>)

There is a dedicated 'Health' chapter outlining the relevant policies related to the health sector in the short-term and medium-term planning documents (i.e. the Annual Budget, the Malaysia Plans and Mid-term Review<sup>28</sup>). The policy areas mentioned in these documents include planning for the health facility infrastructure such as health clinics, hospitals and special institutions; capacity building and remuneration scheme for health personnel; prioritised services and programmes of the preventive and curative health

<sup>28</sup> See footnote no. 22 page 56.

services; prioritised areas for medical research; pharmaceutical control and regulation, ICT programmes in healthcare such as disease registries setup and deployment of electronic medical record (EMR) systems in government hospitals and clinics; and others such as health tourism promotion (Economic Planning Unit (EPU) Prime Minister's Department, 1991, 1996, 2001, 2006, 2011).

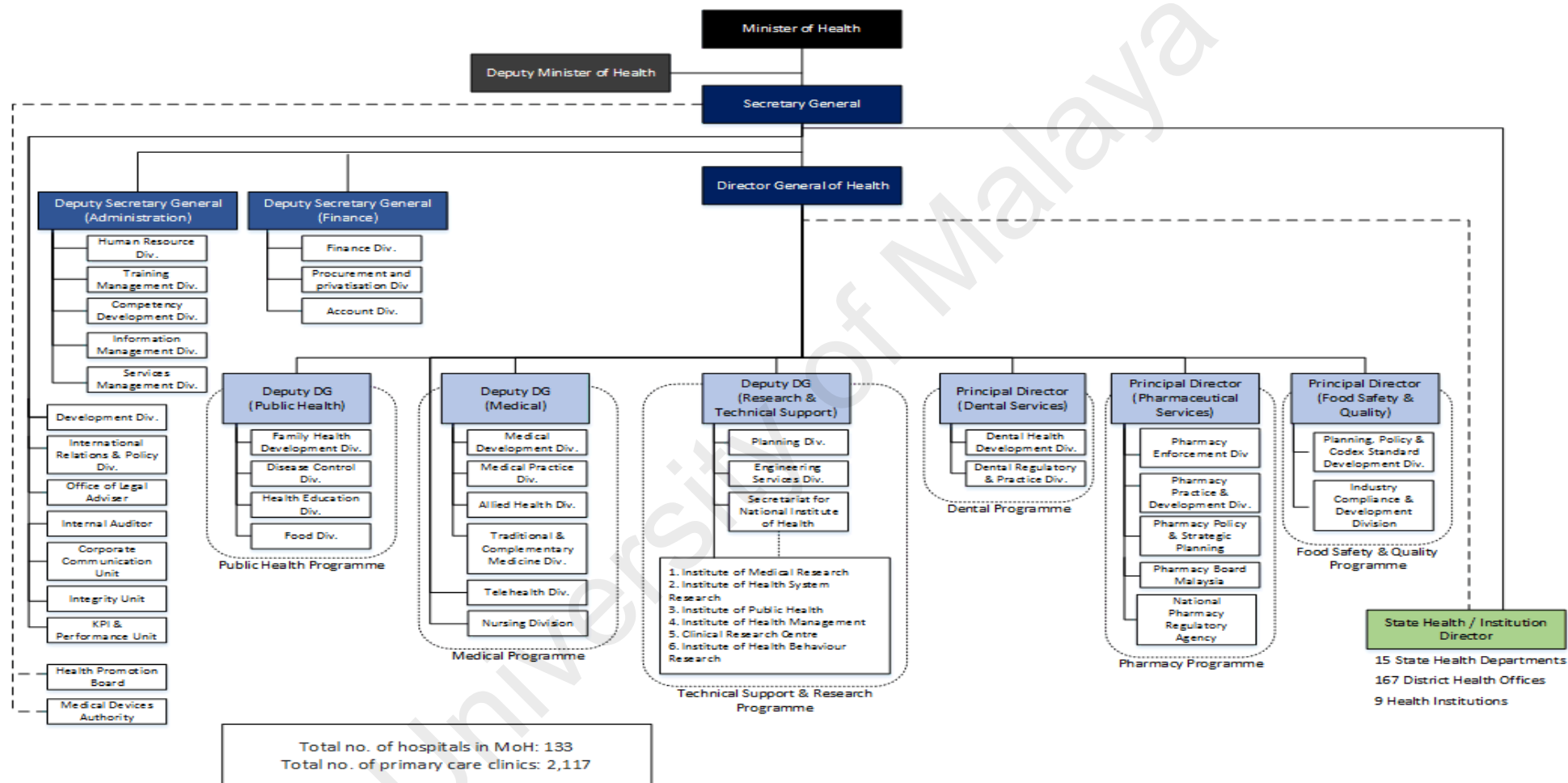
Apart from the 5-Year Malaysia Plan and Mid-term review documents, specific policy statements related to health had not been specifically spelt out as separate headings. However, there were policy statements mentioning plans in areas of socio-economic determinants of health, such as poverty eradication, improvement of public infrastructures such as proper housing and sanitation, and programmes to enhance societal and ethical values (Merican & Yon, 2002). Other policy instruments were in the form of official statements from the Ministry of Health, the Minister of Health's press statements and directives and the Director-General of Health's circulars and directives. Malaysia has also adopted policies advocated by international organisations such as the World Health Organisation which were then incorporated in the national health policymaking, for instance, the adoption of the 1978 Alma Ata Declaration for "Health for All" policy (Merican & Yon, 2002; Safurah et al., 2013). The health policy implementation is undertaken through collaborative federalism – the MoH maintains the broader aspects of health policy and administration centrally but decentralises management throughout the system under a collaborative model (Baracskey, 2012).

The healthcare services are administered in a multi-level bureaucratic hierarchy, and the implementation of the health policies and programmes were undertaken in a top-down manner. The administrative structure consists of four levels, namely, federal, state, district and local level. Health policies and programmes are formulated, funded and operationalised at the federal and state level by the relevant programme/divisions/unit, while the service is provided to the population at the local level by the clinics, hospitals

or specialised institution. The scope and complexity involved in managing such a large organisation is indicated by the following figures (as mentioned in sub-section 3.3.1) - there are six programmes, six research institutions, nine health institutions, more than 30 divisions/department/units, 15 state health departments, 167 district health offices, 133 hospitals and 2,117 clinics<sup>29</sup> (refer MoH organisational structure in Figure 3.10).

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<sup>29</sup> Source: [www.moh.gov.my](http://www.moh.gov.my) accessed on 12 April 2016.



**Figure 3.10: Organisational structure of MoH departments at the federal level and its top management officials (Adapted from MoH organisation chart available from [www.moh.gov.my](http://www.moh.gov.my))**



The executive powers are concentrated at the top, headed by the Secretary General of Health and the Director General of Health<sup>30</sup>. At the state level, the State Health Departments are headed by the State Directors of Health appointed by the Director General of Health<sup>31</sup>. The State Directors of Health are responsible to direct and carry out the health policies and programmes at the healthcare facilities drawn up by the relevant programmes/divisions/unit at the federal level of the MoH.

At the district level, the healthcare facility administrators, i.e. the hospital director or the medical officer in-charge of a clinic, are responsible directly to the State Health Directors. There is also the Medical and Health Officer (M & HO) who is appointed among the Public Health Physician at the district level. The M & HO are responsible mainly for preventive and public health activities, along with the rural health service programmes. In addition, they are also responsible for the proper functioning of all the peripheral units in the district which include the primary healthcare clinics, the maternal and child health clinics, community clinics ('Klinik Desa' or rural clinics) and 1Malaysia clinics<sup>32</sup>. The District M & HO, however, have no jurisdiction over the hospitals within his/her districts. The Hospital Directors report directly to the State Health Director. In short, the responsibilities of the Public Health Physician at the district level and the hospital level are restricted to the programmes of MoH<sup>33</sup>. (refer Figure 3.11).

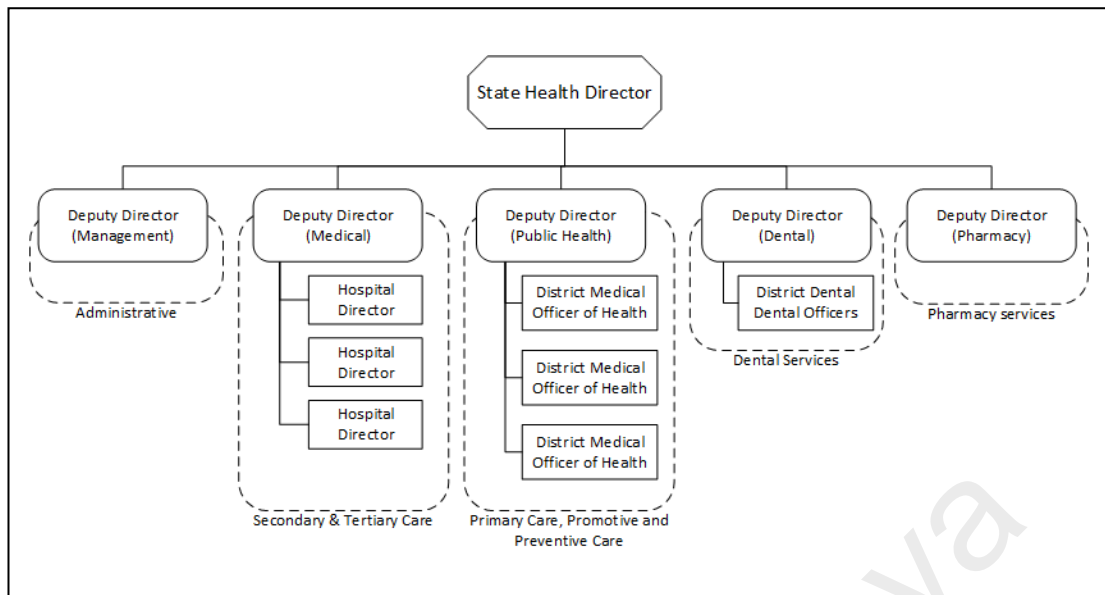
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<sup>30</sup> The Secretary General of Health is the highest position of appointment of civil service in MoH, who is responsible as the chief administrator and the controlling officer for the ministry.

<sup>31</sup> The Director General of Health is the head of the medical and health service i.e. the 'technical' aspects of health service, in which the appointment is made by the head of the federal civil service among the medical personnel of MoH

<sup>32</sup> See footnote no. 26 page 68.

<sup>33</sup> Personal communication with Dr Fauziah Zainal Ehsan, Health Informatics Unit, Family Health Development Division, Ministry of Health, Malaysia



**Figure 3.11: A typical State Health Department organisational chart.**  
(Adapted from Ghani & Yadav, 2008)

The healthcare facility administrators (i.e. the hospital director or the medical officer in-charge) have little discretion on their own in terms of management and fiscal freedom in the daily operational activities except to implement what had been instructed by the top. A government healthcare facility (i.e. hospital, clinics or special institutions) receives a fixed annual budget, organised under standard budget lines and linked to performance indicators and targets. The rationale for such setup by the MoH is that a standard programme is executed across the government health system to facilitate similar and equitable practices across the country to achieve national health goals and visions (Safurah et al., 2013).

In terms of health financing, the primary source of funding for MoH is the federal government through general taxation. The budget for the public-sector is prepared and allocated annually by the Ministry of Finance (MoF) or the Treasury after deliberation and discussion in the parliament based on the various programmes and projects proposed by the various ministries and government agencies (Ariffin, 2012; Chua & Cheah, 2012). The planning and financing process is largely controlled by the federal government and MoH, with top-down allocation through the networks from central to state, district,

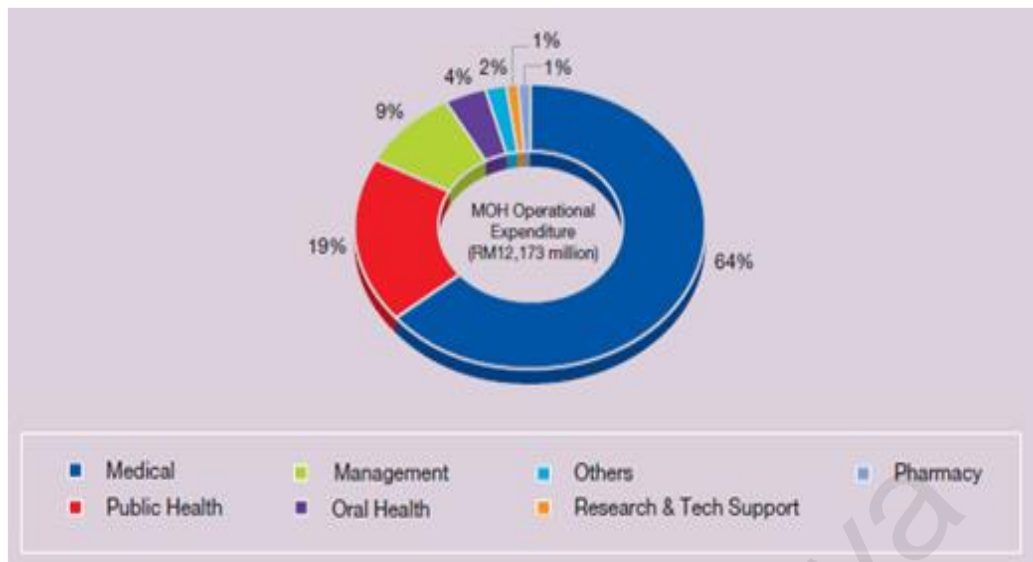
Mukim (sub-district) and village level, as well as between urban and rural sector (Kananatu, 2002). The annual budget allocation and expenditure for MoH for 1997 – 2014 is presented in Table 3.4.

**Table 3.4: Total MoH Budget Allocation and Expenditure (1997 – 2014).**

	Operational		Development		Percentage of Total MoH allocation to National Budget* (%)
	Allocation (RM, Million)	Expenditure (RM, Million)	Allocation (RM, Million)	Expenditure (RM, Million)	
1997	3,236	3,258	579	449	6.17
1998	3,359	3,316	733	716	6.31
1999	3,612	3,615	900	835	6.61
2000	4,214	4,091	1,290	1,276	6.32
2001	4,631	4,680	1,500	1,570	6.33
2002	5,139	5,157	1,715	1,514	6.27
2003	5,786	6,322	1,990	2,690	6.88
2004	7,026	6,686	2,643	2,231	8.00
2005	7,302	6,866	1,197	1,194	6.68
2006	8,206	9,538	1,297	1,300	6.33
2007	9,572	9,772	1,629	1,471	7.02
2008	10,880	11,569	2,222	1,467	7.29
2009	11,863	12,173	2,567	2,540	6.60
2010*	11,765	NA	3,584	NA	8.02
2011*	NA	NA	NA	NA	NA
2012*	14,998	NA	1872	NA	2.25
2013*	17,352	NA	1924	NA	7.66
2014*	20,498	NA	1662	NA	8.39

(Source: Malaysia National Health Accounts. Ministry of Health Sub-Account 1997-2009. Ministry of Health, Malaysia, Putrajaya; 2011 and (\*) MoH National Health Facts, 2015)

As we can see, the annual budget allocation for MoH was around 6 – 7% of the total federal budget. The health budget is distributed according to the respective programmes as shown in Figure 3.12.



**Figure 3.12: MoH operational expenditure by activities assigned to Programmes for the year 2009 (Source: Ministry of Health sub-account 1997-2009. Malaysia National Health Accounts Unit, Ministry of Health, Malaysia, 2011)**

### 3.4 The use of ICT and Telehealth in the Malaysian Healthcare System

In discussing the subject of Telehealth policy in the context of the Malaysian healthcare system, it is imperative to contextualise it with the relevant national ICT initiatives over the last 20 years. The aim of this section is to provide an overview of the antecedents, manifesting the logic of how Malaysia's Telehealth came to be what it is today. The relevant policies, the key national health ICT initiatives and a chronology of events related to Telehealth implementation from 1990 to 2012 are briefly explained. This will provide an overview of the detailed accounts of Telehealth policy for the purpose of synthesising the empirical findings that will be dealt with in Chapters 4, 5 and 6 respectively.

#### 3.4.1 National strategy for ICT and Telehealth

Since the 1990s, the Malaysian government has formulated various policies and strategies pertaining to ICT development to spearhead the surge forward into the digital knowledge-based economy, as presented in sub-section 3.2.2 earlier. With the introduction of e-

government and e-administrative initiative in various spheres in 1996, the public-sector has become the predominant investor and user of these ICT programmes (Kaliannan, Raman, & Dorasamy, 2009). Further, the announcement of Mahathir's Vision 2020 and the rise of the Multimedia Super Corridor, the government had made huge investments to develop ICT infrastructure and deployment of electronic systems in the public sector to enhance the public delivery system (Kaliannan, Raman, & Dorasamy, 2009).

The government had allocated a total of RM7.885 billion in the Eighth Malaysia Plan (2001 – 2005), and RM12.889 billion in the Ninth Malaysia Plan (2006 – 2010) respectively for the development and implementation of ICT-related programmes and projects, including Telehealth (refer to Table 3.5).

**Table 3.5: Government Financial Allocation (Development Budget) and Expenditure for ICT Programmes 2001 - 2010**

<b>Programmes</b>	<b>Eight Malaysia Plan (2001 – 2005) Allocation (RM Million)</b>	<b>Eight Malaysia Plan (2001 – 2005) Expenditure (RM Million)</b>	<b>Ninth Malaysia Plan (2006 – 2010) Allocation (RM Million)</b>
Computerisation Of Government Agencies	1,641.8*	2,125.0	5,734.2
Bridging The Digital Divide	1,098.0*	2,433.1	3,710.2
School	945.0 <sup>#</sup>	2,145.1	3,279.2
Communications Infrastructure	119.8 <sup>#</sup>	254.0	150.0
Service Provision			
Telecentres	33.2 <sup>#</sup>	18.1	101.0
ICT Training/ Services	-	15.9	180.0
ICT Funding	-	1,125.6	1,493.0
MSC Multimedia Applications	1,824.9 <sup>#</sup>	1,153.1	1,100.5
E-Government	434.8*	537.7	572.7
Smart School	401.1*	363.9	169.8
<b>Telehealth</b>	<b>400.0*</b>	<b>91.8</b>	<b>60.0</b>
Government Multipurpose Card (MyKad)	418.1*	159.7	296.0
MSC Development	-	320.8	377.0
ICT Research & Development	300.0*	727.5	474.0
Other	294.4*		
<b>Total</b>		<b>7,885.1</b>	<b>12,888.9</b>

Note:(\*) Figures from Eight Malaysia Plan; (#) Figures from Ninth Malaysia Plan

Source: Eight Malaysia Plan and Ninth Malaysia Plan (Malaysia Economic Planning Unit, 2001, 2006)

The earliest evidence for the use of computerised systems in government hospitals was documented by Lim and colleagues when they reported the epidemiological findings using a computerised database system for in-patient data in Kuantan Hospital in 1987 (T. O. Lim, Looi, Harun, & Marzida, 1991). Strategies to adopt ICT in the government health sector were evident as early as the Sixth Malaysia Plan (1991-1995) when it was proposed that computerised system be deployed in government health facilities (Economic Planning Unit (EPU) Prime Minister's Department, 1991). The MoH had also introduced its Information System Strategic Plan (ISSP), outlining a 10-year road map towards a

comprehensive ICT infrastructure and information system networks for MoH. (Mohan, 2010; Suleiman, 2008).

The federal government had also emphasised the various policy strategies related to ICT initiatives in the public health sector during the Seventh and the Eight Malaysia Plan (period from 1996 – 2000 and 2001-2005, respectively). Among the initiatives were to establish IT hospitals, telemedicine, electronic health information management systems and distance-learning medical education (Malaysia Economic Planning Unit, 2001). It was also envisioned in the Seventh Malaysia Plan (1996 – 2000) that in addition to improving curative health services, the government's intention was to leverage on ICT and that the technology be harnessed as an enabler towards population wellness and health promotion. (Economic Planning Unit (EPU) Prime Minister's Department, 1996; Merican & Yon, 2002).

The turning point of ICT in the Malaysian healthcare scenario was when the Telehealth initiative was introduced under the MSC Flagship Applications as mentioned in Section 3.2.2. The Telehealth initiative masterplan was documented in the Telemedicine Blueprint as it was first announced in 1997 (*New Straits Times*, 26 June 1997<sup>34</sup>). It outlines the strategic plans for the transformation of healthcare delivery system towards the year 2020, from illness-focus care to wellness-focused care and the use of technology as an enabler for a proactive promotion of lifelong wellness and disease prevention in Malaysia. The Telemedicine Blueprint stated that the government embarks on Telehealth with the intention to achieve health system with the eight health service goals for the future Malaysian Health System, as shown in Figure 3.13.

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<sup>34</sup> Telemedicine blueprint near completion (26 June 1997). *New Straits Times*. Retrieved from <https://www.blis2.bernama.com/>.

### **The Eight Service Goals for future Malaysian Health System**

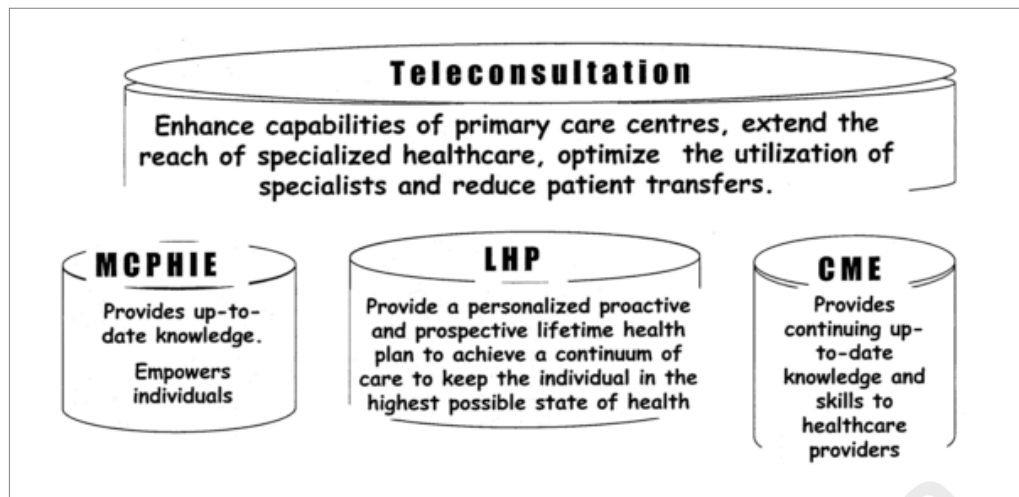
- a) Wellness Focus - Provide services that promote individual wellness throughout life
- b) Person Focus - Focus services on the person and ensure services are available when and where required
- c) Informed person - Provide accurate and timely information and promote knowledge to enable a person to make informed decision
- d) Self Help - Empower and enable individuals and families to manage health through knowledge and skills transfer
- e) Care Provided at Home or Close to Home - Provide services into rural and metropolitan homes, health settings and community centres
- f) Seamless, Continuous Care - Manage and integrate healthcare delivery across care settings, episodes of care and throughout life
- g) Services tailored as Much as Possible - Customise services to meet individual and group needs and special circumstances
- h) Effective, Efficient and Affordable Services - Provide enhanced access, integration and timely delivery of high-quality services at reasonable cost

**Figure 3.13: The Eight Health Services Goals as outlined in the Malaysian Telemedicine Blueprint (Source: The Telemedicine Blueprint, Ministry of Health, Malaysia, 1997)**

The Telemedicine Blueprint defined ‘Telemedicine’ (Telehealth) as the ‘key-enabler’ to provide an accessible, integrated, high-quality and affordable healthcare system, where health information will become more virtual, more distributed and more integrated, resulting in better, more timely and more efficient healthcare delivery. It emphasised that the government foresees the need to transform the Malaysian healthcare system to overcome the challenges of rising healthcare costs, changing patterns of disease, rural-urban migration, increased life expectancy and increased consumers’ expectations. (Ministry of Health, Malaysia, 1997; Suleiman, 2001).

The Telehealth project comprised four major components, which is Teleconsultation (TC), Mass Customised and Personalised Health Information and Education (MCPHIE), Lifetime Health Plan (LHP), and Continuing Medical Education (CME) (Ministry of Health, Malaysia, 1997). The description of these components is illustrated in Figure 3.14.





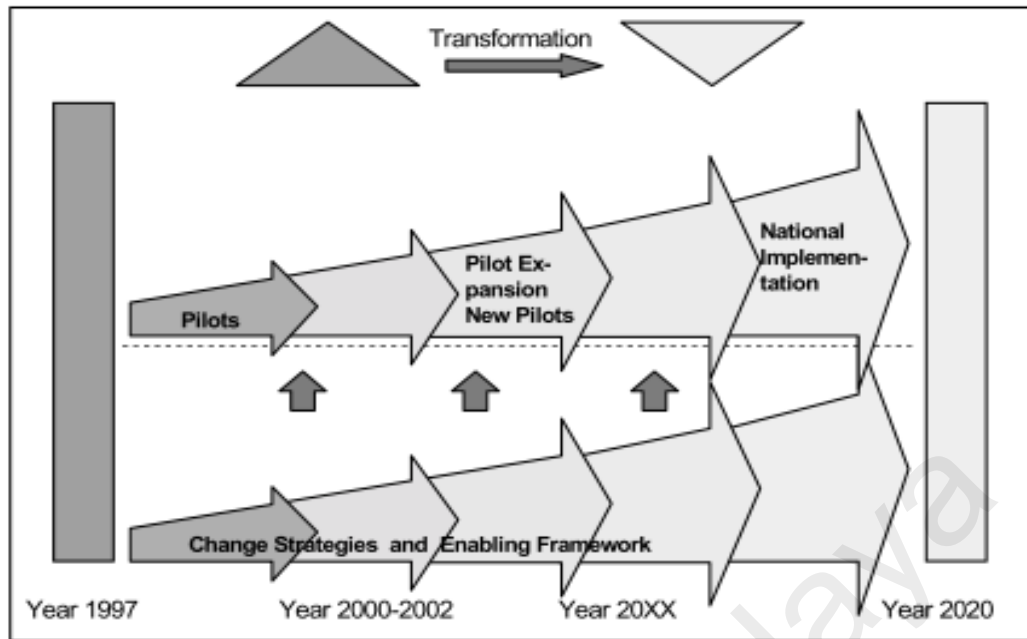
**Figure 3.14: The components of Malaysia's Telehealth-MSc Initiative, 1997 – 2003 (adapted from Suleiman, 2001).**

Apart from the blueprint, the government also introduced other policy documents, such as the Telemedicine Standards<sup>35</sup> and the Telemedicine Bill in 1997. (*Bernama*, 5 May 1997<sup>36</sup>).

The Telemedicine Blueprint outlined a tactical road map of phased Telehealth implementation from 1997 to 2020, which started off with a five-year Telehealth Pilot Project (Figure 3.15) (Ministry of Health, Malaysia, 1997). Being a part of a federally-led MSC initiative, the Pilot Projects involved the participation of industrial players through the PPP, following the aspiration of the MSC to drive the Malaysian economy into the digital industrial age.

<sup>35</sup> Speech by Dato' Chua Jui Meng Minister of Health Malaysia at the Thank You Dinner for the Telemedicine Team at Renaissance Hotel, Kuala Lumpur. (1997, June 25). Kuala Lumpur. Retrieved from <http://blis.bernama.com/getArticle.do?id=693&tid=3&cid=7> on 7 April 2014.

<sup>36</sup> Dr Siti Zaharah tables Telemedicine Bill (5 May 1997). *Bernama*, Retrieved from <http://blis2.bernama.com> ("Dr Siti Zaharah tables Telemedicine Bill," 1997)



**Figure 3.15: The Telehealth implementation for national health transformation was planned to be undertaken in phases from 1997 to 2020 (from the Telemedicine Blueprint, Ministry of Health, Malaysia, 1997, p.20)**

The government had awarded the contracts in 2000, and a total of RM100 million was allocated for the project. The contract for LHP, CME, MCPHIE was scheduled to be completed in 2004 - 2005, and Teleconsultation to be completed in 2003<sup>37</sup>. (Ghani, 2000).

However, in September 2002, the local press highlighted that the LHP, CME and MCPHIE projects were a year behind schedule (*Business Times*, 23 September 2002<sup>38</sup>). Further, it was reported that the clinical systems for the Lifetime Health Record (LHR) and the consumer health information portals (for MCPHIE) were only 20% completed after three years. Until June 2001, the government had spent about RM7 million for the project (*Business Times*, 7 July 2003<sup>39</sup>). In 2004, the government finally announced that it had to terminate the Telehealth projects, giving among various reasons, breaches in the

<sup>37</sup> The Government publicly announced the award of Telehealth-MSC contracts to two local consortia, Medical Online (MOL) and WorldCare. MOL was awarded to implement LHP, MCPHIE and CME and WorldCare was awarded with Teleconsultation (TC) implementation. The contracts were actually finalized and contractors only begun their works in October 1999. (Harun, 2001).

<sup>38</sup> Ganesan, V. Telehealth project hits snag (23 September 2002). *Business Times*. Retrieved from <http://search.proquest.com/>.

<sup>39</sup> Ganesan, V. Telehealth project foiled by ailing Medical Online (7 July 2003). *Business Times*. Retrieved from <http://search.proquest.com/>.

contractual agreement<sup>40</sup>. Meanwhile, the works for Teleconsultation project was completed, with the cost totalling RM21 million with 41 Teleconsultation sites delivered throughout Malaysia (*New Straits Times*, 2 July 2003<sup>41</sup>).

With the termination of the contractual agreements in 2004, the Minister of Health had assured the public that the government would re-look and revive the Telehealth projects (*Bernama*, 19 December 2004<sup>42</sup>). The revived Telehealth projects include re-activation of 38 Teleconsultation sites (from the original 41), re-branding of CME to CPD (Continuous Professional Development) and MCPHIE to MyHealth, and a group of consultants were hired to develop the revised master plan for LHP project, which has now been scaled down in magnitude and scope. A total of RM60 million was allocated for the reviewed Telehealth programmes in the Ninth Malaysia Plan (2006 -2010). (Economic Planning Unit (EPU) Prime Minister's Department, 2006; Marzuki, Ismail, Al-Sadat, & Ehsan, 2012; Mat Som et al., 2010).

In the meantime, the MoH had also begun to implement Teleprimary Care (TPC)<sup>43</sup> services with the roll-out of its services in Johore and Sarawak in March 2005, providing online consultations between the care providers in the rural clinics and specialists in hospitals. In the following implementation phases in 2007 and 2009, several other sites had been implemented with TPC in Sabah and Pahang (*Bernama*, 6 July 2009<sup>44</sup>). In 2012,

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<sup>40</sup> The contractual agreement between MoH and MOL was terminated on 25 March 2004, after the company was put under receivership in September 2003, as reported in press: Ministry ends telehealth agreement with MOL (22 May 2004) *Business Times*. Retrieved from <http://blis2.bernama.com/>

<sup>41</sup> WorldCare completes teleconsultation mandate (2 July 2003). *New Straits Times*. Retrieved from <http://blis2.bernama.com/> ("WorldCare completes teleconsultation mandate," 2003)

<sup>42</sup> Kay Ao. Ministry to restructure telehealth (19 December 2004). *Bernama (Malaysian National News Agency)*. Retrieved from <http://blis2.bernama.com/>.

<sup>43</sup> Teleprimary Care (TPC) is an Information System specifically designed to be used in MoH health clinics. At the initial stages, the primary purpose of the system was for computerization of the government clinics, mainly for health information data collection, electronic medical record and Telemedicine services, such as Teledermatology and Teleconsultation. TPC is managed by the Family Health Development Division, under the Public Health Programme, MoH (Personal communication with Dr Fauziah Zainal Ehasan, Health Informatics Unit, Family Health Development Division, MoH)

<sup>44</sup> Rm10 million for TPC in Sabah and Pahang (6 July 2009). *Bernama (Malaysian National News Agency)*. Retrieved from <http://blis2.bernama.com/>.

the project had covered a total of 88 government clinics, 12 district health offices and four general/district hospitals. (See Appendix A for distribution of Health Clinics with TPC).

### **3.4.2 Chronological listing of Telehealth key initiatives in Malaysia (1990 – 2012)**

The key initiatives for Telehealth in Malaysia from 1990 to 2012 are summarised in Table 3.6 below. These initiatives were documented in the five-year federal government development plan, namely the Sixth MP (1991 – 1995), Seventh MP (1996 – 2000), Eighth MP (2001 – 2005), Ninth MP (2006 – 2010) and Tenth MP (2011 – 2015). However, as mentioned in sub-section 3.3.2, occasionally the policy events are documented from the press statements by the government officials. In addition, information gathered from the literature review which was deemed important to the key Telehealth initiatives were also included.

**Table 3.6: Key initiatives for Telehealth strategy in Malaysia, 1985 – 2015.**

<b>Planning Period (Year)</b>	<b>Synopsis of Key initiatives and citation</b>
Fifth Malaysia Plan (1985 – 1990)	<ul style="list-style-type: none"> <li>• Computerisation was introduced in order to create a more efficient billing system at selected government hospitals. (Malaysia Economic Planning Unit, 1991)</li> </ul>
Sixth Malaysia Plan (1991 – 1995)	<ul style="list-style-type: none"> <li>• Computerised health management information system for non-medical programmes such as billing, patient administration, quality assurance budget performance monitoring in government hospitals. (Malaysia Economic Planning Unit, 1991, 1996)</li> </ul>
Seventh Malaysia Plan (1996 – 2000)	<ul style="list-style-type: none"> <li>• Widening the usage of IT application for patient care management, telemedicine, health engineering and continuing medical education (Malaysia Economic Planning Unit, 1996)</li> <li>• Pilot of teleconferencing system to support remote renal care management by specialists from two tertiary hospitals (Mohan, 2010)</li> <li>• Launching of MSC Malaysia and Telehealth Flagship Application (Malaysia Economic Planning Unit, 2001)</li> <li>• Establishment Telemedicine Blueprint &amp; Telemedicine Standards (Jui Meng, 1997<sup>45</sup>)</li> <li>• Promulgation of Telemedicine Act (1997) for the regulation of medical practice using Telehealth technology and issues on patient's privacy and consent (<i>Bernama</i>, 7 May 1997<sup>46</sup>)“Parliament: Telemedicine Bill Passed,” 1997)</li> </ul>

<sup>45</sup> Speech by Dato' Chua Jui Meng Minister of Health Malaysia at the thank you dinner for the Telemedicine team at Renaissance Hotel, Kuala Lumpur (25 June 1997). *Bernama*. Retrieved from <http://blis.bernama.com>

<sup>46</sup> Parliament: Telemedicine Bill Passed (7 May 1997). *Bernama*. Retrieved from <http://blis.bernama.com>

**Table 3.6, continued**

Planning Period (Year)	Synopsis of Key initiatives and citation
Seventh Malaysia Plan (1996 – 2000)	<ul style="list-style-type: none"> <li>• Setting up of Telehealth Unit, MoH (Mat Som et al., 2010)</li> <li>• Development of the National Telehealth Policies (Ministry of Health Malaysia, 2004)</li> <li>• Contract signing finalised for Pilot Project of Telehealth (<i>New Straits Times</i>, 20 January 2000<sup>47</sup>)</li> <li>• Completion of Phase I Telehealth Flagship Application components – MCPHIE, CME and LHP (Malaysia Economic Planning Unit, 2001)</li> <li>• Deployment of Teleconsultation at 41 sites (Malaysia Economic Planning Unit, 2001)</li> <li>• Establishment of two THIS hospital - Hospital Selayang and Hospital Putrajaya (operational in 2000) (Malaysia Economic Planning Unit, 2001)</li> <li>• Building in-progress for six THIS hospitals (Ampang, Sungai Buloh, Serdang, Alor Setar, Sungai Petani, Pandan) including several other district hospitals with Hospital Information System (HIS) (Lahad Datu &amp; Kepala Batas) (Malaysia Economic Planning Unit, 2001, 2003)</li> <li>• Tele-primary care in selected Health Clinics (Malaysia Economic Planning Unit, 2001)</li> <li>• Proposal to build two new hospitals with THIS (Shah Alam, Cheras Rehabilitative) (Malaysia Economic Planning Unit, 2001)</li> </ul>

<sup>47</sup> Ghani, R. A. Contract to develop Telehealth components (20 January 2000). *New Straits Times*. Retrieved from <http://blis2.bernama.com>

Table 3.6, continued

Planning Period (Year)	Synopsis of Key initiatives and citation
Eight Malaysia Plan (2001 – 2005)	<ul style="list-style-type: none"> <li>• Telehealth deployed at Kajang and Seremban Hospitals and its surrounding clinics (Malaysia Economic Planning Unit, 2003)</li> <li>• Deployment of disease and clinical databases (cancer, cardiovascular, renal, cataract, neonatal, accident and occupational injuries) (Malaysia Economic Planning Unit, 2003)</li> <li>• Completion of Teleconsultation Pilot Project (41 sites) (<i>New Straits Times</i>, 2 July 2003<sup>48</sup>)</li> <li>• Termination of contractual agreement between Government and MOL (<i>Business Times</i>, 22 May 2004<sup>49</sup>)</li> <li>• Launching of MyHealth portal (replacing previously non-operational MCPHIE services) (Mat Som et al., 2010)</li> </ul>
Ninth Malaysia Plan (2006 – 2010)	<ul style="list-style-type: none"> <li>• Tele-primary care launched and Go-Live in Johore &amp; Sarawak in 41 sites (Malaysia Economic Planning Unit, 2006)</li> <li>• Upgrading of the MoH's Health Management Information System (HMIS) network infrastructure between national, state and district health offices (Malaysia Economic Planning Unit, 2006)</li> <li>• Re-activation of Teleconsultation services (Malaysia Economic Planning Unit, 2006)</li> <li>• Upgrading of electronic disease surveillance registries (Malaysia Economic Planning Unit, 2006)</li> <li>• Health Information Management System (HIMS) Blueprint (Selvaraju, 2006)</li> </ul>

<sup>48</sup> WorldCare completes teleconsultation mandate (2 July 2003). *New Straits Times*. Retrieved from <http://blis2.bernama.com>

<sup>49</sup> Ministry ends telehealth agreement with MOL (22 May 2004). *Business Times*. Retrieved from <http://search.proquest.com>

**Table 3.6, continued**

<b>Planning Period (Year)</b>	<b>Synopsis of Key initiatives and citation</b>
	<ul style="list-style-type: none"> <li>• Revision of Telehealth strategies into seven components: (1) Lifetime Health Records (LHR); (2) Lifetime Health Plan Services; (3) Mass Customised Personalised Health Information and Education; (4) Continuous Professional Development (CPD); (5) Teleconsultation; (6) Call Centre/Customer Relation management; and (7) Group Data Services. (Malaysia Economic Planning Unit, 2006)</li> <li>• Pilot implementation of LHR and LHP with emphasis on interoperability and integration between health providers to provide seamless and continuity care (Malaysia Economic Planning Unit, 2006)</li> <li>• Pilot project for Malaysia Health Information Exchange (MyHIX) in 2009 (Mat Som et al., 2010)</li> <li>• Tele-primary care expansion (Perlis, Sarawak, Pahang &amp; Sabah)</li> </ul>
Tenth Malaysia Plan (2010 – 2015)	<ul style="list-style-type: none"> <li>• The use of Tele-primary care for rural areas (Malaysia Economic Planning Unit, 2011)</li> </ul>



### 3.4.3 Telehealth in Malaysia – current status

At this point, the thesis has canvassed information on the key Telehealth initiatives and its related policies. What is interesting about the Telehealth initiative in Malaysia is the evolution and the implementation course taken by the various Telehealth technology components from its intention as laid out in the official policy documents (i.e. the Sixth, Seventh, Eighth and Ninth Malaysia Plans, and the Telemedicine Blueprint) to its actual implementation.

The Telemedicine Blueprint has stated that, with ICT as the technology enabler, Telehealth is envisaged to transform the healthcare service. Patients would be “empowered” by electronic access of customised and personalised health education, diagnosis and treatment can be delivered across distance, the hospitals and clinics would be in nearly paperless working environment; and technology would engage the people to work as partners with health care professionals in maintaining their own health or managing their illnesses (Ministry of Health, Malaysia, 1997; Suleiman, 2001). One of the proposed Telehealth strategies is to create the LHR to store the longitudinal personal health records, which is obtained from the multiple care providers, in an integrated, centralised national repository. It was intended that the LHR will generate personalised care plans as well as collating health information for health planning and management. To achieve this objective, federal MoH’s administrative departments were to be electronically linked to all public and private hospitals and clinics.<sup>50</sup> Hence, the government had proposed the various policies and programmes to attain the objectives.

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<sup>50</sup> Excerpt from the Ninth Malaysia Plan: “A system-wide information system will be introduced to link public and private facilities, thus allowing the transfer of patient information between providers whenever and wherever required to enable the provision of borderless and continuous care. The implementation of the hospital information system (HIS) in selected hospitals will further improve health care delivery by providing accurate and complete patient information online. HIS implementation will be undertaken in phases and will include all new and existing hospitals and clinics” (Malaysia Economic Planning Unit, 2006)

Based on the summary of the key Telehealth initiative as described in Table 3.6, the thesis had identified that the national strategies of Telehealth implementation in Malaysia could be classified into five essential strategies as follows:

- a) Telehealth Pilot Projects under the MSC programme and the four components – LHP, MCPHIE, CME and TC;
- b) Remote telemedicine/teleconference;
- c) Implementation of Electronic Medical Record system at the district and general hospitals named as basic Hospital Information System (HIS) and Total Hospital Information System (THIS); and at the health clinics named as Tele-primary Care;
- d) Efforts to enable systems interoperability between the different healthcare facilities – named as the Malaysia Health Information Exchange (MyHIX); and
- e) Development of Health Management Information System such as electronic diseases registries and surveillance systems.

The status of implementation of Telehealth is discussed according to the five strategies respectively.

#### **3.4.3.1 The Telehealth-MSC Pilot Projects**

At the beginning of the Pilot Projects, Telehealth consisted of four components i.e. Lifetime Health Plan (LHP), Teleconsultation (TC), Mass Customised Personalised Health Information and Education (MCPHIE), and Continuing Medical Education (CME). The pilot projects were scheduled to be completed within five years from 2001 to 2005, and two consortia were appointed by the government to develop the

projects (*New Straits Times*, 20 January 2000<sup>51</sup>; *Business Times*, 23 September 2002<sup>52</sup>).

The aftermaths of the Telehealth components are as follows:

- a) Lifetime Health Plan (LHP) was planned to be implemented at three pilot sites: Kajang, Kuala Lumpur and Ipoh. The chosen sites involved one general hospitals and its surrounding clinics, in which these clinics are administratively linked for patient referrals (from primary care to secondary care and vice versa). To be fully functional, the LHP is required to be linked to the electronic medical record (EMR), and the EMR involved the development of the subcomponents namely the Clinical Support System (CSS)<sup>53</sup>, Healthcare Information Management and Support Service (HIMSS) and the Personalised Lifetime Health Plan generator (PLHP)<sup>54</sup>, (Ministry of Health, Malaysia, 1997, p. 29). It was reported by the local press that LHP was “only 20% complete” and eventually the final product had not taken off as it was originally planned at the three pilot sites (*Business Times*, 23 September 2002<sup>55</sup>).
- b) Teleconsultation involved the setting up centres for remote consultation between a specialist in the tertiary or secondary hospital and healthcare providers and patients in the health clinics (Ministry of Health, Malaysia, 1997). The project was finally completed in 2003 (*New Straits Times*, 2 July 2003<sup>56</sup>), with 41 sites

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<sup>51</sup> RM100 million to develop the Telemedicine Application. (20 January 2000). *Bernama*. Retrieved from <http://blis2.bernama.com/>

<sup>52</sup> Ganesan, V. Telehealth project hits snag (23 September 2002). *Business Times*. Retrieved from <http://search.proquest.com/>

<sup>53</sup> The Clinical Support System (CSS) is a set of application systems that will support the work of practitioners, both clinically and administratively. Such systems include: Hospital Information System (HIS), Clinical Information System (CIS), Laboratory Information System (LIS), Radiology Information System (RIS), Picture Archiving & Communication System (PACS), Pharmacy Information System (PhIS), Critical Care System (CSS) and a Decision Support System (DSS). A major requirement for all these systems is that they must collectively contribute to building Electronic Medical Records (EMR) of patients. This will later help to create the individual's Personalised Lifetime Health Plan (PLHP). (Ministry of Health, Malaysia, 1997, p. 30)

<sup>54</sup> HIMSS is made up of repositories for Lifetime Health Records (LHR) and Lifetime Health Plans (LHPs), the two being managed by an Information Management System (IMS) to handle retrieval, security and coherence. Given that the system contains a potentially large amount of data in terms of LHRs and LHPs, the data can be mined to provide various general and strategic services, such as health statistics, medical forecasting, etc. This part of the system is referred to as the Group Data Services. The personalised Lifetime Health Plan (PLHP) is an application that generates the lifetime health plans for individuals covering both wellness and illness plans. It is a summarised and personalised health-plans for individuals, which should at least integrate all episodic plans from womb to tomb such as immunisation plans, rehabilitation plans, etc. The plans may be generated on demand directly by individuals or via healthcare providers. (Ministry of Health, Malaysia, 1997, p. 30).

<sup>55</sup> See footnote no. 52.

