



Revised Bhutan ICT Roadmap

Contents

1. EXECUTIVE SUMMARY	3
2. INTRODUCTION.....	5
2.1 REVIEW OBJECTIVES	5
2.2 REVIEW APPROACH	5
3. REVISIONS FOR ICT ROADMAP	6
3.1 ICT VISION	6
3.2 DESIRED OUTCOMES AND GOALS	6
3.3 RANKING OF GOALS	8
3.4 PROPOSED STRATEGIES.....	9
3.5 HIGH LEVEL IMPLEMENTATION SCHEDULE	11
4. KEY CHALLENGES AND RECOMMENDATIONS	12
4.1 LOW ADOPTION OF PROGRAMME.....	12
4.2 LACK OF BUDGET.....	14
4.3 LACK OF HUMAN RESOURCE CAPABILITY	15
4.4 ALIGNMENT OF ICT PLAN	17
5. CONCLUSION.....	18
APPENDICES	19
APPENDIX A: BHUTAN’S ICT FRAMEWORK	19
APPENDIX B: GLOSSARY.....	20
APPENDIX C: REFERENCES	21

1. EXECUTIVE SUMMARY

The Royal Government of Bhutan (RGOB) developed the Bhutan ICT Roadmap in October 2011, recognising the value that ICT can bring to social and economic development guided by the values of Gross National Happiness.

The Ministry of Information and Communications (MOIC), with assistance from The World Bank in May 2015, initiated a review of the 2011 Bhutan ICT Roadmap to evaluate the roadmap's objective based on the current state of political, economic and social development in Bhutan, and to assess the progress of the 34 programmes identified in the roadmap.

The review produced a revised Bhutan ICT Roadmap that takes into account the achievements, challenges, gaps and recommendations to drive ICT development in Bhutan.

Revised ICT Vision:

“An ICT-Enabled, Knowledge Society as a Foundation for Gross National Happiness”

Revised desired outcomes and goals:

- ICT for Good Governance;
- ICT for a Shared National Consciousness; and
- ICT as a Key Enabler for Sustainable Economic Development.

Updated programmes:

The review identified a list of 23 uncompleted programmes and for each of these programme included the following:

- Ranked based on RGOB priorities;
- Included key performance indicator;
- Included an estimated implementation cost; and
- Indicated the responsible government agency.

Key recommendations for Royal Government of Bhutan (RGOB) from the review exercise are:

- Establish change management planning for all programmes;
- Strengthen collaboration between GNHC, MOF and MOIC for e-Governance;
- Dedicated team to drive e-Government System and e-GIF Programme;
- Explore alternate funding models such as PPP (Public-private partnership) funding model or subscription model for applicable ICT projects;
- Establish ICT training and competency roadmap;
- Augment capability with domestic or foreign expertise;

- Establish expert pools to bring together personnel with similar knowledge onto a single platform;
- Finance recurrent programme (Google Apps, e-Government Interoperability Framework, e-Government System) through annual budget; and
- Govern all ICT programmes and projects through the e-Governance framework;

Finally, the report recommends for the ICT roadmap exercise to be transitioned into a national level ICT master planning exercise with the timeline aligned to the upcoming 12th Five-Year Plan.

2. INTRODUCTION

2.1 Review Objectives

The objectives of this project is to review and revise the 2011 Bhutan ICT Roadmap by conducting a current state assessment of the ICT developments in Bhutan, identify gaps in programmes, define key priorities that are aligned to the ICT vision of Bhutan, and proposing a high-level implementation schedule aligned with the existing 11th Five-Year Plan.

2.2 Review Approach

For the ICT Roadmap to be reflective of the current situation and assessment to be accurate, the review exercise carried out the following activities:

- Review the objective of the roadmap with senior officials from MOIC;
- Review all programmes prescribed in the ICT Roadmap with feedback from all programme stakeholders;
- Prioritise the goals that will be used for programme ranking;
- In-depth discussion on e-Government System and e-Government Interoperability Framework;
- Reference the 11th Five-Year Plan; and
- Reference the e-Government Masterplan.