<sup>56</sup> WorldCare completes teleconsultation mandate (2 July 2003). *New Straits Times*. Retrieved from <http://blis2.bernama.com>.

functioning to provide remote consultation in four disciplines: cardiology, radiology, neurosurgery and dermatology (Mat Som et al., 2010). The Teleconsultation, the project appears to produce successful results. A descriptive study by Yusof et al. from March 2001 to September 2002 showed that a total of 1,034 referrals were made through the system, and about 62% of patient were monitored at their original locations, avoiding patient transfer (K. Yusof, Neoh, Hashim, & Ibrahim, 2002). They had suggested that the system may seem to produce savings in terms of cost of transfer and time, but whether the system was cost-effective was inconclusive. This is because the study did not state standard outcome measures and the heterogeneous group of patients included in the study, making it impossible to conclude on the cost effectiveness benefit of Teleconsultation (K. Yusof et al., 2002). At present, there are 43 sites providing Teleconsultation services<sup>57</sup>.

- c) Mass Customised Personalised Health Information and Education (MCPHIE) involves the delivery health information and education to the individual via the internet to empower the individual to maintain their health and well-being (Ministry of Health, Malaysia, 1997). The website went live briefly in 2000 (*Berita Harian*, 25 September 2000<sup>58</sup>). In 2005, MoH launched a new service named as the MyHealth Portal, which provides peer-reviewed health information and education articles for the public<sup>59</sup>. A service called “Ask The Expert” allows the public to post-health related questions to be answered by the MoH’s specialists (Mat Som et al., 2010).
- d) Continuing Medical Education (CME) involves the provision of distant learning for the healthcare providers for the purpose of capacity building and career

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<sup>57</sup> Personal communication with Dr Fazilah Shaik Allaudin, Telehealth Division.

<sup>58</sup> Portal Telekesihatan Pertama Malaysia (25 September 2000). *Berita Harian*, Retrieved from <http://blis2.bernama.com>.

<sup>59</sup> Available at <http://www.myhealth.gov.my/> accessed on 27 April 2016.

enhancement. There were three subcomponents: Formal Distant Education, Modular Distant Learning and Virtual Library (Ministry of Health, Malaysia, 1997). The Virtual Library provides access to the subscribed electronic resources and medical references, and only MoH personnel who are registered in the system can have access to them using the internet<sup>60</sup>. The former two have ceased to operate. In 2009, MoH had developed a new system called MyCPD which serve the purpose as an “electronic log-book” and a website to promote Continuous Professional Development activities and events (Mat Som et al., 2010).

#### **3.4.3.2 Remote Telemedicine/teleconference**

Telemedicine services were first documented by Houkin et. al (1999) for neurosurgery involving the transmission of images between Kuala Lumpur (Division of Neurosurgery, Universiti Kebangsaan Malaysia, School of Medicine) and Hokkaido (Department of Neurosurgery, Hokkaido University School of Medicine). Radiographs images (magnetic resonance images, computed tomography scans, digital subtraction angiograms and skull radiographs) were digitised to be reviewed by Japanese neurosurgeons, as the neurosurgeons in Malaysia were very limited in number during that time. It was reported as a success, as the telemedicine system allows for the discussion of diagnosis and strategy of the treatment between the two neurosurgical teams in a relatively quick manner and convenient for the both parties (Houkin et al., 1999). The potential of Telemedicine to overcome the issues of limited specialists in the country had resulted in the introduction of several other initiatives in the following years. During the 1996 - 1998 period, telemedicine was conducted to allow consultation or second opinions of problematic cases with specialists from the tertiary hospital for remote care management in cases such as nephrology, psychiatry and oncology (Mohan, 2010), as well as distant

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<sup>60</sup> Available at <http://vlib.moh.gov.my/cms/index.jsp> accessed on 27 April 2016.

continuing medical education (CME) sessions for healthcare professionals (Mohan, 2010; Pathmanathan & Zain, 1996).

When the Telehealth project under the MSC was introduced, the telemedicine service was incorporated into its components in the form of the Teleconsultation project. The acceptance of Teleconsultation among the MoH health professionals has been positive (B. J. J. Abdullah, 2008; Maarop & Win, 2012; Maarop, Win, Masrom, & Singh, 2011). The current status of Teleconsultation is described in sub-section 3.4.3.1.

#### **3.4.3.3 Implementation of Electronic Medical Record system (EMR) at the hospitals and the health clinics**

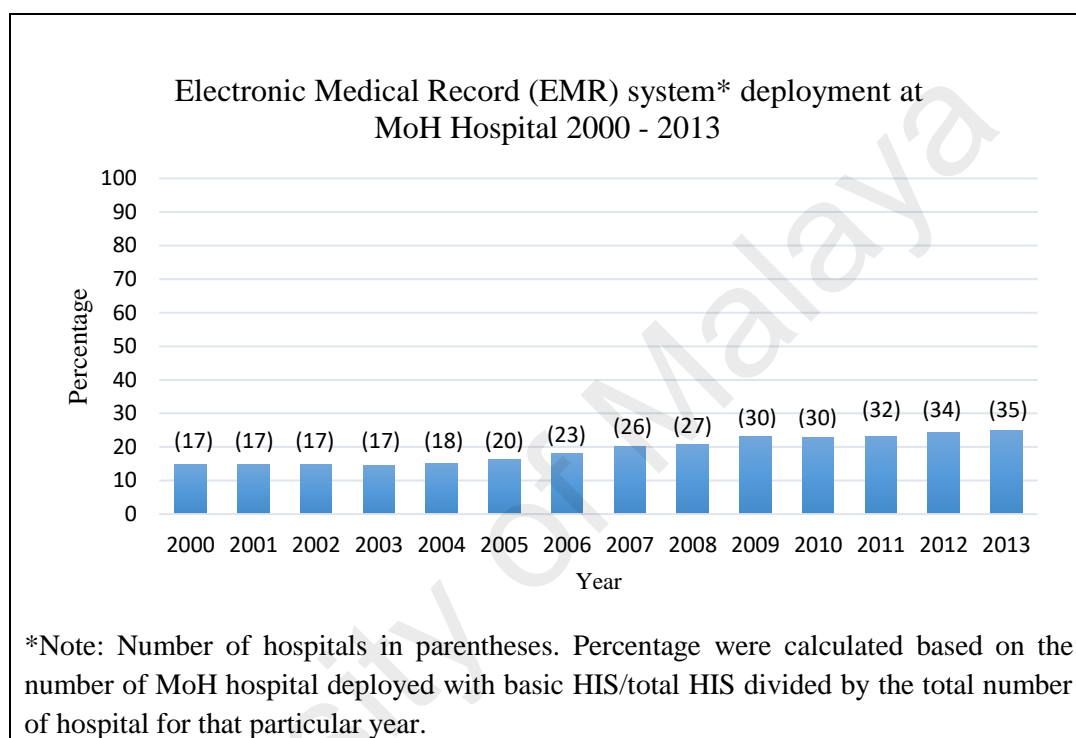
The EMR is one of the salient components for LHR and LHP (as described in sub-section 3.4.3.1). The EMR is the system in which the episodic information of patient care (in a particular hospital or clinic) is recorded in an electronic form, and the individual EMR (from the different sources) is then collated into a centralised repository to become the individual electronic health record (EHR)<sup>61</sup>. An EHR which records the individual health information in a longitudinal manner (ideally from the time he was born till the end-of-life, or called as ‘womb-to-tomb’) is stored in the repository to become the LHR. (Ministry of Health, Malaysia, 1997).

The concept of having a centralised and integrated EHR and the possibility to have access to an individual’s EMR/EHR at any time and any place (by the authorised person/parties) has been initiated by other countries such as the United Kingdom, Canada, Australia and many other countries (Abd Ghani, Bali, Naguib, & Marshall, 2008; Coiera, 2009; Z. Morrison et al., 2011; Rozenblum et al., 2011; Xu, Gao, Sorwar, & Croll, 2013).

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<sup>61</sup> Electronic health record (EHR) is a digital, longitudinal record of a patient’s health information that can be shared by different healthcare providers (as defined by Robertson et al., 2010 in their study on the UK’s NHS National Care Record Service). The difference between the Electronic Medical Record (EMR) and EHR is the element of the ‘duration’ of keeping the record and ability to be interoperable between the different care facilities (which may or may not have the different system in place). Thus, EMR is kept and used only within a particular care facilities, whereas EHR can be accessed from various locations (by the authorised person).

The following figure summarises the implementation status for EMR for MoH hospitals in clinics. Figure 3.16 includes hospitals which have implemented either basic or Total Hospital Information Systems i.e. HIS or THIS. Meanwhile, Table 3.7 summarises the clinics which have implemented the Clinical Information System (CIS) in the health clinics, or also known as the TPC.



(Source: Total number of hospitals from MoH Health Facts available from [www.moh.gov.my](http://www.moh.gov.my); number of hospital with basic HIS and THIS from researcher's compilation.)

**Figure 3.16: Percentage of MoH hospitals deployed with Hospital Information System.**

**Table 3.7: MoH clinics with EMR, from 2000 – 2013.**

<b>Year</b>	<b>No. of clinics with CIS</b>	<b>No. of clinics*</b>	<b>Percentage (%)#</b>
2000	1	947	0.1
2001	1	956	0.1
2002	1	952	0.1
2003	1	959	0.1
2004	1	952	0.1
2005	30	898	3.3
2006	30	895	3.4
2007	56	903	6.2
2008	74	897	8.2
2009	74	898	8.2
2010	89	917	9.7
2011	89	985	9.0
2012	89	1025	8.7
2013	89	1039	8.6

Note: (\*) Clinics includes maternal and child health (MCH) clinics and health clinics. (#) Percentage was calculated based on the number of clinics deployed with CIS or TPC divided by the total number of clinics for that particular year.

(Source: Total number of clinics from MoH Health Facts; the number of clinics with CIS and TPC from personal communication with Dr Fauziah Zainal Ehsan, Health Informatics Unit, Family Health Development Division, MoH)

As can be seen from Figure 3.16 and Table 3.7, at the end of 2013, the rate of EMR adoption was slightly above 20% for hospitals and less than 10% for the clinics. The detailed list of MoH hospitals and clinics with EMR system can be referred in Appendix A and B respectively.

As highlighted by Abd Ghani et al. (2008), these systems are vital components and potentially contribute to the collection and generation of information for LHR. The small percentage of healthcare facilities with EMR implemented is potentially a limiting factor to achieving the Telehealth objectives as outlined in the Telemedicine Blueprint. It was found that among the challenges encountered to implement EMR in hospitals includes the high capital cost, which was between RM80 - RM100 million per hospital (Hassan &



Tajuddin, 2012), cultural differences and digital divide (Z. S. Abdullah & Quaddus, 2012; A. Ismail et al., 2010), as well the lack of interoperability and integration between the different health information systems (A. Ismail et al., 2010; Lee, Ramayah, & Zakaria, 2012).

#### **3.4.3.4 Enabling systems interoperability between the different healthcare facilities – Malaysia Health Information Exchange (MyHIX)**

Interoperability allows the exchange of the patients' health information between the different healthcare facilities (which have their own HIS or CIS), which enables the integration of the information to become the LHR. Thus, a system with interoperability limitations would have limited functionality to exchange patients' information between the disparate systems. As can be seen, the hospitals and the clinics would not have the same system (although possible), and there are several systems in place within a hospital and clinic such as the systems for the laboratory (i.e. Laboratory Information System-LIS), pharmacy (Pharmacy Information System-PHIS) and radiology (Radiology Information System-RIS).

The complete interoperability in healthcare involves technical, semantic and process interoperability. Technical interoperability moves data from system to system independent of domain or the meaning of what is exchanged; semantic interoperability gets at the meaning of the data and allows computers to share, understand, interpret, and use data without ambiguity; and process interoperability is defined as people having common understanding across a network, business systems being interoperable, and work processes being coordinated (Benson, 2012). In short, to be interoperable, the requirements must be met for a common purpose to exchange the needed information, which includes in terms of technical, information architecture, information standards and the standard operating procedures including policies.

When it was learned that the MSC's Telehealth LHP project has stalled and MoH had decided to restart Telehealth (*Business Times*, 20 September 2005<sup>62</sup>), among the reviewed strategies employed, was the implementation of the Malaysian Health Information Exchange project (MyHIX). The project was commenced in 2008 involving the development of an "integration engine" which allows the sharing of patient information between the facilities through the discharge summary. In the beginning, the facilities involved in MyHIX includes four hospitals, after which one more hospital and another clinic were included. (Zaidan et al., 2015).

#### **3.4.3.5 Health Management Information System (HMIS - i.e. electronic diseases registries and surveillance systems)**

According to Mohan and Yaacob (2004), the Health Management Information System (HMIS) under the Telehealth project aggregates the information from LHR, where the de-identified data gathered from LHR is collated into a repository to be available for data-mining purposes that is for health planning, population health monitoring, disease outbreaks and surveillance monitoring. The HMIS is also named as the Group Data Services (GDS) (Ministry of Health, Malaysia, 1997; Mohan & Yaacob, 2004). It is imperative that such information is made available to the health administrators at the local, state and national levels to support the health services management and macro planning (Aljunid et al., 2012; Selvaraju, 2006).

In Malaysia, the HMIS involved collecting and compiling various health-related data from the public and private health facilities. (Selvaraju, 2006). From 2006, the Health Informatics Centre is the custodian of all health-related information for the country<sup>63</sup>. The HIS data were sourced from patient's information records, aggregated in periodic

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<sup>62</sup> Ganesan, V. Ministry moves to revive Telehealth project components (20 September 2005). *Business Times*. Retrieved from <http://search.proquest.com/>.

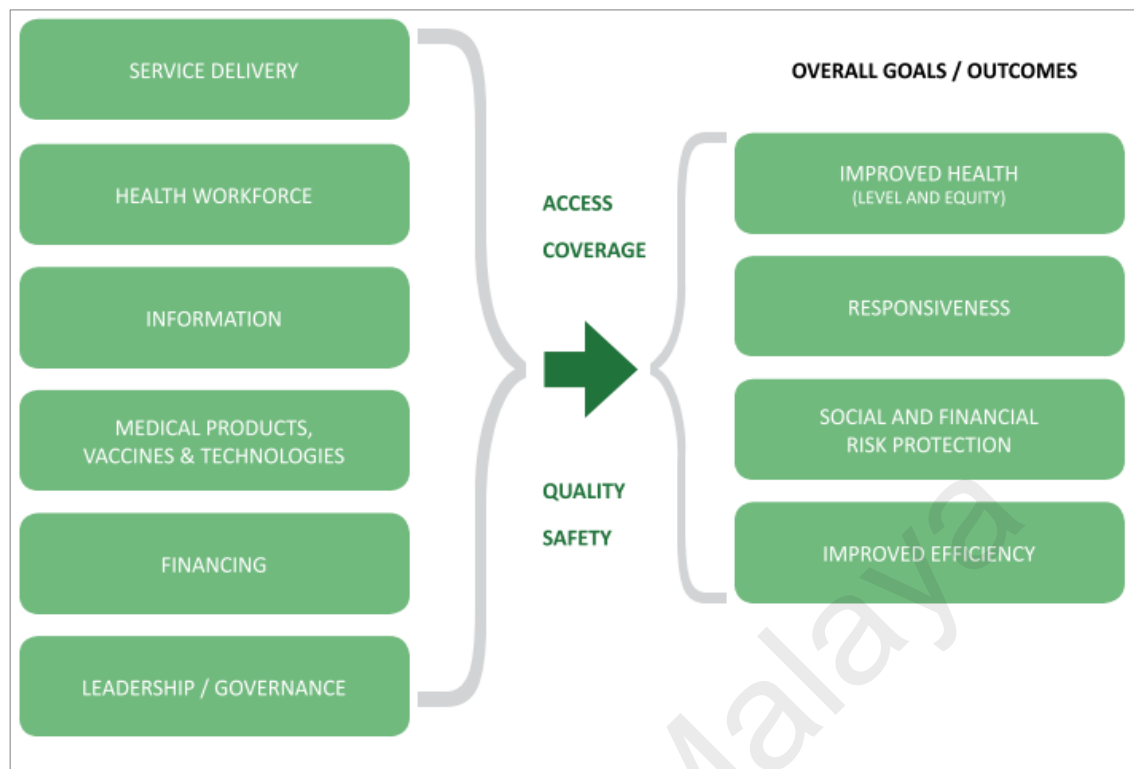
<sup>63</sup> Before 2006, it was under the Information and Documentation System Unit, MoH (IDS)

summary reports, and coordinated at the national level by the MoH's Health Informatics Centre (Selvaraju, 2009). However, HMIS is limited in terms of meaningful data analysis as there is a lack of timeliness of data reporting and data quality is varied among the various health facilities. In addition, there is a lack of integration as the collection of data is managed by the different departments/agencies. According to Aljunid et. al., there are at least five different sources of data from the surveillance system, and about 25 disease registries in the MoH. (Aljunid et al., 2012).

### **3.5 Malaysian Healthcare Challenges and the Potential of Telehealth**

The thesis has discussed the Malaysian health system and the proposals for Telehealth through the Telemedicine Blueprint as the policy instrument for the "health system transformation". It also discussed the eventual fate of the Telehealth strategies under the federally-led MSC initiatives. It is argued that although MoH's efforts to implement Telehealth had not been realised as expected as outlined in the blueprint, the role of Telehealth is as important as other interventions to improve the health systems, if not superior. Furthermore, in the global scene, ICT usage is pervasive in healthcare, and more and more Telehealth solutions are emerging with time. Thus, the strategies to implement Telehealth should be continued and maintained.

Next, the thesis will discuss the challenges of the Malaysian healthcare system and the potential of Telehealth to overcome these challenges. Although there has been considerable health improvement in the country since its independence, the Malaysian healthcare system has long been considered to be under duress (Khoo, 2010; Merican & Yon, 2002). The healthcare system is facing various challenges to ensure the equity and accessibility of healthcare services for its population. To provide detail analyses of the challenges in the Malaysian health system, the WHO 'Health System Building Blocks' is used as the analytical framework (Figure 3.17).



**Figure 3.17: WHO's Health System Building Blocks (World Health Organisation, 2007)**

The 'Building Blocks Framework' provides a useful categorisation of health systems elements into six 'blocks' or key attributes, which portray the system as a blending of various structural, organisational and institutional components. According to this framework, the strengthening of each building block facilitates the delivery of healthcare with improved health access and coverage as well as ensuring quality and safety, which eventually produce improved population health, responsive health services, social and financial risk protection and improved efficiency (World Health Organisation, 2007). The challenges of Malaysia's health systems (from literature review) is discussed along with the outlooks on how Telehealth is considered a potential tool to overcome these challenges.

The following is the analysis of the challenges faced by the Malaysian health system 'blocks' and how Telehealth may contribute to improving the condition. For each 'block',

the desired state based on WHO 2007 report is mentioned along with the potential role of Telehealth to improve the condition (i.e. the challenges).

### **3.5.1 Service delivery - Telehealth may improve the coverage and quality of service delivery**

“Good health services are those which deliver effective, safe, quality personal and non-personal health interventions to those who need them, when and where needed, with minimum waste of resources”

Geographically, there are still many towns and villages located in remote rural areas in Malaysia. A large proportion (39%) of its 30 million population lives in rural settings, especially in states located in the northern and east coast of Peninsular Malaysia, as well as the Sabah and Sarawak in East Malaysia (Department of Statistics Malaysia, 2011). The government has adopted the Alma Ata Declaration, where primary healthcare became the thrust of the healthcare delivery system and supported by the secondary and tertiary medical (Mustapha et al., 2014; Noh, 2011; Safurah et al., 2013). However, there are not enough medical facilities to serve the large population that resides in smaller towns and villages in the rural areas (Hazrin et al., 2013). The majority of hospitals and clinics are located in cities, causing disparity of health access for the population who live in remote areas (Ariff & Teng, 2002; Hazrin et al., 2013). Furthermore, healthcare provision for the population relied heavily on the public-sector (Hui & Jomo, 2007). There is also overutilisation of public services. It was estimated that 80% of hospitalisation occurs in public hospitals. (Hui & Jomo, 2007; Merican & Yon, 2002).

The private hospitals and clinics have been proliferating rapidly since the 1980s (Ramesh & Wu, 2008) whereby the health services in the private sector were readily accessible to the citizens who can afford such services. However, the private health facilities are more commonly found in the urban area. This has deepened the care quality

gaps such as the choices of medications, doctors' workload, practice infrastructure and support facilities between urban and rural populations (Babar & Izham, 2009; Rasiah et al., 2011, 2009). Evidence have shown that Telehealth have been practised in various medical fields for the benefit of the rural population such as maternal health, diabetes, dermatology, cardiology, radiology, pathology, psychiatry, oncology and palliative care among others (Buntin et al., 2011; Hage, Roo, van Offenbeek, & Boonstra, 2013; Mars, 2013; Martínez, Villarroel, Seoane, & del Pozo, 2005; Schrader et al., 2014). Hence the use of Telehealth technology in the existing healthcare delivery system may help to improve the clinical outreach program at the rural areas, reducing time and costs associated with travel, providing healthcare to the rural people in a more effective manner.

### **3.5.2 Health workforce - Telehealth contribute to improving a well-performing health workforce and the fair distribution of specialised care**

“A well-performing health workforce is one which works in ways that are responsive, fair and efficient to achieve the best health outcomes possible, given the available resources and circumstances, i.e. there are sufficient numbers and mix of staff, fairly distributed; they are competent, responsive and productive”

A notable challenge in Malaysia is the shortage of health care providers, particularly specialist doctors. Although Malaysia has an estimated of 55,408 doctors with the ratio of 1.96 per 1000 population, patient's access to specialist care is still limited due to the shortage of specialists (*The Star*, 30 September 2013<sup>64</sup>). The specialists and services available are concentrated in large urban cities, provided either through the public or private health care facilities. This is more pronounced in sub-specialised areas such as neurosurgery, hand and microsurgery and vascular surgery.

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<sup>64</sup> Govt increasing specialist doctor scholarships to 1000 (30 September 2013). *The Star*. Retrieved from <http://blis2.bernama.com/>

The existing dual public-private health care delivery system has created further problems. There is a steady ‘internal brain-drain’ or migration of senior health care providers from the public health sector to the more lucrative private health sector (Chua & Cheah, 2012; Noh, 2011; Rasiah et al., 2011). As discussed earlier, the relevance of Telehealth for rural health is prominent. Telehealth applications help in dealing with shortages of health care providers, building links between well-served and underserved areas and enhances sharing of experience and professional development (Hage et al., 2013; Mars, 2013). For example, peer-to-peer Telemedicine provides an expert second opinion in a timely manner and improves the quality of and access to specialist care for the rural population (Blaya et al., 2010; Buntin et al., 2011; Mars, 2013). In addition, Telehealth enables better-informed health care professionals, which is in line with a the paper commissioned by the WHO in 2004, proposing for the increase of global access to health information, on the premise that limited or no access to information was the major barrier to evidence-based healthcare in developing countries. (Fiander et al., 2015; World Health Organisation, 2004).

### **3.5.3 Health Information Systems - Telehealth enhances the functionality of the existing health information system**

“A well-functioning health information system is one that ensures the production, analysis, dissemination and use of reliable and timely information on health determinants, health systems performance and health status.”

According to Lippeveld and Sapirie, Health Information System (HIS) refers to the “integrated effort to collect, process, report and use health information and knowledge to influence policymaking, programme action and research” (Lippeveld & Sapirie, 2000). A full-functioning HIS will produce a reliable and timely information on health determinants, health status and health system performance, and supports the analysis of

this information to guide activities across all other health system building blocks at all health system levels (World Health Organisation, 2007). As described in sub-section 3.4.3.5, the formal setup for coordinated and systematic data collection for HIS, referred to as HMIS, was established by the MoH since the 1960s (Selvaraju, 2006). Computerised HMIS was implemented since 1995, and the system was designed mainly to capture and analyse routine administrative and financial records in the MoH hospitals and clinics (Suleiman, 2001). There are also systems developed for the purpose of epidemiological surveillance and disease registries (Ministry of Health, Malaysia, 2013). There are challenges for meaningful use of HMIS due to several issues such as incomplete documentation, inadequacy in terms of data accuracy, quality, and timeliness (Aljunid et al., 2012; Selvaraju, 2006, 2009). Problems in data completeness, accuracy and timeliness have caused the limited the use of HMIS for healthcare planning, monitoring, and evaluation (Garrib et al., 2008; Mate, Bennett, Mphatswe, Barker, & Rollins, 2009). The data collection can be improved by having an integrated Telehealth systems as a tool to enable the standardised data collection and data definitions for the whole country.

Telehealth may improve the continuity of care to enable electronic sharing of health information between care providers. A report published by the MoH in 2011 stated that the existing system was recognised to have a lack of integration in the delivery of healthcare (Ministry of Health, Malaysia, 2011). The healthcare services are often delivered in a fragmented manner, where the public and private healthcare sector, and within the public healthcare sector itself (between the facilities and across disciplines) are working in silos (Noh, 2011). In addition, a formal policy or requirement for the continuity of care of a patient, particularly sharing of medical record or health information between the private and public health sector are currently non-existent (Aljunid et al., 2012). Health information and medical records are not readily shareable or accessible between the different health care facilities/institution; unless a formal request was made



to acquire the information needed (with the consent of the patient) or by court order. (Ministry of Health, Malaysia, 2010).

With the increasing ageing population of 60 years and above in Malaysia, from 5.7% in 1990 to 10.21% in 2010, and projected to be 15% in 2030 (Mafauzy, 2000; Samad & Mansor, 2013), it is expected that there will be higher burden of managing chronic disease in the future (Ambigga et al., 2011). An integrated healthcare system is likely to lead to improving effectiveness and quality of care while concurrently increasing cost effectiveness and possibly facilitating cost savings (Health Metrics Networks & World Health Organisation, 2008). As advocated by the WHO, it is essential that the patient is managed through a coordinated and continued manner to tackle the epidemic of chronic diseases (Health Metrics Networks & World Health Organisation, 2008). Having Telehealth such as an interoperable electronic health records (EHR), allows the functionality of keeping a lifelong medical record, enabling the healthcare provider to access medical record in a timely manner<sup>65</sup>. This would have the advantage of providing care in a coordinated and sustained continuity of care for the ageing population as well as with chronic conditions for a lifetime. (Byrne et al., 2014; Hillestad et al., 2005; Ludwick & Doucette, 2009).

Apart from that, patients can use the selective data from their EHRs to inform themselves and become more involved in their medical care. An informed and actively involved patient can be more engaged in disease self-management and is able to adhere better to the recommendations from his or her healthcare provider especially for individuals with chronic conditions (Archer, Fevrier-Thomas, Lokker, McKibbin, & Straus, 2011; Chambers & Coleman, 2016; Coulter et al., 2015; Franek, 2013; Hamine, Gerth-Guyette, Faulx, Green, & Ginsburg, 2015; Rao, Brammer, McKethan, & Buntin, 2012; Urowitz et al., 2008). Evidence has shown that Telehealth has a role in patient

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<sup>65</sup> See footnote no. 61 page 97.

empowerment contributing by improving the quality of care of long-term conditions such as diabetes (Glasgow et al., 2012; Ronda, Dijkhorst-Oei, & Rutten, 2015), chronic cardiovascular diseases (Dansky, Vasey, & Bowles, 2008; Dar et al., 2009; Whitten, Bergman, Meese, Bridwell, & Jule, 2009), mental illness (Robotham, Mayhew, Rose, & Wykes, 2015). In fact, a few studies had demonstrated that these interventions are cost-effective. (Golsteijn et al., 2014; Kruger et al., 2014; Peels et al., 2014; Stanczyk et al., 2014).

Patients with access to their personal health record may obtain information pertaining to their health care such as laboratory results, prescription and appointment alerts, record their medicines and treatments, and monitor and track their treatment and progress, and learn about the prognosis for their illness (Almunawar, Anshari, Younis, & Kisa, 2015; Ammenwerth, Schnell-Inderst, & Hoerbst, 2012; Buntin et al., 2011; Wicks, Stamford, Grootenhuis, Haverman, & Ahmed, 2014). Evidence has shown that these interoperable EHR, known as “health information exchange” contributes to positive changes in care coordination, communication, and knowledge about patients (Hersh et al., 2015). Such systems are already in place in countries recognised to have had established EHR systems deployed on a national or large regional scale, such as the in United States, New Zealand and a few European countries among others (Geissbuhler, 2013; Vest, 2012). General practitioners and hospitals are able to have access and exchange patient information, such as physician notes, examinations, prescribed medications, across the health system; and healthcare facilities are able to plan across primary, secondary, and long-term care settings.

Besides providing health information for continuity and coordinated patient care process for long-term conditions, EHRs may enhance the public health surveillance system by complementing the data available from existing administrative data sources such as the Health Management Information Systems (HMIS) (Birkhead, Klompas, &

Shah, 2015; Birtwhistle et al., 2009; Keshavjee et al., 2011; Shapiro, Mostashari, Hripesak, Soulakakis, & Kuperman, 2011). These interlinked Telehealth systems cutting across sectoral boundaries is probably the solution for a coherent and unifying HIS for public health monitoring, allowing the consolidation of the active and passive case finding of (and responses to) diseases and conditions, as well as detection of high priority risk factors and behaviours in the population (Gray, Bowden, Johansen, & Koch, 2011). As mentioned in sub-section 3.3.1, Malaysia is undergoing epidemiologic transition, where the prevalence of NCDs is steadily increasing. Thus, the use of Telehealth is potentially useful as one of the health intervention to improve chronic care outcomes of the Malaysian population.

#### **3.5.4 Medical product, vaccine & technology - Telehealth contributes towards assured quality and safety of medical product, vaccine & technology.**

“A well-functioning health system ensures equitable access to essential medical products, vaccines and technologies of assured quality, safety, efficacy and cost-effectiveness, and their scientifically sound and cost-effective use”.

One Telehealth system designed to assist healthcare provider in clinical decision-making is the clinical decision support system (CDSS). These systems, which are usually embedded within EHRs, are developed base on specified logical conditions, providing drug allergy checks, drug-drug interaction, reminders for preventive services and integration with evidence-based Clinical Practice Guidelines (CPGs) (Wright et al., 2011). These systems provide passive and active referential information as well as reminders, alerts and guidelines (Ash et al., 2012). Evidence from a systematic review study of 28 RCTs of CDSS intervention in health care processes has shown that there was a statistically significant effect on the patient outcomes in terms of the prevention of morbidity of any disease (Moja et al., 2014).

In Malaysia, published studies on the assessment of guidelines adherence among healthcare providers in Malaysia is limited, but studies on specific condition have been conducted. A cross-sectional study to describe prescribing pattern in two government primary care clinics by Ramli and colleagues (2010) have shown that the anti-hypertensive agents prescribed were not in accordance with current evidence and guidelines, contributing to the minimal improvement of blood pressure control rates among hypertensive patients. They suggested that quality improvement measures are to be undertaken by the local district health department to advocate the appropriateness of antihypertensive prescribing and the overall standard of hypertension management (Ramli et al., 2010), but they did not propose any specific interventional measure. Perhaps, the use of CDSS and EHR should be introduced in primary care settings which may contribute to the appropriate use of anti-hypertensive drugs (or others). After all, only less than 10% of government clinics have implemented clinical information system (as discussed in sub-section 3.4.3 earlier).

A 2009 review of studies on the use of health information technologies and systems in both clinical care and other areas like allied health and preventive services concluded that the use of decision support and alerting systems can increase the clinician's adherence to clinical guidelines which eventually improve the quality of medical and healthcare (Jamal et al., 2009). Another study in Netherlands which compares between General Practitioners (GPs) who use and do not use CDSS for drug prescribing had demonstrated that compliance with guidelines improves when CDSS is used (de Jong, Groenewegen, Spreeuwenberg, Westert, & de Bakker, 2009). In another study, people with diabetes seen by doctors who used EHRs were 35% more likely to get all of the recommended screening measures, such as eye exams and blood sugar tests, than patients whose doctors relied on paper records. Moreover, they were 15% more likely to have favourable outcomes on those measures (Cebul, Love, Jain, & Hebert, 2011). Thus, the use of

Telehealth can promote healthcare providers' adherence to standardised care or CPGs as well as improve evidence-based practices to improve the clinical outcome.

### **3.5.5 Health Financing - Telehealth improves the mechanism of health financing control and management**

“A good health financing system raises adequate funds for health, in ways that ensure people can use needed services, and are protected from financial catastrophe or impoverishment associated with having to pay for them”

In the IT4UHC report by the Asean e-Health Information Network (AeHIN), it was proposed that in instances where a country resorted to social health insurance for health financing, it is anticipated that operating without the help of ICT is impractical or even impossible; because of the sheer volume of work and the complexity in managing beneficiaries, claims (audit, payments), accounting and finances (AeHIN, 2013). The use of computerised systems in operating social health protection schemes has many advantages such as increased transparency, improved planning and better decision-making based on accurate & timely data (AeHIN, 2013, p. 20). Although Malaysia is yet to implement such a scheme, there have been proposals to reform the existing health system which include incorporating the health financing mechanism with national health insurance scheme. The proposal is yet to be finalised (*Bernama*, 8 February 2012<sup>66</sup>, *New Straits Times*, 25 April 2012<sup>67</sup>, Ministry of Health, Malaysia 2011; Merican, 2015; MOH Planning and Development Division, 2011). A national Telehealth system able to link health related information between health facilities and the managed care organisations (payer) for reimbursement is sorely needed. In addition, information gathered from these

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<sup>66</sup> Be open about ICare Proposal, Health Ministry told (8 February 2012). *Bernama*. Retrieved from <http://blis2.bernama.com/>

<sup>67</sup> Details of ICare Health Plan yet to be finalised (25 April 2012). *New Straits Times*. Retrieved from <http://blis2.bernama.com/>

systems can be collated for the purpose of planning, operationalising, measurement and evaluation of a country's universal health coverage achievement.

### **3.5.6 Leadership and governance - Integrated Telehealth supports the decision-making process by the policymakers**

This involves ensuring strategic policy frameworks exist and are combined with effective oversight coalition-building, the provision of appropriate regulation and incentives, attention to system design, and accountability.”

ICT plays an important role in the national HIS for the purpose of monitoring, health planning, and policymaking in the high-income as well as LMICs, (Health Metrics Networks & World Health Organisation, 2008; Macfarlane, 2005; Reddy et al., 2011). Hence, the use of Telehealth is paramount, providing the valuable evidence needed for policymaking and the provision of appropriate regulation. With Telehealth, the data quality and relevance of data is improved to ensure the timely availability for the purpose of planning, operationalising, measurement and evaluation of a country's healthcare achievement. The high-speed Telehealth networks can improve communications reliability for medical response and assists coordination between local and external parties, as well as keeping all parties informed about any changes. The role of Telehealth and HIS is discussed earlier in sub-section 3.5.3.

## **3.6 Chapter Summary**

The previous section describes the background of how Telehealth was positioned in the context of the national ICT agenda and the public-sector reforms. The chapter first canvassed the contextual background of Telehealth policy, describing its status of the high middle-income country, gaining strong economic growth since the 1980s. This was backed up by a strong commitment by the former Prime Minister, Dr Mahathir Mohamad

for his 'Vision 2020' towards a fully developed country by the year 2020. The government implemented MSC initiatives, which includes Telehealth, to harness the ICT potential as a source of the country's prosperity. Secondly, it describes that the healthcare system, particularly the in the public-sector, was already under the pressing need to improve the healthcare services to tackle the due to a multitude of problems such as increasing burden of NCDs and long-term conditions, high expectations from the public and limited fair distribution of human resources.

The MoH officials realised the potential of ICT as a tool to improve the healthcare delivery and proposes the Information System Strategic Plan (ISSP) in 1995. The aims of ISSP were to improve connectivity between healthcare facilities for health data collection, computerization of hospitals and clinics, and Telemedicine services. However, when Telemedicine Blueprint policy was introduced in 1997, it propagates the modernistic idea of 'wellness- focus' and 'seamless-care' for the population, of which was novel at that time. MoH was given the mandate to develop such a system, with the participation of the private companies. The four Telehealth Flagship Applications, LHP, MCPHIE, CME and TC; were scheduled to be completed by 2003. In addition, not all of the existing MoH's ISSP was assimilated in the new Telehealth-MSC project. Only Telemedicine was incorporated, while the computerisation of hospital with HIS and clinics with TPC being developed separately from Telehealth-MSC.

Half-way during the contractual terms, one of the consortia had suffered financial difficulties and was unable to fulfil the deliverables. The LHP, MCPHIE and CME projects were stalled after about three years from the project commencement. MoH had revived and re-look Telehealth projects, and TPC and HIS were managed and implemented by other departments in the MoH. However, the implementation of Telehealth in the healthcare facilities is still limited. Having detailed the contextual background, a policy analysis will be attempted to explore the problems of Telehealth

policy implementation in Malaysia. The following chapter will describe the research methodology for Telehealth policy analysis based on the proposed conceptual framework to fulfil the research objectives.

University of Malaya



## CHAPTER 4 : METHODOLOGY

### 4.1 Introduction

Qualitative research is situated in social experience and takes many forms (Denzin & Lincoln, 2005). The appropriate research methodology chosen for a study is considered based on the nature and aims of the study as well as the associated research questions that are being explored (Creswell, 2007; Mason, 2002; Maxwell, 2012). This study involves understanding the origins of Telehealth policy, its policy processes, who is involved and why, their relationships, and exploring the socio-political and economic landscape. This chapter describes the study methodology - providing the argument for why case study is appropriate, explaining the study paradigm as well as the rationale for the selection of study design.

The first objective is to explain the research paradigm in view of the research aims and objective (section 4.2). The second objective is to outline the study design and discuss the rationale for its selection. Then, it elaborates on the development of the conceptual framework which has been discussed briefly in Chapter 2. The developed conceptual framework is then used to guide the study methodology (section 4.3), which brings the chapter to the third objective, i.e. to describe in detail on the specific methods for this study.

Accordingly, with reference to the research questions posed in Chapter 1, it describes how the study design inform the study of the data collection strategy, the types of data required, and the logical links between data and the inferences to be drawn from them. It explains the use of the theoretical concepts and/or analytical frameworks (as described in Chapter 2) that underpin the analysis of information about policy process which provide the synthesis of findings to address the central question of this study (section 4.4 and 4.5).

In the later sections, the strategy for testing validity and reliability of the research instruments is then explained. Other relevant methodological considerations such as research ethics are also discussed.

The chapter begins with section 4.2 that describes the knowledge paradigms and the rationale to undertake the study through the critical realist paradigm. It is followed by sections that describe the study design, methods and data that were used. Section 4.3 describes the study design, which is a qualitative case study. The data collection strategy and the types of data required, which consists of an in-depth interview and document reviews is explained in section 4.4. In section 4.5, the procedures for data analysis is presented which explain how the logical links between data and the inferences to be drawn from them through the theoretical concepts and/or analytical frameworks (as described in Chapter 2). The theories underpin the analysis to gather information about policy process providing a synthesis of findings to address the central question of this study (Sections 4.4 and 4.5). Then, the strategy for testing validity and reliability of the research instruments is explained in Section 4.6. Finally, another relevant methodological considerations such as research ethics is described in Section 4.7, and the role of the researcher is described in Section 4.8.

## **4.2 The Study's Knowledge Paradigm**

As explained in Chapter 1, the purpose of the study was to gain a better understanding of Telehealth policy in Malaysia. The study investigates how Telehealth appeared on the Malaysian health policy agenda, at what degree to which the cause had been institutionalised in the country, and what are the influential factors for policy implementation. The subject or phenomenon under study is Telehealth policy in Malaysia. The types of questions addressed in the study consist of the 'how' (i.e. How the Telehealth policy was formulated?), 'what' (i.e. What was Telehealth policy was all about?) and 'what influences its policy processes' (i.e. What are the influences of

Telehealth policy processes). As the study is referring to a phenomenon in reality which is guided by the accompanying research questions (on the phenomenon), this placed the study in the critical realist knowledge paradigm. (Gilson, 2012).

On the other hand, the knowledge paradigm founded on positivist understanding starts from the position that the phenomena or issues of investigation exist independently, regardless how they are understood and seen by people. Research in this tradition works with the understanding that these phenomena under study, comprise a set of facts that can be observed and measured by the researcher, without disturbing them; and that there are patterns and regularities within them, causes and consequences, which can be identified through empirical research. The descriptions and differences of the three knowledge paradigm, i.e positivism, critical realism and relativism is shown in Table 4,1 below. (Gilson, 2012).

**Table 4.1: Key elements of knowledge paradigms as applied in Health Policy and Systems Research**

	Knowledge Paradigm		
	Positivism	Critical Realism	Relativism (interpretivism / social constructionism)
Brief description	Research in this tradition works with the understanding that these phenomena comprise a set of facts that can be observed and measured by the researcher, without disturbing them, and that there are patterns and regularities within them, causes and consequences, that can be identified through empirical research	Can be seen as placed somewhere between the positivism and relativism.  Like positivists, critical realists seek to identify the causal mechanisms underpinning social phenomena (such as health policies and systems), but they also adopt an interpretive understanding.  The task of research and evaluation by critical realist is to generate theories that explain the social world and, in particular, to identify the mechanisms that explain the outcomes of interventions	Encompass the understanding that the phenomena being investigated (such as health policies and systems) are produced through interaction among social actors. Such phenomena do not, therefore, exist independently of these actors but are constructed through the way the actors interpret or make meaning of their experience, and these interpretations change over time
Types of questions addressed	Is the policy or intervention (cost)-effective?	What works for whom under which conditions?	How do actors experience and understand different types of interventions or policies?  What are the social processes, including power relations, influencing actors' understandings and experiences?

**Table 4.1, continued**

	Knowledge Paradigm		
	Positivism	Critical Realism	Relativism (interpretivism / social constructionism)
Related disciplinary perspectives	Epidemiology  Welfare economics Political science (rational choice theory)	Policy analysis  Organisational studies	Anthropology  Sociology  Political science (sociological institutionalism)
Key research approaches and methods	Deductive: Hypothesis-driven  Measurement through surveys, use of archival and other data records  Statistical analysis  Qualitative data collected through, for example, semi-structured interviews and interviewing procedures	Deductive and inductive (theory testing and building)  Multiple data collection methods including review of documents, range of interviewing methods, observation	Inductive (maybe theory building and/or testing)  Multiple data collection methods including in-depth interviewing (individuals and groups), documentary review but also participant observation or life histories, for example

Source: Gilson, 2012

As displayed in Table 4.1, the key research approaches and methods of a study through the lens of critical realist paradigm is by the qualitative approach and involving theory testing and/or theory building. In Chapter 2, the study had discussed extensively on the various theories relevant to the study which draws from social science, political science and implementation science. It was highlighted that the theoretical underpinnings and conceptual framework to analyse Telehealth policy draws on the perspective of agenda-setting using Multiple Stream Theory for the policy formulation stage and Normalisation Process Theory for Telehealth implementation stage. Therefore, the study design (i.e. data collection and analysis) was guided based on the defined conceptual framework.

### **4.3 Study Design**

Given the information gathered from the synthesis of the literature on the theories of policy process and implementation in Chapter 2, policymaking is an iterative and dynamic process involving a range of actors linked together through a network of activities, decisions and motivations (Buse et al., 2012; Kingdon, 1984; Walt et al., 2008). Similarly, as stated by Hogwood and Gunn (1984), the policy is not a decision, but the policy is produced in, with, and through negotiations between participants or actors. Policy, therefore, is not an end-product, but a dynamic system of varying pace with no distinction between policy development and implementation (Lipsky, 1980b). Much of what occurs in policy systems is continuous work on persistent issues, and each policy episode is shaped in part by the nature of the organisations involved and organisational mechanisms and processes.

Therefore, considering the contextual background of the research problem along with the literature review on the concepts of policy analysis, the outline of the study design is guided based on the key questions addressed in this study as illustrated in Figure 4.1.

<b>Main research question</b>			
Given that the current state of the National Telehealth (as stated in Section 1.1), how can the challenges in National Telehealth Policy implementation in Malaysia, be better understood?			
<b>Research questions in the study (Section 1.4)</b>	<b>Restatements</b>	<b>Theoretical underpinnings</b>	<b>Methods and sources of data collection</b>
<b>RQ1:</b> How can we understand and explain the policy processes for Telehealth initiatives in Malaysia?	<b>What processes</b> were involved in making Telehealth Policy as part of the national health policy? <b>What were the contents</b> of Telehealth policy since it was introduced in 1997? <b>Who</b> was/was not involved?	Multiple Stream Theory (agenda-setting)	<ul style="list-style-type: none"> <li>• Document analysis</li> <li>• Interviews</li> </ul>
<b>RQ2:</b> To what extent have the policy outputs contributed to the realisation of the policy's objectives?	<b>How</b> was the policy implemented? What were the factors that <b>facilitate</b> or <b>hinder</b> Telehealth implementation?	Normalisation Process Theory	<ul style="list-style-type: none"> <li>• Document analysis</li> <li>• Interviews</li> </ul>
<b>RQ3:</b> What are the influential determinants of Telehealth implementation that can provide lessons-learned for the ongoing and future National Telehealth initiatives?	What did the "implementer" perceive on the implementation process? How can it be done in a better way?	Normalisation Process Theory	<ul style="list-style-type: none"> <li>• Interviews</li> </ul>

**Figure 4.1: Outline of study design based on the research question.**

As mentioned in Section 4.2, the nature of this inquiry locates it firmly in qualitative methodology. Specifically, the study employed a qualitative case study approach. A qualitative case study is the most suitable methodology for policy analysis due to its appropriateness to investigate in-depth a single instance of a phenomenon in its real-life context (Yin, 2011), which suits the subject of the study i.e. the Telehealth policy. Furthermore, according to review findings by Gilson and Raphaely (2008), Walt et al. (2008) and Berlan et al. (2014), the most commonly deployed methodology for policy analysis is by case studies.

In the following sections, the detail of the case study methodology is described. Using policy analysis approach, an in-depth study of Telehealth policy was undertaken covering the 1995-2012 period (i.e. the period of interest as described in Chapter 3) which explores the policy process and implementation at the national, state, district and local level.

#### **4.3.1 Case study as the appropriate methodology**

The purpose of the study is to gain a better understanding of Telehealth policy processes in Malaysia. After the research aims and questions were defined, a literature review was undertaken to provide the key concepts and theories for the purpose of suggesting possible explanations related to the phenomenon under study (i.e. Telehealth policy). Since the aims of this study were mainly to answer ‘how and why’ the Telehealth policy came about, and to explore the policymaking process which is contemporary, a qualitative case study was considered the appropriate research methodology for the study.

The case study methodology is used in this study for analysing the policy process retrospectively, studying the policy process in the health sector, investigating the history behind the different stages of the policy process, such as conceptualization, formulation and implementation. As suggested by Merriam (1998), elements of historical research and case study often converge. Yin (2011) also suggests that “each case study relies on many of the same techniques as history but adds two sources of evidence not typically found in the historian’s repertoire: direct observation and systematic interviewing”. In addition, the case study methodology has the ability to answer ‘how and why’ questions about a contemporary set of events over which the investigator has little control (Yin, 2011). Hence, a case study is the appropriate methodology to understanding the issues of Telehealth policy with the combination of historical as well as the contemporary elements within it.



In addition, case study is appropriate for the study because case study is useful for studying complex and dynamic systems for the purpose of exploring why and how particular outcomes occurred, rather than simply describing what happened. A case study allows the in-depth focus on a relatively small number of units or 'cases' and benefit from prior development of theoretical preposition to guide data collection and analysis (Yin, 2011). The qualitative case study design is appropriate for the study because of the need to reconstruct holistically the history of the Telehealth initiative in the country in order to examine the policy processes at work. The case study approach is better suited than other research methodologies, such as a structured survey and statistical analysis of health service utilisation to achieve this objective (Yin, 2011). This is true because the defining feature of the case study is that it considers a phenomenon in its real-life context, and is, therefore, a research strategy which is well-suited to reveal the underlying processes. Hence, this research had enabled the recording of the 'case' i.e. 'Telehealth policy in Malaysia' in its entirety.

As part of the research design, there is a need to define the nature of the 'case', which effectively forms the 'unit of analysis' being utilised in the research. The unit of analysis is important because it identifies where the case starts and where it ends (Miles & Huberman, 1994). In case of study research, clearly identifying the unit of analysis is essential to avoid deviating from the focus of research, which can lead to the unnecessary collection of data. Yin, further proposed that the unit of analysis can be an individual(s), event, entity, decisions, programmes, implementation process or organisational change. (Yin, 2011).

For the purpose of the study design, the 'unit of analysis' was the 'Telehealth Policy in Malaysia'. Within the Telehealth policy, there is its subunits; mainly the actors, the organisations, the implementation, and the Telehealth technology itself. The unit of

analysis is, therefore, one of an embedded nature and caution is heeded that the focus of the case study remains on the main unit of analysis rather than the subunits (Yin, 2011).

This study was pursued by a single case study. In the single case study, the phenomenon under study is examined without comparison cases, allowing for a smaller, more in-depth focused study (Merriam, 1998; Yin, 2011). This is in line with the objective of the study to focus on the distinctive important events which had a set of circumstances, allowing an in-depth investigation on the inter-relationship between the elements and constructs of the MST and NPT throughout the policy processes related to Telehealth in Malaysia. Although case study methodology is criticised for having limited scientific value because such studies do not provide the basis for statistical generalisation, unlike ‘statistical generalisation’ based on quantitative studies techniques, case studies advance in a way which is called as ‘analytic generalisation’ (Yin, 2011). Thus, the findings from this case study can provide an important direction for research focusing on other similar undertakings (i.e. Telehealth implementation in other developing countries).

#### **4.3.2 Selection of case**

The Telehealth policy was selected as the case study based on the fact that this policy is one of the biggest Malaysian public-sector projects in the health sector. As mentioned in Chapter 3, the aim of the Telehealth policy was to deploy the multiple components of ICT systems which involved multiple organisational levels and MoH institutions throughout the country. In addition, the policy was implemented involving a large amount of government expenditure (see Chapter 3). The policy was thought to have strategic importance as ICT was a priority area and received special attention from the federal government. The rationale of studying this policy is particularly strong - despite their exceptional effort, it appeared to be one of the most controversial programme in Malaysia (as discussed earlier in sub-section 3.4.1). It is also useful to note that the factors leading to the controversy of this programme have yet to be studied.

#### 4.4 Conceptual framework

Conceptual models, frameworks and theories can provide tools to describe, understand and explain health policy processes (Exworthy, 2008). In a qualitative study, the conceptual framework serves several purposes:

- a) identifying who will and will not be included in the study;
- b) describing what relationships may be present based on logic, theory and/or experience; and
- c) providing the researcher with the opportunity to gather general constructs into intellectual “bins”. (Miles & Huberman, 1994).

A conceptual framework can be graphical in nature and can also be simple or complex, driven by theory or common sense, descriptive or causal (Miles & Huberman, 1994). According to Yin, in case of studies, identification of the appropriate theoretical perspective at the beginning of investigation shall serve as a guide for research questions, analysis and the interpretation of findings (Yin, 2011). Furthermore, as argued by de Leeuw (1989), theories are more specific than frameworks and postulate precise relationships among variables that can be tested or evaluated empirically to explain fairly general sets of phenomena (E. J. J. de Leeuw, 1989). Therefore, in this case study of policy analysis, the theories employed in the study contribute to deepening of understanding of causality, and by bringing coherence to a fragmented body of knowledge allowing a more thoughtful conceptualisation of the policy process, that goes beyond ‘telling the story’ (Walt et al., 2008). Moreover, the application of existing theories does have a potential to contribute to theory development in health policy analysis (Walt et al., 2008).

#### **4.4.1 Development and description of the conceptual framework**

The study undertook a comprehensive investigation of the Telehealth policy in Malaysia, from the stages of policy formulation through to the policy implementation where it was expected that the normalisation of Telehealth system in the public healthcare service took place. Previously in Chapter 2, several theories relevant to the study were discussed which included the theoretical perspectives selected for the study i.e. the Kingdon's Multiple Stream and May and Finch's Normalisation Process Theory as the underpinning theory. The purpose of the development of the conceptual framework represents the theoretical lens to analyse Telehealth policy, which provides the foundation for understanding the agenda-setting process, as well as identifying the influential factors or determinants related to Telehealth implementation. In addition, the conceptual framework allows the synthesis of understandings of the inter-relationship between the constructs or dimensions identified based on the theories. The study intends to evaluate Telehealth policy historically from 1997 – 2012. The time-frame was chosen as it was in 1997 that the Telehealth policy was institutionalised after the introduction of the Telemedicine Blueprint, and the year 2012 was the time when the study was conducted.

The diagrammatic representation of the preliminary conceptual framework for this study is illustrated in Figure 4.2, and the explanation of the conceptual framework is described in the following sections.

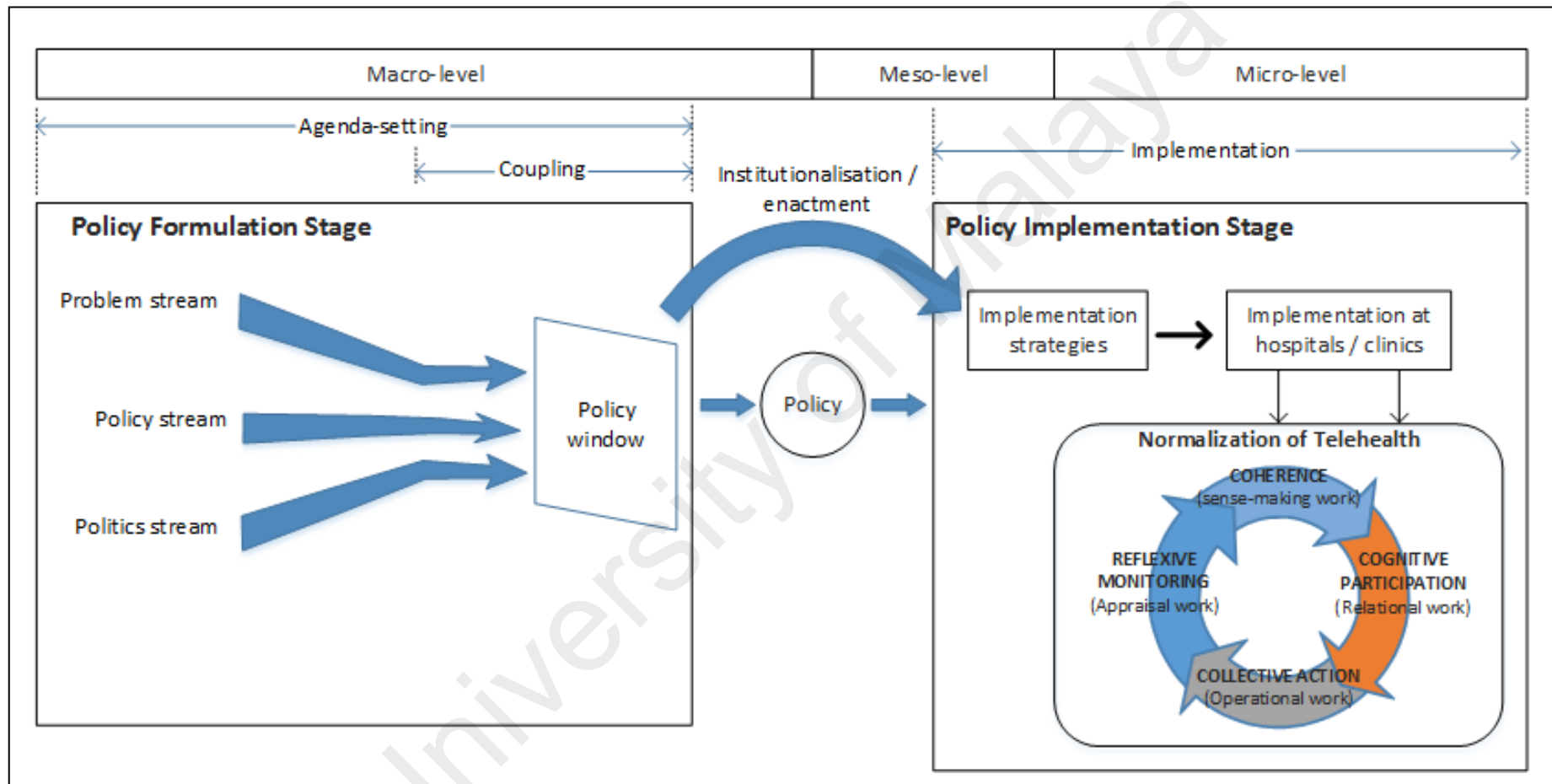


Figure 4.2: The illustration of the conceptual framework.

#### **4.4.1.1 Part 1 – Using Kingdon’s Multiple Stream Theory for Policy Formulation Stage**

For Part 1, the focus is to better understand the process of the policy formulation and the agenda-setting particularly at the national/federal level (i.e. macro level). Thus, the analysis will follow the five structural elements from the Kingdon Multiple Stream Theory, which is the problems, policies and politics (also known as the three streams), policy windows and policy entrepreneurs (Kingdon, 1984). The nature of Telehealth initiative and its accompanying policies were explored through the historical narrative based on Kingdon’s the framework.

The policy process was conceptualised as three largely unrelated streams: a problem stream, a policy stream and a politics stream. The problem stream consists of various conditions of interest that policymakers or citizens define as problems. The problems of health information management such as lack of data completeness, timeliness, and quality of reporting would qualify as such a condition (as discussed in sub-section 3.5.3). The policy stream, which consists of a number of possible policy solutions to conditions in the problem stream, is usually generated by ‘policy actors’ in policy communities – a network that includes, for example, government officials, bureaucrats and academicians. However, because of the challenges involving technical feasibility, value acceptability and resource adequacy, only a few of these solutions receive serious consideration. The politics stream consists of perceptions of the political ‘mood’ and the results of pressure group campaigns, and administrative or legislative turnover. Because government officials and politicians are sensitive to public demands, as well as to the media’s focus on such demands, the various issues and questions appear on the political agenda.

At key points in time, the three streams outlined above are joined: a problem is recognised, an appropriate solution is identified, and the political ‘mood’ is right for the

government to embrace and drive forward policy change the ‘windows of opportunity’ opens. This coupling of the three streams is referred to by Kingdon as a ‘policy window’. When these windows open, policy entrepreneurs<sup>68</sup> must immediately take the opportunity to initiate action (Kingdon, 1984). Policy entrepreneurs are generally regarded as public entrepreneurs who perform several functions in the policy process. For example, they define and reframe problems, propose policy alternatives and greatly contributes to the agenda-setting process (Mintrom, 1997; Mintrom & Norman, 2009). The study identified the agenda-setting process, including who are the ‘policy entrepreneurs’ and the ‘policy window’, by which the Telehealth policy was set as a priority in Malaysia’s health policies at that particular time and situation in 1997.

#### **4.4.1.2 Part 2 – Using Normalisation Process Theory for Telehealth Implementation Stage**

For Part 2, the inquiry was on exploring the influential factors or determinants for Telehealth implementation. The Normalisation Process Theory was applied to explore the Telehealth implementation processes at the state, district and local level (i.e. meso- and micro-level). Given its sociological origin, NPT serves as a heuristic device with which to ‘think through’ on implementation issues. NPT’s also would enable the analysis of the distinctive features of all ‘stakeholders’ or ‘actors’ involvement, either as an individuals or as groups, in the implementation process, as well as the subtle and gradual processes through which complex health interventions (in this case the Telehealth), were made ‘workable’ and ‘integrated’ to the point of becoming embedded as normal practice, or ‘normalised’ in the healthcare settings (C. R. May et al., 2007; Carl May, 2006). In addition, previous studies had demonstrated that NPT was useful in studies to ‘alert’

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<sup>68</sup> ‘Policy entrepreneur’ is a term denotes the individual agents in the policy process who plays an active role in facilitating competing interests during policy-making. Their roles mainly at the initial stages of policy formulation as opposed to implementation, though the literature lacks clarity in definition regarding policy entrepreneurs. (Mintrom, 1996, 1997)

researchers and stakeholders involved in implementation works on a range of macro-, meso- and micro-level issues that are likely to be encountered (C. R. May, Finch, Ballini, et al., 2011). More importantly, NPT has frequently been applied in Telehealth as well as e-Health studies (Bouamrane, Osbourne, & Mair, 2011; Mair et al., 2012; C. R. May, Finch, Cornford, et al., 2011; Murray, May, & Mair, 2010). Studies which employed NPT had provided important insights, particularly paying attention to how knowledge is held, transferred, and created within and across professional groups, as well as to understand the work that actors (e.g. clinicians, implementers, and patients alike) have to engage in to implement new intervention in practice (Gallacher, May, Montori, & Mair, 2011; Murray et al., 2011). Hence, the use of NPT underpinning the study had drawn the attention for the study to explore and gain insights of the influential determinants for Telehealth implementation in MoH, which is in line with the study objective.

As shown in Figure 4.2, the four constructs of NPT which is *coherence* (how individuals or groups ‘make sense’ of new ways of working), *cognitive participation* (the ‘engagement’ work to ensure participants ‘buy in’ and ‘sustain’ an intervention), *collective action* (the work of putting operationalising an intervention) and *reflexive monitoring* (the work of appraising an intervention) interact in complex ways to influence implementation process (C. R. May et al., 2009; Carl May & Finch, 2009). This study attempted to determine how these constructs had influenced Telehealth implementation process in the MoH. In addition, the NPT was used to prompt, guide, and structure other research questions, which is based on each of the four NPT constructs. This approach broadened the questioning base of the study to include queries on issues that the study might have not considered initially. For example, the NPT assisted the study to develop questions about informal policies operating at local levels as well as formal national policies (part of *collective action*) and questions about the extent to which the work of implementation was or was not compatible with existing professional identities (part of



*cognitive participation*). To demonstrate how NPT guides the development of the interview questions, here are examples of the key questions asked for each of the four constructs (Figure 4.3). The development of the interview guides used in this study is elaborated in sub-section 4.5.3.

- **Coherence:** How was the new intervention (Telehealth) made coherent by its users?
- **Cognitive participation:** Who needs to do what to implement/operationalize Telehealth into routine practice, and are these implementation tasks compatible with these people's existing workload, skills, and professional identity?
- **Collective action:** What are the formal and informal policies, operating at local and national levels that might influence implementation? What is the capacity and will the actors/stakeholders/users to do the implementation work?
- **Reflexive monitoring:** How is Telehealth service being monitored by the users?

**Figure 4.3: Examples of Interview Questions derived from the four constructs of the Normalisation Process Theory.**

Thus, in this study, NPT is used as the analytical framework for Telehealth implementation – examining how the ‘normalisation’ of Telehealth occurs, from original concept (as outlined by Telehealth policy documents), through to its operationalisation (or implementation), to its becoming routine (or embedded) and then sustained (or integrated) as the standard practice in the Malaysian public healthcare settings. The study assumed that the focus of each stage of policy implementation is caused by the ‘purposeful social action’ taken by individuals and groups, that is, the different types of actors involved in Telehealth implementation.

The main ‘actors’ of interest in relation to the Telehealth policy were the policy makers and implementers. As argued by Lindblom (1993), “to understand who or what makes policy, one must understand the characteristics of the participants, what parts or roles they play, what authority and other powers they hold, and how they deal with and control each other.” In most public policy research, the policy makers are considered the key

explanatory factor that affect policy formulation and implementation, as well as the subsequent effects of policy for the policies (DeLeon, 1999; Howlett & Ramesh, 2009; Jenkins-Smith & Sabatier, 1993; P. A. Sabatier, 1991a; P. A. Sabatier & Weible, 2007). The role of policy makers has been acknowledged in several Telehealth/e-Health studies such as by MacFarlane (2006), Broens et al. (2007), Sheikh et al. (2011) and Cresswell et al. (2013).

As for the ‘implementers’, they were also considered as the policy actors. These are the senior MoH officials responsible for implementing Telehealth when the policy was ‘enacted’ or ‘institutionalised’. Because of their direct experience of planning and managing implementations, the ‘implementers’ are likely to have useful perspectives towards an understanding of the factors contributing to the success or failure of Telehealth systems (Murray et al., 2011). The study sought to gain insights of the views and experiences of the Telehealth strategic team or the ‘policy implementers’ as well as the organisational consequences of introducing Telehealth systems in the complex environment in the MoH, and how these evolved.

Besides gathering qualitative data through the theoretical lens, literature reviews were also conducted to contribute to the sources of data in this study. The data gathered were analysed and interpreted to synthesise an accurate picture of Telehealth implementation in Malaysia. The strengths and weaknesses of the strategies were deduced upon the findings of this case study to fulfil the requirement of a comprehensive overview of Telehealth as a national strategy, which is useful to gain a full understanding of the situation and the breadth of change required. The recommendations for strategies for Telehealth implementation in the future will be based on these findings.

#### **4.5 Data Collection**

As explained in the previous sections, the study used the qualitative case study methodology undertaken through the critical realist knowledge paradigm driven by the

conceptual framework from the theories of MST and NPT. As a case study methodology implies a research design which can remain flexible throughout the data collection period, the overall process of data collection was to some extent developed iteratively during the study period (Yin, 2011). Efforts were made to ensure that the research questions were addressed in terms of the likely sources of data and the possible sampling strategies to be undertaken (as shown earlier in Figure 4.1).

The conceptual framework for the study (Section 4.4), illustrates that the data collection approaches involved the multiple organisational levels of MoH, which is at the macro level (policymakers in the MoH), meso-level (policy implementers within the MoH departments) and micro-level (implementers at the sites) (as shown in Figure 2.3 and 4.2). As suggested by Yin and Patton, for a qualitative case study, data collection involved multiple sources with the use of various techniques such as observation, interview, and document analysis (Patton, 2002; Yin, 2011). The reason for using a combination of the various data collection techniques was for the purpose of triangulation - 'the combination of methodologies in the study of the same phenomenon' (Denzin & Lincoln, 2005). The qualitative researcher is expected to draw upon multiple (at least two) sources of evidence; that is, to seek convergence and corroboration through the use of different data sources and methods (Yin, 2011). ('Triangulation' is discussed further in the data analysis in Sub-section 4.6.2 and Sub-section 5.2.3).

Given the research questions and based on the considerations in relation to each method (as discussed in the following sub-section 4.5.1), a combination of key informants and document review were identified as the most appropriate technique for data collection. The following sub-sections explain the methods or procedure for data collection of the study based on the case study methodology such as from Yin (2011) and Merriam (1998), along with the synthesis of literature review.

#### **4.5.1 Procedures for data collection**

According to Yin, the qualitative case study is useful for a descriptive picture of the phenomenon of interest. Thus, a case study may illustrate the phenomenon of interest as a descriptive case study, interpretive case study or evaluative case study (Yin, 2011). The nature of a case study method is illuminative and illustrative rather than predictive and causal. In qualitative case study research, the purpose of ‘sampling’ emphasises on providing an in-depth understanding of a phenomenon and its context (Yin, 2011), rather than aiming for generalisation as in probability sampling (Patton, 2002).

As stated by Miles and Huberman (1994), sample selection in qualitative studies is theory driven. The theories employed in this study (as discussed earlier in Chapter 2 and in sub-section 4.4.1) had guided the study on who (and what) will be included in the study. The study had given the detail examination of the concepts and the theoretical underpinning for the study (as described in Section 4.4), where the study has ascertained that the rich, in-depth information pertaining to the study (i.e. Telehealth Policy) possibly derives from two sources. First the policy documents, and second the ‘policy actors’, including the ‘policymakers’ and ‘policy implementers’.

Thus, the study undertook purposive sampling (Miles & Huberman, 1994), where the subject of interest of the study was chosen based on the pre-determined criteria. This ‘information-rich’ policy actors, as well as the details in the policy documents, provide the insight into the research question, allowing the study to gain the detail descriptions and understandings of Telehealth policy processes in Malaysia.

The following sub-sections describe the two data collection strategies i.e.

- (1) Key informants interview; and
- (2) Documents review.

#### 4.5.2 Identifying the Key informants

The purposive sampling (Miles & Huberman, 1994) to identify key informants<sup>69</sup> was based on these criteria:

- a) The 'key informants' included the MoH officials involved in the Telehealth policy throughout the policy cycle, from policy formulation and Telehealth programme implementation during the study period (1997 – 2012);
- b) The key informants must have the experience as well as having the responsibility in policy making and/or planning and/or implement Telehealth in the MoH; and
- c) These officials must be in service during the period of the study (1997 – 2012).

The study had made an assumption that the 'key informants' should have the knowledge and rightful information related to the Telehealth policy and the programme. Given that their particular position as the appointed officer in MoH, they should know a great deal about the subject of the study (i.e. Telehealth Policy) that allows the study to gather their experience, perspectives and insights on Telehealth policy process.

The study sought to identify between 9 – 12 key informants, considering the small 'sample pool' (Baker, Edwards, Adler, Becker, & Doucet, 2012; Francis et al., 2010)<sup>70</sup>. The 'sample pool' was considered small as the key informants comprised the officials involved in Telehealth policy in the two departments in the MoH<sup>71</sup>. These officials mainly healthcare and IT professionals, is estimated about 30 to 40 in numbers in each departments. In addition, the key-informants consist of senior management officials in

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<sup>69</sup> A key informant is simply someone who, by virtue of his [sic] particular position in the society, knows a great deal about the subject of the research. It may be that his expertise is to know who knows, so that he refers the research worker to others more knowledgeable than himself (Stacey 1969: 47).

<sup>70</sup> According to Baker and colleagues (2012), the adequate number of interviews is influenced by a number of factors, including 'sample pool' or 'sample subjects'. In some studies, a small number of cases or subjects, may be extremely valuable and represent adequate numbers for a research project (eg. deviants or elites); and there are some types of research where larger numbers of subjects may be easier to get, or more plentiful (eg. college students). For studies with a small 'sample pool' 6-12 interviews is adequate, and the availability of a larger 'sample pool' may require for an 'n' of 30 – 100. (Baker, 2012).

<sup>71</sup> The two departments involved in Telehealth was Telehealth Division and Health Informatics Unit. About 1/3 of the total number at each departments are professionals, while the remaining consist of paramedics and administrative personnel.

MoH and considered as ‘elites’, and relatively few in numbers<sup>72</sup>. Furthermore, purposeful sampling was used where the theories and the conceptual framework has guided the study to select the potential key informants. The study undertook this technique to ensure that the study able to examine in-depth on the relevant concepts, as well the range of concepts and characteristics deemed critical for any emergent findings during data collection and data analysis (B. Glaser & Strauss, 1967; Strauss & Corbin, 1990). Therefore, the study decided that a sample of 9 – 12 key informants is adequate for the study, given the in-depth nature of the topic which is known only by the MoH officials who had worked closely on Telehealth policy.

Although many scholars on qualitative research proposed that the sample in qualitative studies relies on the concept ‘saturation’ i.e. the point at which no new information or themes are observed in the data (B. Glaser & Strauss, 1967; Miles & Huberman, 1994; Morse, 2000), it provides little practical guidance for estimating sample sizes prior to data collection (Guest, Bunce, & Johnson, 2006; O’Reilly & Parker, 2012). The question on how to determine the adequate sample size in qualitative study is discussed by Baker et al. (2012) and Francis et al. (2010). The articles of both authors and colleagues concluded that the ‘suggested’ sample size is varied from study to study depends on various factors.

According to Morse (2000), among a number of factors includes “the quality of data, the scope of the study, the nature of the topic, the amount of useful information obtained from each participant, the number of interviews per participant, the use of shadowed data, and the qualitative method and study design used.” Therefore, as argued by Marshall (1996) cited in O’Reilly and Parker (2012), “the researcher should be pragmatic and flexible in their approach to sampling and that an adequate sample size is one that sufficiently answers the research question”.

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<sup>72</sup> ‘Elites’ as defined by Harvey (2011) refers to study participants which considered who has the ability to “exert influence” through “social networks, social capital and strategic position within social structures” in the organisation (Harvey, 2011).

Apart from being a source of data collection, the key informants are also valuable in contributing to the richness and depth of information gathered in a study by referring to other potential key informants who are more knowledgeable. Hence, in addition to purposeful sampling, the key informants were also identified through ‘snowball sampling’, by asking the key informants participating in the study whether they knew any other informants who were knowledgeable about the research topic. (Patton, 2002).

In the process to identify the potential key informants, first, the initial list of potential key informants was identified based on a simple stakeholder analysis as in ‘who is in charge of what’ related to Telehealth policy within the macro-, meso- and micro-level. The study identified that the senior official in charge for Telehealth is the Director of Telehealth Division<sup>73</sup>, MoH. He, as the chief officer in charge of the matters on Telehealth in the MoH, had also contributed his expertise by informing the study of other potential key informants by getting in touch with the implementation team members and the relevant head of project/programme/department/unit, whom he considers knowledgeable in Telehealth policy. This, in turn, helped the study to approach other individuals as the potential key informants.

As illustrated in Figure 2.3, depending on the policy level, the potential key informants comprised ‘policymakers’ and ‘implementers’, who can be found at the federal MoH departments (macro- and meso-level), and the hospital or clinics (micro-level). The list of names for the key informants was identified through the Director of the Telehealth Division personal contacts as well as documentation on Telehealth projects or programmes. From the initial access of the information pertaining to the potential key informants obtained from the Telehealth Division, eight key informants were identified, and it was determined to be adequate at that point of time. The potential key informants

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<sup>73</sup> The Telehealth Division is the key department for Telehealth implementation in the MoH. Telehealth Division provides advisory role, collaborates and work in partnership with various agencies in MoH such as the Medical Programme, Public Health Programme and Planning Division, as well as other government agencies (outside MoH) to develop and implement Health IT initiatives.

comprised MoH senior officials, including the directors of the country's health service, heads of programmes, heads of departments, healthcare administrators, clinicians, ICT officers, health professionals, and allied health staff.

Although there were only eight sample in the beginning, the study identifies other potential key informants through the snowball sampling method. At the end of the study, the study had identified a total of 13 potential key informants. The details of key informant is described later in sub-section 5.2.2.

#### **4.5.3 Key informant interviews and development of interview guides**

By definition, interviews are aimed at obtaining in-depth information on a particular issue from a single individual (Greenhalgh & Taylor, 1997). In qualitative research, interviews can be conducted either through open-ended questions (or unstructured interviews) or guided with a series of questions (semi-structured interviews) (Kvale, 1996; Patton, 2002). The study employed semi-structured interviews using the interview guides developed based on the research questions together with the concepts and constructs of the theories from the developed conceptual framework (see Figure 4.1, 4.2, 4.3 and Section 4.4). Besides using the conceptual framework guiding the topic guides for interview, the study also examined and searched the literatures for other principles mentioned or described concerning the influential determinants for Telehealth implementation particularly on national or large-scale implementation. The core topics in the interview guides is provided in Figure 4.4 below.



A. General

- demographic information about the name of the organisation and title or position of the key informants
- the role and responsibilities relating to the Telehealth policy formulation and/or implementation and on the level involvement (macro-, meso- or micro-)

B. Policy Formulation (based on concept of MST)

- the roles and responsibilities on a wider level i.e. involvement in policy-making and strategic planning of Telehealth
- knowledge about policy documents relevant to Telehealth
- knowledge regarding Telehealth policy formulation

C. Telehealth implementation (based on concept of NPT)

- challenges associated with implementing and establishing the Telehealth systems in MoH (macro-, meso- or micro-)
- knowledge and experience of budgetary issues and finances and the commissioning process.
- Other topics developed aimed to explore the different constructs of NPT in implementing Telehealth comprised cognitive participation, coherence, collective action and reflexive monitoring (see Figure 2.2 and 4.2)

**Figure 4.4: The core topics for interview guides.**

The first draft of the interview guides was developed and then reviewed and refined. First, the interview guide was shared with selected colleagues for a preliminary review to gauge whether the data collection tool was suitable and adequately covered the study topics. This was to ensure the appropriateness and clarity of the questions and to identify possible information gaps or potential omissions in the interview guides. Then, the second draft is reviewed by the supervisors of the study. The interview guide was discussed by the study team to check for relevance and was then finalised. The interview guides were then used in the field. However, after the first two interviews, the study observed a few information gaps when conducting the interview related to subjects regarding the influential determinants for Telehealth implementation. This resulted in rectification, where the influential determinants were specifically included in the interview guides.

With revisions, the final version of interview guides was agreed upon<sup>74</sup>. The final interview guides are shown in Appendix D.

The study employed face-to-face interviews. Based on the initial list of names, the study attempted to contact the key informants via email or telephone, or approached in person, if appropriate, to arrange a suitable date and time for the interview. Upon initial contact, the key informants were asked whether they agreed to participate in the study. When they agreed, they were provided with a consent form including an information sheet (Appendix E). Data collection was commenced upon receipt of the signed consent form. In instances where the key informants who did not respond to the original email contact, attempts were made to contact them via telephone approximately one week later. In this study, only one key informant did not respond to the efforts to contact them, in which case the study abandoned further attempts assuming they were not interested in participating in the study.

The interviews were conducted in English except for two respondents, in which the interviews were conducted in Malay. The interview sessions were tape recorded, and permission to record was sought from the interviewees. The interview sessions were then transcribed. All of the audio and texts records were kept securely.

#### **4.5.4 Documents review**

Another data collection technique used in this study is documents reviews, which is one of the techniques for data collection in a case study (Yin, 2011). The documents were gathered together to find concepts, intent and trends respective to the phenomenon under study and can provide valuable information to help a qualitative-focused study to understand the central phenomena (Creswell, 2007; Shank, 2006).

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<sup>74</sup> The first two Key-informants were approached again for a follow-up interview with the revised interview guides.

The procedures to identify the documents for document review for the study was undertaken throughout the period of study mainly during the data collection. This study used three methods to obtain eligible Telehealth policy documents: the World Wide Web, bibliographic academic databases, and direct contact with the government officials.

First, the study undertook a World Wide Web search using the Google search engine. The types of documents searched included any internet entries on the conceptualisations or commentaries on Malaysia's Telehealth. In the web searches, the study focused on the official websites of Malaysia's MoH, the Prime Minister's Office, and other relevant ministries such as the Ministry of Communication. Searches were also undertaken in the online archives of the local newspaper agencies websites. The searches were performed in June 2012 but covered the period from 1995 inclusive of documents which were current at the time the study. Various search terms were used (as shown in Figure 4.5) and all identified documents were considered.

The following is the list of various search terms used in web searches. The search terms were entered as a single term or in combination. The search terms were also combined with ('AND') "Malaysia".

- "Telehealth"
- "Telemedicine"
- "Teleconsultation"
- "Hospital Information System"
- "Teleprimary care"
- "*Telekesihatan*"\*
- "*Teleperubatan*"\*

(\*note: These terms is in Malay Language, which means Telehealth and Telemedicine respectively)

**Figure 4.5: The list of search terms used for literature and web search to identify documents relevant to Telehealth Policy in Malaysia.**

Secondly, searches were also undertaken using the general biomedical databases such as Medline/PubMed and other indexed journals published from around the world.

However, these databases exclude much of the unpublished literatures. Nevertheless, a few indexed and peer-reviewed articles regarding Malaysia's Telehealth were available and retrieved.

Thirdly, some documents were identified either by suggestion or obtained directly from the key informants during the data collection period. These documents mainly consist of unpublished documents and were not publicly available. Some of these documents were also classified as 'restricted'. In view of upholding the ethical conduct of the study, the 'restricted' documents were excluded from the study<sup>75</sup>.

The following were the categories for documents considered to be reviewed in this study:

- a) The official Malaysian policy papers or recommendations published by various Malaysian government ministries;
- b) Scholarly or peer-reviewed publications on Malaysia's Telehealth; and
- c) Non-scholarly articles such as articles published in the media, including press statements or newspaper reports with regards to Telehealth, books and reports.

Similar to the list of the key informants, the list of the documents included in the study will be examined further in Chapter 5 to be presented as one of the findings of the study.

#### **4.6 Data Analysis**

Data analysis refers to the process where the volumes of data collected are organised and presented in an orderly and structured form (Patton, 2002). The following sections describe the data analysis procedures. The data analysis involved three main components:

- (1) analysing data from documents reviews;

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<sup>75</sup> Restricted documents are for internal circulation of the MoH or other government agencies which includes contractual agreements, papers tabled for parliament hearing, restricted government reports, minutes of meetings and others. These documents are meant for the intended circulation list only and not for public consumption.

- (2) analysing transcripts of the key informant interviews; and
- (3) analysing data that relate and based upon the developed conceptual framework and research questions.

#### **4.6.1 The data analysis from document review**

The study analysed documents related to Telehealth policy. First, content analysis was undertaken to identify the substance of the Telehealth policy (Collins, 2005). The documents were read with this question in mind: Does the document state anything related to the Telehealth policy and its policy processes - such as project goals, actors and implementation? Then, the texts were re-read closely to establish the contribution to the aims of this study (Bowen, 2009). At this point, the question was: Are there any gaps in the documents related to the Telehealth policy formulation or implementation? Apart from that, the document review was used to establish a timeline of the Telehealth policy and its implementation from 1997 to 2012. Figure 4.6 presents an example of the document analysis procedure.

Document	How is the document relevant to Telehealth policy?	Does the document comment on the policy process related to Telehealth, in terms of project goals, actors and implementation plans?	Are there any policy process gaps in the documents related to the Telehealth policy formulation or implementation?
The Telemedicine Blueprint, 1997	Outlines the master plan to implement national Telehealth in a phased approach through the development of four components: LHP, MCPHIE, TC and CME.	Project goals: Yes Actors: Yes Implementation plans: Partial Realisation: Partial Monitoring: No	Yes. The description of the project benefit realisation is very general and vague. Nothing is said how the project outcome is monitored and evaluated.

**Figure 4.6: Example of document analysis procedure.**

#### **4.6.2 The data analysis of interviews**

The interview data were analysed from the first interview session. The analysis was undertaken in several steps using a thematic framework analysis approach, which is used to classify and organise data according to key themes, concepts and emergent categories (J. Ritchie & Spencer, 2002) to learn the officials' experience in the policy process.

First, the study listened to the audio-tapes for transcription. Then, the interview transcripts were uploaded into Atlas.Ti, a software package for qualitative data analysis. The audio was listened again, and the transcripts were read several times to get a sense of the meaning of the whole policy process. From this, the study identified as many headings as needed to develop the 'codes' (open-coding). Then, using these main headings, the transcripts were re-read, focusing on the research questions. Then several headings were coded to describe all aspects of the transcripts. Again, using these headings, the transcripts were re-read, focusing on the identification of meaning units (i.e. groups of words or

statements that relate to the same central idea) which then condensed and sorted into sub-categories. Condensing refers to the step in which the meaning units were abbreviated, while still preserving their core ideas (A. M. Huberman & Miles, 1983).

Next, sub-categories were created from the interpretations and classifications of the condensed meaning units. In this step, the purpose was to condense the meaning units further, as well as to increase their relevance to the research questions (A. M. Huberman & Miles, 1983). The condensed meaning units and sub-categories can be seen as the influential determinants in the policy process. Finally, the sub-categories are analysed in search of the main categories that reflected the content of the meaning units. Table 4.2 presents an example of the analytical procedure.

**Table 4.2: Examples of meaning units, condensed meaning units, sub-categories, and a main category.**

Meaning units	Condensed meaning unit (Themes)	Sub-category (NPT sub-construct)	Sub-category (NPT construct)
“Of course, we do a lot of change management programmes, you know; awareness. So, to improve, improve their buy-in process.”	Change management activities	Skill-set workability	Collective Action
“The clinical head must be the one, who really totally believe in the system, will use the system and will push the others to use. If the clinical head doesn’t use the system, then the rest will not use it.”	Leadership quality	Contextual Integration	Collective Action

**Table 4.2, continued**

<b>Meaning units</b>	<b>Condensed meaning unit (Themes)</b>	<b>Sub-category (NPT sub-construct)</b>	<b>Sub-category (NPT construct)</b>
“Whenever TPC had its implementation in 2005, it has rolled out slowly but, it has roll out to more sites than the first few pilot site. So, each time when we want to go to a new site we need some ‘champions’, they are the change agent, we called them. So, these are people who are more ICT savvy, ICT friendlier, they feel friendly towards ICT. So, they are the ones who will help push their colleagues to change, from manual system to this electronic system.”	Champion	Initiation	Cognitive Participation

(Note: The above was obtained from content analysis of the Key Informants’ experiences with the Telehealth policy process)

Throughout the data analysis, the codes and categories were cross-checked with the interview transcripts to ensure that they were applied to relevant responses found within and across the interviews. The focus was placed on identifying, summarising, and retaining the patterns and similarities, differences, and new emerging themes. Data were then triangulated with other sources such as the information gathered through informal discussions and document reviews. Although the process is presented as a linear process, it is important to stress that this was an iterative process that involved continuous shifting back and forth from informant’ narratives to the researcher’s interpretation of what the informants meant (Miles & Huberman, 1994).



#### **4.6.3 The data analysis based upon the developed conceptual framework and research question**

The data from document review and key informant interviews were analysed with the qualitative data analysis software Atlas.Ti. The transcripts were entered and the codes and the codes structure were formulated to relate to one another in a coherent manner that is guided by the study conceptual framework and research questions. As described, the technique used for documents review was content analysis and the key informant interviews was framework analysis. In both techniques, the coding structure was guided by the developed conceptual framework and research questions. The list of codes and codes families can be found in Appendix F.

#### **4.7 Validity and Reliability**

This study cannot claim to be free of bias. However it was possible to minimise study bias and improve the quality of data collection and analysis.

First, the study adhered to the study design as tightly as possible and had generated findings through careful observation, interviewing and undertaking content analysis of the documents. As much as possible, the study ensured that the work involved is of high-quality. Secondly, to reduce the likelihood of errors in the application of research methods, data techniques like triangulation and informants' validations or member checking were used.

In triangulation, the study corroborated the evidence from various data sources. For example, collecting data on the same issue through an interview with more than one subject, or using different data collection techniques for the same issue i.e. interviews and document review and focus group discussion for the same issue. The data collection was also validated with the respondents' validation of recorded notes and interviews. In addition, the emerging patterns of data analysis and study findings were shared, and

assurance was obtained from the selected informants. The illustration of data triangulation in this study is described in Sub-section 5.2.3.

#### **4.8 Ethical Consideration**

The study was conducted according to the best ethical standards. There are three issues related to ethical standard for the study. The first issue was clearance from the institutional review board, the second was on the choice of subjects' participation in the study, and the third was with regards to privacy and confidentiality.

The study obtained clearance from the University of Malaya's Internal Review Board (IRB) and MoH Ethical Review Board. The documentations of ethical approval can be found in Appendix G).

The second is regarding the willingness of the respondents to participate. The researcher contacted the selected key informants and informed them about the background and the purpose of this study prior to the interview session. When the key informants had given verbal approval, a covering letter with a brief information on the study background was sent. The researcher contacted the key informants again to confirm about participation in this study and to set the appointment for the interview session as agreed by both parties. The majority of the potential key informants agreed to participate when asked, especially when the researcher mentioned to them that they were referred to be interviewed by the other key informants who had participated in the study.

The third ethical commitment is related to informants' privacy. Despite the essential input for the study by the key informants, they were given an opportunity to refuse answering particular questions. The probing question during the interview does not mean to force them giving something confidential but a normal practice of interview in digging as much information as possible. Prior to that exercise, they were assured that their identity would not be disclosed. In addition, they were reassured about their anonymity.

#### 4.9 Researcher as an ‘Instrument’

In addition to following specific guidelines for the methodology, the most important part in any research whether it is quantitative or qualitative is the role of the researcher in the field. In a qualitative study which employs interpretive approach, the researcher is viewed as ‘the key instrument’, one which is ‘calibrated’ first through training in theory and methodology and then through experience (Forsythe, 1999). Since the researcher is the primary instrument in interpretive studies, the role of the researcher is crucial for research design, data collection and management, data analysis and interpretation, and reporting processes to ensure trustworthiness of the study outcome (Borland, 2001). The factors influencing the role of the researcher include his/her background and personal qualities, the degree of neutrality and involvement, as well as his/her relationships with the informants and the organisation. The following describes myself, as the researcher.

*“At one point during the study period, I was a junior officer in the Telehealth Division, MoH. I had served in the department since 2003 after serving for more than a year in a rural hospital in Negeri Sembilan. It was an eye-opener as I was trained as a medical doctor. The Head of Department had explained that my responsibility was to become the domain subject matter expert for one of the components of the Telehealth Flagship Applications. Hence, I was somewhat involved in managing and coordinating Telehealth in MoH. It was also during that time period when there were several incidents that came to my attention about the problems of Telehealth. These experiences have raised the awareness about the complexities of Telehealth policy, hence the decision to undertake this study to understand it further.”*

Undertaking this study has been a personal journey where the researcher have learned as much about herself as well as about the research process itself. In reflecting on the first years as a researcher, the researcher admitted that she was naïve about conducting

academic research. A doctoral study is just the beginning of understanding what it means to be a researcher. The Research Methodology and the Qualitative Inquiry in Public Health module provided the foundation about the knowledge and skills needed to conduct the research, such as interviewing skills and qualitative data analysis. As the study progressed, the researcher remained interested in the findings and answers to the research questions but also became equally interested in the research process and its limitations. As Robson (2002) proposed, “the researcher should have an open and enquiring mind, be a good listener, be flexible and adaptive, and be able to grasp the issues as well as be devoid of bias.” The career experience and the direct involvement in the subject of the study was useful, making it possible for to be proficient in grasping the issues and interpreting them during the study, so that any evidences, clues, etc. would not be missed or misinterpreted later. In addition, the researcher has to be open to contrary findings in order to avoid bias.

Further, Yin (2011) recommends “the case study researcher should have a firm grasp of the issues being studied.” The researcher’s experience of being a close observer of the subject provides the study with the aforementioned strength. In addition, being in the position among the Telehealth ‘community’ had allowed me to present oneself as a reasonable, courteous and unthreatening to others – by cordially interacting with the subjects, and show interests in what people do and what they have to say (Randall, Harper, & Rouncefield, 2007).

Furthermore, the establishment of links to the relevant personnel of the healthcare service at various levels may produce results with potential usefulness if it is presented in an appropriate way (Aagaard-Hansen & Henry Ouma, 2002; Barker, 1995). This argument provides further support to the researcher’s role as a policy shaper. Finally, the objective of this researcher throughout the research process has been “to make sure that,

whatever point of view we take, our research meets the standards of good scientific work, that our unavoidable sympathies do not render our results invalid” (Becker, 1967).

The effect of the researcher’s role as an ‘insider’ was ambivalent. The limitation of being an insider is that the participants may feel that the researcher is having a direct personal stake in their matters and thus may feel awkward to freely express their views (Walsham, 1995). On the other hand, having a common language and work background facilitated the interviews, making them easy and pleasant events for the participants. The criticism presented during the interviews was a sign of achieved trust. In addition, some participants might have expressed more positive attitudes to Telehealth than with a complete outsider as a researcher. However, the total effect of the researcher on the results was probably more positive than negative, as familiarity with the circumstances of Telehealth policy process was essential in the study.

#### **4.10 Chapter Summary**

This empirical case study was conducted using a qualitative paradigm. There were data obtained through semi-structured face-to-face interviews with key informants, and data resourced from various documents related to Telehealth. Analyses of data utilised qualitative analysis methods. The data were analysed using ATLAS.ti. Analysis was conducted in an iterative manner, initially inductive and then deductively based on pre-determined constructs of the selected theories and developed conceptual framework.