3. REVISIONS FOR ICT ROADMAP

Workshops were conducted with senior officials in MOIC and programme stakeholders from MOIC, MOE, MOF, MOEA and TCB. Feedback from the workshop participants forms the basis for the revision and recommendations in the revised ICT Roadmap. Revision and recommendations were made in the following areas:

- ICT Vision
- Desired Outcome and Goals
- Strategies and Programmes
- High level Implementation Schedule
- Key Challenges and Recommendations

3.1 ICT Vision

The ICT Vision is widely recognised within the government and it acknowledges that ICT plays an essential role in achieving Gross National Happiness (GNH). During the discussion with the senior officials, “Knowledge-Based Society” and “Knowledge Society” were found to be synonymous, which led to the use of the latter to provide a concise vision statement:

“An ICT-Enabled, Knowledge Society as a Foundation for Gross National Happiness”

3.2 Desired Outcomes and Goals

The previous set of desired outcomes were still considered relevant, except one of the outcomes, namely “ICT for a Bhutanese Information Society”, was changed to “ICT for a Shared National Consciousness” to reflect the importance of building and preserving a common national identity.

The revised desired outcomes were:

- ICT for Good Governance;
- ICT for a Shared National Consciousness¹; and
- ICT as a Key Enabler for Sustainable Economic Development

Goals for each desired outcome were reviewed and the consensus from the workshop was that many of these goals were still applicable. Summary of the desired outcomes and its goals are listed below.

¹ Shared National Consciousness is defined as the common national identity and shared values of Bhutan guided by the four pillars of Gross National Happiness.

3.2.1 ICT for Good Governance

Goals for this outcome were left unchanged, as they are still relevant in today's context. The goals are:

- i) Transparency and Accountability
- ii) Effectiveness and Efficiency
- iii) Citizen and Business Centricity
- iv) Citizen Participation and Engagement

3.2.2 ICT Enabling a Shared National Consciousness

Similarly, goals of this desired outcome were found to be still appropriate and were kept. The goals are:

- i) ICT Lifestyle
- ii) Ease of Access to Information
- iii) Learning and Responsible Society
- iv) Preserving, Evolving and Promoting Culture
- v) Environmental Consciousness

3.2.3 ICT as a Key Enabler for Sustainable Economic Development

Goals for this desired outcome were enhanced to reflect the intended state of using ICT to drive sustainable economic development, which are:

- i) Ubiquitous, Affordable and Reliable ICT Infrastructure
- ii) Investment Friendly Environment
- iii) Vibrant and Sustainable ICT Industry
- iv) Businesses Leveraging ICT for Competitiveness and Innovation

3.3 Ranking of Goals

Goals were ranked to allow subsequent ranking of programmes. The list of goals, ordered from high to low, are shown in the table below.

Rank	Goal
1	Ubiquitous, Affordable and Reliable ICT Infrastructure
2	Citizen and Business Centricity
3	Effectiveness and Efficiency
4	Investment Friendly Environment
5	Ease of Access to Information
6	Transparency and Accountability
7	Vibrant and Sustainable ICT Industry
8	Citizen Participation and Engagement
9	ICT Lifestyle
10	Learning and Responsible Society
11	Preserving Evolving and Promoting Culture
12	Environmental Consciousness
13	Business Leveraging ICT for Competitiveness and Innovation

3.4 Proposed Strategies

There will be no change to the strategies that were previously prescribed. The table below shows a list of strategies that will support the revised desired outcomes & goals.

S/ n	Desired Outcomes	ICT for Good Governance				ICT for a National Shared Consciousness				ICT as a Key Enabler for Sustainable Economic Development			
		Transparency and Accountability	Effectiveness and Efficiency	Citizen and Business Centric	Citizen Participation and Engagement	ICT Lifestyle	Equal and Ease of Access to Information	Learning and Responsible Society	Preserving, Evolving and Promoting Culture	Environmental Consciousness	Ubiquitous, Affordable and Reliable ICT Infrastructure	Investment Friendly Environment	Vibrant and Sustainable ICT Industry
1	Enhance ICT Leadership	✓	✓						✓				
2	Promote ICT Adoption in Private Sector										✓	✓	✓
3	Develop ICT Industry										✓	✓	
4	Bridge Digital Divide and Develop Human Capacity						✓	✓					
5	Develop National Infrastructure and Services			✓						✓			
6	Enhance ICT Security		✓			✓							✓
7	Develop ICT Legislation, Policy and Standards	✓							✓		✓		
8	Promote ICT Awareness and Adoption			✓	✓	✓							
9	Enhance Service Access Channels					✓			✓		✓		
10	Deliver G2C and G2B e-	✓	✓	✓				✓	✓				✓