Based on the discussions on the methods employed for the study as discussed here in in Section 4.3, the overall study design is summarised as shown in Figure 4.1.

This chapter dealt with the methodology employed in this research project. The research adopted a qualitative research design. The research paradigm, the research design, sampling procedures and the data collection methods and analysis employed were

elaborated upon in this chapter. Finally, the need for ethical consideration when collecting data was explained. The next chapter focuses on the results and findings of the research.

University of Malaya

## **CHAPTER 5 : THE TELEHEALTH POLICY FORMULATION STAGE**

### **5.1 Introduction**

The aim of the study was to analyse the policy processes and implementation of Malaysia's Telehealth initiative. As described in Chapter 3, despite the introduction of the Telemedicine Blueprint in 1997 and other policy statements which declared the government's commitment on Telehealth, progress towards accomplishing the goals of Telehealth was significantly delayed. There has been a disparity in terms of what was planned and what was implemented – or in other words the “implementation gap”. After more than 18 years, EMR systems have only been installed in about 10 – 20% of government hospitals and clinics in the MoH (sub-section 3.4.3.3).

With only a small percentage of healthcare facilities deployed with EMR, the potential to reap the benefits of Telehealth are far from being achieved. Only a small number of hospitals and clinics can provide electronic data to generate health information for Telehealth (Abd Ghani et al., 2008). This may hamper the realisation of the potential benefits of Telehealth, such as to improve the quality of health services, advancement in population health monitoring and timely decision-making.

The study had made the proposition that (refer to Section 1.3), if the policy processes were effectively made, that is, when the policy was formulated and had taken into consideration the influential determinants which facilitate or hinders Telehealth implementation, then, there is a higher possibility that the Telehealth policy objective is achieved. The study argued that a better understanding of this phenomenon would allow policy makers to proceed from a more informed perspective in terms of policy formulation and implementation to facilitate a more successful Telehealth programme in Malaysia.

Hence, the overarching research question posed in this study is: **How can the Telehealth policy process in Malaysia be better understood?**

Inherent in this question is the assumption that a better understanding of the policy process potentially translates into effective action to realise the expectations of the Telehealth policy as outlined in Chapter 3.

In Chapter 2, the literature review of the theories in policy analysis has informed the study that the policy process took place in stages, and the courses it takes is often non-sequential and complex, involving many layers and policy actors (Buse et al., 2012; Kingdon, 1984; Walt & Gilson, 1994).

This conception is explored in the subsidiary questions:

1. What were the processes involved in the policy formulation and who were the key actors?
2. What was the process involved to implement Telehealth and who were the key actors?
3. What were the influential determinants that support or impede Telehealth implementation?

The idea was to trace policy processes retrospectively, starting from already realised and present measures. A framework to analyse the policy process was conceptualised in Chapter Four (Section 4.4) which underpins by two theories – Kingdon’s Multiple Stream Theory (Kingdon, 1984) and Normalisation Process Theory (C. R. May et al., 2009; Carl May & Finch, 2009). The conceptual framework provided the guidance for in-depth analysis of Telehealth policy to frame the research questions and its associated sub-questions, as well as the research methods and techniques, and data analysis.

The findings are presented following the two-stage policy process i.e. (1) Telehealth Policy Formulation and (2) Telehealth Implementation, as described in the conceptual



framework developed for this study (sub-section 4.3.3). Thus, the outcome of the policy analysis is presented in two parts:

- Chapter 5: The Telehealth Policy Formulation Stage; and
- Chapter 6: The Telehealth Implementation Stage

This is the first of two chapters of the study's findings. The presentation of findings in this chapter is discussed according to the study's interpretation of the Telehealth Policy Formulation using Kingdon's Multiple Stream Theory (MST) (Kingdon, 1984). The policy analysis describes the relationships and meanings of the MST elements - the three streams (problem, policy and politics), policy actors and policy windows, and the coupling of these three streams that lead to the agenda-setting for Telehealth policy.

The chapter begins with the description of the data sources for this study in Section 5.2. First, the list of the documents review used in this study is presented in sub-section 5.2.1 and secondly the profile of key informants is presented in sub-section 5.2.2. The documents review consists of formal documents published by the government and publicly available which provided the descriptive analysis of Telehealth policy in Malaysia. The professional backgrounds of the key informants are presented to describe the role and responsibilities, as well as their knowledge of the study subject.

Section 5.3 presents the findings for Telehealth Policy Formulation. The study analysed qualitative data from the key informants as well as document reviews. The study synthesised MST elements based on the insights gathered from the key informants' interviews through content analysis (Bowen, 2009; Hsieh & Shannon, 2005) and framework analysis approach (J. Ritchie & Spencer, 2002). The elements of the MST will be discussed as the following:

- Sub-section 5.3.1 - Problem Stream
- Sub-section 5.3.2 - Policy Stream

- Sub-section 5.3.3 - Politics Stream

With the information of the three stream elements, the study then analysed the data to synthesise the coupling of the three streams as explained in sub-section 5.3.4. The coupling of the three streams provided an explanation on how the agenda for Telehealth became a national policy priority. As part of data analysis and to enhance the study's trustworthiness and validity, data triangulation strategy was used based on the findings from the multiple data collection techniques (Miles & Huberman, 1994; Yin, 1999, 2011) to illustrate the context and meanings of the Telehealth Policy Formulation. The chapter is then summarised in Section 5.4.

## **5.2 Sources of data**

Procedures for conducting document reviews and KIIs are applied as described in the previous Methodology Chapter 4 (Section 4.5). The sources of data used in the study are as follows.

### **5.2.1 Key Documents of Telehealth Policy**

The document reviews were undertaken from October 2012 until August 2014 and comprised publicly available policy documents with the specific criteria as discussed in sub-section 4.6.1. The study found a total of twenty documents relevant to Malaysia's Telehealth policy. The list of the documents is shown in Table 5.1

.

**Table 5.1: List of key documents related to Malaysia's Telehealth policy analysis included in the study**

<b>Document title</b>	<b>Year</b>	<b>Published by</b>	<b>Source</b>
Sixth Malaysia Plan 1991-1995	1991	Economic Planning Unit (EPU), Prime Minister's Department, Malaysia	<a href="http://www.pmo.gov.my/dokumenattached/RMK/RM6.pdf">http://www.pmo.gov.my/dokumenattached/RMK/RM6.pdf</a>
Seventh Malaysia Plan 1996-2000	1996	Economic Planning Unit (EPU), Prime Minister's Department, Malaysia	<a href="http://www.pmo.gov.my/dokumenattached/RMK/RM7.pdf">http://www.pmo.gov.my/dokumenattached/RMK/RM7.pdf</a>
Telemedicine Blueprint	1997	Telehealth Division, Ministry of Health, Malaysia	<a href="http://www.moh.gov.my/images/gallery/Tel%20medicine/TelemedicineBlueprint.pdf">http://www.moh.gov.my/images/gallery/Tel emedicine/TelemedicineBlueprint.pdf</a>
Telemedicine Act (Act 564)	1997	Government of Malaysia	<a href="http://www.moh.gov.my/english.php/database_stores/store_view_page/11/26">http://www.moh.gov.my/english.php/databa se_stores/store_view_page/11/26</a>
National Telehealth Policies (unpublished)	2000	Ministry of Health, Malaysia	Telehealth Division, Ministry of Health
Eight Malaysia Plan 2001-2005	2001	Economic Planning Unit (EPU), Prime Minister's Department, Malaysia	<a href="http://www.pmo.gov.my/dokumenattached/RMK/RM8.pdf">http://www.pmo.gov.my/dokumenattached/RMK/RM8.pdf</a>
Ninth Malaysia Plan 2006-2010	2006	Economic Planning Unit (EPU), Prime Minister's Department, Malaysia	<a href="http://www.pmo.gov.my/dokumenattached/RMK/RM9_E.pdf">http://www.pmo.gov.my/dokumenattached/RMK/RM9_E.pdf</a>

**Table 5.1, continued**

<b>Document title</b>	<b>Year</b>	<b>Published by</b>	<b>Source</b>
Tenth Malaysia Plan 2011-2015	2011	Economic Planning Unit (EPU), Prime Minister's Department, Malaysia	<a href="http://www.pmo.gov.my/dokumenattached/RMK/RMK10_Eds.pdf">http://www.pmo.gov.my/dokumenattached/RMK/RMK10_Eds.pdf</a>
Country Health Plan. 10th Malaysia Plan 2011 – 2015. 1Care for 1Malaysia	2011	Planning and Development Division, Ministry of Health, Malaysia	<a href="http://www.moh.gov.my/images/gallery/Report/Country_health.pdf">http://www.moh.gov.my/images/gallery/Report/Country_health.pdf</a>
<i>Pelan Strategik 2011 – 2015: 1Care for 1Malaysia</i> (1Care for 1Malaysia: The 2011 – 2015 Strategic Plan)	2011	Ministry of Health, Malaysia	<a href="http://www.moh.gov.my/images/gallery/Report/Plan_Strategik_KKM 2011-2015.pdf">http://www.moh.gov.my/images/gallery/Report/Plan_Strategik_KKM 2011-2015.pdf</a>
Ministry of Health Annual Reports: 2002 – 2011 (Total of 10 reports)	2003 2004 2005 2006 2007 2008 2009 2010 2011 2012	Ministry of Health, Malaysia	<a href="http://www.moh.gov.my/english.php/pages/view/56">http://www.moh.gov.my/english.php/pages/view/56</a>

In addition to the formal policy statements, the study also identified other documented evidence in regards to the Telehealth policy as found in the form of newspaper articles and speeches of government officials. This is because much of the policy directions in Malaysia were informed to the public by press statements of political or high-level government officials, as policymaking in Malaysia is usually undertaken in a highly bureaucratic manner (Leong, 1992; Sundaram & Wee, 2013a). As such, the list of newspaper articles and speeches can be found in Appendix H.

### **5.2.2 Profile of Key Informants**

Face-to-face in-depth interviews were arranged with 13 key informants. However, one of the key informants did not respond to the invitation sent via emails and text messages, which left the study with 12 key informant interview (KII) sessions. The interviews were conducted from December 2012 to March 2013 using the interview guides (Appendix D). The KIIs represent a retrospective account of respondents' experiences of the policy processes involved in Telehealth, and what it takes for Telehealth to be 'normalised' by the staff at the MoH hospitals and clinics.

The detailed profile of the key informants, given aliases K1 to K12, is presented in Table 5.2. It describes the variabilities in terms of their role and experiences in Malaysian Telehealth programme in MoH and their domain of expertise (i.e. either clinical domain or technical domain<sup>76</sup>). In addition, the informants' familiarity with regards to the MoH's Telehealth programme components (as identified in section 3.4.3.1)<sup>77</sup> is summarised in the following Table 5.3.

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<sup>76</sup> The appointment of expertise for clinical domain and technical domain comprised medical or health personnel for the former and IT officers for the latter.

<sup>77</sup> The thesis had identified that there were five main Telehealth policy strategies in MoH (as described in sub-section 3.4.3) i.e. (i) Telehealth Pilot Project under the MSC; (ii) Teleconsultation or Remote Telemedicine; (iii) EMR implementation in clinics or hospitals; (iv) Enabling Health Information Exchange; and (v) HMIS or National health surveillance databases.

**Table 5.2: Profile of the key informants.**

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1)	Key informant initial	:	K1
	Designation during interview	:	Deputy Director, Telehealth Division, Ministry of Health
	Experience	:	(1) More than 15 years' experience as the clinical domain expert in policy formulation and implementation at ministerial level and government hospital (2) Previous responsibility includes as the Project Manager for Telehealth implementation in a government hospital. (3) Before joining Telehealth Division, was the Deputy Director (2009 – 2011) in Hospital ABC - one of the first IT Hospitals in Malaysia.

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2)	Key informant initial	:	K2
	Designation during interview	:	Director, Telehealth Division, Ministry of Health
	Experience	:	(1) More than 15 years' experience as the clinical domain expert in policy formulation and implementation in government hospitals and primary care clinics. (2) Previous responsibility includes as the Project Manager for two of the Malaysia's Telehealth components (in 1997-2003 and 2006-2010). Also involved in other Telehealth projects such as developing the national health database. (3) Appointed as the Director of Telehealth Division since 2010 which is responsible for the overall planning and implementation for Telehealth in MoH.

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**Table 5.2, continued**

3)	Key informant initial	:	K3
	Designation during interview	:	Deputy Director (IT), Telehealth Division, Ministry of Health
	Experience	:	(1) More than 15 years' experience as the technical domain expert for Telehealth in policy formulation and implementation in MoH for government hospitals and primary clinics. (2) Previous responsibility includes as a Project Team member for one of the Malaysia's Telehealth components (in 1997-2003 and 2006-2010). Also involved in other Telehealth projects such as developing the national health database.
4)	Key informant initial	:	K4
	Designation during interview	:	Senior Principle Assistant Director, Family Health Development Division, Ministry of Health
	Experience	:	(1) More than 7 years' experience as the clinical domain expert in policy formulation and implementation in MoH for government primary clinics and involved as Project Team member for other projects such as the national health database (2) Previously as the Medical and Health Officer in-charge at a district where one of Telehealth system was deployed with direct contact with end-users of the systems.

**Table 5.2, continued**

5)	Key informant initial	:	K5
	Designation during interview	:	Deputy Director, Family Health Development Division, Ministry of Health
	Experience	:	(1) Responsible in strategic planning and programme implementation for primary care and family health in Ministry of Health. (2) More than 15 years' experience as clinical domain expert in Telehealth policy formulation as well as project implementation at government clinics and primary care services.
6)	Key informant initial	:	K6
	Designation during interview	:	IT Officer
	Experience	:	(1) More than 3 years' experience as technical domain expert in Telehealth policy formulation as well as project implementation (2) Responsible on operations and maintenance of Telehealth systems at government primary care clinics at various locations with close contact with the end-users.



**Table 5.2, continued**

7)	Key informant initial	:	K7
	Designation during interview	:	Senior Assistant Medical Officer, Family Health Development Division, Ministry of Health
	Experience	:	(1) More than 15 years' experience as clinical domain expert in Telehealth policy formulation and project implementation at government primary care clinics. (2) Responsible on operation and maintenance, particularly end-user training conducted at government clinics.
8)	Key informant initial	:	K8
	Designation during interview	:	Assistant Medical Officer, Family Health Development Division
	Experience	:	(1) 3 years' experience as clinical domain expert in policy formulation and co-ordinate Telehealth implementation at government primary care clinics. (2) Had worked at a government clinic where one of Telehealth system was deployed with direct contact with end-users of the systems

**Table 5.2, continued**

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9)	Key informant initial	:	K9
	Designation during interview	:	Nurse Manager, Family Health Development Division, Ministry of Health
	Experience	:	(1) 5 years' experience as clinical domain expert in policy formulation and co-ordinate Telehealth implementation in government primary care clinics. (2) Had worked at a government clinic where one of Telehealth system was deployed with direct contact with end-users of the systems

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10)	Key informant initial	:	K10
	Designation during interview	:	Medical Specialist, Telehealth Division, Ministry of Health
	Experience	:	(1) More than 15 years' experience in as clinical domain expert in policy formulation, strategic planning and overseeing national Telehealth implementation in MoH for government hospitals and primary care clinics. (2) Head of Telehealth Unit (1997 – 2003) which responsible for the planning and implementation for Telehealth and supervised the implementation of its components

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**Table 5.2, continued**

11)	Key informant initial	:	K11
	Designation during interview	:	Government IT Consultant, Telehealth Division, Ministry of Health
	Experience	:	(1) More than 9 years' experience as a technical domain expert in policy formulation and implementation at government primary care clinics and hospitals. (2) Involved in other government health IT projects such as the consolidation of the various disease registries in MoH.
12)	Key informant initial	:	K12
	Designation during interview	:	MoH Top Management Official (retired)
	Experience	:	(1) More than 15 years' experience in Telehealth. (2) Was formally in charge with making authoritative decisions in MoH on the policy direction for national health affairs from 1991 to 2001. The first few government IT hospitals were established during his tenure of office together with the introduction of Telemedicine Blueprint and the promulgation of the Telemedicine Act (Act 564).

**Table 5.3: Key Telehealth strategies which the key informants most familiar and have experience with.**

Aliases	M or IT*	Involvement in key Telehealth Strategies (policy development/implementation/user)					
		Telehealth- MSC Pilot Project	Tele- consultation	HIS / CIS in Hospitals / Clinics	Health Information Exchange	HMIS & electronic health databases	Experience as user
K1	M			✓	✓	✓	✓
K2	M	✓	✓	✓	✓	✓	✓
K3	IT	✓	✓	✓	✓	✓	
K4	M			✓		✓	✓
K5	M	✓		✓		✓	
K6	IT			✓			
K7	M			✓			✓
K8	M			✓			✓
K9	M			✓			✓
K10	M	✓	✓	✓	✓	✓	
K11	IT	✓		✓	✓	✓	
K12	M	✓	✓	✓	✓	✓	
Total	M (9); IT (3)	6	4	12	6	8	6
*Note: M = medical professional background, IT = IT professional background.							

As presented in Tables 5.2 and 5.3, all of the key informants has had experiences in EMR implementation in government hospitals and clinics. About half of them ( $n = 6$ ) were involved in the Telehealth-MSD Pilot Project and Health Information Exchange. Eight had experience in the implementation of the HMIS and health databases, while four of them had involved in Teleconsultation. Among them, six of the key informants has had experiences as the end-user of Telehealth, particularly EMR. The majority of the key informants were medical professionals ( $n = 9$ ), while three were IT professionals.

Although the number of respondents was small, the sample is adequate given the high level of knowledge and expertise of the informants related to the subject of the study (Guest et al., 2006; Romney, Weller, & Batchelder, 1986). The key informants were selected by purposeful sampling (Miles & Huberman, 1994; Patton, 1990). The key informants were MoH officials known to have in-depth knowledge about Telehealth policy processes - from the point of view of policymaker, implementer, as well as the end-user. They were involved in Telehealth policy processes at all the three levels, the federal, state/district and the local (clinics and/or hospitals) for at least three years' duration. The key informants were resourceful to capture the core experiences with regards to the policy processes, yet representing the variation of expertise and knowledge of MoH's Telehealth strategies.

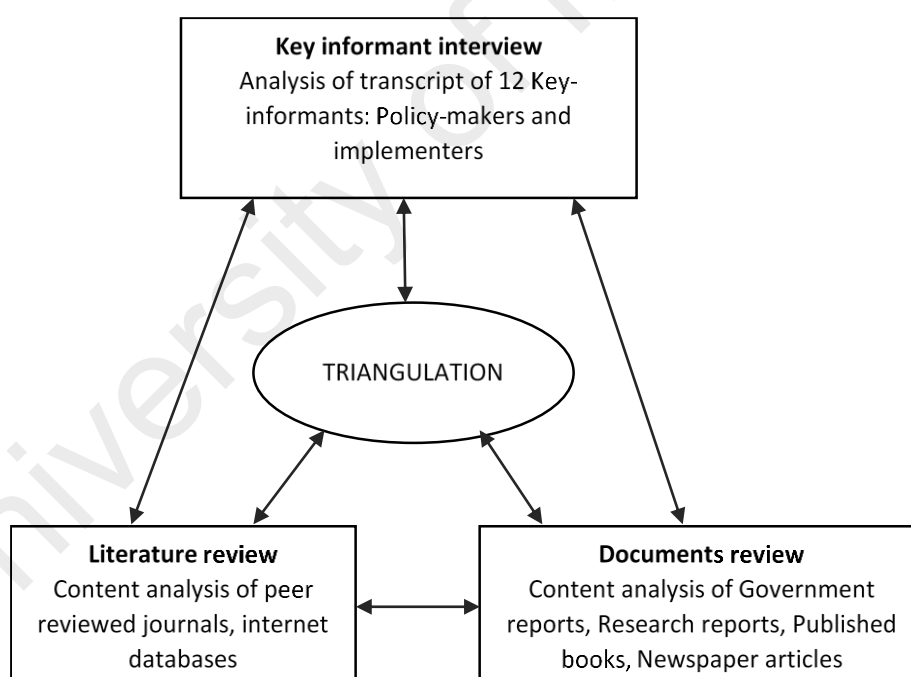
### **5.2.3 Data Triangulation**

For triangulation, transcripts of the key-informants interviews were studied in order to identify the common themes and completeness of data during data analysis along with findings from literature review and document review. As discussed in Section 4.7 earlier, triangulation were used to verify the accuracy and validity of information. The synthesis of information obtained from the different individuals; policy-makers and implementers were corroborated with evidence from the documents review. The summary data sources is in Table 5.4 and the following Figure 5.1 illustrates the triangulation process. It is

important to stress that this was an iterative process that involved continuous shifting back and forth between the themes emerging from the KII data and the domains established from the study framework.

**Table 5.4: Summary of data sources**

<b>Data Source</b>	<b>Data obtained</b>
Key-informants	1) Policies and programme for Telehealth 2) Experience and perceptions of Telehealth policy formulation and programme implementation
Documents review	1) Bills, public laws, and resolutions of Telehealth programme 2) Process of implementation of Telehealth programme 3) Corroborate and supplement data source
Literature review	1) Scientific evidence of Telehealth policies and process of implementation programme



**Figure 5.1: The Triangulation Process**

The following section is the synthesis and analysis of the findings of the policy formulation stage through the theoretical lens of Kingdon's Multiple Stream Theory (Kingdon, 1984).

### **5.3 The Policy Formulation for Telehealth Initiatives (1995 – 2000)**

The findings that emerged from the study as to how Telehealth was incorporated in the national health policy were in line with the three streams in Kingdon's Theory i.e., problem, policy and politics (Kingdon, 1984). The study documented the broad range of experiences with regards to the relationship and meanings of the elements of Kingdon's Multiple Stream Theory and thereby provides the study to understand the reality of the Telehealth policy process better.

The findings for the policy formulation stage are presented with details that support and explain the findings. Illustrative quotations from interview transcripts are presented to portray the multiple key informants' perspectives capturing some of the complexity of the subject matter. Where appropriate, critical policy statements and findings from the literature review and document review are inter-woven with the interview data to corroborate the findings and solidify the discussion. The source of policy statements and documents were mainly prior to the Telemedicine Blueprint 1997.

#### **5.3.1 Problem stream**

The majority (n = 10 or 83%) of the key informants talked about the recognition of the problems in the healthcare system that gave rise to policy strategies for Telehealth. The synthesis of findings identified three areas in the problem stream:

- a) lack of coordination for national health data collection and meaningful use for population health monitoring and planning;
- b) challenges of the healthcare delivery services; and
- c) perception of the need for health system transformation to fulfil the federally-led MSC vision.

### **5.3.1 1 Lack of coordination for national health data collection and meaningful use for population health monitoring and planning**

The majority of the key informants (n = 8 or 67%) indicated that there were shortfalls in the health information management in terms of the meaningful use for the purpose of health services management and planning, as well as population health monitoring. The Telehealth implementation strategies were intended to overcome these limitations by enabling a more coordinated and streamlined health data collection at the local, state and national level.

ICT use in the public health sector was first introduced during the Fifth Malaysia Plan (1985 – 1990) with the emphasis to improve hospital administration particularly patient billing<sup>78</sup>. As reported in the Sixth Malaysia Plan (1991 – 1995) document:

*“13.19 (During the Fifth Malaysia Plan) Improvements were made to the billing system in general and district hospitals to ensure a more effective collection of user charges. Computerisation was introduced in order to create a more efficient billing system”* (Economic Planning Unit (EPU) Prime Minister’s Department, 1991).

There exists the need for a more accurate patient billing. Hence, the MoH officials perceived that the task for the itemised billing for every patient would be difficult without a computerised system in place, as explained by K2, the Director of Telehealth Division:

*“The (ICT system) was initially targeted to solve the issue of patient’s management - Registering the patient, having a billing module so that we can bill the patient properly. And because we want to bill, you have to have a record of orders than having a module where, (we need) to know whatever orders that were done for the patients, especially for*

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<sup>78</sup> Refer sub-section 3.4.3 and as evidenced by Lim, Looi, Harun and Marzida (1991).



*labs, imaging and procedures or prescription, are actually can be captured by the (ICT) system so that we can bill the patient.”*

Apart from the need to improve patient billing and administration, the MoH was also facing challenges for health data collection to allow timely and meaningful information for population health monitoring. As K2 added:

*“Because public health depends on a good flow of information. For both - the care providers, from individual patients, from local government agencies. Even from the private sector themselves. So, how (can we) ensure that the information flows properly? The correct information to flow properly is critical (for service). And that’s where Telehealth has played the major role in ensuring that the information is sent in a proper format, is accurate, is comprehensive, is sent on time and it goes to the people who need them, for decision-making.”*

Therefore, ICT was recognised as the solution for health data collection and analysis for the benefit of health services management and planning. As told by K5:

*“What does ICT mean? Collecting data, right? No doubt about it. The reason why we want to collect data so that it serve for a purpose. The valuable data that is been collected which was consciously created to be variable-based, to be a data and not text...that allows people to analyse the data, you know, what do you call as drilling in (analytics).”*

According to Selvaraju (2006), the national health management information system (HMIS) in the MoH was established in 1981. It was set up through the recommendations from the World Health Organisation and modelled on the hierarchical pyramid structure of the Malaysian healthcare system. The data were sourced from patients’ information

records, aggregated in periodic summary reports, and coordinated at the national level by the MoH's Information and Document System Unit (IDS)<sup>79</sup> (Selvaraju, 2006).

The process of manual methods of data collection has been challenging for the healthcare system at the staff at the multiple levels (Aljunid et al., 2012). The challenges were attributed to a number of factors: the physical size and diversity of the health sector (public and private, serving nearly 28 million people nationwide); various administrative divisions and a hierarchical and centralised working structure in the MoH; and various staff functions each dealing with different kinds of data (involving multiple returns) for various health programmes. The HMIS had encountered problems in terms of data completeness, timeliness, and quality of reporting and lack of harmonisation and integration between various public and private health data sources. (Aljunid et al., 2012; Selvaraju, 2006).

K7 described the difficulties to submit the multiple returns by the staff at the healthcare facility:

*“At that time (before ICT deployment), we were doing (the returns) manually. So, it’s quite difficult. At the end of the month, we tend to do return everything (in manual forms), it’s quite impossible to dig up everything. So, the best way is to do it with (the use of) ICT”*

K4 expressed concerns of the lack of data quality and timeliness particularly for communicable diseases notifications:

*“We want quality care. Because we want quality care, we need quality data. With the manual system, diseases are notified slowly. We received notifications late - sometimes after the outbreak has occurred. Then only (later) we pick up that there is an outbreak. We should be picking up earlier so that the control measures can be done. So, I think*

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<sup>79</sup> At present, the IDS unit is known as the Health Informatics Centre, an agency under the Planning Division, MoH.

*electronic system should help to improve on this (communicable diseases) notifications, the speed of notifications.”*

K3 also agreed to the idea for the need for completeness of health information for population health monitoring and research:

*“For example, why there’re so many insane<sup>80</sup> people? It needs research. (It needs) information. So we’re just supplying the (needed) information (and) data to the public health (department).”*

K9 explained her experience as a user when she used to work in an urban health clinic with the primary care team headed by the Family Medicine Specialist:

*“We need the Ministry (of health) to get the real-time data and ad-hoc data for us. So, the use of IT can have a big impact for us to get data in a timely manner. In case we want to see, for example, (the demographic data of) diabetic patient. We need to get ‘real’ data in terms of age and (the incidence of) complications encountered so that the doctor can make analysis of the disease (within the population).”*

The Sixth Malaysia Plan (1991 – 1995) and Seventh Malaysia Plan (1996 – 2000) draw attention to the government efforts to strengthen the HMIS as part of the strategic priorities for health planning, budgeting, monitoring and evaluation:

*“17.21 During the Plan period (i.e. the Sixth Malaysia Plan), the Ministry of Health computerised some non-medical programmes such as the health management information system, quality assurance and budget performance monitoring to generate accurate, relevant and timely information to improve efficiency of services. Computerisation of the health management information system provided information on health indicators, thereby allowing for better monitoring of healthcare activities at various levels of care and more effective management of these programmes and activities.”* (Economic Planning Unit (EPU) Prime Minister’s Department, 1996)

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<sup>80</sup> K3 was giving example on investigating why there is so many ‘insane’ people.

The policy priority for the use of ICT for health administration was reiterated in the document as follows:

*“17.51 Efforts will be made to increasingly use information technology (IT) as a tool for medical care and health services administration. In the area of medical care, IT application will assist efficient patient care management, while health services administration will be further improved.”*

According to Mohan, in 1996, the MoH introduced the Information System Strategic Plan (ISSP) and among the approaches included was establishing a centralised electronic HMIS with the network infrastructure between major hospitals, district and state health departments, and federal health divisions. It was during the plan period when a total of 14 state hospitals were deployed with the Patient Management Information System (also known as SPP) (Mohan, 2010). The federally-led MSC initiative was also officially launched in 1996 during the Seventh Malaysia Plan Period (1996 – 2000) along with the Telehealth Pilot Project (Economic Planning Unit (EPU) Prime Minister’s Department, 2001).

#### **5.3.1.2 Challenges in the healthcare delivery service**

A total of seven key informants ( $n = 7$  or 58%) remarked on the intention of the government harnessing the ICT potential to improve the quality of the health service, particularly curative care. This was in line with the government strategies as evidenced in the Seventh Malaysia Plan (1996 – 2000), where it was found that the government had begun the intention to expand the use of IT to improve the quality of healthcare service to the people, rather than restricting the use of IT for the purpose of health administration:

*“17.51 Efforts will be made to increasingly use information technology (IT) as a tool for medical care and health services administration. In the area of medical care, IT*

*application will assist efficient patient care management, while health services administration will be further improved. A study on IT application in the health sector will be conducted with the view to exploring the possibilities of widening the usage and application of IT in areas such as telemedicine, health engineering and continuing medical education.” (Economic Planning Unit (EPU) Prime Minister’s Department, 1996)*

The finding that emerged from the key informants was that Telehealth strategies were considered as a potential tool to overcome the challenges of the healthcare in two aspects, namely reducing the urban-rural gap for health service equity and improved quality of healthcare service in terms of patient safety.

The problem of the mal-distribution of healthcare professionals particularly of urban-rural specialist gap has been discussed previously in sub-section 3.5.2. Healthcare provision to rural and remote communities particularly in the east Malaysian States of Sabah and Sarawak has been a major challenge (Ariff & Teng, 2002). In addition, there exists an ensuing imbalance of health human resources between urban and rural, as well as private and public-sector. (Kanchanachitra et al., 2011; Merican et al., 2004; Merican & Yon, 2002).

K4 explained regarding the need to increase the coverage of specialist care to rural area, and how Telehealth was a potential solution without having the patient to physically attend the specialist clinic:

*“Definitely, there’s benefit (of Telehealth) to the patients. The doctors in the (rural) clinic able to refer the patient’s note to the specialist in the hospital. So, this has reduced (the need for) patient to travel physically to the hospital, and actually made it faster... for patient to get that specialist care.”*

In a different point of view, K3, the senior IT professional, described the urban-rural gap in terms of the density of the healthcare professionals, and how the public would expect the same level of medical treatment albeit the locations:

*“What they (the public) want is the people-focused service. So, in the area, for example Gua Musang or Jeli, that are very remote, they don’t want research officers. They sure wanted the (medical) service (which are available in the cities) to be available there. But the Ministry of Health can’t afford to give that service, because there are no people (i.e. healthcare professionals) to be deployed (posted) there. So, by using that technology, we can make virtual services, (overcoming) the problem where there was no Medical Officers willing to work in rural areas.” (K3)*

In view of improving the quality of health service, three key informants (K1, K2 and K12) who had previous experiences as the hospital director highlighted the potential of Telehealth, particularly the Hospital Information System (HIS) to improve the healthcare quality in terms of patient safety:

K1: *“Many aspects of HIS addresses patient’s safety. For example, the order management, the lab information system, the pharmacy, and so forth, (all of the systems) addresses patient’s safety. And effectiveness or efficiency (of healthcare delivery) Because, when the system is done, all this processes are put in place (in the system) to make sure it works effectively and efficiently. So, health IT is definitely one of the ways to improve (patient) safety.”*

K12: *“So, how can we do patient safety without hospital IT system? Basic. Order entry must be electronic. Reporting must be electronic. It can be linked up to information system, link up to lab information system, the pharmacy information system, it can the check on errors before anything has to been done, very basic. Dosage, drug sensitivity, drug interaction, it (can be) automatically done (with hospital IT system). Without*

*hospital IT system, it cannot be done. I mean, you can do it (without system), but not effectively.”*

*K2: “IT helped in terms of patient’s safety and effectiveness. Sometimes, when a user put in data into the system, they can enter the wrong data. But IT systems can have a validation system in place, to make sure that if any word is misspelt, the system can prompt. For example, if a doctor wants to order a drug and he puts the wrong dosage in, the system can actually highlight that. You can’t do that with a paper system. So, IT has play a big (potential) role for that (i.e improve patient safety)”*

### **5.3.1.3 The perception of the need for digital transformation of healthcare in order to fulfil the federally-led MSC vision**

Another emerging finding of the problem stream was the perception of the need for digital transformation of healthcare in order to fulfil the federally-led MSC vision. This view was shared among the key informants who were positioned at the higher levels of management in the MoH, namely K2, K3, K4, K10 and K12.

As explained by K2:

*“In terms of the broad (Telehealth) approach, it was transformational in nature. So, I think, if we want to see what our objective was at that time, it is very clear to see what the health services goal that we have identified were (i.e. the eight service goals)<sup>81</sup>. So those was very important. (It is) important to be able to achieve the goal, we would have to transform our thinking and our paradigm in terms of healthcare...What we did, officially, we got to have the vision and mission of the project (i.e. the MSC Telehealth Pilot project). So, we had consultations. So, eventually we agreed for the consultations (committee) to come out with that report, which came out as a Telehealth Blueprint.”*

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<sup>81</sup> The eight goals of the future healthcare system is featured in Figure 3.13.

He further clarified that the Telehealth strategies in the Blueprint were to “transform” healthcare, rather than just to computerise or automate the healthcare process:

*“If you put a computer of what you have been doing with paper, then you are not putting in the transformation aspect and you not gaining the true potential of the Telehealth component. So, if you’re still doing it in a same way, you are not really improving the system. You may be improving the system, from the perspective of the worker. You may not improving it in the perspective of the patient, the family or the community. That’s what we want.”*

K3 also talked about how the Blueprint was developed following the MSC initiative:

*“In fact, the involvement (to produce the policy) was because of the Telehealth was under the MSC project. And at that time, MSC was involved with seven flagship applications, smart schools, MyKad, all of that. ... So, when the time we wanted to draw (formulate) the Telehealth policy, we (were) asked to come out with the National Telehealth Blueprint. It means that it’s not one person’s idea to produce the National Telehealth Blueprint. (It involved) even external parties (outside government). In fact, from the domain expert, we took the Australian... their domain (experts)... came together with us to discuss, so that’s what we came out with, the four pillar projects (i.e LHP, CME, MCPHIE and TC).”*



K10 confirmed how Telehealth strategies were in common with the national IT vision which later incorporated in the Telemedicine Blueprint:

*“There is common national vision - the national blueprint of IT. The foundation of (Telehealth Blueprint) was the national IT vision and mission, and to see what are the things (i.e. healthcare service) that can be electronically supported, telehealth can support, and what are not. And (we) put in the right infrastructure to support that. So, that was a way forward in terms of doing this. And it was approved by the (federal) government. So, there is a common national vision in terms of telehealth. There was a national blueprint in terms of IT”*

Further, K10 illustrated his understanding of the conceptual vision of Telehealth:

*“Telehealth is the use of IT to support healthcare for both the person and also for the population, making use of IT as an enabler. Enabler to support health management, as well as patient self-empowerment. So, in doing that, the telehealth concept, we have a thing that would integrate all the health activities. These are the clinical records and these clinical records which contains a very important one (component) what we called as the Lifetime Health Record, LHR.”*

K2 had also affirmed that strategies in the Telemedicine Blueprint was for health system transformation:

*“The blueprint says that we need to transform the way in which we deliver services. And the agent for that transformation is the use of IT, and that’s what we are doing now.”*

### **5.3.2 Policy stream**

The policy stream within the context in which Telehealth initiatives had been carried out in MoH as laid out in the federal government policy directions between the Fifth Malaysia Plan (1985 – 1990) and Seventh Malaysia Plan (1996 – 2000), and the MoH's ISSP when it was first introduced in 1996.

The study discussed the key initiatives related to Telehealth and its underlying policies in sub-section 3.4.2. In this section, the policies are presented through the rich description by the key informants, as well as content analysis from the documentary reviews.

Analysis of the policy stream revealed that the policy stream comprised either through the exclusive government policy initiatives or through the public-private partnerships (PPP). The Telehealth initiatives were pursued through three major programmes:

- a) ICT strategies were incorporated as part of the health policy priority to improve the health system as stated in the cyclical 5-yearly Malaysia Plans;
- b) MoH's internal policies to improve the HMIS including to develop disease-specific electronic registries; and
- c) The public-private partnership of Telehealth-MSD initiatives.

#### **5.3.2.1 ICT strategies were incorporated to improve the health system in the 5-yearly Malaysia Plans**

The document review revealed that ICT strategies was recognised as part of health policy priority and was incorporated in the federal government cyclical 5-yearly Malaysia Plans.

The study classified the strategies as follows:

- Computerisation of the healthcare facilities (hospitals, clinics, and regional health departments) for health management and planning – during the Fifth (1985 –

1990) and Sixth (1991 – 1995) Malaysia Plans (Economic Planning Unit (EPU) Prime Minister's Department, 1991). Excerpt of the policy was discussed in section 5.3.1.1 previously.

- Infrastructural development of new hospitals with built-in Hospital Information Systems (e.g. Selayang and Putrajaya Hospitals<sup>82</sup>) – during the Seventh Malaysia Plan (1996 – 2000).

*“17.13... During the Plan period (i.e. Seventh Malaysia Plan), a total of 33 hospital projects was approved for construction. These included two IT-based specialist hospitals in Selayang, Selangor and Putrajaya, which were commissioned in 2000. Work also began on the construction of six hospitals incorporating the computerised Total Hospital Information System (THIS), namely in Ampang, Serdang and Sungai Buloh, Selangor; Alor Setar and Sungai Petani, Kedah; and Pandan, Johor. In addition, 25 small- and medium- sized hospitals, including 12 in Sabah and Sarawak with capacities ranging from 76 to 499 beds, incorporating the computerised Health Information System (HIS) were in various stages of planning and development” (Malaysia Economic Planning Unit, 2001)*

- other health IT initiatives, such as Telemedicine and Continuing Medical Education – during the Seventh Malaysia Plan (1996 – 2000). Excerpt of the policy was discussed in section 5.3.1.2 previously.

These policy strategies have been realised in the MoH as documented in the literature. For example, regarding how hospital computerisation had improved the hospital administrative records by Lim and colleagues (1991), various studies by researchers on THIS hospitals, ranging from descriptive studies to measuring technology adoption (A.

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<sup>82</sup> The list of hospital with EMR is in Appendix B.

Ismail et al., 2010; N. I. Ismail & Abdullah, 2012; N. I. Ismail, Abdullah, Shamsudin, & Ariffin, 2013; Lee et al., 2012; Sulaiman & Alias, 2006), the description of the pioneer neurosurgery teleconsultation between Kuala Lumpur and Hokkaido in 1999 (Houkin et al., 1999) and the use of telemedicine as a modality for distant CME (Pathmanathan & Zain, 1996).

The key informants were also in agreement that the Telehealth initiatives in the MoH were pursued along the federal policy initiatives, as illustrated below:

*“The federal government is very pro ICT. Because, if you see, there is the policy that says by 2014, I think, 90% of services provided by the government should be through ICT, you know? So, that is ICT as such. So, I’m sure it would apply to Telehealth as well, you know? Because we are government. So, that means, what I see is that, meaning the government is going towards ICT, so Ministry of Health should not be lagging behind.” (K4)*

*“There is there a currently a common national vision. Yes, there is a national (federal government) blueprint on IT. And I also assisted to develop the national policies on IT. The foundation was based on national vision and mission, and see what are the things can be electronically supported, telehealth supported, and put in the right infrastructure to support that.” (K10)*

*“They (the federal government) always has what we called the Strategic Planning. Of course, some people call it under the Blueprint, or the ISP - the various terms they name it. However, the public-sector (civil service), in particular, are very confident that there is a need to develop some form of IT Blueprints which come in many names. We developed it (for MoH), and they have put it in a much-organised manner, they know what goals to achieve and what are the mission, and objective there. What are the clinical, what are infrastructures that needs to be put and what are the IT infrastructures that needs to be in place, what are the IT standards they (need) to put into place. And then subsequently,*

*they can see the IT infrastructure to achieve the objective. So, you see the IT Blueprint in Ministry of Health, (it was) very systematic to achieve certain objective. (K10)*

*“I am aware that our (federal) government already has an IT infrastructure plans in health services, and we have Vision 2020. I knew about it ever since I was a (university) student in year 1996. The health system requires IT, am I right? It was called Telemedicine during that time, I think. Telemedicine was (meant for) the IT structure for health.” (K6)*

#### **5.3.2.2 MoH’s internal policies to improve the HMIS including to develop disease-specific electronic registries**

In MoH, there exists policy direction with regards to health IT. The most pronounced policy priorities were to advance the HMIS. According to Mohan and Suleiman, MoH initiated the ISSP in 1996 with the plan to deploy computerised system in hospitals and infrastructure networks, connecting the departments at the federal level with the district health offices at the multiple levels to improve data collection for health planning. (Mohan, 2010; Suleiman, 2001, 2008).

The informants commented that the development and progress of Telehealth was also attributed to the MoH’s internal policy direction.

K1: *“Telehealth policy (in MoH) is actually very broad, you know. You can talk about the MoH’s Information System Strategic Plan (ISSP). We also have what we called Telehealth policy; that's for very, very focused area and we (MoH) have many other policies regarding health IT. (K1)*

K12, praised the MoH’s effort to establish the coding standards for HMIS<sup>83</sup>:

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<sup>83</sup> The informant was referring to the National Health Data Dictionary (NHDD) which serve as reference to provide standard definition of the terms (i.e. coding) used in the health care industry. It was developed by the Health Informatics Standards working committee in MoH (Selvaraju, 2006).

*“One of the probably the most successful part (for HMIS) were the work that was done was headed by Datin Dr Selvaraju. And this was the language (standard codings) for the clinical language, they want to be adopted, you know. Because so much people were involved, doctors, nurses, pharmacist and then different specialties and we got to decide on different components of it... an enormous amount of work was done at that time, which I think elsewhere haven't been done before... and I have to take my hat off... the commitment by Selvaraju and all their specialist was really commendable.”*

K2, stated in the interview on how registries were developed based on proposals from the heads of the various health programs and disease-specific groups during the technical meetings (eg, cancer registry, diabetes registry, etc):

*“There have been a few systems (registry) that were developed for a specific purpose (by the specific programmes). These systems are very specific and because they are very specific, previously, we used to have about 42 disease registries!”*

### **5.3.2.3 Public-private partnership of Telehealth-MSC initiatives**

During the Sixth Malaysia Plan (1991 – 1995) and Seventh Malaysia Plan (1996 – 2000), there was intense effort by the federal government to pursue the national ICT strategies following the introduction of Vision 2020 by Mahathir in 1991 (Mohamad, 1991). The federally-led MSC initiative was officially launched in 1996 during the Seventh Malaysia Plan Period (1996 – 2000) along with the Telehealth Pilot Project (Economic Planning Unit (EPU) Prime Minister's Department, 2001). As explained in sub-section 3.2.2, the MSC initiative involved the close collaboration between the private and the government to foster the Malaysian k-economy.

As stated in the Eighth Malaysia Plan (2001 – 2005), referring to the progress of the MSC during the Seventh Malaysia Plan (1996 – 2000) following the introduction of MSC in 1996<sup>84</sup>:

*“13.15 Realising the need to drive the economy towards higher productivity through information technology and high value-added economic activities, the MSC was established in 1996 to provide a comprehensive world-class ICT – enabled working and living environment to catalyse the development of a knowledge – based economy.” (Economic Planning Unit (EPU) Prime Minister’s Department, 1996).*

Further, the progress for MSC Flagship applications were reported as below, which emphasised the government intention to promote close collaboration between the public and the private sector:

*“13.18 To jump start the development of MSC, seven flagship applications were introduced to provide business opportunities for private sector participation. These flagship applications were categorised into two groups, namely multimedia development flagship applications and multimedia environment flagship applications. The multimedia development applications included Electronic Government, Smart Schools, Multipurpose Card and **Telehealth**, while Research and Development (R&D) Cluster, Worldwide Manufacturing Web and Borderless Marketing were applications to create the Multimedia environment.” (Economic Planning Unit (EPU) Prime Minister’s Department, 1996)*

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<sup>84</sup> Dr Mahathir Mohamad had officially launched the MSC on 1<sup>st</sup> of August 1996 during the opening of Multimedia Asia on Multimedia Super Corridor Conference at the Putra World Trade Centre, Kuala Lumpur (Corporation set up to develop multimedia super corridor (1 August 1996) *Bernama*. Retrieved from <http://blis2.bernama.com/>, Kyngé, 1996)

The informants were aware of the PPP arrangements with regards to the Telehealth initiative. Hence, the informants talked about the role of the two parties – the private sector, which referred to as the ‘vendor’ and the government.