Revised Bhutan ICT Roadmap

S/ n	Strategies	Desired Outcomes				ICT for Good Governance				ICT for a National Shared Consciousness				ICT as a Key Enabler for Sustainable Economic Development			
		Goals	Transparency and Accountability	Effectiveness and Efficiency	Citizen and Business Centric	Citizen Participation and Engagement	ICT Lifestyle	Equal and Ease of Access to Information	Learning and Responsible Society	Preserving, Evolving and Promoting Culture	Environmental Consciousness	Ubiquitous, Affordable and Reliable ICT Infrastructure	Investment Friendly Environment	Vibrant and Sustainable ICT Industry	Businesses Leveraging ICT for Competitiveness and Innovation		
	Services																
11	Deliver G2E and G2G Shared Systems	✓	✓							✓	✓						
12	Implement Whole-of-Government Shared Infrastructure		✓								✓						
13	Develop Key Agency Backend System		✓						✓								
14	Enhance ICT Governance	✓	✓	✓	✓												
15	Build Capacity in Government		✓														

3.5 High Level Implementation Schedule

The high-level implementation schedule for programmes, which are not completed or in progress, is shown in the table below. The time period for the implementation schedule is aligned with the timeline of the 11th Five-Year Plan.

Programmes	2015	2016	2017	2018
Enhance ICT Leadership				
P1. Awareness and Capacity Building for ICT Leaders				
Promote ICT Adoption in Private Sector				
P3. ICT Adoption for Tourism Sector				
P4. ICT Adoption for Creative Sector				
Develop ICT Industry				
P35. Green Data Center				
Bridge Digital Divide and Develop Human Capacity				
P9. ICT Accessibility				
Develop National Infrastructure and Services				
P11. National Broadband				
P12. Broadcast Infrastructure				
P13. National Data Centre				
P37. Disaster Management Platform				
P38. Research and Education Network				
Enhance ICT Security				
P14. National Computer Incident Response Team				
Develop ICT Legislation, Policy and Standards				
P16. Government Interoperability				
P17. Government-wide ICT Policy Development				
Enhance Service Access Channels				
P20. Community Centres				
P21. Mobile Services				
Deliver G2C and G2B eServices				
P22. Integrated Services				
Implement Whole-of-Government Shared Infrastructure				
P25. Aggregation of Common Data				
P26. Government Shared Services				
Develop Key Agency Backend System				
P28. ICT for Ministry of Finance				
P29. ICT for Ministry of Education				
P36. ICT for Ministry of Health				
Enhance ICT Governance				
P32. Whole-of-Government ICT Governance				

Programmes	2015	2016	2017	2018
Building Capacity for Government				
P33. Training for Government ICT Professionals				

4. KEY CHALLENGES AND RECOMMENDATIONS

The government faced several challenges during the implementation of the Bhutan ICT Roadmap. These challenges were highlighted and discussed during the stakeholder workshop and documented as part of the review exercise. The challenges were analysed together with the stakeholders and recommendations defined.

4.1 Low Adoption of Programme

Completed programme does not always get the necessary traction despite the effort and resources committed to it. It is important to note that successful delivery of a programme does not end at the development of a solution or framework. Stakeholder adoption or mainstreaming of the developed product (e.g. application systems, policies, frameworks) will reflect the true success of the programme.

In the case of e-Government System (IT Management and e-Governance Framework) and e-Government Interoperability Framework, these frameworks were developed but they faced the challenge of adoption across the entire government. Common feedback from these programmes included the lack of awareness, lack of appreciation, lack of confidence or in the worst scenario, lost of faith in the programme.

The review recommends:

Establish Change Management Planning²

Addressing the lack of stakeholder adoption or mainstreaming for the programmes, the programme owners will require clarity in engaging all the right stakeholders and getting their buy-in. This would fundamentally rely on a well-planned change management strategy, which often is based on a well-executed communication plan. This is currently absent in most programme implementation, so much so that it is hampering programme adoption. All

² Change management planning is the process to identify stakeholders affected by change (e.g. introduction of new technology), understand their needs and expectations, define values for the change and develop activities to ease the transition.

programme owners need to carry out change management planning, with clearly crafted communication strategy and trainings to reach out to the right stakeholders.