K12: *“Well, officially we got to have the vision and mission of the (Telehealth) project. We had a three months consultation in Kuala Lumpur which involved international people. I think it’s something like 23 international companies from all over the world participated, 17 local companies participated...they work on the consultations. So, eventually we agreed for the consultations to come out with that report, which came out as a Telehealth Blueprint.”*

K4 explained her point of view on why the government was pursuing the Telehealth initiative through the public-private partnership:

*“Because, as you know, any health IT project is very expensive, it needs a lot of resources, expertise and that expertise (in health IT) may not be available within the ministry itself. It’s out there in the private sector. A way to work out (on Telehealth) is at this public-private partnership.”*

K12 illustrated how the government engaged private participation to the MSC Telehealth project:

*“I went on to develop the Concept Request for Proposal, CRFP<sup>85</sup>. I was one of the main authors for to develop that (CRFP).... we went on to call the vendors all over the world to come.... we developed the contracts of this (flagship) application, and we managed the contract.”*

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<sup>85</sup> The Concept Request for Proposal (CRFP) scheme was the method employed by the Malaysian government to seek the suitable parties (i.e. private companies) to develop the MSC Flagship Applications. Companies (local and international) were invited to submit proposals that define project objectives and benefits for the specific flagship programmes. MDC, the government-linked company tasked with overseeing the development of the MSC, opened the CRFP scheme to four flagship applications, namely electronic government, smart-schools, multi-purpose card (MyKad) and Telehealth. The CRFP was launched on July 26, 1997 (Harris, 1998; W. Lim, 1997).



He further adds on what was the relationship between the government and private vendor:

*“We formulated the contract agreement, and that contract agreement clearly defined the following roles. First, is in terms of the roles or the vendors in terms of proposing for the right requirement of the application. Secondly, the role of the vendors with the assistance of governments in terms of application development or construction. Thirdly, the role of the government in terms of accepting the system what we called Provisional Acceptance Test and others. The government’s role is to define when, where it is done, and how it is done. Fourthly, is in terms of payment. Is it payment (to the vendor) by service or payment by progress of development? Very clear role, very clear. Then, lastly, is in terms of the management (operations) and the maintenance of the system.”*

### **5.3.3 Politics stream**

In the politics stream, the role of stakeholders and the levels of power responsible for exercising authority in Telehealth initiatives was instrumental. As explained in Chapter 3 on the study context, MoH is managed through a hierarchical institution – at the federal, state, district, and local hospital, or clinic level. The hierarchical culture translates into the value of order, law, authority, power, respect and loyalty between the upper and lower level managers (Seng, Jackson, & Philip, 2010).

The top-level management officials at the federal level have enormous power to implement new initiatives. The power of political individual to enforce new programme was voiced by K3:

*“The politicians, who have power...(programmes which) are started by the politicians, it’s a directive. So just we had to do it... We did it!”*

Further, K12 asserted his point of view of how crucial the role of the top-level management officials, the Director General of Health, to set up the Malaysia's first paperless hospital, Selayang Hospital, during the Sixth Malaysia Plan (1991 – 1995) period:

*“I was responsible for setting up the first paperless and filmless hospital - that was at Selayang Hospital.... I think we started planning for it in 1993-1994.”*

He elaborated further on what it takes for the vision to be included as part of the national health policy priority:

*“First, we discussed it. It was in 1993-1994 when I had a lot of discussion with (the) Economic Planning Unit (EPU). Because initially, EPU did not agree. Because we could not actually estimate the cost. And because we could not estimate the cost, EPU was reluctant to give the approval, until I have to go and see the Director General of EPU, and I told them, “Look, Why don't you not to worry about the cost of the hospital information system. But rather give us total cost of the project (i.e the budget allocation), and we will include that (Selayang Hospital) as part of the project. So eventually he agreed.”*

The significant role of the top-level management official was agreed by K4 when she expressed her views regarding the intensive MoH efforts to instil the Telehealth strategies during the 1990s as compared to the present time:

*“The commitment of the top-level management back then in the 1990s was much stronger than now.”*

As told by K12 and K10, when the federal government's MSC initiatives introduced in 1996, this gave rise to political pressure, where the MoH was given the mandate to incorporate Telehealth as part of the MoH's policy priorities:

*“Well, what we did, officially we got to have the vision and mission of the project... We had a three months consultation in Kuala Lumpur which involved international people... I was appointed as the chairman of the steering committee for Telehealth project. So I got to report directly to the Prime Minister.” (K12)*

*“I think, we had the champion (for Telehealth). The Honourable Tun (Dr) Mahathir was the champion, and it rippled downwards to our (former) Director-General of Health, Tan Sri (Dr) Abu Bakar.” (KI 10)*

#### **5.3.4 Coupling of the three streams and opening of a Policy Window**

Kingdon (1984) suggests that there are three streams of the policy process that need to line up before the policy window opens so it can become used. The study had found that at a particular moment, the three streams – problem, policy and politics converged, which opens up the Policy Window. In the analysis, the study draw on these streams to see how the policy entrepreneur(s) brought the events together.

During mid-1990s, the policymakers become increasingly concerned about the challenges of the healthcare system, such as increasing financial constraints (Simon Barraclough, 1999; Suleiman, 2001), disparity of healthcare coverage between urban and rural, the public and private health sector (B. J. J. Abdullah, Ng, & Pathmanathan, 1999; Pathmanathan & Zain, 1996; Suleiman, 2001; Wong et al., 1998) as well as the limitations in the health information management system for health planning. It was also during this timeframe that computer and Internet was introduced, and the policymakers recognised that ICT would be an enabler to overcome these problems. (Economic Planning Unit (EPU) Prime Minister’s Department, 1998).

During the same timeframe, there was another problem. The national health information system was fragmented. There were multiple disease registries managed by the different departments in the MoH which were developed by the clinicians and

researchers representing the various departments and programs within the MoH (Aljunid et al., 2012; Selvaraju, 2006). Policymakers were aware of the problems in the existing HMIS was due to the disparity in technical and ICT infrastructure, giving rise to a fragmented data collection systems.

Technology advancements in ICT had made it possible as a potential solution. Firstly, ICT is used to strengthen the health information system, allowing an integrated and a full-functioning HMIS to improve data quality, timeliness reporting, and analyses. Secondly, the horizontal and vertical equity of healthcare service ICT can be improved by enabling remote consultation for care process through Telemedicine. In addition, the international experiences with ICT use as a tool to improve the efficiency and effectiveness of healthcare service had also supported the feasibility of such policies.

Realising the ICT potential to improve the country's healthcare system, in 1995, the MoH's top-level senior officials decided to develop the underpinning policy, the ISSP in 1996<sup>86</sup> which includes to establish an integrated and computerized hospitals and health clinics (Suleiman, 2001). With input from the various departments in MoH, the ISSP included plans for new hospitals and health clinics to be equipped with computerized systems, setting up of more than 90 telemedicine sites across nation, as well as to strengthen the national HMIS infrastructure and network. (Blanning, Bui, & Tan, 1997; Mohan, 2010; Pathmanathan & Zain, 1996; Suleiman, 2001, 2008).

When the then Prime Minister Dr. Mahathir Mohamad launched the Vision 2020 in 1996 and decided to pursue the MSC initiatives in his desire to create the 'cybercorridor', it was in a context of politic opportunities. The then Director-General of Health, Tan Sri Abu Bakar Suleiman become the policy entrepreneur - he collaborated with his close associates and sought to unite a number of inter-related problems that arose out of the

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<sup>86</sup> From informants interview (sub-section 5.3.2.1), Mohan (2010) and Suleiman (2008).

distinctive context to match up with the existing MoH's ICT initiative with MSC<sup>87</sup>. Drawing on the uniqueness of the immediate situation, he sought to re-define the problems in his own terms and iteratively devise policy to harmonise and lead the task-force to develop the Telemedicine Blueprint.

The blueprint outlined relatively separate but immensely powerful interests sought to capitalize on the MSC vision: one emphasising the pressing challenges of the country's healthcare service, another regarding how ICT can be harnessed and became the key-enabler to overcome these challenges, and thirdly advocating the change in paradigm from illness-focused to wellness-focused care for the national healthcare system.

The concept in the Telemedicine Blueprint was established with a vision of healthcare system transformation from illness-focused to a wellness-focused system (Ministry of Health, Malaysia, 1997). Cited as among the first nations to publish such a public and a clearly defined policies on Telehealth (R. E. Scott et al., 2002), the development of the Blueprint involved multi-sectoral agencies including the private sector, and lead by the MoH top-level management officials (*New Straits Times*, 26 June 1997<sup>88</sup>). Along with the Telemedicine Blueprint, the other documents produced was the Telemedicine Standards and the Concept Request for Proposals (CRFP) for each of the four components. These documents provided the requirements of the identified pilot applications, allowing the private industrial players the flexibility to innovate and deliver the best solutions for each of the Telehealth components (Harris, 1998)<sup>89</sup>.

Through the integration of health IT, the Telehealth initiatives aim to implement a comprehensive national Telehealth service network, entitling all citizens to achieve equity, efficiency, quality to healthcare access. The health goals to achieve the vision were focused on the individual and wellness, care at home and in the community, self-

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<sup>87</sup> As told by K10 in sub-section 5.3.3.

<sup>88</sup> Telemedicine blueprint near completion (26 June 1997). *New Straits Times*. Retrieved from <https://www.blis2.bernama.com/>

<sup>89</sup> See footnote no. 85 page 184.

empowerment through information, and seamless access to quality health care. According to the Telemedicine Blueprint, Telehealth acts as an enabler, allowing seamless health information flow across geographical and physical constraints, and across all levels of care, starting from self-care and all the way up to the specialised tertiary care, with sure emphasis on promotive and preventive theme for its citizen. (Ministry of Health, Malaysia, 1997; Mohan & Yaacob, 2004; Suleiman, 2001).

In the year 2000, these three different streams converged. The MoH's top-level management officials proposed the concept behind the Telemedicine Blueprint during the parliamentary cabinet meeting and politically shaped the ownership of the ideas as part of the country's MSC aspiration to be developed nation by 2020. The cabinet approved and agreed with MoH's that Telehealth to be one of the MSC Flagships Applications and conferred the legitimacy on the policy content (i.e. Telemedicine Blueprint). Subsequently, the Telehealth master-plan was accepted, in which the federal government had allocated RM 100 million for its implementation during the Seventh (1996-2000) and Eight Malaysia Plan (2001-2005), respectively. (Economic Planning Unit (EPU) Prime Minister's Department, 1996, 2001).

As Telehealth was one of the federally-led MSC initiatives, the implementation had taken place in a 'top-down' manner. The MoH has been given the mandate to set up the nation's long-term and an integrated strategy for Telehealth which was expected to be fully realised towards the year 2020. Apart from the four Telehealth components (as described in sub-section 3.4.1 and Figure 3.14), the roadmap indicated a phased implementation that includes a 5-year initial 'pilot project' which was to be followed by progressive expansion to implement Telehealth nationally throughout a 23-year period (Figure 3.15). (Ministry of Health, Malaysia, 1997).

Having Telehealth as a part of the MSC Flagship Applications meant that its development was based on the close collaboration of government ministry i.e., MoH with

the private ICT companies (Economic Planning Unit (EPU) Prime Minister's Department, 2001; Harris, 1998; Huff, 2002). Thus, in 1999, the government awarded the contracts to two successful companies: Medical Online (MOL) and WorldCare; MOL was responsible for implementing LHP, MCPHIE and CME; whereas WorldCare was responsible for implementing TC. The contractual terms were for a 5-year period with the initial budget allocation for the whole project was close to RM100 million at that time (*New Straits Times*, 20 January 2000<sup>90</sup>; *Bernama*, 23 March 2001<sup>91</sup>). The details of the MSC Telehealth initiative is as described in Chapter 3 sub-section 0.

#### 5.4 Chapter Summary

The intention of this chapter was to illustrate the Telehealth policy formulation stage. The findings illustrated the multifaceted and complex nature of policymaking, analysing the relationship and meanings through the lens of Kingdon's Multiple Stream theory.

The study's interpretation of findings was similarly pointed out by Almaeida, in which ideological, political, and economic factors are decisive in the formulation of proposals and the progress of the initiatives decided upon (Almeida & Báscolo, 2006). Before the policy window opened, various issues were identified, which resulted in the agenda-setting and the policy decision for Telehealth. As can be seen from the Telehealth story told in this Chapter, the top-level management officials in the MoH became the "policy entrepreneurs", who managed to exploit an important window of opportunity (the MSC agenda) leading to a solution to overcome the multitude health system challenges faced at that time. What was evident was the creation and subsequent transfer of Telehealth strategy, and the idea was taken up by those with the

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<sup>90</sup> Ghani, R.A. Contract to develop Telehealth components (20 January 2000). *New Straits Times*. Retrieved from <http://blis2.bernama.com>

<sup>91</sup> Medical Online Secures RM45 Million for its Telehealth Project (23 March 2001). *Bernama*. Retrieved from <http://blis2.bernama.com>

power within the federal government and the MoH to influence the ministerial decision and to establish legitimacy. Once the legitimacy to act was established, the idea of what to do was sold in a simplified, branded, version to the public (i.e. the Telehealth-MSD initiative). The reasons behind this decision to allocate funding may not be disclosed; as what we all had already known is that policy decisions are rarely made in public and are not systematically the result of a rational process, as the context is often highly political (Collins, 2005).

According to Kingdon, issues enter the policy arena when there is the simultaneous occurrence of favourable aspects of all three streams. “The probability of an item rising on a decision agenda is dramatically increased if all three elements - problems, policy proposal, and political receptivity - are linked in a single package.” (Kingdon, 1984, p.211). The simultaneous occurrence of favourable aspects of the three streams can be enhanced through the actions of individuals. Policy entrepreneurs, people committed to particular policy problems or supportive of specific policy solutions, act to couple together the various elements. While such policy entrepreneurs may facilitate coupling problems and solutions, it is not until the political situation is appropriate (a policy window of opportunity) can they act to influence the policy agenda. Policy entrepreneurs are influential over time, due to their long-standing commitment to their issues, and their readiness to present coupled problems and policies when the opportunity arises. Kingdon's agenda-setting approach is particularly useful in the high politics activities of state as well as federal governments. It can provide explanations as to why it is possible to place on the policy agenda an issue such as healthcare and technology, as presented here in this study.



## **CHAPTER 6 : THE TELEHEALTH IMPLEMENTATION STAGE**

### **6.1 Introduction**

In this Chapter, the study will continue the discussion of the findings to understand Telehealth policy processes through the stage of Telehealth implementation. The thesis framed the interpretation of the case study to evaluate Telehealth implementation to become as a part of the routine healthcare services across MoH settings. Using the Normalisation Process Theory as the theoretical lens, the study will synthesise the findings in order to answer the overarching research question: “What are the influential determinants of Telehealth implementation, so that Telehealth becomes the routine way of working in the MoH?” What ‘works’ for Telehealth implementation is assessed from the perspective of the health administrators and implementers.

Therefore, the following research questions are addressed in this Chapter:

1. What were the processes involved to implement Telehealth?
2. Who were the key actors involved and what was their role in Telehealth implementation?
3. What were the influential determinants that support or impede Telehealth implementation across MoH setting?

The case study will describe the empirical findings, providing theoretical insight into the policy processes to explain how Telehealth was implemented in the Malaysian healthcare setting. NPT is used to theorise Telehealth implementation in Malaysia as the theory is advocated as a robust explanatory framework which captures the works and meanings of implementing, embedding and integrating new technologies or services into routine practice (C. R. May et al., 2009; Carl May, 2013; Carl May & Finch, 2009; McEvoy et al., 2014). By interpreting the decisions and meanings of the informants’

experiences in context, the NPT is the suitable framework to build an understanding of Telehealth implementation, exploring how and why the policy implementers carried out programs in an effort to make Telehealth implementation successful in the MoH.

Accordingly, the study argues that evaluation of the Malaysian Telehealth initiatives is not only to question about measuring its effectiveness, but to establish the feasibility of the Telehealth interventions, before embarking a large scale evaluation. As suggested by May et al (2007) “the question of process evaluation draws attention not only to questions of measuring effectiveness, but also to problems of understanding the workability and integration of interventions in settings that are themselves dynamic and complex.” Therefore, ‘process evaluation’ is of central importance to effective implementation, recognising that a complex intervention, like Telehealth, interacts with existing patterns of service organisation, professional practice, and professional-patient interaction. Such an approach has important effects such as to set out the implementation and integration of complex interventions as organisational or business processes that are as important as clinical and cost effectiveness assessments (C. R. May et al., 2007).

Following the NPT which was described in Chapter 2, sub-section 2.3.2.5, the theory posits that the work process involved in the implementation of complex interventions requires integration and workability. That is, if a complex intervention can be integrated smoothly into an organisational setting and is workable alongside other tasks and duties, then it is likely to become routine or normalized (C. R. May et al., 2009; Carl May & Finch, 2009). Hence, the study argued that, until the problems of Telehealth implementation is fully understood, there is not enough information to decide whether the Telehealth policy has been a success or not.

As discussed previously in Section 4.6, the study deployed Ritchie and Spencer's (2002) 'framework analysis' approach. The framework approach to data analysis involves five stages:

- (1) familiarization with the data;
- (2) identifying a thematic framework;
- (3) indexing,
- (4) charting; and
- (5) mapping and interpretation.

Coding process was both inductive and deductive. Firstly, transcripts were open-coded to allow themes to emerge from the data. Then, to analyse and present the results, the NPT theoretical framework provided guidance as themes were categorised according to the NPT constructs and its sub-constructs. The theoretical propositions were used to refine the codes and explore relationships between the themes. As Walt et al suggested, "the explicit attention to a theory does not imply a reductionist approach to analysis but rather it provides coherence and potential avenues for linking themes and concepts" (Walt et al., 2008). The following is the coding themes and categories for the analysis of Telehealth implementation.

## **6.2 The NPT Coding Categories**

The study used the following coding framework to assign the 'in vivo' as well as the descriptive codes found in the interview transcripts. The study adapted the definitions of the coding framework from May et al. (2007) and Mair et al. (2012)<sup>92</sup>. The detailed

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<sup>92</sup> The article by Mair and colleagues is a systematic review of reviews on e-Health implementation which spans from 1990 to 2009. The systematic review paper had identified the facilitators and barriers of e-Health implementations, as well as identifying the gaps in research on the subject (Mair et al., 2012).

description of the NPT constructs from these two articles was considered to be appropriate for this study.

### **6.2.1 Coherence (COH) – Sense-making work**

Data were coded as coherence (COH) if they described ‘sense-making’ work that people do individually or collectively in order to develop a shared understanding of the Telehealth service.

In NPT, the construct of coherence is broken down into the sub-constructs as the following:

- (COH1) differentiation – the understanding of how Telehealth services / technology is different from the existing practice;
- (COH2) communal specification – a shared understanding of the aims, objectives, and expected benefits of the Telehealth service;
- (COH3) individual specification – a clear understanding of the specific tasks and responsibilities of the actors in the process of Telehealth implementation; and
- (COH4) internalization – the understanding on the value, benefits and importance of the Telehealth service.

The review by Mair et al (2012) had found that coherence work was mainly related to preparatory activities – often policy building or dissemination of information which is undertaken either locally or nationally (Mair et al., 2012).

### **6.2.2 Cognitive participation (COG) – Relationship work**

Data were coded as cognitive participation (COG) if it concerned the ‘relational work’ that people do to encourage people to engage, buy-in and sustain Telehealth programs. Sub-categories include:

- (COG1) initiation – the key people/individuals willing to drive Telehealth implementation;
- (COG2) enrolment – people/individuals ‘buy-in’ to the idea of Telehealth service;
- (COG3) legitimisation – the sense that the individuals believe that it was right for them to be involved, that it fits with what they perceive as their role and expectations; and
- (COG4) activation – the actions needed to sustain the involvement in Telehealth.

According to Mair et al (2012), the practices found in the literature includes awarding ‘incentives’ for each of the parties involved and recruiting ‘champions’ tasked to support and promote the Telehealth implementation process.

### **6.2.3 Collective action (COL) – Enacting work**

Data were coded as collective action (CA) category if they pertained to the ‘enacting work’ that people do and what needs to be done to ensure that the Telehealth implementation works in a real-life and is sustained in practice. Sub-categories include:

- (COL1) interactional workability – concerning whether the Telehealth service or technology make the people’s work easier or the ‘ease of use’ of the new systems for healthcare staffs;
- (COL2) relational integration – the individuals’ confidence in Telehealth and their trust in the new systems and technologies, including security and safety concerns;
- (COL3) skill set workability – the allocation of new job scope or responsibilities when Telehealth is used in work and the need for training;
- (COL4) contextual integration – the overall fit of the Telehealth with the organisational context, in terms of issues related to resource allocation,

infrastructure and policy, and the extent to which the organisation had supported to implementing Telehealth.

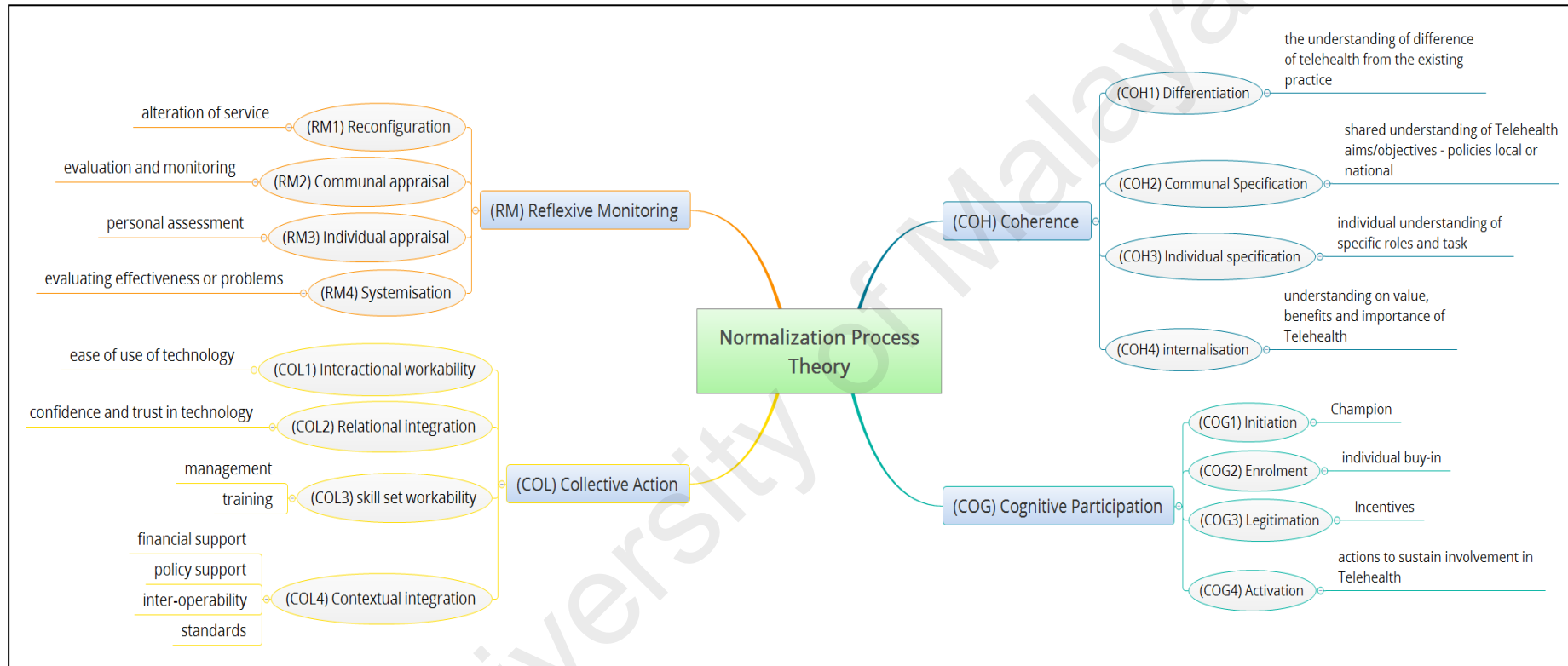
Mair et al (2012) and May et al (2007) had found that the contextual integration emphasised particularly on the extent to how Telehealth implementation are managed and resourced. This may include adequate financial support, policy support, standards, and interoperability.

#### **6.2.4 Reflexive monitoring (RM) – Appraisal work**

Data were coded as reflexive monitoring (RM) category if they described it as ‘appraisal work’ that people do to assess and understand the impact of Telehealth. When the new Telehealth intervention is implemented, both individuals and organisations make assessments, either formally or informally, about how well it is working. This category acknowledges the ways in which managers and other users appraise whether the Telehealth intervention is worthwhile or not. The sub-categories include:

- (RM1) reconfiguration — indications that individuals or the work group itself attempted to alter their service or work process or the Telehealth technology;
- (RM2) communal appraisal – assessment by the workgroup of the value or effectiveness of Telehealth;
- (RM3) individual appraisal – individuals assessed how the Telehealth affects them personally and in the workplace; and
- (RM4) systemization – judgments about the utility and effectiveness, or assessment of the benefits (or problems) with Telehealth. (Mair et al., 2012; C. R. May et al., 2009, 2007; Carl May & Finch, 2009).

The coding framework is illustrated in Figure 6.1, and in Table 6.1 the description of the coding scheme and analytical themes is provided.



(Source: Author's analysis adapted from May, 2013; Mair et al., 2012, May & Finch, 2009 and May et al., 2009)

**Figure 6.1: The network diagram of coding framework for Telehealth implementation.**

**Table 6.1: Descriptive themes and definitions.**

<b>Categories (NPT Sub-constructs)</b>	<b>Descriptive Themes*</b>	<b>Definition*</b>
<b>(COH1) Differentiation</b>	<ul style="list-style-type: none"> <li>Differentiation</li> </ul>	The sense-making work understanding that with Telehealth, there is different way of working from the previous way of working
<b>(COH2) Communal Specification</b>	<ul style="list-style-type: none"> <li>National vision / policies on Telehealth aims / objectives</li> </ul>	A shared understanding of Telehealth aims and objective – through the national or local policies
<b>(COH3) Individual Specification</b>	<ul style="list-style-type: none"> <li>The specific role or responsibility by individual in Telehealth</li> </ul>	The individual's understanding of their specific tasks and responsibilities around Telehealth
<b>(COH4) Internalisation</b>	<ul style="list-style-type: none"> <li>Value, benefits and importance of Telehealth</li> </ul>	The individual's understanding of the value, benefits and importance of Telehealth
<b>(COG1) Initiation</b>	<ul style="list-style-type: none"> <li>Champion</li> </ul>	Delegation of a small group of team/ professionals/ managers who are charged with the work of setting up Telehealth systems at the hospitals/clinics, and engaging with the local staff to make things happen.
<b>(COG2) Enrolment</b>	<ul style="list-style-type: none"> <li>Individual 'buy-in'</li> </ul>	Getting healthcare professional to 'buying in' to use Telehealth system
<b>(COG3) Legitimation</b>	<ul style="list-style-type: none"> <li>Incentives</li> </ul>	Legitimacy to use of Telehealth, which ties either with remuneration / personnel performance.
<b>(COG4) Activation</b>	<ul style="list-style-type: none"> <li>Actions to sustain Telehealth</li> </ul>	Actions and procedures to get the sustained use of Telehealth



**Table 6.1, continued**

<b>Categories (NPT Sub-constructs)</b>	<b>Descriptive Themes*</b>	<b>Definition*</b>
<b>(COL1) Interactional Workability</b>	• Technology fit	Whether the Telehealth technology fit the existing daily work process across MoH setting.
	• Staff workload	The influence of staff workload on the use of Telehealth.
<b>(COL2) Relational Integration</b>	• Security and confidentiality	Confidence and trust in Telehealth system
<b>(COL3) Skill-set workability</b>	• Change management & training	The new knowledge and skills needed when Telehealth is used at workplace
<b>(COL4) Contextual Integration</b>	• Financial/funding support	Financial resources for system development and to support and maintain Telehealth
	• Infrastructure support	The availability of a reliable network, power supply and working equipment (hardware) for Telehealth
	• Interoperability	Requirement for Telehealth systems interoperability
	• Policy supporting Telehealth implementation or operation	Details of policy influences on the implementation work
	• Standards	Details of standards required for Telehealth implementation (eg. data standards, coding standards, image standards)
	• Contract and Project Management	Informants' experiences of the project management capacity and procurement process during the early phase of Telehealth implementation
	• Leadership quality	Quality of leadership within organisation

**Table 6.1, continued**

<b>Categories (NPT Sub-constructs)</b>	<b>Descriptive Themes*</b>	<b>Definition*</b>
<b>(RM1) Reconfiguration</b>	<ul style="list-style-type: none"> <li>• Alteration in service</li> </ul>	Appraisal work by individuals/group resulting to the alteration or redefining the Telehealth service or technology
<b>(RM2) Communal Appraisal</b>	<ul style="list-style-type: none"> <li>• Monitoring and evaluation</li> </ul>	Appraisal by a group of professionals/managers eg. in meetings on the effects/impact of Telehealth
<b>(RM3) Individual Appraisal</b>	<ul style="list-style-type: none"> <li>• Individual appraisal</li> </ul>	Appraisal by individual user (at workplace) on the effects from using Telehealth
<b>(RM4) Systemization</b>	<ul style="list-style-type: none"> <li>• Formal evaluation</li> </ul>	The process of collecting information to evaluate Telehealth effectiveness or problems through formal evaluation eg. research

**\*Note: Description themes and definition adapted from May (2013), Mair et al. (2012), May & Finch (2009), May et al. (2009) and May et al. (2015).**

### 6.3 Coding Example

The process of selecting and translating the ‘in vivo’ codes is described in the following example in which an informant described about the factors that influenced implementation of Telehealth systems at the health clinics:

Interviewer: “Is there any key individuals shown to drive TPC implementation and adoption?”

K5: *“Definitely. And it has to come from the top. Even if let’s say, the clinicians are into it, it won’t help. The best, it’s the whole team. If the state director is into it, or the DG into it, it will work. Because it is an instruction. So, it works very well. We’ve seen a situation where the state directors are very committed, they do visits, they do audits - definitely it worked well.”*

Interviewer: “Even though you have mentioned about concerned top management on the implementation of a TPC that makes this system works, is there any other ways that you think had improved this implementation adoption of TPC?”

K5: “A lot of people say that at the provider level or at the user level. If the system is friendly, if the system is reliable, if the system is speedy, that would definitely help. Unfortunately for TPC, of late, we’re saying we have a seven-year-old computer, not replaced. We have a line that is 512 kbps, and people now are (on) 2Mbps (network speed)!”.

The ‘in vivo’ codes highlighted in the above quotes captured the implementer experience and perception on the ways to get the doctors’ buy-in for Telehealth at the health clinics. The study compared these codes to the NPT constructs and found that they were closely matched two categories: (1) cognitive participation: activation (COG4) and (2) collective action: contextual integration (COL4). Informants (as the implementer) observed that the top-management level involvement to drive Telehealth implementation was crucial,

which included activities such as visits and audits to the clinics (activation). There were difficulties for system ‘buy-in’ among the users because of the old PCs as well as unreliable and slowness of the network at the clinics (contextual integration). The data analysis and interpretation were performed according to the description of the coding scheme and analytical themes provided in Table 6.1.

#### **6.4 Data interpretation**

The following is the analysis and synthesis of the findings for Telehealth Implementation Stage. The presentation of the findings used the similar approach to that of Chapter 5, where the analysis and synthesis for the Telehealth implementation is presented with details that support and explain findings, using illustrative quotations from interview transcripts. Critical policy statements and findings from the literature and document reviews are interwoven with the interview data to corroborate findings and solidify the discussion where appropriate. The study determined that the point of implementation stage started when the government announced the Telemedicine Blueprint in 1997. (*New Straits Times*, 26 June 1997<sup>93</sup>).

The following sections discuss of the findings gathered from interview analysis, beginning with the highest number of the descriptive themes mapped with the NPT constructs.

##### **6.4.1 Collective action (CA)**

The coding category that had the highest number of data matches was Collective Action – the enactment work carried out collectively for Telehealth implementation. A total of six sub-themes emerged from the data – three sub-themes were categorised under the Contextual Integration (COL4) sub-construct; and another three were categorised under

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<sup>93</sup> Telemedicine blueprint near completion (26 June 1997). *New Straits Times*. Retrieved from <https://www.blis2.bernama.com/>

the remaining three sub-constructs respectively – Interactional Workability (COL1), Relational Interaction (COL2) and Skill-set Workability (COL3).

There was a strong theme in all the key-informant interviews that Telehealth implementation was influenced by how Telehealth can be integrated into practice within the MoH. These are the three sub-themes which were gathered from all of the informants and corresponds to the Contextual Integration (COL4) sub-construct:

- (1) The organisational support in strategic management and planning mechanism, and allocating the appropriate resources is detrimental for Telehealth implementation in the MoH;
- (2) Concerted effort from the various agencies and the capacity and capability of managing Telehealth project is important during the initial phase of implementation; and
- (3) The Telehealth implementation is compounded by the lack of the appropriate policy and standards addressing the key concepts and processes for integration and interoperability.

Further, the sub-themes corresponding to the remaining Collective Action sub-constructs are as follows:

- (4) The allocation for the new job scope or responsibilities for the healthcare providers with the use of Telehealth were achieved through continuous Change Management and training (Skill-set Workability – COL3);
- (5) Telehealth system design and work environment influences users' acceptance (Interactional Workability – COL1); and
- (6) The need to finalise the regulatory framework conducive for Telehealth practice in Malaysia (Relational Integration – COL2).

#### **6.4.1.1 The organisational support in strategic management and planning mechanism, and allocating the appropriate resources is detrimental for Telehealth implementation in the MoH**

All of the key-informants indicated that Telehealth implementation is influenced by the organisational support to allocate the resources needed for Telehealth. The processes involved during the early phase of Telehealth implementation, such the decision-making process to obtain top-level management commitment for the needed resources to deploy Telehealth is detrimental to Telehealth implementation in the MoH. This includes the inadequate capability of strategic management and planning mechanisms to allocate appropriate and sufficient resources to ensure Telehealth is integrated within the organisational practices.

It begins with the less than strong commitment shown by the top-level management on the approaches to achieve the visions of Telehealth, and the importance of aligning Telehealth requirements at the federal, state and local levels, as stated by K2 and K12:

*“The managers (top-level management officials) always have a big role because they are the ones who ultimately have to make the final decision on the scope of services, on where to implement, when to implement, and how to implement. And after the implementation, they are the ones who have to ensure that the maintenance is done regularly, comply with the various new processes, new policies. So, managers played a leading role. And they have to be involved from the very beginning.” (K2)*

*“This is an issue about leadership and the management of the projects. So, I mean, if the hospital director is not interested, then it will not work. If the director general of health is not interested, then it will not work. So, the leadership must ensure that there is leadership at all levels. Leadership at all levels, and I emphasise that. If DG only take leadership, nobody else, just him alone; if DG doesn't give emphasise to it, and say he*

*support it, others also, may not want to support it. But if, for example, the nurses, the pharmacists, the doctors, in a hospital, don't take leadership for their own component. Because everything got to work together. Because you don't do your work, then the other people also cannot do their work. Because it is integrated... very important to understand that.” (K12)*

According to the informants, the different understanding of the role of Telehealth by the top-level management officials appeared to have implications for the development and implementation of Telehealth. At one time, Telehealth was regarded as a solution for the overburdened health system. An informant pointed out that it was the overarching Vision 2020 and k-economy which was inspired by the former Prime Minister that had prompted the vision of IT-driven healthcare transformation.

*“Previously, the honourable Tun Mahathir was the ‘champion’, and (it) ripple downwards to our Director General Tan Sri Abu Bakar... People who say that IT can make the money, can bring money, can make change to people ... So, the Prime Minister must say that, our DG say must give (have the vision) to change (the) healthcare of the people.” (K10)*

The informants also mentioned that for the past a couple of years, there were changing views on Telehealth from the MoH top-level management. The purpose of Telehealth was to improve the requirements for data quality for health planning. The informants stated that there is increasing recognition in the MoH on the importance to advance Telehealth towards health information system integration and interoperability among the government clinics and hospitals in recent years.

*“If according to the present plans of the ministry, since the beginning of last year, we have the Director General of Health to see the issue of data (which) could not be used extensively. This issue has been proposed and we do have plans. Now we've seen that*

*(and) we've started this thing since 2012. We are now looking forward to system interoperability (to enable data sharing). Previously, we see clinic as a clinic, a hospital as a hospital (as separate system). Our Director General of Health is aware of this and will look into the matter seriously (towards systems integration and interoperability).” (K6)*

*“I think, ministry is working towards coordination of the system, so there is some movement in that area. So, that’s good.”(K4)*

Despite recent developments for health information system coordination between the clinics and hospitals, the informants perceived that the MoH’s efforts in pursuing the strategies to integrate Telehealth into the mainstream of healthcare delivery has not been adequate, especially after the stalled Pilot Project circa 2002-2005

*“After the failure of the initial jump-start programme (i.e. Telehealth Pilot Projects under MSC), all the ICT implementation in health has come out in pockets. So, nobody has been looking at aligning all these efforts in implementing health IT programmes towards the whole Blueprint vision... So, nobody has really look into aligning all this thing.” (K11)*

*“Support and priority should be given to us, like the support from the ministry to control infectious diseases, non-infectious disease... we have often seen, our ministry's core business is to control communicable diseases, non-communicable disease control, health education... So I think the ministry at the executive level, the top-level department heads, have to give more support and encouragement to us. High support!” (K8)*

*“Somehow, the core business of Ministry of Health is still health services. They are still making sure that there’s enough drugs to the patients, enough reagents to do all those laboratory testing. So, ICT becomes less of priority as compared to these other activities. It is not seen as a core activity.” (K4)*



One informant commented that it seemed that efforts to deploy Telehealth were affected by the “Telehealth-savviness” shown by the top-level management officials. When there was lack of push for Telehealth, implementation was slow.

*“I think Ministry of Health really need to look seriously at improving the infrastructure of the health facilities so it would be ready when the ICT system comes in. The ‘info-structure’, I think, ministry is working towards it. But the top-level commitment need to improve - we need stronger top-level commitment. The commitment of the top-level management back then in the 1990s, was much stronger than now. I think, the ones who takes over at the top management level are not, as IT-prone, as the predecessors.” (K4)*

Several informants described that, after the initial Pilot Project, there were uncertainties surrounding Telehealth implementation. Informants discussed that there appeared to be a mismatch between the objectives outlined in the Blueprint, and the implementation strategies being carried out in the MoH. Among the issues raised by the informants were competing demands in funding to acquire the necessary financial support and resources for Telehealth, which resulted in limitations in infrastructure readiness among others.

*“There are good policies, such as The Telemedicine Blueprint and ISSP. I think it waits to be seen, to be realised. Telemedicine blueprint, is a blueprint, a Strategic Plan is Strategic Plan, and in management we need both. My analogy of the two, at the moment – our vision, is to make sure all our transport system fast, ‘electronize’, with bullet trains, here and there. Yet, our Strategic Plan is to develop buses, and cars, and bicycles. Maybe we ‘rationalize’? We have to create (and) use buses, because we don’t have enough tracks to run? So, now we need to get them matched. It’s not synchronized. We have a seven-year-old system with networks speed like a snail. We need to change.*

*But, it comes with a cost and it comes with a price. It has been planned since last five, seven years ago. But every time we submit, we do not get the budget.” (K5)*

*“Our government already has an IT structure (strategies) in health services. For IT, we have Vision 2020. The health system requires IT and it is called Telemedicine. The drive to boost the system (Telehealth) is still lacking. We have the system, but it needs to be implemented together with a stronger (robust) infrastructure. I believe financial support from the government is the main factor, because that factor has always become an issue. To complement IT in the health services is still difficult because of cost constraint.” (K6)*

*“At the moment, I think, they need to review the road-map towards Telehealth implementation nationwide. And to have a focus group just to address those issue, just to look into its implementation - like a task force, a dedicated team. Once you draw out the road map, it needs to be implemented at some (according to the) programmes. But this team needs to look into (monitor), the implementations. Because it cannot be done just by one party. There’s a lot that needed to go across (it involves multiple divisions/units). Any implementation of any healthcare ICT systems, it needs to be aligned with the road map.” (K11)*

*“We are still backwards, still far behind, you know. TPC - it is only deployed in about 15% of our clinics, HIS is only 10% of our hospitals, OHCIS in dental clinic - it is about 3% of our clinics. Still have a long way to go. Maybe because of funding. The intention is already there for nationwide roll-out. I think it is the (lack of) funding.” (K1)*

The various requirements needed to mobilise the Telehealth efforts were explained by informants – from the requirements for to the deployment of health IT infrastructure and network across the MoH, the policy and regulatory frameworks, and to the requirement of technical expertise for managing Telehealth implementation. The informants remarked much has yet to be improved in these prerequisites to achieve successful implementation.

*“They (MoH) always have what we called the Strategic Planning. Of course some people call it under the Blueprint, ISSP. We (have) developed (it), and they have put it in a very organised manner – they know what goals to achieve, what are the mission, and the objectives (were outlined) there. What are the clinical (systems), what are the network infrastructures that needed to (be) put and what are the IT infrastructures (equipment) that needed to be put in place, what are the IT standards they (needed to be) put into place. And then subsequently, (with the use of) the IT infrastructure is to achieve the objective. So, you see the IT Blueprint in Ministry of Health are very systematic to achieve certain objective. So, it’s there.” (K10)*

*“So, they are trying to put in, when the (new) clinics comes up, it is ICT ready. For the old, the existing clinics, (in) our future plans, we are looking to roll out (the TPC), we’ll ask the state (which clinics are suitable to implement TPC). The state (health director) will give some suggestion. So, we are looking at that (infrastructure) readiness.” (K4)*

*“I think there need to be (a standard) operating policies. Otherwise, you will not be able to interact with different system.” (K12)*

*“Ministry of Health needs to provide a wider scope of officers under our unit. For example, like from the PIK, (need officers who have the same expertise like those from PIK - the Health Informatics Centre), to develop the electronic system/ICT systems. Financial support also play an important role in this matter. ICT consumes a lot of cost.” (K8)*

One informant commented on the matters related to the provision of the appropriate legal and regulatory framework to advance Telehealth practice and the governmental bureaucracies involved, which appear to have slowed the pace of Telehealth implementation.

*“If we need to change the law, then change the law. They keep saying it’s not allowed by law. Then, we (should have) make a proposal to amend the law. For example, sharing of (patient’s health) information between private and public. Currently, the law doesn’t allow it. We need to change the law (for the reason of) to interact for the continuity of care (between the public and private health sector). We have the procedures and we have the steps that we can follow. (We have to) go to the parliament (to table the proposal to amend the law), fight (for it in) the parliament, what’s the problem?” (K3)*

K3 referred to the insufficient regulatory framework in regards to the security and the control of information flow related to Telehealth practice. At the time of interview, there is no specific regulatory framework related to the practice of Telehealth. At one time, the Telemedicine Bill was tabled to the parliament in 1997 (*Bernama*, 5 May 1997<sup>94</sup>), but it is yet to be enforced<sup>95</sup>. The limitation in the regulatory framework was identified in two aspects – firstly, the existing laws does not permit the sharing of patients’ health information between the public and private health sector; and secondly, there is limitation in the laws and regulation that cover all aspects of data protection, such as, to curb health data breaches or to control access and the use individual health data from the health databases<sup>96</sup>.

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<sup>94</sup> Dr Siti Zaharah tables Telemedicine Bill (5 May 1997). *Bernama*, Retrieved from <http://blis2.bernama.com>

<sup>95</sup> As part of the government strategy to promote a conducive legal and regulatory environment for MSC, four cyberlaws were enacted in 1997: the Digital Signature Act, the Copyright Act (Amendment), the Computer Crimes Act, and the Telemedicine Act. Only the Telemedicine Act is not yet enforced (referred to as Telemedicine Bill 1997). The Telemedicine Bill states the provision on the control of medical practice using multimedia technology. According to the Bill, only medical practitioners fully registered with the Malaysian Medical Council with recognized qualification were permitted to engage with practices using Telehealth technology. In other words, the practice of Telemedicine requires ‘licensing’. (Retrieved from the Attorney General’s Chambers of Malaysia Official Portal, [http://www.agc.gov.my/agcportal/index.php?r=portal2/lom&menu\\_id=b21XYmExVUhfOE4wempZdE1vNUVKdz09](http://www.agc.gov.my/agcportal/index.php?r=portal2/lom&menu_id=b21XYmExVUhfOE4wempZdE1vNUVKdz09) accessed on 26 April 2016). Thus, although the initial intention of the Bill was to safeguard the public interest to ensure safety and effective medical practice of Telehealth use, the Bill was seen to be “obstructive and counter-productive, particularly for developing countries” (Kekana, Noe, & Mkhize, 2010; Mars & Jack, 2010)

<sup>96</sup> Personal communication with Dr Amiruddin bin Hisan, Director of Telehealth Division and as described by Mohan and Yaacob (2004). There are, however, existing laws that govern cyber-related activities. For example Computer Crimes Act 1997 (CCA), the Digital Signature Act 1997 (DSA), the Copyright Act 1987 (CA) (also known as Copyright (Amendment) Act 1997), the Communications and Multimedia Act 1998 (CMA), the Communications and Multimedia Commission Act 1998 (CMCA), the Electronic Commerce Act 2006 (ECA), the Electronic Government Activities Act 2007 (EGA) and the Personal Data Protection Act 2010 (PDPA). Those found to have abused the internet can also be charged under traditional laws (Mohamed, 2013). However, there is no specific legislation on Telehealth.