Strengthen Collaboration between GNHC, MOF and MOIC for e-Governance

The developed e-Governance Framework is to allow effective governance of ICT projects across the government. The review found that ICT projects were not identified and reviewed by the governance committees before submitting for budget. GNHC, as the owner of PLAMS, and MOF, responsible for government expenditure, would be key agencies to support MOIC in managing ICT specific projects and have them go through the necessary governance process as prescribed in the framework. The Project Management Office (PMO) in MOIC needs to establish the close collaboration with GNHC and MOF to facilitate the execution of e-Governance Framework.

Dedicated Team to Drive e-Government System and e-GIF Programme

Low adoption of completed programme could stem from the lack of dedicated resources to operate or maintain them. Specifically for e-Governance Framework and e-Government Interoperability Framework, it was noticed that these frameworks have been developed but each of these frameworks do not have dedicated team of officers to implement, maintain and promote them to the other government agencies. Dedicated resources need to be identified and be responsible to propagate the use of both frameworks across the government. A strategy to ensure dedicated resources are allocated would be to include goals into the annual performance appraisal but subjected to availability of resources (human resources and budget).

4.2 Lack of Budget

The lack of budget is a perennial challenge that all agencies have to tackle. The government has to be prudent in its expenditure, accompanied by recurring operational expenses that can put a strain to the overall budget.

Key funding programmes such as Chipen Rigpel is expected to complete at the end of 2015, will have an impact to the computer literacy goal that the government sets out to achieve.

The lack of budget will inadvertently pose an obstacle to overall development of ICT in the country but the review also noted that in many programmes, the operating expenditure is often not considered resulting in the lack of maintenance of these programmes.

The review recommends:

Explore Alternate Funding Model

The lack of budget is posing a major hurdle for programmes to be carried out. Instead of relying only government or donor funds, the RGOB could explore

other funding models such as Public-Private Partnership (PPP) or subscription-based model. It was noted that MOEA has recently developed a policy on PPP but with focus on infrastructural project. It will do well if the PPP could be refined for the purpose of ICT services. A PPP policy is a step in the right direction where often, risks from implementing large and complex project are assumed by private entity but with commercially attractive returns for the private entity when the users pay for the usage of the service. Capital outlay for the government in such a case would usually be nominal to nothing. PPP may not be applicable in all projects but a study should be conducted with the industry, to explore possible projects so as to overcome budget constraints.

Similarly, subscription based model provides low cost adoption of technology where large expenditure outlay is not possible. Services or technology can be made available immediately upon subscription and this takes away the protracted wait and risks involved in system or infrastructure development. An exemplary case study of subscription model is the government adopting the use of Google Apps where functional and reliable services are readily made available. Subscription model can also be used on technology for the purpose of test bedding where technology can be deployed as part of a feasibility study.

Note that subscription-based model could also take place between agencies through inter-agency charging. This happens when an agency developed a reusable and sharable solution that other agency can utilise.

4.3 Lack of Human Resource Capability

It was duly noted, during the review, that execution and maintenance of projects are often hampered by lack of human resource capability. It is acknowledged that the number of government's ICT professionals is limited and their job scope varies widely. Getting the ICT professionals proficient in all aspects of ICT is nearly impossible.

Lack of capability would also prevent effective evaluation of ICT solutions and whether the end product delivered its expected outcome.

The review recommends:

Establish Training and Competency Roadmap

It is crucial to adopt the ICT Training Roadmap defined in the ICT Management Framework for technical competency development. The ICT Training Roadmap provides a suite of technical competencies required for different streams of ICT professionals and provides a good and consistent competency guide. In addition, a set of soft skills will need to be identified beyond the technical skills defined in the ICT Training Roadmap. Trained and certified

human resources will allow for the government to carry out their ICT plans effectively. In view of the lack of funding, RGoB will invite trainers or training institutions to Bhutan for the training of human resources. Train the trainer method is a feasible option so as to ensure competency in a core group of ICT professionals and subsequently passing their knowledge to a larger group of ICT professionals.

It is also important that workshops or forums for government leaders are organised. ICT knowledge and awareness allow key decision makers to effectively to plan and drive ICT initiatives.

Augment Capability with Domestic or Foreign Expertise

Government needs to engage resources with the right expertise whether domestically or from overseas to augment current human resource capability. The objective is for the experts to work alongside government ICT officers so as to impart skills and experience during the implementation. Government agencies can also collaborate with educational institutions, IT association or industry partners to execute some of its programmes. A framework agreement can be put in place to facilitate the hiring of these experts especially for mission critical programmes.