Currently, the data security in the healthcare sector relies on the confidentiality principle<sup>97</sup>. The duty to keep medical information confidential, including in electronic form, can be implied as professional obligation under the Malaysian Medical Council's Code of Professional Conduct and the Medical Act 1971. Hence, the data protection of patients' medical records is to be kept confidential and not to be disseminated without the patient's consent<sup>98</sup>. For the private health sector, the provision of Section 115 of the Private Healthcare Facilities and Services Act 1998<sup>99</sup> stipulated that it is an obligation for every person employed, retained or appointed for the purpose of the administration or enforcement of the said Act to preserve the confidentiality of all information that comes to his or her knowledge in the course of his or her duties. The private sector was also required to follow in accordance to the Personal Data Protection Act 2013 in handling individual information<sup>100</sup>. In addition, the medical record is considered as a legally binding document and the release of medical records is prohibited except under subpoena by the court of law<sup>101</sup>. Hence, according to the existing regulations, sharing of health information through electronic means between the healthcare establishments is not permitted, unless the patient had expressed his or her consent for it.

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<sup>97</sup> The matters related to system security of Telehealth practice is identified to correspond with the Relational Integration (COL2) sub-themes (sub-section 6.2.3). The discussion on the laws and regulation framework is discussed here as the two issues are inter-related: (1) provision to permit the sharing of patients' health information between the public and private health sector, and (2) the comprehensive laws and regulation that cover all aspects of data security and protection.

<sup>98</sup> The Malaysian Medical Council (MMC) is the governing body for professional medical practices licensures. The registered medical practitioner is obliged to comply with the MMC guidelines and failure to comply with the guidelines may cause the practitioner subjected to disciplinary proceeding. Source: the Malaysian Medical Council website at <http://www.mmc.gov.my/v1/images/contents/ethical/Confidentiality-guidelines.pdf>

<sup>99</sup> The Private Healthcare Facilities and Services Act 1998 (Act 586) ("PHFSA") was gazetted on 27th August 1998, but only came into force on 1st May 2006 with the issuance of the Private Healthcare Facilities and Services (Private Hospitals and Other Private Healthcare Facilities) Regulations 2006 [P.U. (A) 138/2006] or widely referred as PHFSA Regulations 138.

<sup>100</sup> The Malaysian Personal Data Protection Act 2013 (Act 709) ("PDPA") having come into force on 15 November 2013 further complicates the issue of data sharing between the public and private sector, as the PDPA does not apply to the federal and state governments. The reason for relaxation given to public sector under the PDPA is that privacy in the public sector is regulated through Official Secrets Act 1972, section 4 of Statistics Act 1965, section 19 of National Land Code and section 139 of Consumer Protection Act 1999. (see Sarabdeen & Ishak, 2008; Yong-Cieh, 2013).

<sup>101</sup> The MoH's Director General of Health Circular no. 17/2010 on handling and management of medical records in hospitals and medical institutions (*Garispanduan Pengendalian dan Pengurusan Rekod Perubatan Pesakit Bagi Hospital-Hospital Dan Institusi Perubatan*) states that medical records should be kept within the hospital, and it is the sole duty of the hospital director or officer in-charge for safe-keeping. The medical record cannot be taken out from the healthcare establishment, except with order from the court of law (p. 31). (translated from [http://www.moh.gov.my/index.php/database\\_stores/attach\\_download/312/194](http://www.moh.gov.my/index.php/database_stores/attach_download/312/194) in Malay language)

Further, the study would like to recap on what was mentioned by K11 regarding the consequences after the Pilot Project implementation and corroborate with the findings from document reviews:

*“After the failure of the initial jump-start programme (i.e. Telehealth Pilot Projects under MSC), all the ICT implementation in health has come out in pockets.” (K11)*

K11 was referring to the Telehealth-MSK Flagship Application project. The Malaysian Government awarded a contract to Medical Online Sdn Bhd to develop the Telehealth Pilot Project for five years on 20<sup>th</sup> January 2000 (*New Straits Times*, 20 January 2000<sup>102</sup>), but on 22<sup>nd</sup> May 2004, the government officially announced that the agreement was terminated (*Business Times*, 22 May 2004<sup>103</sup>). As a result, there were no further development of the three Telehealth components, the LHP, MCPHIE and CME. In fact, there were reports of implementation problems after two years of project initiation (*Business Times*, 23 September 2002<sup>104</sup>).

On 20<sup>th</sup> September 2005, the Health Minister had announced that the government had allocated RM60 million to re-develop the stalled Telehealth components<sup>105</sup>. The RM60 million was allocated since the Ninth Malaysia Plan (1996 – 2000)<sup>106</sup>. According to Mat Som (2010), in October 2004 the Telehealth Unit, was re-structured under the Medical Services Programme. The unit was previously under the office of the Director General of Health (Ministry of Health, Malaysia, 1997)<sup>107</sup>. The scope of Telehealth was

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<sup>102</sup> Ghani, R. A. Contract to develop Telehealth components (20 January 2000). *New Straits Times*. Retrieved from <http://blis2.bernama.com>

<sup>103</sup> Ministry ends telehealth agreement with MOL (24 May 2004). *Business Times*. Retrieved from <http://search.proquest.com/>

<sup>104</sup> Ganesan, V. Telehealth project hits snag (23 September 2002). *Business Times*. Retrieved from <http://search.proquest.com/>

<sup>105</sup> The RM60 million was the remainder of the initial RM100 million budget allocated for Telehealth (see Ganesan, V. Ministry moves to revive Telehealth project components (25 September 2005). *Business Times*, Retrieved from <http://search.proquest.com/>). The RM60 million has been allocated since the Ninth Malaysia Plan (1996 – 2000).

<sup>106</sup> See also section 3.4.1

<sup>107</sup> The Director General of Health in office from 1995 - 2012: Tan Sri Datuk Dr. Abu Bakar bin Suleiman (01/11/1991 - 02/02/2001); Tan Sri Datu Prof Dr Mohamad Taha bin Arif (05/02/2001-03/03/2005); Tan Sri Dato' Seri Dr. Haji Mohd. Ismail bin Merican (05/03/2005 - 04/03/2011); and Dato' Sri Dr Hasan bin Abdul Rahman (11/03/2011 - 14/11/2012).

reorganised from the initial four to become seven components: (1) Lifetime Health Record (LHR); (2) Personalized Lifetime Health Plan (PLHP); (3) MyHealth Portal; (4) Continuous Professional Development (CPD); (5) Teleconsultation (TC); (6) Call Centre; and (7) Group Data Services (GDS) (Mat Som et al., 2010).

After the restructuring, some of the Telehealth components were developed with the collaboration between the Telehealth Division and the corresponding agencies. The MyHealth portal, which went live in 2005, was developed with the collaboration with the Health Education and Communication Centre and (Mat Som et al., 2010). The MyCPD website, which allows online CPD activity monitoring and evaluation, was operational since 2010 and developed with the collaboration with the Medical Development Division<sup>108</sup>. The Virtual Library (VLib) is under the administration of the MoH's library<sup>109</sup> providing electronic resources for the healthcare professionals (Mat Som et al., 2010). TC services have been operational since it was initiated, and has had strong support from healthcare professionals (Azmi, Ahmad Zamzuri, & Mohammed Saffari, 2013; Maarop & Win, 2012; Maarop, Win, Masrom, & Hazara-Singh, 2011). The LHR consultancy exercise completed in 2007 proposed the LHR implementation framework and the adoption of IHE standards for health systems interoperability (*Business Times*, 20 September 2005<sup>110</sup>; Hisan, 2012). This was followed by the implementation of the Malaysia Health Information Exchange (MyHIX) in 2009, with the deployment of the integration engine using the IHE framework, allowing the sharing of patient discharge summary among the facilities of the MOH using HIS and CIS application systems (Marzuki, 2015; Zaidan et al., 2015).

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<sup>108</sup> <http://www.mycpd.moh.gov.my/newmenu.aspx>

<sup>109</sup> [http://vlib.moh.gov.my/cms/page.jsp?id=com.tms.cms.page.Page\\_ContactUs](http://vlib.moh.gov.my/cms/page.jsp?id=com.tms.cms.page.Page_ContactUs)

<sup>110</sup> Ganesan, V. Ministry moves to revive Telehealth project components (20 September 2005). *Business Times*. Retrieved from <http://search.proquest.com/>.

Several of the Telehealth components were developed with other departments as the leading agency. The Group Data Services is developed as the Malaysia's Health Data Warehouse (MyHDW) under the Health Informatics Centre (*The Star*, 17 April 2016<sup>111</sup>; Marzuki, 2015; Zaidan et al., 2015). Back in 2005, the implementation of Teleprimary Care system, the CIS systems and Teleconference for the health clinics, were under the Family Health Development Division initiative (*Utusan Malaysia*, 8 March 2005<sup>112</sup>; *Bernama*, 24 February 2009<sup>113</sup> & 6 July 2009<sup>114</sup>; Mat Som et al., 2010). The proposal of the deployment of 'THIS' at the selected MoH hospitals as laid down in the 5-year development plan documents was not explicitly mentioned to be related to Telehealth. It was pursued as part as the country's social infrastructure development projects<sup>115</sup>. For PLHP and Call Centre, at the time of the thesis writing, published evidence on the progress of the two components were only available from the MoH's annual reports<sup>116</sup>.

#### **6.4.1.2 Concerted effort from the various agencies and the capacity and capability of managing Telehealth project is crucial during the initial phase of implementation**

The informants highlighted that Telehealth implementation requires a concerted effort from the various agencies especially during the initial phase of implementation. Being part of the MSC Flagship has given the MoH the advantage of being able to collaborate with the industrial players through the public-private partnership. The private industrial

<sup>111</sup> Chin, T. S. Big Data to help in Malaysian healthcare policy and planning (17 April 2016). *The Star*. Retrieved from <http://www.star2.com/health/wellness/2016/04/17/big-data-to-help-in-malaysian-healthcare-policy-and-planning/>

<sup>112</sup> Projek TPC khidmat pakar di desa dilancar (8 March 2005). *Utusan Malaysia*. Retrieved from <http://blis2.bernama.com/>

<sup>113</sup> Ministry to expand Teleprimary care to Pahang, Sabah and Sarawak (24 February 2009). *Bernama*. Retrieved from <http://blis2.bernama.com/>

<sup>114</sup> Rm10 million for TPC in Sabah and Pahang (6 July 2009). *Bernama*. Retrieved from <http://blis2.bernama.com/>

<sup>115</sup> See Suat-Ling, C. Selayang Hospital dry-run in January (20 September 1998). *New Straits Times*; Chua: Many unaware of e-hospital in Putrajaya (26 July 2001). *The Sun*; and Fay Sel. Solutions Protocol win RM76.4 mln "paperless hospital" contract (9 January 2002). *Bernama*. Retrieved from <http://blis2.bernama.com/>. See also section 3.4.2 for the summary of the key Telehealth initiatives and section 3.4.3.3 on the relevance of TPC and THIS with Telehealth.

<sup>116</sup> In the 2006 MoH's annual report, it is stated that the development of LHR would provide the information for the creation of PLHP (Ministry of Health Malaysia, 2007). In the 2008 report, it was mentioned that the development of Call Centre was deferred to the Tenth Malaysia Plan (2010 – 2015). (Ministry of Health Malaysia, 2009).



player is perceived to have the better technical expertise and higher level of innovativeness in Telehealth technology. However, there seems to have been impediments in Telehealth implementation in terms of the bureaucracies surrounding the procurement processes.

*“Government should take the role of encouraging the involvement of vendor or participation of the private sector (in Telehealth). Because I think they are more innovative.” (K1)*

*“(To implement Telehealth) it needs a lot of resources, expertise and that expertise may not be available within the ministry itself it’s out there in the private sector. A way to work at it is through this public-private partnership. So, if we can identify that particular (IT) vendor that has the expertise in health, I don’t see why we cannot work with them directly. (We) do not need to go through an open tender. Because, when you do an open tender, you are exposed to any company that wants to come in. And to evaluate that company is not easy - you might end up appointing a company that actually does not have expertise.” (K4)*

*“Big companies usually have a lot of resources. But that doesn’t mean that they are better. Sometime the smaller companies (are better) because they are more focus, they’re better delivering a product, better fits our requirement. The way in which we do our procurement, the time scale (gap) when we first publish (advertise) our tender and when the tender close, unless (the vendor) actually have a product in hand. Big companies, because they have more resources, they can actually concentrate their resources and can come out with proposal in that short timeline. But smaller companies cannot. So, a lot of time you find that it’s the big companies that continue to get involved in our procurement exercises (get awarded), even though they may not be as good as the small companies.”(K2)*

In addition, Telehealth implementation is influenced by the capacity to manage the project. The importance of mutual understanding of Telehealth vision and the needed skill and knowledge among the MoH officials and vendors were considered crucial to manoeuvre the Telehealth projects.

*“I think one of the things that we have found is that, if we get a vendor that understands both the technical issues, means the IT parts, as well as the domain issues, they are usually able to deliver what we wanted. But, if they do not understand, usually if they do not fully understand the domain issues, that’s where we face a problem.” (K2)*

The capital strength of the vendors throughout the project implementation, specifically during the contract period, was also said to be of importance.

*“How we manage the (Telehealth) project is very important. We’re weak in project management and we’re still weak in vendor engagement... We always have this problem with vendors. If we had a very good relationship vendors, I think, a lot of our problems can be solved. A lot of our projects that have failed because the vendor has failed also. Either they’ve gone financially (in trouble), or they are not sustainable, they are bankrupt, and so forth. It has to be both ways. We have to have a very good vendor, stable vendor for us, so that our projects to be successful.”<sup>117</sup> (K1)*

An informant, K12 described how the vendor had approached him personally, asking for his expert opinion to guide the development of THIS in Selayang Hospital. He explained that, eventually, the vendor was successful in delivering the THIS systems as intended.

*“The appointed vendors, they came to see me. And they told me, even though they are appointed, they accepted the contract, they were unable to deliver on the paperless and*

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<sup>117</sup> In a press statement, the Minister of Health stated that the Telehealth Pilot Project under Medical Online Sdn Bhd was stalled for the reason of financial problems and ‘was not founded on pragmatism’. (Ganesan, V. Ministry moves to revive Telehealth project components (20 September 2005). *Business Times*. Retrieved from <http://search.proquest.com/>)

*filmless hospital for Selayang. After that I said, "No! I don't find what they tell me acceptable". Because, I said, "You've been appointed based on that requirement, I should expect you to deliver on that." So they said, "It is very difficult." I said, "No. You have to do it." So, when I insisted on that, they have to come around to do that. And I realised subsequently, because they came and periodically briefed me on the difficulties, but, I insisted they must deliver. So, actually they delivered." (K12)*

The importance of close collaboration between the MoH and vendor was further emphasised by K5 in implementing TPC:

*"it was very close collaboration (between the MoH and vendor). Because, I think the vendor, pardon me from saying, are quite clueless. So, we have to set the direction, the specifics that we want. Because some of the specifics that we want are also peculiar to Malaysia. So, that's why (it needs) a very close has (collaboration). And I don't think we can do without that close collaboration." (K5)*

Apart from mutual understanding of the technicalities surrounding project management and system development, the business and service models of PPP of Telehealth implementation also influenced Telehealth implementation. The informants described the ways in which the occurrence of the unprecedented adversities which occurred within the contract period (as mentioned in section 6.4.1.1) had resulted in the unwanted consequences which affected the plan to accomplish the objectives of the Telehealth Pilot Project. One particular vendor was afflicted with funding difficulties, resulting in the failed execution of the contract deliverables.

*"The thing is this, the LHP involves a big investment. To create the health record of an individual from birth to his/her death, it requires a big budget. Clinical information system as a basis to capture data. But we make the LHP project with BOO concept, Build, Operate and Own. Means that the Government is not responsible for even one cent except*

*when we use the service. Means that, it's the vendor's responsibility to set it up. We only pay when we use it (the LHP service). If we don't use it, we don't need to pay. Because of that, in the previous LHP project, actually the Government didn't waste anything. Just wasted the time. Because we didn't pay for even one cent (for the service). It's the vendor who lost so much. But, at the same time, is it fair to award another company for half of billion ringgit project just like that. For example, at the same time we award Solution Protocol to implement HIS in 14 hospitals worth 644 million – which was an 'easy job' with BOT<sup>118</sup>. So, if we were as the company that makes the BOO, we also feel frustrated. We (the company) have to make the same thing, but then it's not paid. That's also one of the sources of failure.” (K3)*

*“One of the vendors, their thinking was good because they're doctors who are actually driving the project. But they went into bankruptcy because ministry did not pay the vendor on what the works that been done. Because of that, they were not able to do another work (deliverable). From what I knew, they did do some works in the list (per contract. The concept that we had, attracted a lot of idea, a lot of interest around the world, because it was very attractive. But I think the complexity also resulted that not very many people will be able to do that.” (K12)*

The underlying objective of PPP is to combine public sector accountability with private sector efficiency, and enable joint sharing of risk. According to Sharma (2007), there is a wide spectrum of PPP models which depend largely on the agreements between the government agency and private partners. A few models that are widely used in e-Government projects by governments worldwide, including Malaysia are: Build-own-operate (BOO); Build-operate-transfer (BOT); and Build-own-operate-transfer (BOOT) (Sharma, 2007). The Telehealth Flagship Application components were implemented

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<sup>118</sup> In 2002, Solutions Protocol was awarded a RM665 million contract to build ICT systems, including THIS for 13 government hospitals. See Jayaseelan, R. Kompakar to buy Solutions Protocol (20 February 2006). *The Edge*. Retrieved from <http://blis2.bernama.com>

using the BOO concept, where the appointed consortium was given the task to digitise and interconnect the government hospitals electronically, and the government will subsidise RM10 for every patient who registered with the LHP system (*Business Times*, 13 June 2003 and 22 May 2004<sup>119</sup>). Meanwhile the implementation of HIS for public hospitals was under BOT or Turnkey Project (see A. Ismail et al., 2010; Suleiman, 2008).

Because the business model for the Telehealth Pilot Project was BOO, the agreement was that the government will pay the Consortium according to the 'transactions' of digitising and the use of LHP for each individual registered to the system. However, since the service (and the system) was not delivered, it was impossible to 'create' individual LHP. Hence, without the delivery of service, no payment is substantiated (see *Business Times*, 23 September 2002 & 7 July 2003<sup>120</sup>). The CEO of Medical Online Sdn. Bhd., however, had issued the following statement on 25 September 2002, refuting the newspaper claims of the company's difficulties: "*Although the project was proposed during the Asian financial crisis and the overall project requirements were arbitrarily reduced (then), we continued to support and invest into the project as we recognised the importance of this project to nation building and the benefits it provides everyone once it is rolled out nationwide*" (*Bernama*, 25 September 2002<sup>121</sup>). As described in earlier subsection 3.4.1, the company was put under receivership in September 2003 and subsequently the MOL contract with MoH was terminated on 25 March 2004<sup>122</sup>.

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<sup>119</sup> Ganesan, V. Telehealth project affected by funding problems? (13 June 2003); Ministry ends telehealth agreement with MOL. (22 May 2004). *Business Times*. Retrieved from <http://search.proquest.com/>

<sup>120</sup> Ganesan, V. Telehealth project hits snag (23 September 2002) & Ganesan V. Telehealth project foiled by ailing Medical Online (7 July 2003) *Business Times*. Retrieved from <http://search.proquest.com/>.

<sup>121</sup> Zain, A. Z. Medical online back on track towards being global telehealth leader (25 September 2002). *Bernama* (Malaysian National News Agency). Kuala Lumpur. Retrieved from <http://blis2.bernama.com/>.

<sup>122</sup> See also footnotes 10 and 39.

#### **6.4.1.3 Telehealth implementation is compounded by the lack of the appropriate policy and standards addressing the key concepts and processes for integration and interoperability**

Another hurdle for the work of Telehealth implementation in the MoH was the lack of policy directives, or specification of such directives to support the practice of integrated healthcare services using Telehealth. The informants mentioned that the integration-enabled Telehealth systems was not possible because of the different systems deployed at the clinics and hospitals.

To become interoperable, such systems must have technical, semantic and process interoperability, and the systems deployed must meet the requirements for a common purpose to exchange information, which includes in terms of technical, information architecture, information standards and the standard operating procedures including policies (see sub-section 3.4.3.4). The informants viewed that policy directives regarding interoperability seems to be unclear. There appeared to be difficulties in maintaining shared commitments across departments and programmes, resulting in incompatible information systems to enable interoperability across the MoH.

*“IT in Ministry of Health, no doubt it is led by the IT Division (i.e the Information Management Division). Then, we have another unit in Telekesihatan. Then, some of the department or division, they have their own initiative. Ministry has to standardize that. But, the problem, the new hospital which don’t have (IT) and have the IT, which doesn’t talk together, because of the different IT system. Let’s say for example, we have a patient Selayang, Serdang, Putrajaya which is all (deployed with) different IT systems. So, they must have to be standardized to all throughout the hospitals by using only one, this one*

system (HIS)<sup>123</sup>. The other thing is, all the clinical software (systems) everything, it must be owned by Ministry of Health. They must have the experts or the skilled people to manage that. Because if they don't have the experts, then we got no point. You cannot expand that system from this (existing) one." (K7)

Informants had also pointed out the problem where there is no specific policy directive that drive "business needs" i.e. to establish a common purpose for health information exchange across the health systems that requires system interoperability.

"Basically, interoperability driven by the business needs. So, most of the time, interoperability is done based on specific needs or specific system environment. If there is a need. That means, they will ensure any that those related system are interoperable. But in terms of nationwide interoperability, probably it is available in a way the financial system, banking system. Financial, electronic payment now with government, what you called it? But I'm not sure if there's a specific policy on that." (K11)

"I think there need to be operating policies. There must be an operating policies (on interoperability), otherwise, you will not be able to interact with different system." (K12)

One informant expressed her concern for the need to establish the policy for integration and interoperability in view of the possibility of public-private collaboration of the national healthcare system in the future.

"Because I think, we are looking at public-private partnership (in healthcare delivery). Because, health resources within the public sector is not as abundant as in the private sector. Because, in private (sector), there are about 8 000 private primary care clinics out there, as compared to 800 within the public sector. So, that means, we really

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<sup>123</sup> Refer to Appendix C for the types of THIS in MoH Hospitals. The HIS types were based on functionalities i.e. either Total HIS (THIS), Intermediate HIS (IHIS) or Basic HIS (BHIS) (N. I. Ismail et al., 2013). However, based on personal communication with Dr Fazilah Shaik Allaudin, since 2013, all MoH with HIS was no longer to be differentiated between the various HIS functionalities.

*need to look at that (integration and interoperability between public and private). So, (in the future), we will need information sharing, we will need monitoring, so there has to be interoperability.” (K4)*

Although the MoH had not established the specific policies for integration and interoperability across the health systems, key-informant had pointed out that there has been increasing recognition in the MoH for interoperability for streamlining data collection and improving data quality through to adopting and formulating the standards of documentation.

*“Yes, that’s where we moving towards, to make sure it’s interoperable. We are able to exchange data, and so forth. I think interoperability is very important. And it’s slowly picking up. It has become a priority now. It may not have been a priority, just say in 1997 or year 2000, you know. But interoperability is needed. Especially when our patients move from one place to another. We have to make sure we exchange data and so forth. So, interoperability, that is with external. But interoperability within an institution is also important. We may have multiple systems. But they must interoperate.” (K1)*

As part of the effort to enable interoperability, the MoH had established the specific standards in terms of data definition and interoperability. This includes policies and documentation on data standards and information exchange.

*“I think it (standards on interoperability) is one of the more important critical success factors for us. Because our main interest is to ensure that systems are integrated, can be integrated and will be integrated. And, the only way in which we can move forward in this is to come up with standard policies, standards on IT to enable the integration to move forward. Without the standards, it’s very difficult to, to proceed with integration, especially on a national scale.” (K2)*



*“Our official document (for system development) has stated that, we need to follow the international standard, such as the CDA, Clinical Document Architecture. So, for the Clinical Document Architecture certainly there’s document. Everybody can read and follow.” (K3)*

A few documentation standards had been developed and already been used in the MoH.

*“There is certainly policy applied to the Telehealth infrastructure and data standard. In describing medicine, we have the Malaysian Drug Code. The existing data standard, we adopt the National Health Data Dictionary. And, at the same time we try to establish health data standard. Just like the use of (internationally used), HL7<sup>124</sup> or all of that, internationally used terminology, for interoperability. What we want Putrajaya Hospital (system) to communicate with Serdang Hospital. As long as the system in Hospital Putrajaya able to communicate to the Serdang Hospital (system), the system able to understand (interoperable), that’s what we want. For example, we have to use HL7 because we are using a lot of biomedical equipment from overseas.” (K3)*

*“The work that was done was headed by Datin Dr Selvaraju... and this was the (standard) language for the clinical language. They want (it) to be adopted (in the MoH Telehealth systems). Because so much people were involved, doctors, nurses, pharmacist and then different specialties, and we got to decide on different components of it - an enormous amount of work was done at that time which I think elsewhere haven’t been done before.” (K12)*

In addition, the MoH had organised ‘Connectathon’ to encourage the vendors to test their products for system interoperability.

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<sup>124</sup> HL7 refers to the Health Level Seven, an international standard to exchange or transfer clinical and administrative data between software applications used by the various healthcare providers.

*“What has been done so far, this is to enable the more vendors to participate in Telehealth, we have the Connectathon Programme. For, for example, this is one of the things where they are allowed to put their system on test on compliance to IHE Standards. So, by having those kind of activities such as Connectathon, there are more vendors coming forward to showcase their system, which complies the standards. We have organized this Connectathon since probably around 2007, 2008. We had a few (events) after that.<sup>125</sup>” (K11)*

However, informants had pointed out that, due to the lack of co-ordinated policies for services models that drives for an integrated healthcare service, such as the PLHP and LHR, the reasons for implementing and using Telehealth seemed to be irrelevant.

*“But because the (pilot) project did not progress, that amount of work (on preparation of clinical documentation standards) was so valuable and so much of work done by so many specialists around the country. Actually, I think, it’s a pity, so much effort was put in and I have to take my hat off – the commitment by Selvaraju and all their specialist was really commendable. They kept me informed all about it. I was really impressed, like (the) commitment of the people. I view that is a success, that component. But not the implementation of the project.” (K12)*

*“Policies are there (for interoperability). Because the telehealth policy (Blueprint) had mentioned on interoperability in terms of service integration - the data integration (which) a lot of IT people talking about, but it did not happen. So, the policy in terms of service interoperability or integration is there (in the Blueprint), however it was not implemented (being operationalize). We said that, “Everybody must have LHR. Whatever (it takes), everybody must have PLHP”. Because, if I downloaded my PLHP, everybody*

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<sup>125</sup> The Malaysia’s Connectathon was first organized in 2008 (see J. Li, 2010). It is an event designed by the Integrated Healthcare Enterprise (IHE) to enable system developers to test their products on a face-to-face real-time interoperability testing based on the IHE standards (refer to <http://www.iheusa.org/connectathon-registration.aspx>). Malaysia had officially adopted IHE Standards since 2009 (Personal communication with Dr Amiruddin Hisan, Director of Telehealth Division).

*reads, know what to do, what happened to me, where I'd get my examination, where I'd get my diagnosis, when did the test done before, everyone should know it, because it's in LHR... We said that we had the policy. But policy, it remained as a policy. But to make it 'act', we 'had failed'. Because, not only the PLHP service not there, even LHR service is not there, the infrastructure to do that is not even existed.” (K10)*

Further, the informants commented that there is only a limited number of health facilities which had systems deployed and capable of exchanging data. Only recently has there been increasing recognition in the MoH to deploy appropriate ICT infrastructure in the newly-built clinics with the appropriate network connectivity.

*“I say (the TPC system is) significant is when the public health department is able to use the data that is generated from TPC to facilitate in making projection, looking at incidences and what's not. The system is able to do so. But unfortunately, the collection of data, the utilization of TPC has not been complete (at all the clinics), there's a lot of vacuums. And for analysis, it becomes difficult. We still can use, you know, sometimes, from vacuum. But we have to clean up (the data). And then what is cleaned, is what you're going to interpret. But it needs a lot of work.” (K5)*

*“I think the ministry is now aware about ICT requirements. So, they are trying to put in when the clinics comes up, it's ICT ready. For the old, the existing clinics, our future plans, we are looking at that. Because, actually the government has this big picture (of integration). They are setting up connectivity to all these areas. So, in our planning, also from lessons-learnt, when we plan to roll out (ICT systems), we ask the state (of the suitable location). The state (health departments) will give some suggestion. So, we are looking at that (infrastructure) readiness. If that area doesn't have the electricity, inconsistent electricity supply, we are trying not do it yet, until it is ready.” (K4)*

The informants felt that there have been uncertainties about the policy directives towards integrated healthcare systems, whether among the primary clinics, the hospitals,

and between the public and private health sector. It was sensed among the informants that the implementation of Telehealth would be smoother if there is clear policy directives for the use of Telehealth for integrated healthcare delivery. An example for such directives is aligning policies for networked care among primary and secondary care, with information technology as the intervention to improve quality of care or clinical effectiveness.

#### **6.4.1.4 The allocation for the new job scope or responsibilities for the healthcare providers with the use of Telehealth were achieved through continuous Change Management and training**

Skill-set Workability (COL3) is referred to the allocation for the new job scope or responsibilities for the healthcare providers with the use of Telehealth in work. According to the informants, Skill-set Workability were mainly achieved through the change management and training, which were carried out through a structured programme regularly during Telehealth implementation. The change management and training were carried out to ensure users' adoption of the system.

*“Because you might have a good system, the system is actually useful, fits the requirements. But people don't use it because they don't know how to use it or they are scared of using it. So, that means you have to make sure that all the time, promotion, change management activities are carried out consistently, regularly.” (K2)*

*“We have to motivate them to (use the system), telling them it is good to have a PCs, what is the advantage of that (using the system), why is it useful doing the daily task (using IT). We have to do the change management to all the staff on the ground (at the healthcare facilities).” (K7)*

The role of change management is emphasised during implementation and organised at each of the healthcare facilities in-situ.

*“Change management cannot be underestimated (during implementation), there’s a lot of change management that needed to be done. In order to ensure Telehealth becomes a part of the way of providing service by the practitioners, there should be a very structured programme for them to ensure adoption by these people at the healthcare facilities.” (K11)*

#### **6.4.1.5 Telehealth system design and work environment influences users’ acceptance**

Interactional Workability (COL1) refers to ensuring that the Telehealth service or technology fits the scope of work of the end-user’s daily tasks. Informants highlighted that, ease-of-use of technology were achieved through designing Telehealth systems that fit the work-processes in hospitals or clinics.

*“What we have done was to make sure that when we define the scope for the IT system we ensure that we get a good representative to give a good feedback the users (on the requirements). So that when the system is developed, it actually fits the requirements of the users. Then the users, the healthcare providers find it easier to accept and adopt.” (K2)*

*"Provide those (users) with easy to use tools - the interface should be friendly, and also in terms of retrieval of information for them to make better (clinical) decision, capability of data retrieval for them to make better decision. The other thing is to make the design the way that fit them (to do their work)" (K11)*

The informants also mentioned that the burden of the existing workload impedes the use of Telehealth at the work place. The high volume of patients in the clinics had caused an increase in work tasks. Some practitioners felt that the use of Telehealth made their daily job slower.

*“From the feedback (of users), we found that the barriers (to use Telehealth) may due to staff constraints. In terms of staffing, if we compare with the staffing and the number of patient visits, sometimes it’s ridiculous.” (K8)*

At times, the hectic routine works at the clinics had affected the system performance, which in turn frustrates the user.

*“They will feel a bit frustrated with the hectic routines at the clinic. In the meantime, when they tried to save the data and failed to save the thing (into the system), they get frustrated.” (K9)*

Infrastructure readiness and network connectivity also affects users’ willingness to use the system.

*“We actually go to the ground and see actually what’s the problem is facing by the users. The problems that they raise consistently is about the infrastructure like electricity, the connectivity and the hardware itself. Most of our Health Clinics are quite old buildings. Those are the constraints that we have to work with, in these areas that we need the system (i.e. at rural areas). Unfortunately, this are also the areas which the infrastructure is not ready.” (K4)*

*“I was involved indirectly because I stayed at the public clinic with TPC facilities and I was also a champion there. In the early stage, there were many barriers. Shortcomings, not barrier. Because it is a new system. There is a power supply (problem). Some places sometimes face unstable power supply. Unstable.” (K8)*

#### **6.4.1.6 The need to finalise the regulatory framework conducive for Telehealth practice in Malaysia**

Issues on gaining trust with Telehealth practice corresponds to Relational Integration (COL2) sub-themes. It mainly revolves about to safeguard the security and confidentiality of information used or stored in Telehealth – about the regulatory and policy issues,

especially on technical capacity and legal provisions, concerning secured and ethical Telehealth practice.

The majority of informants mentioned that technology has been sufficient to address the security concerns of Telehealth. This is because almost all the systems must comply with the security standards before being commissioned by the government. Although there are existing regulatory frameworks, such as the various laws related to cyber security, however, monitoring and individual compliance to the regulations is still lacking.

*“There’s already adequate regulations or legislations - controlling patients’ information confidentiality and privacy of the patients. The issue has always been how we monitor - whether our people actually comply with the regulations and the legislations. A good example would be like this - because everybody now has cell phones, people find it easy to share information merely by texting. Or if their phone has access to webmail, then sending a mail through their phone - it’s not wrong. Provided they take steps to ensure that the information that they are sending across either through SMS or email, is kept confidential. That means nobody else has access to it. The issue is always been that they do not ensure that this information is kept confidential. Their mails are stored in public services for example Google or Yahoo. SMS is not a secure way of sending information. People can snoop on SMS. If you want to send email, patient’ information through email, then you have to encrypt it.” (K2)*

One informant expressed that there is the need to formulate specific regulations to safeguard the security and confidentiality of patients’ health information used in Telehealth systems.

*“Security in terms of infrastructure, hardware, network, and so forth, is we follow the government MAMPU security framework<sup>126</sup>. But I think Ministry of Health, we have also come out with the security policy. But in terms of data confidentiality, we still go back to the Medical Acts where, where your health data is, is confidential. But I think, sooner or later we must have very specific security, privacy, confidentiality issues on health IT. You know, which right now is not there. We just try to marry whatever security policies we have, and we implement it. So, we don’t have very specific.” (K1)*

The sub-themes of Relational Integration are also coded under Contextual Integration sub-theme (as discussed in Section 6.4.1.1 earlier). Previous scholars had also discussed concerning the limitation in the regulations related to the safeguarding of the individual’s right on confidentiality and privacy (Bulgiba, 2004; Mohan & Yaacob, 2004). Moreover, there have been increasing public concerns in terms of the security, privacy and access rights for electronic health data (Sulaiman & Alias, 2006; B. Zaidan, Zaidan, & Kiah, 2011). Existing laws and regulations regarding ownership, confidentiality, privacy and usage of data that govern all policies and procedures of Telehealth programmes is still lacking (M. K. A. Ghani, Bali, Naguib, & Marshall, 2008; Mohan & Yaacob, 2004; Sarabdeen & Ishak, 2008). Thus, there seems to be the limitation for a comprehensive laws and regulation for health data protection as well as restrictions to share health information between the public and private sectors because of the provisions and clauses in the aforementioned laws and regulations, as mentioned in section 6.4.1.1 previously.

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<sup>126</sup> The Malaysian Administrative Modernisation and Management Planning Unit (MAMPU) is under the administration of the Prime Minister’s Department which serves as the central agency in planning and devising e-Government initiatives. At the highest level, there is a powerful Steering Committee called as the Government IT and Internet Committee (GITIC), chaired by the Chief Secretary to the government and MAMPU act as the secretariat. The committee is responsible for providing policy directions, approving e-Government programmes and activities, and monitoring their implementation, including developing the necessary institutional framework and coordination mechanisms related to e-Government initiatives (source: <http://www.mampu.gov.my/web/en/gitic>)



#### **6.4.2 Coherence (COH)**

Coherence, refers to the sense-making of Telehealth. It involves the work carried out individually or collectively towards the shared understanding of Telehealth. Based on the key informant interviews (KIIs), coherence was relevant from the initial phase of Telehealth implementation as well as throughout the process of deployment of Telehealth systems at the healthcare facilities. Two core sub-themes of coherence also emerged from the KIIs.

- (1) The shared beliefs and understanding of the value and benefits of Telehealth that defines the objective for the National Telehealth policy. This sub-theme corresponds to Communal Specification (COH2), Differentiation (COH1) and Internalisation (COH4)
- (2) The knowledge and belief of individual and the specific roles identified by the informants particularly in understanding the new organisational roles and responsibilities within Telehealth. This sub-themes corresponds to Individual Specification (COH3)

##### **6.4.2.1 The shared beliefs and understanding of the value and benefits of Telehealth that defines the objective for the National Telehealth policy.**

In policy terms, the notion of Telehealth as a tool that improves the healthcare service has emerged against the background of the duress encountered by the public health sector and the portrayal of how ICT technology can be harnessed to overcome the existing health system challenges. There was considerable variation between informants especially between the top-managers and the middle managers, in terms of their understanding of the need to change – whether Telehealth is viewed as a tool for largescale health system transformation, or as a another tool to facilitate routine care processes.

The majority of informants who are top-level managers shared the understanding of Telehealth vision as an enabler for large scale health system transformation – offering an innovation from the existing illness-focused care to wellness-focused care, with the ultimate objective to provide a tailored or customised patient-oriented health service. This corresponds with Differentiation (COH1) and Communal Specification (COH2).

K10 described on the role of LHR as one of the Telehealth components, to integrate the healthcare delivery process, as well as the potential tool for patient empowerment. He envisioned that Telehealth became the enabler to support healthcare, personally and population-wise.

*“Telehealth is the use of IT to support healthcare for both the person and also for the population, making use of IT as an enabler - to support health management, as well as patient self-empowerment. In Telehealth concept, we have a thing that would integrate all the health activities - these are the clinical records, and these clinical record that is very important one, what we called the Lifetime Health Record, LHR.” (K10)*

K2 shared a similar point of view. Telehealth would create a more person-focused healthcare, and developed with the intention for a more efficient and effective healthcare service delivery.

*“When we planned for health IT within the Ministry of Health, we planned with the intention of integration, being able to share information. Making sure that using IT is not just for the sake of using IT, but so that we can transform the way in which we deliver (health) services. To become more efficient to, to make sure that the services are actually targeted to the user. And all of this is actually in line with what is stated inside the Telemedicine Blueprint” (K2)*

Meanwhile, K3, talked about the difference between Telehealth and THIS. He felt that Telehealth is a tool that can improve the equity of healthcare service and allows tailored person-focused care. On the other hand, THIS is more of a tool used by healthcare providers to improve the healthcare processes in hospitals.

*"The objective that we want to change, by harnessing ICT, has been giving the specialists services to remote area. Because our main problem was the dis-isolation of the care provider. If we go to the (remote) health clinic, we're being attended by a nurse or the Assistant Medical Officer, not by a medical doctor. So, where is our equitable access to healthcare? Actually, that's what is meant by provider-focus and patient-focus service - we want to be different (in the way we provide the service). What we are doing now (deploying THIS in many hospitals), mainly is provider-focused service. But, what is stated in the Blueprint is patient-focused. So, it's not the same. For example, in the area of Gua Musang or Jeli, that are very remote, they don't want the research officers. If you ask what the public, for sure wanted the (health) service to be available there. But the Ministry of Health can't afford to give that service because there are no people (staff) to be deployed there. So, by using that technology, we can make virtual services."* (K3)

The informants were also mindful that Telehealth implementation comes with the vision of potential benefits for health system effectiveness or improving service quality. However, the realisation of the expected benefits from Telehealth may not be manifested within a short time period or until the system matures. This corresponds with the Internalisation (COH4) sub-theme.

*"Because we think there are benefits from the use of IT in health. Number one, people may not appreciate TPC now, until a few more years. I'd like to revert back (to the previous time), was there (a thought) for the benefit using IT in collecting eHMIS data (then)? Definitely now, we are enjoying it. We are enjoying from the collection of data*

*and we're able to make interpretation and all that. But, we can only appreciate it after we got it solid (implemented fully). So, I think it just a matter of time that the population will benefit, not directly. Until such time, when we (can) make it friendly, (so) that the patient or the population can receive health information at home.” (K5)*

Thus, it is important that the stakeholders bear in mind that the benefits can only be achieved in an incremental manner. In addition, there is the need to be clear on the pathway towards accomplishing Telehealth vision, and the efforts to follow the strategies towards achieving the objectives need to be consistent, as K10 has put it:

*“The Telemedicine Blueprint in Ministry of Health are very systematic to achieve certain objective. So, there's the right planning, right putting (allocation of) resources including money, to do it in an incremental manner. You need to have it, or else it won't work. Telemedicine Blueprint remain just as a concept.” (K10)*

On the other hand, the majority of the middle managers have their own understanding of Telehealth. In their views, the difference in providing the existing service is that Telehealth serves as a complementary tool facilitating the care processes at the healthcare facilities.

*“From my understanding, Telehealth is health network produced or designed to facilitate civil servants in the Ministry of Health Malaysia, to carry out clinical tasks, and health management tasks in virtual or electronic mode. For example, in the clinical area in terms of its system we will change from manual to electronic system.” (K8)*

An informant considered that TPC, apart from creating the paperless environment for recording patient health information, also makes it easier for processing medical records.

*“The main function of this TPC Clinic System is to provide service in terms of electronic data to all public, who are the clients of this clinic. This system will create*

*electronic medical record as a reference for ministry. At the same time, patients will gain benefit from this system whereby their data are recorded electronically that is supposedly to be paperless system. The objective of this paperless system is to reduce the hassle of keeping all the patients' record. It's economical, it can save space.”(K6)*

The Nurse Manager, K9, was aware of the multiple systems integration in place, which she viewed was based on the existing service needs for gathering data for maternal and child health monitoring at the clinic when she was in charge.

*“Take TPC system, for instance, it can be integrated with any system, for example the electronic guarantee letter system (eGL)<sup>127</sup>. And also intervention from other systems like disease control system, SIPs, and so forth. In terms of its implementation, I think it's sufficient. We follow according to need (for the system) is on the Maternal and Child Health. Thus it should exist in the system.” (K9)*

The study demonstrated that, although there were variations in the beliefs and understanding of the perceived benefits to the evidence base for Telehealth implementation, there is a common vision among the key informants of the positive outcomes for Telehealth. Such a phenomenon among the stakeholders would give the advantage in establishing and maintaining the shared Telehealth agendas across the health systems, which, in turn, affects the development and deployment of Telehealth systems in order to accomplish its objective and vision.

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<sup>127</sup> The eGL system allows the civil servant (and next-of-kin) to produce Letter of Guarantee when getting treatment at the public hospitals. The service is part of the e-Government initiative, involving the integration between HIS and HRMIS (the Civil Servants' Human Resource Management Information System).

#### **6.4.2.2 The knowledge and belief of individuals and the specific roles identified by the informants particularly in understanding the new organisational roles and responsibilities within Telehealth**

The key informants also discussed about their new or given roles and responsibilities arising from Telehealth implementation. They mentioned that there were two core activities involving Telehealth implementation: Firstly, regarding the administrative and managerial role during initial phase of implementation; and secondly, management and supervisory roles on the activities involved during the deployment of the systems at the clinics and hospitals. The key informants were involved in Telehealth implementation at the federal, state, and health facility levels.

K12 explained tactfully his role in Telehealth implementation, which the study considered was fundamental in establishing the Telemedicine Blueprint and the strategic road map of Malaysia's Telehealth. He talked about how the Telemedicine Blueprint was produced with the input of various technical and domain experts, from local and abroad, the public and industrial sector, as well as from academia, and was monitored closely by the former Prime Minister:

*“Officially, we got to have the vision and mission of the project - we had a three months consultation in Kuala Lumpur which involved international people. I think, it's something like 23 international companies from all over the world participated, and 17 local companies. I was appointed as the chairman of the steering committee for Telehealth project. I got to report directly to the PM. We had Jai Mohan, and Arif, and one of the professor of computer science from USM. Eventually we agreed for the consultations to come out with that report, which came out as a Telehealth Blueprint. So, in other words, that (the blueprint) took into account the development and the thinking from around the*

*world. We had two other conferences after that - two international conferences where the people around the world came again, to discuss the blueprint.” (K12)*

K10 proudly described his role as the clinical domain expert when he and his unit was given the task to work with the consortium during the Telehealth Pilot Project, and how he had continued to improve himself on Health IT subsequent to leaving the unit:

*“You’re looking at what we called the clinical domain expert. Domain expert are not clinician (i.e. full-time practicing healthcare professionals) but people who knows about IT and also some clinical background. We advise people in development of (health) IT. Because, they know about their clinical domain, they know about the algorithm to make sure the team (clinical process) can become IT. So, I became the Head of the domain expert in the MSC project. And later on where the project was implemented, I became the Head of the Telehealth, from the year 2000 until 2003 - looking at the flagship application, (and components) – Continuing Medical Education, Teleconsultation, Lifetime Health Plan, and Mass Customized Personalized Healthcare Information. Before that, I spend quite a lot of time to develop the Telemedicine Standard, the Telemedicine Blueprint and also the Telemedicine Act. I also contributed to develop the Concept Request for Proposal, CRFP<sup>128</sup> – I was one of the main authors for that. And then, we went on to call the vendors all over the world to come. We developed the contract (agreements), the contracts of this (flagship) applications and we managed the contract. But then, in April 2003, I came here (being transferred) because I was promoted. I continued to become the Telehealth advisor – not for Telehealth office, but for a lot of IT activities here. So, I keep my involvement in Telehealth. I continue my role in Telehealth, so that I can propagate this idea on Telehealth.” (K10)*

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<sup>128</sup> See sub-section 5.3.4, footnotes no.69 and 105.