Establish Expert Pools

Establishing the expert pools developed in the ICT Management Framework help ensure human resources with similar competencies are brought together into a common platform. This platform provides quick response when specific resolution is required, but also provides a knowledge base where expertise can be shared and further enhanced.

4.4 Alignment of ICT Plan

ICT Planning is an essential tool for the Government of Bhutan to strategize development of ICT as a key enabler for national development. Since the creation of the ICT Roadmap in 2011, RGOB has gone forward to develop ICT Masterplan in e-Government, Education, Health and Tourism sectors. Independent ICT planning initiative was also carried out in the Agriculture sector.

The review recommends:

Transition ICT Roadmap into National ICT Masterplan

The various ICT Masterplans provide the foundation for developing a national level ICT Masterplan. The National ICT Masterplan will encapsulate the various sectors' ICT aspiration to form an overarching strategic ICT plan. The National ICT Masterplan will define the national direction in terms of ICT vision and goals. Aligning with the timeline of the national Five-Year Plan, the development of ICT Roadmap should thereby transition into the development of a National ICT Masterplan by middle of 2018. Output from the national masterplan would form the basis of ICT programmes in the 12th Five-Year Plan.

5. CONCLUSION

A series of workshops, conducted with various stakeholders, provided insights to the implementation of ICT programmes identified in the Bhutan ICT Roadmap. These insights provided the data points for the revision of the Bhutan ICT Roadmap.

The review concluded that the objective, outcomes and goals of the ICT roadmap were still relevant except for minor enhancement. Of the 34 programmes, 23 programmes were identified to be 'in progress' or 'not started'. As part of the review exercise, these uncompleted programmes were ranked, assigned with KPIs, included implementation cost and allocated with the responsible agency.

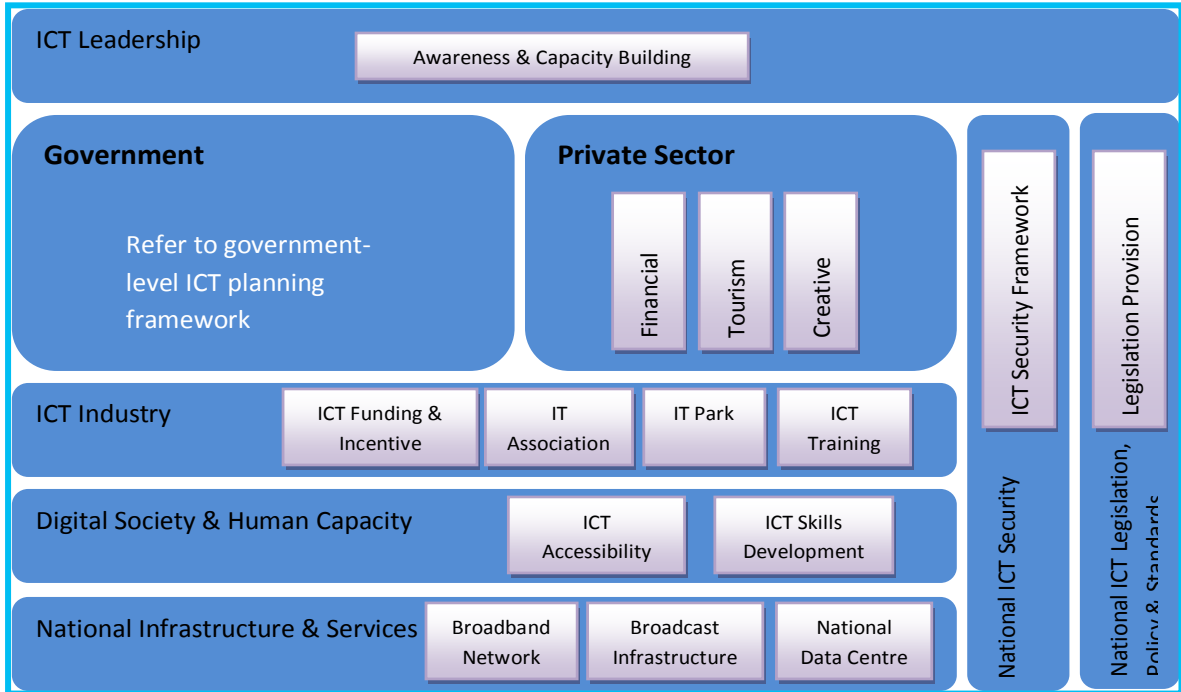
Key recommendations such as commitment to change management planning, exploring other funding models (such as PPP), building up human resource capability by adopting ICT competency training roadmap and the development of a national ICT masterplan are important for government to carry out.

It is essential that governance be in place for the execution of all ICT programmes. All programmes will therefore need to be closely monitored by the e-Governance committees.

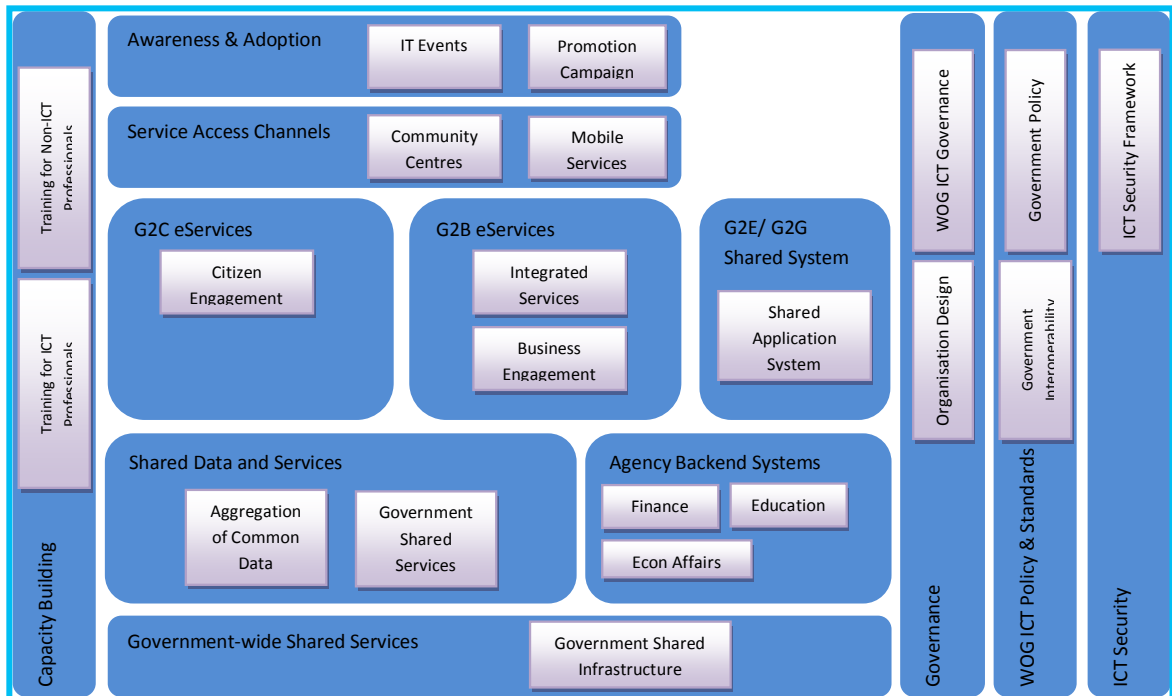
In conclusion, the revised ICT roadmap reflects the current status of ICT programmes and offered several recommendations to overcome implementation challenges. The revised Bhutan ICT Roadmap and the 11th Five-Year Plan will provide the necessary impetus for ICT development in Bhutan for the next four years.

APPENDICES

Appendix A: Bhutan's ICT Framework



National-level ICT Planning Framework



Government-level ICT Planning Framework

Appendix B: Glossary

Acronym	Description
DITT	Department of Information Technology and Telecom
GNH	Gross National Happiness
GNHC	Gross National Happiness Commission
ICT	Information Communications Technology
RCSC	Royal Civil Service Commission
RGOB	Royal Government of Bhutan
TCB	Tourism Council of Bhutan
MOE	Ministry of Education
MOEA	Ministry of Economic Affairs
MOF	Ministry of Finance
MOIC	Ministry of Information and Communications
WOG	Whole-of-Government

Appendix C: References

1. Ministry of Information and Communications, 2011, Bhutan ICT Roadmap
2. Gross National Happiness Commission, 2013, Eleventh Five Year Plan
3. Ministry of Information and Communications, 2012, E-Government ICT Masterplan