The informants described their roles and responsibilities throughout the system development life-cycle – from the beginning when establishing the functional and technical requirement, monitoring system development, system deployment, and until ensuring the adoption and sustainability of Telehealth systems.

*“We need to look in terms of what are the specific issues (in care process) that has to be addressed (with the use of Telehealth). When a health facility or one of the health agencies wants to develop IT system to fit a particular requirement, they can come to us for advice – first of all, defining the scope of that IT system, coming up with the technical requirements for that IT system, helping them with the implementation and the development of that IT system. And later on, advising on them on how to continue to maintain, or to further enhance their IT system, to provide the services that they want to do. So, in that case, (we were) acting as subject matter expert or think-tank for the various health agencies.” (K2)*

In addition, K2’s unit were given the task to develop the appropriate policies for Telehealth – one such policy was to enable systems integration, and another is the policy to safeguard patients’ electronic medical record.

*“We have been involved in actually developing policies, probably looking at areas in which no other health agencies are actually playing a role. For example, the integration between health systems. Because most agencies will be looking only at their systems. But when they want to integrate, we actually would be the main player defining how systems needs to integrate - coming up with the technical requirements and the policy that would enable the integration to take place.” (K2)*

On the policy to safeguard patients’ electronic medical record, the work involved the development and monitoring of the security policy at the MoH healthcare facilities – named as the User Access Control Policy (UACP):



*“We were asked (by the top-level MoH official) to look at how the hospital with the HIS systems, (how to) control access to the patients’ electronic medical records. We (have) found that a lot of the mechanisms and the policies that were supposed to control access to patients’ records at the hospitals, were either lacking or vague. We came up with user access control policy that was standardized, that can be applied to all health facilities that have IT systems. Once that policy has been developed, we will then distribute it then and also then follow-up with the specific institutions, conducting audit on their (compliance) to the user access control policy, and advising them on how to further tighten their user access control policy.”<sup>129</sup> (K2)*

K1, who works in the same department and works under K2, explained her roles:

*“So, I’m involved in, in many aspects (of Telehealth implementation). Sometimes I’m involved in the development of the policies or plan; or I’m involved in the implementations of a project; or the planning of the projects. I’ve also had the experience involving in evaluations of e-Health or health IT policy or projects.” (K2)*

She further describes how she developed her skills and knowledge through on-the-job experience and training:

*“Well, when first when I came in of course I didn’t know what health IT was. I was put in (to be in-charge) into a project, straight away manage a project. From there, I develop my interest, my expertise and so forth. So, a lot of my experiences or whatever that I will share with you will be based on hands-on, real practical experiences.” (K2)*

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<sup>129</sup> The Director General of Health Circular No. 13/2011 for the implementation of the User Access Control Policy at MoH facilities is available from MoH’s website: [http://www.moh.gov.my/english.php/database\\_stores/store\\_view\\_page/10/215](http://www.moh.gov.my/english.php/database_stores/store_view_page/10/215). There is an overarching MoH’s ICT Security Policy which was implemented since 2007. Currently on version 4.0, the ICT Security Policy was developed under the Information Management Division.

K3, the Senior IT Officer, explained his role which is related to his technical knowledge and expertise on IT systems:

*“I’m assigned to look at the necessary infrastructure to support the implementation of the (Telehealth) projects that have been planned. So, I’m confined with the infrastructure only. For example, what type of server that is required in implementing a certain project, for example, the MyCPD.” (K3)*

So was K6, who is the IT Officer at the Family Health Development Division:

*“For this division, my role and responsibility is to create a technical support system, the TPC system. This task also includes planning, development, and enhancement. In addition to that, I also look for new technology that can be applied to the TPC system to advance the system from how it works now.” (K6)*

K7, described his role in the development and implementation of TPC in the MoH.

*“I was in Hospital JB at that time - they put me in one of the teams - to have a system requirement studies for TPC project, they called its ‘IT in clinic’ at that time. In 1997/1998, (we) sit down (had a meeting) in KK Putrajaya to do the user needs - the requirements, the process flow of the system. There were two sessions. One month session in KKPJ, another month in one of the hotels in KL. We sit down together and we came out (with) the document known as system requirements study for TPC. But because the financial thing (crisis), so they postponed rewarding the tender for that, they held on until 2003 - and use the same document... and we did everything.” (K7)*

K4, K8 and K9 were also in the same department with K7. K4 was the supervising officer of K8 and K9.

*"I am the desk officer for Teleprimary Care, and I have been involved with this project since 2005. I was involved in the development of this system, I'm in-charge of its implementation, its monitoring and any other future expansion or enhancement" (K4)*

*"My job is to ensure that every user in the clinic understand the functions of clinic information systems, and health information systems through the electronic systems. I have to teach them and making sure that they are using the system correctly. Our training begins with the pre-use, how we introduce the system to them. The purpose of the system, the benefits of the system, the obstacles that they will encounter with the system, the system development in the future, the upcoming facilities, our plan for implementation." (K8)*

*"For the TPC system. Any problems that occur, any variable requirements may change from time to time and make all the changes, my team and I will see into the system, according to the current need...doing system enhancement (if needed). I monitor the entry report (remotely) from the Ministry. Should there be problem on the reports, I will take action by calling the site and enquire why such problem happens. We also do monitoring on an ad-hoc basis. If there's a problem occurring there, we will try to solve it on the spot for users, we always tell them what to do, they will tell us in the reports that we monitor. But in terms of training, Mr. K7 is more qualified. I do my monitoring, I will also do training while I'm on the ground." (K9)*

However, there seemed to have separation of roles between the top-level management officials and the policy-implementers, as clearly stated by K12:

*"... then the tender was awarded. Actually, they (the vendor) came to see me, but in terms of the engagement, between the people involved, the (concept) request for proposal (CRFP document preparation), I was not involved. I mean, I was involved during the consultation for the Blueprint. And some of them (the vendor) actually, made the request*

*for proposal, but I was not involved. It was done by other people, within the ministry at the project level (the unit).” (K12)*

### **6.4.3 Cognitive Participation (COG)**

Cognitive participation concerned the ‘relational work’ that was undertaken to encourage people to engage, buy-in and sustain Telehealth programs. The findings from the KIIs mainly revolves on the strategy used by the policy implementer during the stages of system development and deployment. Two sub-themes found in the data belong to the theme Cognitive Participation:

- (1) The secondment of ‘Champions’ in order to engage users and getting the healthcare professionals ‘buy-in’ to use the system – which corresponds to Initiation (COG1) and Enrolment (COG2);
- (2) Firm official directives from the health administrators to the use of Telehealth systems across MoH settings to ensure sustained use – which corresponds to Legitimation (COG3) and Activation (COG4)

#### **6.4.3.1 The secondment of ‘Champions’ in order to engage users and getting the healthcare professionals ‘buy-in’ to use the system**

The informants highlighted that engaging users throughout the system development life-cycle, from getting the functional system requirement, to deployment of the system at the designated location (clinics or hospitals), improves Telehealth adoption at the healthcare facilities. A key driving force to implement Telehealth was to identify the suitable champion, recognise and harness the healthcare professional’s skills throughout the implementation process as well as facilitating skill sharing and upskilling:

*“In my experience, the most effective way has been early and often engaging the healthcare providers, the clinicians, both in the development work, whether we go with*

*(getting) specifications, or even in the testing of the systems. If you engaged them early and regularly, then, they get a better understanding, of what you're trying to do, and they buy-in to what you're trying to do. Then it gets easier for them to actually adopt the system that you want to implement.” (K2)*

*“What we always do is, we develop a team. For example, we are doing HIS in a hospital – there must a team from the hospital that is involved in this (deployment), the champion must be from there as well. And it must be a clinician. A clinical leadership is a very important in HIS implementation. It cannot be run by an IT. It must be a clinician with some knowledge of, ICT. So, that's how we get them involved and buy-in. These are the champions who will steer the other people. It should be managed by them... this is the way how we get them in.” (K1)*

*“TPC, since its implementation in 2005, has rolled out slowly but, it has roll out to more sites than the first few pilot site. So, each time when we want to go to a new site, we need some champions, they are the change agent, we called them. These are people who are more ICT savvy, ICT friendlier, they feel friendly (comfortable) towards ICT. So, they are the ones who will help push their colleagues to change, from manual system to this electronic system.” (K4)*

However, identifying a suitable champion may not be an easy task, as described by K2 and K1:

*“But it is actually very difficult to, to get somebody to accept the work of a champion, because it's a lot of work. And if you can't find somebody who have the required character to be a good champion, it's also very difficult. For example like in, in one department, you might need somebody who is very authoritative as a champion.” (K2)*

*“Before you select champion, first you must have that team - the core-team. The core-team must (comprised) representative of all areas that's going to get this Telehealth*

*(system). The champion, usually, has some knowledge on health IT and also must be respected and like by the people.” (K1)*

Meanwhile, appointing and maintaining champions among the staff at the health clinics faced a different challenge:

*“In our TPC system, in every clinics, in states, they must have the quality team, quality unit, or what is known as ‘champions’. Champions to look after (the system) there. Usually, the champion in clinics, keep on changing from personnel to personnel, that’s, the problem. What we do in Ministry (at federal level), we organise trainings for the champions, for the state coordinators once a year, at least once a year. And for the new staff, or (new) users coming to the clinic, the state organiser must put them in the list for training to at least in their training, they must go for training in IT lab. For one day or two days depends on what module they’re in.” (K7)*

The champions at the clinics were given the task to train their colleagues, especially those who were new to the system:

*“Before they undergo formal training (training sessions held by project team) session, the new staff in the clinic will undergo in-house training, which would be taught by the champions in the clinic.” (K8)*

Experience from the informants had evidenced the crucial role of ‘champions’ for Telehealth implementation. However, K3 pointed out that the sole reliance on a ‘champion’ to get local user buy-in and awareness should be considered with caution, as there is the risk that these champions are transferred out. Hence, there is the risk of discontinuity of local ‘push’ or motivating factor towards Telehealth practices.

*“From the aspect of awareness, for promotions, the champion is important - they could be the champion in his/her community. The bad thing is that, we’re fully dependent on*

*the champions. These champions are being transferred. So when our champions had transferred, we're done. To be successful, it's not enough if we're fully dependent on the champions."* (K3)

#### **6.4.3.2 Firm directives from the health administrators to the use of Telehealth across MoH settings facilitates adoption and sustained Telehealth use**

When the informants were questioned whether there is any incentives programme being practiced in the MoH to encourage the use of Telehealth, they replied that, at the time the study was conducted, incentives were not mandated for Telehealth use. The key theme which emerged from the data was that, it was the firm directives from the health administrators that facilitated Telehealth adoption and sustained use. Incentives, however, were not completely absent. 'Rewards' have been given to the healthcare providers or their clinics who performed well in Telehealth usage, and the implementers felt that it proved beneficial in Telehealth implementation..

*"When we started TPC we had to use incentive. We just have to because it is (involves) additional work, additional burden. Who wants to burden themselves (with additional responsibilities)? So, either incentive or dis-incentive. At some points, some of the state directors even used dis-incentive, such as: "If you don't want to use TPC in that particular clinic, you can choose to work in another clinic without TPC!" That was a dis-incentive. Now, incentive, we acknowledge them - invite them to come to conferences, we give them presents. So, those are the kind of acknowledgment (rewards). Yes, it works."* (K5)

*"There are actually no incentives for improving the use or uptake of Telehealth services. Instead of incentives, what we have is actually 'dis-incentive'. It actually becomes like mandatory. If we already having that service and that service is now provided through electronic means or electronic system, and users (healthcare providers)*

*are forced to comply. Because, once we had the services implemented in an electronic system, we no longer accept people using, or apply for the service in the manual system. For example, a lot of our reporting from the health facilities is now done online. We no longer accept (the returns) in the (the form of) old days – papers records or disk or CD from the hospital facilities. We all have to do it online.” (K2)*

*“It’s the responsibility of the medical officer who administer and supervise the clinic (to ensure the system is used). The officer (medical officer in-charge) need to inform all the staff involved. We can observe the staff and officers in Salak and Kangar clinics are using this system. The patients are well-managed with the help of this system. The system can be improved with the co-operation between the officers and the staff. Without the cooperation from the top management, the users will still try to achieve the KPI (key performance indicator) target but there is no collaboration between the two groups. Without clear explanation (on the advantages of using TPC), the users will feel that they are ‘forced’ into using the system to achieve the KPI target. They will only achieve the KPI but without receiving the full benefits of this system.” (K6)*

The informants also felt that monetary incentives are not that important to encourage Telehealth use among the MoH personnel. Furthermore, consistent financial allocation for incentives would be out of the question given that there were already problems to finance Telehealth. Instead, it would be better if the funds (for incentive) were used to upgrade the existing ICT equipment, providing a more conducive work environment, as expressed by K4.

*“Monetary incentive would be nice, but I don’t think that will be sustainable and whether that (method) would actually have a great impact. Because you need to sustain those kind of things. But, the government has done some initiative. For example, TPC itself, has won this Anugerah Inovasi Sektor Awam Award, and what was given (as a reward) is monetary incentive. We have shared (the reward money) with the clinics. What*



*they had done with the money is they actually used the money to improve the clinic, buying more ICT equipment which they do not have. So, they have done that, you know? So, what I see is, they do not need monetary incentive for themselves, but incentive, in fact, to improve the infrastructure of their clinics so that they can use the system better.” (K4)*

#### **6.4.4 Reflexive Monitoring (RM)**

The theme Reflexive Monitoring (RM) corresponds with the ‘appraisal work’ by both individuals and the organisations to assess and understand the impact of Telehealth implementation. When Telehealth was introduced across the MoH, assessments were made by the individuals and organisations, either formally or informally, about how well the Telehealth implementation is working, and responded to it. The two sub-themes that emerged from the data which belong to the theme Reflexive Monitoring are as follows:

- (1) The monitoring and evaluation of Telehealth has been mainly on the Telehealth implementation progress, rather than on the Telehealth effectiveness – which corresponds to Communal Appraisal (RM2), Individual Appraisal (RM3) and Systemisation (RM4);
- (2) There was evidence of changes in implementation strategies for Telehealth across the macro-, meso- and micro-levels in the MoH - which corresponds to Reconfiguration (RM1).

##### **6.4.4.1 The monitoring and evaluation of Telehealth has been mainly on the progress of Telehealth implementation, rather than on the Telehealth technology effectiveness**

The sub-themes that emerged from the data was that the ‘Reflexive Monitoring’, which corresponds to Communal Appraisal (RM2), Individual Appraisal (RM3) and Systemisation (RM4) categories altogether, involved mainly with regards to the

Telehealth implementation processes itself across MoH settings. The impact evaluation of Telehealth on the healthcare delivery processes were also being carried out at the various MoH levels. However, these undertakings have been limited, involving only among the implementers and healthcare communities within the Telehealth systems network. The informants also agreed that there were limited monitoring and evaluation on Telehealth, particularly impact evaluation, measuring its effectiveness after the deployment of Telehealth at the healthcare facilities

*“At this point of time, we only monitor in terms of performance, whether the services are being delivered, whether the users can make use of the system, the services – that has been the extent of our monitoring.” (K2)*

*“I think we don’t do much (monitoring and evaluation). Initially (during system development), we’re doing a lot, but slowly we are not, we just let it to go - that is the one that we must improve. I mean monitoring, evaluation, the way to improve it - after we implement the system or application in one facility. That is the part we are poor at. That is the part we are poor at.” (K1)*

*“Teleprimary Care is real public health network. There’s a lot of impact. We have the microbiology network with the Public Health Laboratory. We were able to send the results electronically to the clinics, such as notifications and all that. Sometimes the system able to ‘call’, we notify back (to the sender) everything. It has given us a lot of impact in terms of systematic way of giving (lab) results of the patient. But how much it giving impact back to the (population) healthcare? We have not analysed. Pathology-wise, we have not analysed.” (K10)*

The informants stated that attempts have been made by the MoH for a formal evaluation exercise on Telehealth, such as economic evaluation studies. However, due to the limited capacity for conducting such studies, the outcome of such studies may not be meaningful or generalisable.

*“There have only a few studies of cost effectiveness or cost benefits for some of the, some of the (Telehealth) projects. Basically because it’s very difficult to come up with the proper cost effective or cost benefit analysis of implementing HIS, for example - and we know that we are not implementing a full HIS, we just implementing in parts. The other problems we faced if we want to do a cost benefit or cost effectiveness analysis is that, we don’t have a lot of health economist available in the country to advice on how to undertake a proper study. So, most of the study we have done actually have been very limited in terms of the coverage. And even the studies that had been done, whether the results actually can be applied outside of the projects itself is actually debatable. Because the studies have been actually much focused, very localized on very specific things.” (K2).*

Apart from the limited capacity of undertaking such studies, the informants also emphasised that, unless the users had adopted and used the systems as per required, only then could the meaningful appraisal works for Telehealth the system can be achieved. The informants had observed that when Telehealth is used at the facilities, they could see that the local users were slowly benefitting from systems.

*“When it is widely used in areas where they’re using it, definitely there’s benefit to the patients. The doctors in the clinic able to refer the patient’s note to the specialist in the hospital. So, this has reduced patient having to travel physically to the hospital, and actually made it faster for patient to get that specialist care. The clinician are interested. For example in Johor Baharu, some parts in Sarawak, so they are using it.” (K4)*

*“Because they are using ICT, they can appreciate the data they’re collecting. So, they can analyse (the data from the system) and we have seen our specialists, particularly our Family Medicine Specialist, are using all the various data to improve their services.” (K5)*

According to the informants, it is crucial to make the healthcare providers understand the potential benefits. It was believed that, when the healthcare providers were made to understand the Telehealth benefits, they could appreciate the purpose of its implementation, and it subsequently motivates them to use Telehealth. Otherwise, the users may feel the use of Telehealth is an additional burden in their daily tasks.

*“If only we can prove that the services that we give have been beneficial. The problem is not to the patients, the problem here is to the care provider. If the care provider thinks that what we have done doesn’t benefit them at all, they will not use it.” (K3)*

*“On the other hand, it would be difficult to the users if they feel that the system is a burden. It’s all about acceptance. Thus mind-set is important. We can train the new users if they can’t see the benefits of using the system. (But) to understand the output of this system they will have to record the data (first). Most of the users now are aware that they need to reach the KPI (quality assurance in recording patients’ data), but they don’t really understand the purpose of that data in achieving the KPI. Even if we mention the benefits of the system, they wouldn’t understand because they don’t feel they are part of this thing.” (K6)*

#### **6.4.4.2 Reconfigurations of Telehealth implementation process was evidenced across the macro-, meso- and micro-levels in the MoH**

With regards to the Reconfiguration (RM1) category, the themes that emerged from the data concerned the efforts by either individuals or organisations, to alter their service, work processes or the Telehealth technology, for improved Telehealth implementation. What was gathered from the KIIs data is that reconfiguration had taken place at the macro-, meso- and micro-levels involving matters related to the Telehealth implementation strategies. The policy implementers ‘modified’ the course for Telehealth implementation when the Telehealth Pilot Projects under the MSC Flagship Application

has not progressed as planned (as discussed in Section 6.4.1.1). Implementers had to take the necessary actions in order to accommodate the constraint of the government procurement requirements and the on-going operational needs.

Apart from that, following the stalled Telehealth Pilot Project due to the termination of MOL contractual agreement, it appeared that the alignment of strategies between the primary and secondary care (or clinics and hospitals) with the objective for an integrated Telehealth system as laid out in the Telemedicine Blueprint was poor. Informants perceived that this may be attributed to conflicts of interest among the Medical Development Division, who is the administrative body for government hospitals, and the Family Health Development Division, who is the administrative body for government clinics.

*“In terms of the LHP in particular, we go (implement it) by district. Of course Kinta doesn’t work. I presume, (it was) due to the blunder from the vendor. But for KL, Seremban, Kajang, the whole concept is very clear that there is a hospital (networked) with the surrounding clinics. That connection (between hospital and clinics), it’s more than Teleprimary Care. It allows for the clinic to operate with the system called the Clinical Information System. When it (clinic) want to feed information, importantly consultation, we will feed that (information to the hospital) and support with Teleconsultation to the system itself - the concept of spoke: there is central and periphery, it was already there (the concept) - supported by many things: LIS, HIS, PACs – all is there, where appropriate. To say that they (the government clinics) being left out? No! The concept was there. It’s just, at that time, the wall between the public health and the hospital are two big giants - they want to outshine the other. Clinics want to ‘outshine’, hospital ‘outshine’ (the clinics). So, in doing that, two people going for the same margin and we should move together - we are not moving together - because DG of Health was very keen for it. (K10)*

It was possible that the motivation to develop a separate strategy for Telehealth system implementation for the clinics was emulated from the THIS implementation strategy earlier. As told by K12, rather than expecting the Telehealth Pilot Project to deploy systems at the government clinics, the Family Health Development Division pursued their initiatives to deploy Teleprimary Care systems in their clinics<sup>130</sup>.

*“The first paperless and filmless hospital – that was at Selayang Hospital, and that was not part of Telehealth (Pilot) Project. That was from the MoH initiative. The Telehealth project is part of the MSC project which came much later in 1997. It (The Selayang Hospital) was done separately from the Telehealth (Pilot) project - and the similar way, subsequently, Teleprimary Care was developed separately.”* (K12)

Furthermore, due to the relatively high operational cost for the CIS deployed at Putrajaya Clinic then, the decision was that a more cost-effective option for MoH was to develop a government-owned system. In addition, it appeared that MoH preferred a systems to be custom-built according to the local needs, rather than purchasing off-the shelf system to be rolled-out nationwide. As explained by K4 and K7:

*“That project (at Putrajaya Clinic) did not expand. Because it was not developed by the Ministry of Health – it was developed by a company and it (the system) belongs to that company. So, when ministry wanted to expand to the other clinics, there was IPR<sup>131</sup> issues - the Ministry (of Health) had to pay (additional) license fees for subsequent expansion to other sites. Because of that, Ministry of Health embarked on Teleprimary Care (TPC). It (TPC) was built as an enterprise-wide system, as compared to Putrajaya*

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<sup>130</sup> The Teleprimary care (TPC) system was officially launched on 7<sup>th</sup> March 2005, about one year after the official announcement of the termination of the MOL contract with MoH (see section 6.4.1.2). (Projek TPC khidmat pakar di desa dilancar, (8 March 2005). *Utusan Malaysia*. Retrieved from <http://blis2.bernama.com/>).

<sup>131</sup> IPR- Intellectual Property Rights. In this case, at the time of the study, it was learned that the company which install the system in KK Putrajaya has not yet transferred their source codes copyrights to the Malaysian Government. The practice to obtain source code copyrights for IT systems is in accordance with the government rules for ICT procurement (refer circular no. S/K.KEW/PK/D/1100/000000/10/31JLD.34 SK.1 (18) Surat Pekeliling Perbendaharaan Bil. 3 Tahun 2013 Garis Panduan Mengenai Pengurusan Perolehan Information Telecommunication Technology (ICT) Kerajaan available from <http://www.epu.gov.my/documents/10124/41902176-33bb-4bf8-845f-c77e602b7951>)

*which was built as a standalone system. So, that was the main difference - TPC was really customized to the actual needs for primary healthcare in Malaysia” (K4)*

*“We tried to use the Putrajaya Clinic system to be used in other clinics. But because of the licensing - it’s not owned by the Ministry of Health. That’s why the Ministry decided to have a new system, which is TPC system.” (K7)*

Perhaps the quotes related to Reflexive Monitoring on the overall implementation course for Telehealth in the MoH was best described by K10, who summarized it as follows:

*“In any project that is least successful or not been managed successfully, we look into four things. Number one, how you plan things. Number two is, how you organised the things. Number three is, who you put your leaders and the champion. And number four is that, how you monitor the things. So that things work. So, you’ve put a right monitoring tool. So, to me all four need to be strengthened. For instance, how we organised ourselves in the health sectors. We find that not many doctors who wants to get involved in Telehealth. So, we have the people who plan things (on Telehealth) and all sometimes are not doctors. Because we (the doctors) are the one who knows about what you need. But if it is planned by non-doctors, non-medics, sometimes the planning doesn’t meet the needs of us (as healthcare providers), but meet the needs of somebody else... The planning of IT in hospital among others are to collect money, to get revenues. In there, they try to pick up here and there on how to deploy the clinical information system or some other form (of system), but for the purpose of billing and collecting. So, because it has to be developed by doctors (as domain expert), they said the clinical interaction application is very important, the billing is secondary. And the planning part sometimes it is not to achieve certain clinical goals, but to achieve some other goals. Although we had the Blueprint (to guide the planning), but the point to achieve may not in terms of patient empowerment, seamless care, equity of care - it could be something else.*

*The other thing is in terms of the (health service delivery) organisation. This organisation sometimes is being organised but it's just a 'spill-over effect'. When they wanted to improve healthcare service, for example the (national) pathology services, they just 'patch' the IT components on the service, instead of incorporating IT where IT is part and parcel of the whole thing. Just for the sake of having IT systems, and not considering IT as the 'one' thing. To make it successful, IT component is mandatory, and therefore you must put it there: LIS must be there, in all state hospital and major hospital. It didn't happened that way.*

*"The third thing, the leaders on leading functions. We do not have many IT person who are going to champion all that. Last time, Tan Sri (Dr) Abu Bakar, our (former) DG, the champion to all of these. But then, after some time, some people got some other priority, we lose. So, the leading and the championing of Telehealth, we need some champion. And they are not many. Of course the monitoring tools of (Telehealth) success, we do not have it - you have to monitor things - the monitoring tools has not been there. We know things were not doing so well - the monitoring tools are not there for the Telehealth." (K10)*

Table 6.2 provides a summary of the overall results, organised according to the constructs of the NPT (see table 6.1 for explanation and Figure 6.1).



**Table 6.2: Normalisation process theory coding frame for promoting and inhibiting factors of Telehealth implementation.**

NPT construct	NPT sub-construct	Descriptive Themes	Promoting factors	Hindering factors
Collective Action	Contextual Integration	<ul style="list-style-type: none"> <li>• Leadership quality</li> <li>• Policy supporting Telehealth implementation or operation</li> </ul>	<p>Tech-savvy top-level management officials and observed to plan strategically and allocate appropriate resources for Telehealth.</p> <p>There exist several policies to support Telehealth implementation such as the Telemedicine Blueprint and ISSP.</p>	<p>Top-level management officials did not recognize Telehealth as part of the mainstream activities in MoH.</p> <ul style="list-style-type: none"> <li>• Insufficient regulatory framework and tedious process to promulgate supportive laws for Telehealth practice.</li> <li>• Policy was not followed up effectively with the appropriate implementation and resource allocation.</li> </ul>

**Table 6.2, continued**

NPT construct	NPT sub-construct	• Descriptive Themes	Promoting factors	Hindering factors
		<ul style="list-style-type: none"> <li>Contract and project management</li> <li>Standards for data and interoperability</li> </ul>	<p>MoH collaboration with expertise from other agencies and private sector who was perceived to be more innovative had contributed to Telehealth development in MoH.</p> <p>There exist standard data definitions such as NHDD and Pharmacy Code and interoperability standards from Telehealth Policy documents.</p>	<p>Inappropriate business model had caused financial disadvantage to vendor which eventually affect the sustainability of Telehealth implementation.</p> <p>Lack of policy for an integrated healthcare service model and data standard for interoperability across MoH.</p>
	Skill-set workability	<ul style="list-style-type: none"> <li>Change management and training</li> </ul>	Change management and user training was carried out regularly at the healthcare facilities.	-
	Interactional workability	<ul style="list-style-type: none"> <li>Technology fit &amp; ease of use</li> </ul>	The Telehealth system was designed involving the users to ensure it fits the user's needs.	Users in hospitals and clinics felt that there is increased workload and time consuming to use Telehealth due to the high volume of patients and staff constraints.

**Table 6.2, continued**

NPT construct	NPT sub-construct	• Descriptive Themes	Promoting factors	Hindering factors
	Relational Integration	• Confidence and trust in Telehealth	Robust security standards (i.e. for infrastructure, hardware, network) and cybersecurity regulations in place.	Lack of regulatory framework to safeguard the security, confidentiality, ownership and access rights for electronic health data.
Coherence	Communal Specification	• National vision/policies on Telehealth aims/objectives	Top-level managers viewed Telehealth as a healthcare innovation from illness-focused care to wellness & person focused care. Meanwhile the middle managers perceived Telehealth as a complementary tool facilitating the existing care process at the hospitals and clinics.	It took a long time to see Telehealth benefits realization.

**Table 6.2, continued**

NPT construct	NPT sub-construct	• Descriptive Themes	Promoting factors	Hindering factors
	Differentiation	• Differentiation	Top-level management officials, the middle managers and implementers had a clear understanding of the needed tasks and responsibilities to implement Telehealth	Hierarchical nature of officials' relations resulted in separation of roles.
Cognitive Participation	Initiation	• 'Champions'	Engaging 'champions' right from the beginning improves users buy-in and facilitates Telehealth adoption.	Identifying the right 'champions' for each location and risk of discontinuity of 'pushing factor' when the 'champions' are transferred out.
	Activation	• Actions to sustain Telehealth	Top-level management supported and had given firm directives to staff to use Telehealth.	Staff perceived that they are 'forced' to use the system and only for the purpose of fulfilling the departments' KPI.

**Table 6.2, continued**

NPT construct	NPT sub-construct	• Descriptive Themes	Promoting factors	Hindering factors
Reflexive monitoring	Communal appraisal	• Monitoring & evaluation	Implementers monitor the delivery of Telehealth system and its performance.	Limited capacity to undertake studies to evaluate/measure Telehealth effectiveness.
	Reconfiguration	• Alteration of service	The programme heads altered Telehealth implementation strategies when things had not worked out as expected.	Conflict of interest among programme heads especially from non-medical high-level management officials.

## **6.5 Summary of Telehealth implementation**

This chapter shed the light on the complexity of the Telehealth implementation and its influencing factors. The findings of KIIs were mapped onto the NPT constructs and sub-constructs which were categorised into four major headings and twelve sub-themes. The emerging themes were organised according to the NPT constructs in order to answer the research questions, revealing the Key-informants' perceptions vis-à-vis their experiences of the Telehealth implementation across MoH settings. The views from the Key informants who consist of policy makers and implementers, as well as key-informants who played dual roles as implementer as well as the end-users mainly displays the complexity of Telehealth implementation primarily at the meso-level. Qualitative data comprised extensive samples of quotations from the key-informants were included. The data highlighted the extent of cognitive and behavioural work that clinicians, implementers, and policy-makers had to perform, either individually or collectively, in the efforts to embed Telehealth practices. By using the key-informants' own words, the study attempted to accurately represent the realities of the persons, situations and contexts related to Telehealth implementation in Malaysia. The interview analysis were then corroborated with document review findings. The findings for Telehealth implementation phase can be summarised into five major findings as the following.

The primary finding of this study has suggested that throughout the Telehealth implementation, Collective Action – the enaction work carried out collectively for Telehealth implementation – was the most important key mechanisms influencing Telehealth implementation. This finding emanated from the expressed descriptions from all of the key-informants as they discussed their implementation experiences. The informants had also discussed their perceptions on how to successfully deploy Telehealth systems across MoH settings. What kept emerging among all the informants was the importance of Telehealth implementation to fit with the overall organisational

context – the need for Telehealth to be aligned with MoH goals as part of the mainstream healthcare service so that a reasonable resource allocation is made to mobilise Telehealth deployment. Although there were differences in the understanding of Telehealth vision among the top-level management officers and the middle managers, it is imperative that the top-level management officials to show commitment towards Telehealth implementation. Informants felt that it was the strong push and commitment shown by the top-level management officials that had initiated and steered the Telehealth Pilot Projects when it started in 1995 as part of the federal MSC programme.

The second finding was regarding the organisational management of Telehealth strategies in the MoH. In discussing how they felt Telehealth implementation efforts since the past years, several informants talked about the lack of concerted efforts to streamlining the disparate Telehealth components and systems, which seemed to belong to the various divisions in the MoH, especially after the termination of Telehealth Pilot Projects contracts in 2003. Although most informants appreciated the public-private partnership (PPP) initiative as a positive move for instilling innovativeness in the public health sector, they expressed that somehow the unanticipated adversities faced by the vendors; such as technical difficulties, or government bureaucracies surrounding PPP procurement practices, had given an unequal advantage among the private vendors. Some vendors had successfully delivered and some did not. Consequently, the government was unable to fulfil the payment obligation for some of the vendors, resulting in non-performance and further delay in overall Telehealth implementation programme. Apart from the vendors' financial position, getting the right technical expertise and the close collaboration between the system development team members to fulfil MoH's requirements had proved to be successful. Conducive policies such as establishing standards for healthcare related data definitions and interoperability has been consistently being carried out in the MoH throughout the years. However, informants felt that more

efforts is needed to strengthen policies and regulatory framework on the security and the control of information flow related to Telehealth practices.

The third finding was that when Telehealth is being implemented at the local settings, either in the clinics or hospitals, majority of the informants recognized that users' participation had a positive influence in Telehealth implementation process. This corresponds with the Coherence and Cognitive Participation constructs. The policy-makers and policy implementers understands the Telehealth vision and what is the required job scope, and what they need to do about it. They were prepared to undertake their roles and responsibilities either as consultants, technical or domain experts in ensuring smooth implementation. At the local level, 'champions' were identified among the healthcare personnel by the implementers to facilitate the process of Telehealth embeddedness at the clinics and hospitals. Facilities which shown to have successfully implement Telehealth systems were usually led by directors or HODs who had positive outlook on Telehealth. In addition, involving users as part of the project team had also been helpful. Informants also mentioned that consistent change management activities and training were crucial to ensure Telehealth adoption. The change management activities were not only to provide the knowledge and skills to use the system, but to ensure the users understand and internalize the purpose of Telehealth system – for the benefit of providing a quality healthcare service. However, effective Telehealth adoption has not been realised due to various challenges such as the slow network, inadequate ICT equipment and the users' perception of additional work burden.

The fourth and fifth finding corresponds to the Reflexive Monitoring construct. Findings related to this construct revolves on two aspects, one is on the reflections of the policy implementers on the reconfiguration in the changing course of Telehealth implementation strategies in the MoH, and two on evaluating the performance or impact of Telehealth technology on the healthcare service. For the fourth finding, informants felt



that the shift of Telehealth strategies occurred when it was evident that the vendor for Telehealth Pilot Project had failed to deliver LHP, which includes to deploy EMR in hospitals and clinics. The divisions responsible for clinics and hospitals embarked to develop EMR on their own, and perhaps had overlooked the requirement for an integrated system between the primary and secondary care. During the period of Telehealth Pilot project, implementation was under the purview of the Telehealth Unit which was under direct supervision of the then Director General of Health. But after the termination in 2003, Telehealth Unit were moved under the Medical Development Division – the division responsible for hospitals. In addition, with the limited budget and the existing bureaucracies surrounding ICT procurement practices has left the implementer with a limited choice to implement Telehealth in an effective way.

The fifth finding is about appraising the Telehealth systems itself. Informants had noted since Telehealth started, evaluation has been more of monitoring the project progress and system performance, rather than to measure its impact or outcome on healthcare service. Many of the informants viewed that this was due to the limited capacity to conduct such studies in the MoH. Nevertheless, there have been informal evaluations conducted at the local levels, such as at the hospitals and clinics. The findings of the study were shared among limited audiences in organisational meetings. National-level conferences had also been organised bi-annually to gather all TPC users as a platform for discussion forums.

The above findings from the interviews were corroborated with document reviews whenever available. The use of NPT had provided guidance to identify and synthesise findings from interview data on what are the factors that influenced Telehealth implementation in Malaysia. The views from the Key informants who consist of policy makers and implementers mainly displays the complexity of Telehealth implementation

which was focused at the meso-level and influenced by the various elements in organisational, social, technical aspects.

University of Malaya

## **CHAPTER 7 : DISCUSSION AND CONCLUSION**

### **7.1 Introduction**

The Government of Malaysia introduced the Telehealth initiative in 1997, recognizing Telehealth as the technology enabler to achieve the eight goals of the health system as the country move towards a developed country status by the year 2020. It wishes to create a national integrated Telehealth network, allowing nationwide access to personalized electronic health records (i.e. the LHP) as a means to deal with the anticipated escalating costs of providing care to an ageing population with concurrent epidemiological transition, as well as delivering new models of personal empowerment for health. Despite the 23 years' plan of actions as stated in the Telemedicine Blueprint with substantial Government investment, only a small number of MoH hospitals and clinics that have potential to contribute the collection and generating information for LHP. After more than 15 years, ICT adoption in the Malaysian healthcare sector has been slow and Telehealth in Malaysia remains underdeveloped.

This study aimed to describe the policy processes of the Malaysia's Telehealth initiative, and the study has also revealed the acknowledge gap between the goals of the Telehealth Policy and its actual implementation. The choice of Telehealth as the focus of study was because of the continuing magnitude of problems of Telehealth programme in Malaysia and elsewhere, which demanded an ongoing quest to understand the challenges surrounding ICT implementation to support healthcare delivery.

This concluding chapter begins with Section 7.2 which will briefly review the analytical framework and methodology used in this study. Section 7.3 will present a summary and discussion of the study's main results including the historical narrative of the Telehealth policy in Malaysia woven with the study's analytical framework in. This includes the summarised synthesis on the influential determinants of Malaysia's

Telehealth policy formulation and implementation. Section 7.4 presents the lessons-learned drawn from this study. The policy implications of these findings on local and international health developments will be presented in Section 7.5. The remaining sections of this chapter discuss limitations of this study and possibilities for further research.

## **7.2 Understanding the complexity of Telehealth policy**

Despite the increasing number of studies over the last decades that had identified weaknesses in Telehealth implementations and suggested recommendations, problems persisted. While there are some successful implementation of Telehealth solutions either on a small-scale or at localised levels, challenges remains on a larger scale and at national implementations (Adamson, 2016; Greenhalgh & Keen, 2013; Z. Morrison et al., 2011; Sheikh et al., 2014). Recent empirical studies on scalable Telehealth implementations have identified that digital health interventions are complex with many intervening factors (Agbakoba et al., 2016; Andreassen, Kjekshus, & Tjora, 2015; Catwell & Sheikh, 2009; Devlin et al., 2015; Geissbuhler, 2013; Greenhalgh, Procter, Wherton, Sugarhood, & Shaw, 2012; J. Harvey, 2016; Carl May et al., 2007). In addition, Telehealth research has a strong tradition of being cross-disciplinary, concerning the way how healthcare service is delivered – which involved the healthcare system and its service delivery institutions, the relationship between people and technology, as well as the widespread use of public-private partnerships in this endeavours (Greenhalgh & Russell, 2010; Hosman, Fife, & Armey, 2008; Sheikh et al., 2014; Takian, Petrakaki, et al., 2012; Wade, Gray, & Carati, 2016). Thus, evaluation of a large-scale Telehealth, such as undertaken here, involved multi-disciplinary assessments that address technology, human and organisation issues from the area of political science, health policy and services research and information system management.

By and large, the technical method or directives for a national Telehealth programme is at the national level – that is through its policies and their processes. While progress has been achieved in the development of new policy content related to Telehealth programme (as highlighted in sub-section 3.4.2), there is limited evidence with regards strategies to improve the policy processes and implementation for Telehealth. The focus of this study on the policy processes was to further understand the influential determinants which interplay in the policy process, so as to inform and assist policy actors in engaging with these processes.

The study has identified that the implementation gap was due challenges encountered by the implementers involving the government ICT outsourcing practice which resulted in the slow Telehealth adoption rates in the MoH as reported in this thesis (Figure 3.16). As highlighted in sub-section 3.4.3, in 2013 there were only 35 of 141 hospitals (24.8%) and 89 of 1039 primary clinics (8.6%) in the MoH that had EMR. Foremost amongst these was the failed implementation the three Telehealth components (LHP, MCPHIE and CME) as the Government terminated the centrally-procured contract in 2004. The Telehealth Pilot Project which cost the Government an amount of RM7 Million<sup>132</sup> was a part of federal government's MSC programme, the Government's interests to develop knowledge-based economy in a mission to be a developed country.

There is, however, gains made by the Government with regards to Telehealth. Following the completion of Telehealth-MSC, there is increasing number of EMR deployed at public hospitals and primary clinics – the former equipped with THIS and the latter with TPC. There was also evidence that apart from the clinical systems, administrative-oriented and epidemiologically-oriented health information systems were being developed. However, the heterogeneity of the players involved due to the outsourcing practices have given rise to a disparate non-interoperable Telehealth systems

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<sup>132</sup> The total amount paid by the Government to the appointed concessionaires for LHP, CME and MCPHIE as reported in Business Times, 22<sup>nd</sup> May, 2004. ("Ministry ends telehealth agreement with MOL," 2004). Retrieved from <http://search.proquest.com/>

across MoH. There were evidences from this study about conflict of interest among the top-level management officials of different departments which undermines the best efforts for an integrated health information system across MoH. Hence, to this date, the nationwide electronic sharing of patient-level information between healthcare providers has not been materialised, and these Telehealth systems remains fragmented.

The complexity related to the Telehealth technology and its management is further overlaid by the technical infrastructure and operational difficulties faced by MoH against a background of problems as “there is little ICT funding continuity across the Malaysia Plans” (Safurah et al., 2013). In addition, there is considerable degree of data inconsistency and limited data quality collected by the various health agencies, giving rise to problems for timely and meaningful information required for national and international use (Aljunid et al., 2012; Ministry of Health, Malaysia, 2013). Nevertheless, progress related to efforts to strengthen the country’s Health Information Management Systems are also recognised and reported in this thesis. These include research studies and institutional activities evolving the concept and content of Telehealth, such as recommendations and guidelines for essential technical and infrastructure readiness, gazettelement of health-related data standards, and some legal and policy issues on Telehealth<sup>133</sup>. With the low rates of Telehealth adoption in the MoH hospitals and clinics and unresolved issues of nationwide health information system integration, little is known whether the desirable policy targets would be achievable, which suggests that the problem is indeed complex.

As mentioned earlier, the persistent obstacles to implementing Telehealth and to realise the targeted changes to support healthcare delivery requires the understanding of the challenges surrounding its implementation. Therefore, this study hypothesised that

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<sup>133</sup> Referring to the various data dictionaries, data definitions, guidelines and policies, as presented in Chapter 3.

these problems and gaps may not be explained only by quantifying the technology and management deficits in terms of measuring its efficiency or effectiveness, but that political, technical and social issues, had played an important role. This, if established, would have broader policy implications. Therefore, a policy analysis approach was adopted. Using the study's analytical framework derived from Kingdon's Multiple Streams Theory (MST) (Kingdon, 1984) and the Normalisation Process Theory (NPT) (C. R. May et al., 2009; Carl May & Finch, 2009), the study focused analytically the two stages of the policy processes – policy formulation and implementation.

The Multiple Streams Theory (MST) approach was used focusing the policy formulation stage to analyse the agenda-setting that led to the introduction of Telehealth Policy. The insights to policy change is explained according to the MST concepts including its components and subcomponents – regarding the nature of the problem, its policy content and politics, particularly policy actors, context and the window of opportunity. On the other hand, the Normalisation Process Theory (NPT) was used to explain Telehealth implementation, embedding and integration by reference to the role of the four NPT constructs – coherence, cognitive participation, collective action and reflexive monitoring. Insights regarding the social organisation of Telehealth implementation to make it as a routine element for healthcare practices is explained, revealing the presence or absence of factors recognised of importance for Telehealth to become an integrated, routine part of healthcare service for the policy makers and policy implementers.

Though health policy is a highly researched area, this study proposed applying a novel framework to analyse Telehealth policy. A specific contribution of the study is that it incorporated a participatory top-down and bottom-up approach, capturing the views and knowledge generated from the hands of implementers, particularly the Telehealth Project team members, as well as from the policy makers who involved directly in the projects.

Thus, this study adopted an integrative approach looking at the interaction throughout all levels of the policy process – the macro-, meso- and micro-level; at the national level policy including international influences, as well as what actually happens at the health facilities level i.e. the clinics and hospitals. It thus differs from much policy analyses that tend to concentrate at national or macro level and are implicitly top-down. Because this study seeks a better understanding of Telehealth policy processes, information was gathered within the institutions where the national health services authority's strategic planning processes took place, as well as the relevant departments where the ensuing Telehealth implementation of such priority-settings were carried out. A sample of key-informants was drawn from top-level organisational and institutional leadership in the Ministry of Health, the authority which was mandated to implement Telehealth in Malaysia. Triangulation was used in this study, where the information is obtained from different individuals; policy-makers and implementers, and corroborated with evidence from the documents review. Although it can be seen that most of the Key informants held management positions, many of them has had experiences as Telehealth end users as well, that enabled the study to gain the views of knowledgeable and experienced persons on Telehealth policy process issues.

Besides adopting policy analysis frameworks, it was necessary to use the analytic framework together with the concepts of policies and technology aspects of Health IT/Telehealth as backdrop. The study, therefore, had a literature review of these aspects (presented in Chapter 2, and 3), and then explored how these were translated into Telehealth policy and practice.

### **7.3 Summary of main findings**

The synthesis of policy processes is presented according to the study's methodologies for an improved understanding of Malaysia's Telehealth initiative. The policy formulation stage is presented according to the concepts of the MST namely, the nature of the



problem, policy content, and politics (including context, policy actors and policy window). Meanwhile, the NPT is applied to explain the stage of Telehealth implementation based on the constructs of coherence, collective action, cognitive participation and reflexive monitoring. A policy approach is necessarily broad in scope and needs to consider several aspects influencing mass interventions. Some insights concerning the aspect of Telehealth technology which relevant to the study but not primarily studied here are based on the literature. Having concluded this study, the study will modify the descriptors for each characteristic based on what the study has uncovered about Telehealth policy formulation and implementation, which the study may not aware of when the research began. The following section starts off with the policy formulation stage.

### **7.3.1 The ambition for National Telehealth: the role of policy entrepreneur**

The study findings echo many of the factors associated with regards to evaluation of large-scale Telehealth implementation found in literature (Andreassen et al., 2015; Emmanouilidou & Burke, 2013; Greenhalgh et al., 2010, 2013; Heeks, 2006; Heimly, Grimsmo, Henningsen, & Faxvaag, 2010; Kaplan & Harris-Salamone, 2009; Murray et al., 2011; Rozenblum et al., 2011; Sheikh et al., 2011; Vitacca, Scalvini, & Mazzù, 2009), but provide unique insights into the attempts of a middle-income country to implement Telehealth. Another interesting point about this study is the uncovering about the influence of political leaders who were driven by the federal government's interest to foster k-economy for the country's socio-economic development and proposed to incorporate ICT innovation for healthcare service delivery as one of its activity. The results therefore build on the existing literature by illustrating that the centralized management model lead by officials with differences of underlying philosophical assumptions, values, and perspective on technology can undermine the best efforts for a

successful and sustainable Telehealth programme to become part of the mainstream activity of a national health system.

As shown in this thesis, the Malaysia's Telehealth initiative is the manifestation of political intention involving a course of action that is shaped by political acts, events and interactions among its actors resulting in a product in the form of the government policy directives and/or documentations. The thesis has shown that, even before the release of the Telemedicine Blueprint, policies related to ICT in health had been incorporated in the Health Chapter of the 5-Yearly Malaysia Development Plans since the Fifth Malaysia Plan (1985 – 1990). The study had also revealed that, up till the Sixth Malaysia Plan (1991 – 1995), the policy priority in the MoH was the use of ICT to strengthen the administrative-based national health information system. This has arisen from the problems with the fact that there was no centralized integrated system for health data collection to allow for timely and meaningful information for health planning and management. Despite the establishment of the Information Documentation System Unit (IDS) and the Health Management Information System (HMIS) in 1981, which modelled from the World Health Organisation recommendations<sup>134</sup>, problem remains as data collection were still fragmented and timely analysis was limited (Ministry of Health, Malaysia, 2013; Selvaraju, 2006).

In 1996, the top MoH management officials introduced the Information System Strategic Plan (ISSP) which set out to create a centralized health information system, building a network between the major hospitals, district and state health departments, and with the health divisions at the MoH headquarters. However, interview data had revealed that there were problems in terms of financing such activities as there was disparity in infrastructure readiness and competing demands in health funding. It was also during the

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<sup>134</sup> In 1975, the Malaysian Government collaborated with the World Health Organisation and proposed recommendations to improve the existing National Health Management Information System (Selvaraju, 2006).

Seventh Malaysia Plan (1996 – 2000) when the federal government introduced the Multimedia Super Corridor programme (MSC) agenda.

As highlighted in sub-section 3.2.2, Telehealth was among the seven MSC Flagship Applications. The policy was mandated as part of the MSC agenda – a broader national policy to create the high-technology k-based economy to catalyse Malaysia's 'leap' to a developed nation status by the year 2020. It was the political processes that strongly influenced the formulation of Telehealth policy. Interview data and documents review has revealed that during the early phase of the policy formulation, the federal government supported the Telehealth initiative, with the then Prime Minister, Tun Mahathir Mohamad and the Director General of Health, Tan Sri Abu Bakar Suleiman both taking active interests in it<sup>135</sup>. When the federal government introduced the MSC, it was in a context of policy opportunities with regard to the national health information strengthening using ICT. It was the policy entrepreneurs whom build legitimacy and seize action to exploit the 'window of opportunity' leading to the imminent solution for the existing problems of the national health information system.

The coupling the three streams in the policy process: (1) policy stream – the MoH policy of on ICT for health information strengthening and federal government policy for a modern high technology public service management; (2) problem stream – the disparity in healthcare ICT infrastructure and the critical need to improve the national Health Information Management System and quality of healthcare service; and (3) politics stream – the political pressure by the Prime Minister as the champion for the federal MSC agenda and the top-level management officials who were responsible exercising authority to enforce new initiative across MoH, opens the 'window of opportunity' as the idea was taken up by those with the power within the MoH and the federal government to influence ministerial decision to establish legitimacy. Once the legitimacy to act was established,

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<sup>135</sup> As reported in the Business Times, 17<sup>th</sup> January 1997, "PM confident of MMA nod for Telemedicine and Bernama, 16<sup>th</sup> January 1997, "PM says Malaysia aims to be regional centre for Telemedicine. (Hashim, 1997; Kamil, 1997)

the idea of what to do was sold in a simplified, branded, version to the public, widely known as Telehealth-MSC initiative. The coupling of the three different streams and the policy entrepreneurs who seized the ‘window of opportunity’ during the ministerial meetings were instrumental for the agenda-setting and secured the funding required for Telehealth implementation as documented in the Seventh and Eight Malaysia Plan (1996-2000 and 2001-2005) respectively.

However, the introduction of the Telemedicine Blueprint featured a policy shift – rather to further enhance the administrative-oriented ICT infrastructure and networks across the health sector, the Telemedicine Blueprint focused on a whole-system reform transforming the way healthcare is delivered and consumed. It was the national enthusiasm with the global emergence of the internet and the World Wide Web during the early 1990s that had led the Malaysian Government (as well as other countries) to begin developing web-based public-related information and services in order to align governments with societal and economic systems and expectations. Thus, Telehealth was viewed to hold the key role as a technology enabler for the new healthcare model – from the paternalistic, disease-focused healthcare, to personal empowerment and wellness-focused care driven by the anticipated demographic and epidemiological transition that posed challenges to the Malaysian healthcare system. It was distinctly mentioned in the Telemedicine Blueprint, that the role of Telehealth is “as the key technology enabler to support the new healthcare paradigm and the realities of operating in the Information Age”, featuring a reformed healthcare service delivery for an informed and ICT-enabled person-centred care model, (Bulgiba, 2004; Harum, 2004b; Ministry of Health, Malaysia, 1997; Suleiman, 2001).

The study had also revealed that, unlike the usual practice for policy formulation which involved exclusively within the government agencies, the Telemedicine Blueprint was produced with the participation of health IT subject matter experts (SMEs) from local and

international companies (see interview data in sub-sections 5.3.1.3 and 5.3.2.3). Although the original intention was to gather and converge international ideas to harness the ICT potentials for a new modern high-tech healthcare solution, with the involvement of such external SMEs, one cannot deny there was a possibility that some elements of business and profit-making were dictated in the policy<sup>136</sup>. The fact that the ensuing policy content of the Telemedicine Blueprint which comprised Concept Request for Proposals of the four Telehealth components further indicates the strong Government intention to outsource Telehealth to the industrial players<sup>137</sup>. Furthermore, the Telehealth-MSc mobilisation strategy were also in accordance to the broader government's economic policy that promotes public-private partnerships (Bunnell & Coe, 2005; Huff, 2002). Hence, the Government offered lucrative procurement contracts which claimed to promote investment opportunities and support the country's economic growth (Greg Felker & Sundaram, 1999). A total of RM400 million was allocated for Telehealth in the Eighth Malaysia Plan (2001 – 2005)<sup>138</sup> and the Government appointed two local consortia in 2000 to complete the Pilot projects within a 30-month period with contracts valued at RM100 million (*New Straits Times*, 20 January 2000<sup>139</sup>; *Bernama*, 20 January 2000<sup>140</sup>; 23 March 2001<sup>141</sup>). The finalised contract agreement had garnered worldwide attention, where the national and global society eagerly awaits for the birth of the

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<sup>136</sup> In *Business Times*, 31 May 1997, the Health Minister announced in a press statement that there were 17 local and international companies involved in preparation for the Telemedicine Blueprint (1997). Also see sub-section 5.3.2.

<sup>137</sup> The four CRFPs were produced by the Multimedia Development Corporation, a government-linked company endorsed by the Government to overseeing the development of the Multimedia Super Corridor (*Business Times*, 20 December 1997) (W. Lim, 1997).

<sup>138</sup> The original allocation for Telehealth in the Eight Malaysia Plan (2001 – 2005) was RM400 million, before it was revised to RM119.7 million during the mid-term review (Economic Planning Unit (EPU) Prime Minister's Department, 2001, 2003) following the global economic downturn.

<sup>139</sup> Ghani, R.A. Contract to develop Telehealth components (20 January 2000). *New Straits Times*. Retrieved from <http://blis2.bernama.com>

<sup>140</sup> RM100 million to develop the Telemedicine Application (20 January 2000). *Bernama*. Retrieved from <http://blis2.bernama.com/>

<sup>141</sup> Medical Online Secures RM45 Million for its Telehealth Project (23 March 2001). *Bernama*. Retrieved from <http://blis2.bernama.com>

‘healthcare system of the future’ (*Bernama*, 6 September 2001<sup>142</sup>; *The Edge*, 7 May 2001<sup>143</sup>; *The Sun*, 24 March 2001<sup>144</sup>; Norris, 2001).

### 7.3.2 Telehealth implementation: approaches and challenges

At this point, it was understood that the Telehealth policy priority had shifted from the emphasis to improve MoH’s administrative-oriented ICT strategy to a whole-system transformation into an ICT-oriented healthcare service. The study had also revealed that prior to the Telehealth-MSC project, there were a number of health IT related interventions developed and managed by the various MoH divisions and programmes, giving rise to the fragmented and patchy Telehealth coverage across MoH. The Telemedicine Blueprint offered a potential feasible solution to streamline the various health IT initiatives across MoH, and the Government was prepared to invest into it. Political influence mandates that the Telehealth-MSC is implemented through the public-private partnerships, and the national Telehealth is to be developed through a centrally-procured systems.

In recent years, there is a great deal of evidence to support that developing a digital, person-centred healthcare services requires substantial investments to ensure technology and infrastructure readiness to support such services (K. Cresswell & Sheikh, 2009; Devlin et al., 2015; Frisse et al., 2008; Kern & Kaushal, 2007; McCarthy et al., 2014; Tang, Ash, Bates, Overhage, & Sands, 2006; Vest & Gamm, 2010). It also involves organisational readiness which requires changes in the culture and behaviour of individuals and organisations, from both the perspectives of service providers as well as ‘consumers’ to make people to start thinking of themselves as proactive stakeholders for

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<sup>142</sup> Health Info transmission key to telehealth project success, says Law (6 September, 2001). *Bernama*. Retrieved from <http://blis2.bernama.com>

<sup>143</sup> Get Ready for e-health (7 May 2001). *The Edge*. Retrieved from <http://www.mps.org.my/newsmaster.cfm?&menuid=36&action=view&retrieveid=33>

<sup>144</sup> Sharon Tan. Telehealth project to get gov hospitals online (24 March 2001). *The Sun*. Retrieved from <http://blis2.bernama.com>

their own health and well-being, as opposed to passive recipients of healthcare (i.e. as patients) (Chumbler, Haggstrom, & Saleem, 2011; Coulter et al., 2015; J. Glaser, Henley, Downing, & Brinner, 2008; Greenhalgh et al., 2010; Nguyen, Bartlett, Rodriguez, & Tellier, 2016; Tang et al., 2006). Thus, the study has demonstrated that it is a complex policy process, affecting many stakeholders and a variety of different players' interests which demand significant efforts to achieve the necessary implementation actions in order to accomplish the targeted objectives.

The discussion continues on the Telehealth implementation stage focusing about the 'workability' of Telehealth implementation, and how it might be successfully to be integrated in the existing healthcare services and practice. Rich data were obtained from the 'implementers' who primarily provide implementation experience at the macro-, meso- and micro-level. The NPT was used as the theoretical lens, informing the study of the influential determinants of Telehealth implementation reflected from the four key constructs of NPT: coherence, cognitive participation, collective action and reflexive monitoring. The focus on 'context', which refers to the wider system into which a complex intervention is implemented, had guided the analysis and interpretation of the certain aspects of data regarding the 'work' by the individuals and organisation to embed and 'normalize' Telehealth across MoH settings.

As presented in Chapter 3, the underdeveloped state of Telehealth in Malaysia was evident following the termination of the Telehealth-MSM contracts, and the study has also revealed that the trend of Telehealth adoption across MoH was very low after that (see sub-section 3.4.3) which suggests that implementation was difficult. This reflected that there were obstacles encountered along the 'downstream' Telehealth policy implementation. Concluding discussion related to the Telehealth implementation in

Malaysia related to four main issues which is mapped to the key NPT constructs<sup>145</sup> as the following:

1. The decision-making process on matters related to Telehealth implementation;
2. Challenges in working within the multi-agency partnership model during the system development phase;
3. Achieving Telehealth adoption across MoH settings; and
4. Identifying the appropriate indicator to measure the targeted Telehealth outcome.

Indeed, it was undeniable that the implementers had underestimated the complexity of the task.

First, the study will discuss on the decision-making process on matters related to Telehealth. Decision-making was identified as one of the sub-constructs of *collective action*.

All policies pertaining to health matters are developed at central level MoH and responsibilities for decision-making lies upon the top-level management officials. It was evident that the policy priority by the top-level management for matters related to Telehealth was inconsistent during the period covered in this study:

- 5MP (1986-1990) and 6MP (1991-1995) – improving the administrative-oriented health information systems;
- 7MP (1996-2000) and 8MP (2001-2005) – developing integrated Telehealth to enhance the service-oriented health IT with the concept of well-informed patient during the MSC era, which received substantially great funding; and
- 9MP (2006-2010) and 10MP (2011-2015) – the government interest was ‘to recover what is left’ after the failed Telehealth Pilot Projects with

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<sup>145</sup> In the following paragraphs, the NPT constructs is italicized to indicate the mapping of the constructs with the discussion points presented in this study.



As discussed previously in section 7.3.1, policy decisions are more likely to be influenced by political agendas, which is a similar point made by Aljunid (2014) and Barraclough (2000). However, political support at the national level does not necessarily translate into good implementation practices as evident from experience of the Telehealth-MSK Project. As shown in this study, the authoritarian central political pressure had influence in the policy processes, which could be counterproductive given that the vision to establish an ICT-oriented healthcare delivery service at such scale was relatively new and unproven at that time, particularly in this part of the world.

In addition, the centrally-driven outsourcing and procurement process proved to be a disadvantaged policy process, as the Government awarded contracts to two “start-up” local companies which had “strong government links” (Matthews, 1999)<sup>146</sup>. As observed by other analysts (Bunnell & Coe, 2005; Johnson & Mitton, 2003; B. K. Ritchie, 2005; Sundaram & Wee, 2013b), it was the wider socio-political pressure during the 1997-1998 global economic crisis that was thought to be the external driver for the appointment of the consortia (*The Edge*, 7 May 2001<sup>147</sup>). However, in at least one of the consortia, work was invested in ensuring that the Teleconsultation service was in alignment with the ongoing strategic planning of the Telemedicine Blueprint.

The inter-dependence of political and policy leadership and the role of personalities in leadership positions were also found to be important. The national policy leadership for Telehealth was dynamic during the early phase (i.e. 7MP and 8MP), with the ability to negotiate with political leadership at the central levels, as well as with the external agencies and industrial players, to learn from the experience of others on matters related to Telehealth. It also created influence and position for Telehealth, generating *coherence*

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<sup>146</sup> Decision-making on health-related matters by politicians means that projects can be awarded without assessment by the expert professionals in the Ministry of Health (Chee & Barraclough, 2007b).

<sup>147</sup> Get Ready for e-Health (7 May 2001), *The Edge*. Retrieved from <http://www.mps.org.my/newsmaster.cfm?&menuid=36&action=view&retrieveid=33>  
<http://www.mps.org.my/newsmaster.cfm?&menuid=36&action=view&retrieveid=33>

among the leadership across MoH organisational levels. Implementation was at its best when national policy leadership embraced the Telehealth vision and execute the appropriate actions, taking advantage of the government willingness to invest in Telehealth.

However, *coherence* was disturbed by the changes among the top-level management. Policy continuity was hampered with the appointment of new personalities in leadership, both at MoH and central level. The changes in policy priority can be gauged by resource allocations of finances, plans for activity/programme and other developments related to Telehealth (*collective action*). Despite political rhetoric, allocated resources have been low and insufficient across MoH organisation levels. During the 9MP and 10MP, the Telehealth budget allocations were greatly reduced, causing delays in ICT infrastructure upgrading. (see interview data in sub-sections 6.4.1.1 and 6.4.4.2).

Apart from changes in policy priority, there were also inconsistent Government decisions regarding the National Telehealth strategies. Despite considerable efforts invested to establish an integrated national Telehealth network at the specified sites, another new consortium was appointed to develop the EMR (i.e. THIS) for government hospitals. The contract was valued at almost 75% of the total Telehealth-MSK project cost (*Bernama*, 9 January 2002<sup>148</sup>; *The Star*, 10 January 2002<sup>149</sup>; 6 July 2002<sup>150</sup>). Furthermore, Telehealth was not considered as one of the mainstream healthcare activities anymore. When Medical Online contract was terminated in 2004, Telehealth Unit<sup>151</sup>, which was previously under the office of the Director General of Health, was shifted to the Medical Service Programme<sup>152</sup>.

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<sup>148</sup> Fay Sel. Solutions Protocol win RM76.4 mln “paperless hospital” contract (9 January 2002). *Bernama*. Retrieved from <http://blis2.bernama.com>

<sup>149</sup> Solutions Protocol gets RM76m hospital job (10 January 2002). *The Star*. Retrieved from <http://blis2.bernama.com>

<sup>150</sup> Abu-Bakar. Kompakar hopes for higher turnover with more IT contracts (6 July 2002). *The Star*. Retrieved from <http://blis2.bernama.com>

<sup>151</sup> Telehealth Unit was the primary implementer of the Telehealth during the MSK Pilot Project.

<sup>152</sup> The Medical Service Programme is the MoH authorities’ agency to oversee matters related to hospitals and its service. See also MoH Annual Report 2005 (2006).

The difficulties to maintain *coherence* across the MoH organisational levels was accentuated with the “bad image” of the failed Telehealth-MSC projects. The existing healthcare system had to face societal expectations for technology improvement for its service delivery and the Teleprimary Care (for the government health clinics) was launched after only a year the termination of contract (*Utusan Malaysia*, 8 March 2005<sup>153</sup>). In addition, it was also revealed that there were increasing number of standalone health information systems being built, particularly epidemiological-oriented information systems and disease-registries. The development of disparate systems by the different programmes/departments had resulted in ‘information silos’, giving rise to the new challenge for the national healthcare information system – interoperability – which is also identified under the overarching construct of *collective action*.

In fact, the national integrated Telehealth system envisioned in the Telemedicine Blueprint had considered ‘interoperability’ as an important technical functionality<sup>154</sup> (Ministry of Health, Malaysia, 1997). In recent years, studies on the design and implementation of large-scale Telehealth implementations, such as by Cresswell and Sheikh (2009), Ghani (2008), Cresswell et al. (2012), Ghani et al. (2013) and Greenhalgh et al. (2013) have emphasised that the basis to establish such a system requires input in the form of a lifelong electronic patient record, which referred as the EHR. The EHR stores all the relevant events and information linked to a patient’s healthcare history, and access should only be allowed to the authorized person or parties<sup>155</sup>.

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<sup>153</sup> Projek TPC khidmat pakar di desa dilancar (8 March 2005). *Utusan Malaysia*. Retrieved from <http://blis2.bernama.com>

<sup>154</sup> It is undeniable that Telemedicine Blueprint has considered systems interoperability. However, only one paragraph had it mentioned (Ministry of Health, Malaysia, 1997, p. 35), and this had made a point that the importance of interoperability as one of the core technical requirements and functionality to establish a national integrated Telehealth has been understated. The thesis had discussed regarding the technical and functional requirements of integrated Telehealth including interoperability earlier in sub-section 3.4.3.4

<sup>155</sup> Malaysia has named this lifelong EHR as the Lifetime Health Record (LHR), and the Telehealth component which to provide the personalised, prospective healthcare throughout the lifetime continuum, is called as the Lifetime Health Plan (LHP). Whereas the electronic medical records (EMRs) collect and process a patient’s health care episodes occurring within one healthcare provider or facility, EHRs collect information relating to longitudinal health care episodes affecting a patient across a network of health care providers at a regional or national level (Harum, 2004b; Ministry of Health, Malaysia, 1997; Suleiman, 2001).

Attention to interoperability only started after the review of Telehealth in 2004 via an external consultancy exercise, when it was suggested that interoperability was one of the issues overlooked in the LHP plan. To tackle the issue of non-interoperable health systems, MoH established the Health Informatics Centre in 2006 to play the important role of national health information governance, such as establishing and maintaining health data standards (Ministry of Health Malaysia, 2007). This is followed by the implementation of Malaysia's Health Information Exchange Project (MyHIX) in 2009 to demonstrate interoperability among MoH facilities. However, as revealed in this study, the lack of appropriate policy and standards in place to support interoperability (which also comes under *collective action*) has hampered the expansion of MyHIX network (i.e. the number of healthcare facilities that can exchange patient information in electronic form)<sup>156</sup>. Indeed, as shown in this study, there are existing laws relevant to and may be applicable for Telehealth practice, as discussed earlier in sub-section 6.4.1<sup>157</sup>. However, specific regulatory framework conducive for Telehealth is still lacking, resulting in the limitation of health information integration across MoH settings, as well as between the public and private health sector (Aljunid et al., 2012; Selvaraju, 2006).

The second discussion point is on the challenges in working within the multi-agency partnership model during the system development phase.

The system development phase is considered as a critical phase in Telehealth implementation. A successful system development will likely create a sustainable Telehealth system<sup>158</sup> and might be used further in routine healthcare service (Braa, Hanseth, Heywood, Mohammed, & Shaw, 2007; Braa, Monteiro, & Sahay, 2004; Kimaro & Nhampossa, 2005). In MoH, almost all Telehealth projects implementation is

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<sup>156</sup> The project started with 4 facilities in 2009 and at the time of the thesis writing, it had only expanded to only 3 additional sites.

<sup>157</sup> Refer footnotes 75 – 81.

<sup>158</sup> System development here refers to the different phases described in the 'System Development Life-Cycle – SDLC' from information system studies. The traditional SDLC is characterized by the following phases: (1) planning, (2) analysis, (3) design, (4) implementation, and (5) maintenance and support (Hoffer et al, 1999; McConnell, 1998 in Kushniruk, 2002)

monitored by the Project Management Team established at the federal level. A senior federal level officials usually led the Project Team and the members consists of other officers from the same department as well as representatives of the project stakeholders including the end-users. As demonstrated in this study, almost all Telehealth system developments in Malaysia were undertaken through outsourcing via the public-private partnerships. Thus, project management and control mainly occurred at the meso-level and implementation took place in a top-down manner.

As observed in this study, the outcome of Telehealth implementation can be classified into three categories:

- (1) clear-cut failed implementation – for instance the LHP;
- (2) successful or completed Telehealth project but remain as pilot or status quo without any expansion in sites or upgrading. Example such as Teleconsultation and the disease registries; and
- (3) successful or completed Telehealth project followed with sustained use, either in terms of expansion in number of sites or system enhancement. Perhaps the implementation of THIS in government hospitals may come under this category.

The strategic aims of Telehealth-MSM was to support seamless and continuous care across healthcare settings, creating new partnerships to foster healthcare that draws on a diverse range of stakeholders including the various departments within the MoH, other government agencies (such as MOF and MAMPU), the MDC, industrial players, as well as academia. However, challenges emerged related to forming and sustaining such heterogeneous partnerships, as each of stakeholder holds different interests. As shown in this study, the lack of concerted effort from the various agencies (*collective action*) had resulted setbacks during system development and the eventual project success. Examples

included the unclear articulation of roles among the project team members (i.e. the stakeholders representatives) during system development. As demonstrated in this study, the implementation of a less complicated standalone systems which deals with smaller number of stakeholders, such as implementation of THIS for a particular hospital, was more likely to be sustainable, as compared to a complex system such as LHP, which involved a great deal of stakeholders. In addition, it was found that the lack of capacity and capability in Project Management knowledge and skills was also attributed to the problems causing delayed project completion and/or system non-performance. In addition, there were also differences of working culture and values between the government agencies and the private technology partners.

In spite of these challenges, the multi-agency partnerships made significant progress and began to share their lessons-learned on what helps to facilitate new collaborative partnerships across the traditional silos of the different stakeholders. Most of the facilitators were the typical good project management skills, such as keeping in constant dialogue across partnerships, clear communication and active problem-solving. The importance of team work and understanding exactly what roles entail at individual and collective level are of key importance, as well as the dynamic leadership and strong project management skills in ensuring that shared vision or *coherence* are maintained and to gain stakeholders 'buy-in' with the project objectives.

The stakeholders' 'buy-in' brings us to the third discussion point on issues of achieving Telehealth adoption across MoH settings.

Successful stakeholders 'buy-in' also attributed to the increased likelihood for Telehealth adoption and embedding at the hospitals and clinics. The Telehealth Project teams<sup>159</sup> recruited local 'champions' to legitimize participation in the implementation process during the early system development phase, so as to promote a sense of

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<sup>159</sup> Project Teams usually lead and consist members form officials from the departments at MoH headquarters.

‘ownership’ among the end-users (which fell within *cognitive participation*). On top of being part of the Project Team, the ‘champions’ were also tasked to lead change management programmes, as they were seen to be more familiar with their colleagues and social environment at the grass-root levels. However, ensuring the same ‘champions’ throughout the system development phase was difficult as personnel transfer is quite common in the MoH, either due to personal or career development reasons.

In addition to the problems of sustaining ‘champions’, the common occurrence of personnel transfer also impedes Telehealth adoption, as the newly transferred personnel had to learn the new skills of the system in place. As EMR coverage is quite low, majority of the MoH personnel had not been exposed to the system deployed specifically at the particular MoH facilities. Regular training and change management activities were undertaken to ensure satisfactory system usage. As demonstrated in this study, in addition to the localised change management activity, the role of personalities in leadership position at each of the organisational levels were also crucial to drive and encourage MoH personnel to make full use of the system. Positive performance of system use were observed among the facilities with dynamic leadership who enthusiastically supporting Telehealth implementations. Further, a positive support for Telehealth is accompanied with the improved policy priority for Telehealth, ensuring the appropriate resource allocation (*collective action*). Limited adoption due to inadequate infrastructure support was reflected in this study by the frustrations among end-users who had to work with outdated computers and slow networks.

Fourth and the final discussion point is with regards to identifying the appropriate indicator to measure the targeted Telehealth outcome, which fell under *reflexive monitoring*.

The study had demonstrated that the measurement of the targeted Telehealth outcome such as evaluating its effectiveness or efficiency in healthcare service has not been widely

conducted in the MoH. As found in the interview data, much of the evaluation exercise in the MoH were undertaken in a small scale or at local level, rather than through formal empirical studies. The limited capacity and funding to conduct scientific research were thought to contribute this problem. Nevertheless, the number of empirical studies on Telehealth in Malaysia has increased in numbers in recent years. Most of these researches dealt with evaluating system utilization as well as opinions for future Telehealth implementations (sub-section 3.3.3). There was little evidence on localised appraisals of the ways in to improve Telehealth implementation, or what technology might work to improve healthcare quality or outcome. Perhaps because the limited Telehealth deployment coverage (and meaningful utilization) giving rise to difficulty to attain a reliable data pool for analysis. When there is limited information to appraise Telehealth, it might be difficult for health administrators and policy makers to determine whether Telehealth is a worthwhile investment or not.

#### **7.4 Lessons learned and policy recommendations**

The synthesis of the following lessons learned and policy recommendations were formulated from the insights and deepened understanding of the challenges in policy processes related to Telehealth, which some of it aligned with the studies that already published.

Firstly is the key role of a policy entrepreneurs in the ‘micro’ processes of ‘opening’ the ‘policy window’, working on ‘coupling’ the three streams of problem, policy and politics to make policy agendas happen (Kingdon, 1984; Mintrom, 1997). An effective ‘policy entrepreneur’ must bear the personal criteria such as ‘dynamic’- forward-looking on Telehealth potentials in healthcare; ‘connectivity’ - able to gain influence and ‘trust’ from others across multiple levels for collaboration and partnership; and ‘politically-aware’ - skilful at aligning the problems related to health matters with the agenda of



political actors' in power. In this thesis it was the then Director-General of Health, Tan Sri Abu Bakar Suleiman who acts as the 'policy entrepreneur' and played the dominant role of the process to open the 'policy window'.

Secondly, despite successful agenda-setting of a policy, compromises may be needed to translate policy statements into a workable implementation. The study had demonstrated that MoH had to compromise on several key elements related to Telehealth implementation especially during the Thelehealth-MSK Pilot Projects. For instance, policy formulation was carried out with the collaboration of national and international SMEs from the industry entities to ensure technical innovativeness and functionally appropriate. In addition, policy-making in Malaysia was usually known to be undertaken in private, and public or civil society involvement was almost unheard of (Leong, 1992). In addition, formulation and implementation of the policy are affected and buffeted by factors such as ideological preferences, political support and economic factors (Almeida & Báscolo, 2006; Simon Barraclough, 1999; K. L. Phua, 2001), and also populist pressures (K.-L. Phua, 2007, p. 68).

Thirdly, poor teamwork hinders implementation, which emphasise the need to generate 'coherence' throughout the policy implementation (Mair et al., 2012; C. R. May et al., 2009; Carl May & Finch, 2009; D. Morrison & Mair, 2011). Therefore, successful heterogeneous multi-agency partnership working requires excellent project management skills, careful continual communication, and may take some time to achieve coherence in order to influence the working of new healthcare model as envisioned in the Telemedicine Blueprint. Apart from coherence within the teams that was 'actively working' at a particular time of the project or 'horizontal coherence', it is also important to achieve 'vertical coherence' - the change of top-level management personnel is accompanied with an agreed view about the remaining 'work' to be done under the new leadership to ensure 'staying the course' of policy implementation. It was also reflected in this study on the

inconsistency of policy direction in the 5-Year Development Plans with regards what function is the most sought after from Telehealth. The personality in leadership positions should also has the ability to navigate through the complex socio-technical challenges against a backdrop of the wider political and economic uncertainty throughout the course of implementation. (K. M. Cresswell et al., 2013; K. Cresswell & Sheikh, 2013; Gagnon et al., 2012; Greenhalgh & Keen, 2013; Joseph et al., 2011; Kaplan & Harris-Salamone, 2009; Øvretveit, Scott, Rundall, Shortell, & Brommels, 2007; Paré, Sicotte, Poba-Nzaou, & Balouzakis, 2011; Vitacca et al., 2009).

Fourthly, it is recognised that Malaysia was facing challenges in the four health system dimension similar to what is commonly found in other LMICs – stewardship, organisational, technological and financial (Merican et al., 2004; Safurah et al., 2013) and the introduction of new technologies in healthcare is recognised to be highly complex and challenging concerning factors such as policy, organisational, managerial, professional, and technical considerations (K. M. Cresswell et al., 2013; K. Cresswell & Sheikh, 2013; Zanaboni & Wootton, 2012). The Telehealth implementer needs to consider the problems in each of these dimensions on top of focusing to improve the weaknesses in organisational capacity and culture related to Telehealth technology use for healthcare delivery processes, and the weakness in ICT infrastructure. In addition, the practice-related matters regarding Telehealth is also noteworthy, such as setting standards and policy on interoperability and legal provisions concerning to safeguard patient information, which are still lacking.

Fifth, improvement in technology adoption across MoH might be approached through the early user engagement during system development phase to build the sense of ‘ownership’ (K. M. Cresswell et al., 2013; Gagnon et al., 2012; Hage et al., 2013). ‘Champions’ may play a role to promote and influence healthcare staff at grass-root levels to improve ‘buy-in’ (K. M. Cresswell et al., 2013; Greenhalgh et al., 2013, 2012; van

Gemert-Pijnen et al., 2011), but personnel transfer is quite common occurrence for career development, which may involve the 'champions'. Hence, 'champions' may be given special consideration – entitled to get promotion without being transferred out. It is also demonstrated in this study that adoption of technology is achieved through change management activities and training conducted locally and at frequent intervals. Therefore, a special dedicated team for change management and training might be formed and recognized as a formal team at a particular health premise. Notwithstanding the limited numbers of Telehealth projects deployed across MoH, implementation at the facilities level was leveraged by the strong leadership capacity and a clear sense of direction in Telehealth among the leadership personalities in-charge - at the hospitals, clinics and departmental levels.

Finally, the Telehealth evaluation exercise tends to focus on feasibility of technology or performance in project management, rather than measuring the clinical impact and/or cost-effectiveness, thus making it difficult for administrators and policy-makers to conclude on benefits (Black et al., 2011; Chaudhry et al., 2006; DesRoches et al., 2010). The reasons were attributed to the limited capacity and resource to conduct scientific research. It is recognised that the lack of routine evaluation of projects is an issue in most circumstances where the political and financial imperatives trumps the need for monitoring and evaluation for processes and impacts. It is recommended that an independent evaluation should be an integral part of the budget allocation. Thus building capacity in the knowledge and skills on Telehealth research is needed, or policy implementers may create a set of 'administratively-acceptable' indicators favourable for policy-makers, assisting them in resource-related decision-making process. Apart from accommodating the organisational management requirements, the communities of healthcare practitioner needed to be made aware on what would be the realistic

expectation of Telehealth technology (K. Cresswell et al., 2013; K. M. Cresswell et al., 2013), considering the limitations in the existing health system environments.

Henceforth, on overall Telehealth implementation in Malaysia, the present study recommended that five key areas should be addressed for future implementation:

1. The decision for a central procurement of Telehealth is to be accompanied with a careful selection of consortia based on professional assessment on vendors' experience in health IT implementations, availability of key SMEs who are hired to do the right job and a strong capacity in organisational and financial capital. An independent evaluation should be an integral part of the budget allocation for such endeavour.
2. Setting a reasonable and realistic timeline to implement Telehealth. Implementation at a large scale for an enterprise-wide Telehealth system (i.e involving creation of a network of multiple clinics or hospital) may take up a longer period of timeline between contract signing to program initiation (kick-off system) which should take a minimum of 5 to 7 years, whereas a simple standalone system for example implementing EMR at one clinic or hospital should be completed within 18 months to 3 years. The experience from Telehealth-MSC project was that implementation was expected to complete within a mere 30 months!
3. There should be significant time and effort invested in assessing the ICT infrastructure readiness of the healthcare facilities involved as well as organisational readiness. In addition, a greater degree of consensus is to be achieved among programme heads in the MoH of what service should be developed appropriate for the need for a particular population or programme (and economically viable). Implementation across MoH is to be carried out in an

incremental manner with sensible project monitoring and control with continues feedback loop mechanism realising the risk in environment uncertainties.

4. There needs to be greater attention paid to the current status of legal provisions on health information security with Telehealth use, as well as concerted effort among the various healthcare stakeholders in using standards in data definitions and tackling the deficiencies of the lack in interoperability, which still posed a great barrier to the meaningful Telehealth service at scale.
5. Strengthening the organisational structure for Telehealth governance and stewardship to establish a formal programme or agency within the MoH to recognize that ICT in health as part of the mainstream activity within the national health policies.

#### **7.5 Limitations of the study and future research directions**

Throughout this study a number of limitations is highlighted. One is that, although the Malaysia's Telehealth programme is large and diffuse, the study was unable to include all the relevant policy actors. Other policy actors such as industrial players and private health sector representative were not included as the focus of the study was on Telehealth programme in the MoH. One of the reason is due to the limited resource and period of study. Also, the data presented in this study had focused primarily through the perspectives of implementers and the study had not gathered data directly at the micro-level i.e. getting the views from the end-users such as doctors, nurses and patients. Rather, the study had relied on the data conveyed by Key informants who acted in dual roles – as the implementer and end-user. There were several Key-informants who used to be end-users and has had the direct working experience with Telehealth at the clinic and hospital and as well as involved in Telehealth implementation. The inclusion of these stakeholders may substantially improve the validity and relevance of the study according to the adopted models as they could have given granular data and some important perspectives of the

implementation processes. But then again, there was limited Telehealth systems deployed across MoH, and implementation was shown to be top-down in manner. Many of the Telehealth projects were undertaken through the centrally-driven outsourcing, and these project management were monitored by officials from the federal departments. Hence, there was a justifiable reason for this study focuses on Telehealth policy processes at the macro- and meso-level. Despite these limitations, the rich descriptions found in this study provides a valuable contribution to the knowledge base on policy processes related to Telehealth implementation at a national scale in the context of low- and middle-income countries.

Two is that the research design and methodology being an exploratory qualitative study, the principal limitation associated with this type of study methodology is the acknowledgement on its research validity and reliability. Therefore, to ensure the validity and robustness of coding framework, the study have drawn data from multiple different sources to enhance confidence in the study findings as a research method. In addition, the study applied theoretical frameworks in its methodology. The use of theory to inform coding framework may raise concerns that the study may “forcefully” imposed the study data to fit the framework or retrofitting, that is the data interpretation were unnecessarily constrained by the theory. However, the study had explicitly looked for data that fell outside the framework and did not exclude such data in order to conduct a rigorous and meaningful analysis of the implementation processes. As proposed by Walt et al, (2008), the explicit attention to a theory does not imply a reductionist approach to analysis, but rather provides coherence and potential avenues for linking themes and concepts. The study used these frameworks to explore on why Telehealth was incorporated as the national policy agenda, and how Telehealth was integrated in the Malaysian healthcare system.

Thirdly, the study was undertaken by a single individual who carried out all the documents review and KIIs. There was potential to introduce bias into the study. However, as discussed by Molloy et al. (2002), the benefit to having a single person to conduct interviews is that consistency in interviewing technique is more likely to be achieved and it may be possible to develop greater rapport with interviewees to gain a more insightful responses. The personality of interviewer might also be considered a limitation. A number of scholars have suggested that the background of an interviewer may have effect on the information made known to the interviewer (Hoddinott & Pill, 1997; Richards & Emslie, 2000). As suggested by Kvale (1996) there is potential for a 'power imbalance' between the interviewer and interviewees, and information disclosed by interviewees may be modified when the interviewer is known professionally or is a colleague or peer. The interviewer was transparent about her occupational background (of being a staff from Telehealth Division), which may have had some effect on the findings with interviewees - perhaps modifying their responses by not disclosing the actual information of the implementation of Telehealth systems which is solely under their agency's control. To address this, the interviewer explained her role as a researcher and that the focus was for this study, and not evaluating the management practice concerning the Telehealth project which are under them.

Finally, the retrospective data collection in this study may lead to recall bias being introduced into the study. Key-informants were being asked to recall events that had in some cases happened up to more than 10 years ago, especially in the events related to the agenda-setting of the Telehealth policy, as well as the implementers' experiences in developing and managing the Telehealth-MSC Pilot Projects. However, as pointed out by Sabatier (2007), policy evaluation requires a long timeframe and had suggested that in some cases this may take for at least a decade. In this study, the longitudinal approach was valuable in terms of the depth and richness of the data, with the 12 key-informants

participating in interviews, who had first-hand involvement on the policy processes. In addition, themes were also explored from a longitudinal perspective to see how changes evolved over time. A longitudinal approach to data collection was particularly important for the themes of to evaluate the impact of organisational change and working in partnerships particularly in the process to implement Telehealth at such scale. Further, the relatively small number of key-informants who was selected through the purposeful sampling may potentially limit the diverse attitudes and opinions expressed by the population under study. Also, the researcher's cognition and experience influence the result interpretation. The result presentation relies on the researcher alone, which could be a limiting factor due to the researcher's ability to communicate and present the complexity of research.

## **7.6 Concluding thoughts**

The analysis conducted in this study has revealed that there were many aspects of the policy processes of the Malaysia's Telehealth initiative undertaken by the government during 1995-2012 that needs further improvement. It was also pointed out in the study that Malaysia's Telehealth initiative to integrate ICT systems in the healthcare sector was not a simple task illustrated with a history of many mistakes and wasted spending. Several Telehealth projects have been successfully being implemented, while some of these were abandoned. There are also a number of Telehealth projects remain as pilot, requiring decision making from the top-level management officials to allocate adequate and appropriate resource and address implementation challenges in order to keep up with the societal expectation in the era of rapid technology development.

In the beginning, the study had divided the policy processes of Telehealth initiative into two stages – policy formulation and implementation. The study applied Kingdon's Multiple Stream Theory to achieve a better understanding of policy formulation which



had focused on the role of policy actors and policy entrepreneurs to opening of 'policy window' leading to the sequence of events for agenda setting. Meanwhile the insight into the socio-technical interactions of Telehealth implementation was achieved through the Normalisation Process Theory, focusing about the organisational practices and institutional mechanisms in Telehealth implementation which highlighted the enabling and hindering conditions noted in the study. It is revealed that, in fact, policy formulation and implementation reciprocally interact creating interdependencies with each other, and there is unclear definitive boundary between these two stages. This is attributed to the various dimensions of Telehealth policies, as suggested by Scott (2004) and Khoja et al. (2012), on top of the overarching national health policy for Telehealth initiatives.

The application of the theories proved to be insightful to provide a better understanding of complexity issues in the policy processes related to matters to integrate Telehealth in the healthcare sector at the national-level. It was revealed that the policy content, sometimes assumed to be based on rational, scientific decision-making component in the health sector, but it was, however, determined by a political process which eventually influenced the projects objective, the strategy employed, and the institutional mechanisms set up to translate implementation into policy. And, during implementation, the prerequisite for an improved Telehealth integration is a better understanding of technical and organisational interdependencies as well as of what actually occurs in the tasks and care work-processes of the healthcare service delivery.

It is clear that to develop a digital, person-centred healthcare services at a national scale requires substantial investments to ensure technology and infrastructure readiness to support such services. Furthermore, it involves changes in the culture and behaviour of individuals and organisations, from both the perspectives of service providers as well as 'consumers'. Since this process affects many stakeholders and a variety of interests of different players, it is a complex policy process demanding significant effort to achieve

the necessary implementation to accomplish the targeted objectives. Henceforth, the study has shown the overarching importance of developing the capacity of policymakers and implementers for policy analysis - for a better understanding of technical and organisational interdependencies concerning the factors responsible for this outcome to attempt to resolve the underlying problems in the policy processes.

As far as is known, Malaysia's Telehealth initiative was one of the world's pioneer country to undertake healthcare innovation using ICT for such a large-scale. Through more than a decade, challenges have been overcome and alternative implementation course of Telehealth have been established due to the unpredicted influences of unforeseen events, which may result in an escalation of complexity. Even though this escalation means that plans and ambitions may not be realised as defined originally, it does not mean that the ambitions are not relevant. One needs to accept that plans may need to be changed along the way, in order to realise such ambitions. In this sense, it might be a good idea to focus on changes made through incremental steps rather than following the initial plan rigidly. As demonstrated in this study, there are several Telehealth components had gained a reasonable momentum within each healthcare communities, representing a significant effort in building capacity and a network of SMEs in this new interdisciplinary field. It is also important to understand that integrating Telehealth as well as implementing them in practice takes time and the anticipated outcome might be difficult to measure, and these consideration is therefore a foundation for any successful implementation. In conclusion, the identification of the key influential determinants for an improved Telehealth policy processes provides invaluable information that will benefit real world implementation of Telehealth at the national scale.

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## LIST OF PUBLICATIONS AND PAPERS PRESENTED

1. Oral Presentation. International Conference on Green and Ubiquitous Technology (GUT), 2012. Grand Royal Panghegar Hotel, Bandung, Indonesia. 7-8 July 2012. Evaluation of Telehealth implementation in government primary health clinics - A study protocol by Nuraidah Mohd Marzuki, Saimy Ismail, Nabilla Al Sadat Abdul Mohsein, Fauziah Zainal Ehsan
2. Oral Presentation (Post-graduate Colloquium). Qualitative Research Conference 2012. 4-7 November 2012. Hotel Seri Pacific, Kuala Lumpur. Nuraidah Mohd Marzuki, Saimy Ismail, Nabilla Al Sadat Abdul Mohsein, Fauziah Zainal Ehsan.
3. Poster Presentation: Factors that influence Telehealth implementation in Malaysian Public Hospitals and Clinics: A Case Study By Marzuki, N.M., Ismail, S., Abdul Mohsein, N., Ng C. W., Khoo C. C., Ehsan, F. Z. International Research Symposium on Population Health 2013. University Malaya Medical Centre (UMMC), Menara Selatan, 13th Floor, University of Malaya, 50603 Kuala Lumpur, Malaysia. 19-20 November 2013.
4. Oral Presentation: Strengthening the National Health Information System Towards Universal Health Coverage in Malaysia: An In-depth Exploratory Assessment Marzuki, N., Ismail, S., Ehsan, F. Z., Al-Sadat, N., & Ng, C.-W. In 46th Asia Pacific Academic Consortium for Public Health Conference. Kuala Lumpur. 17 – 19 October 2014.
5. WoS-Journal Publication: Marzuki, N., Ismail, S., Al-Sadat, N., Ehsan, F. Z., Chan, C.-K., & Ng, C.-W. (2015). Integrating Information and Communication Technology for Health Information System Strengthening: A Policy Analysis. *Asia-Pacific Journal of Public Health*, 27(8 Suppl), 86S–93S.