

DECLARATION

I hereby declare that the thesis submitted for a D.Litt. et Phil. Degree to the University of Johannesburg, apart from the assistance recognised, is my own work and has not been formally submitted to another university for a degree.

Stephen M. Mutula



SUMMARY

The purpose of this research was to determine the status of e-readiness of Small and Medium-Sized enterprises (SMEs) in the ICT sector in Botswana with respect to information access using ICTs for competitiveness in the local and international markets. The population of study consisted of key informants from 114 SMEs in the ICT sector in Gaborone and Francistown, the capital city and the second largest city of Botswana respectively. The official list of ICT companies provided by the government of Botswana was used as the sampling frame.

The research used a two-phase design - the preliminary survey and the main survey of the project. The preliminary survey consisted of two stages. During the first stage, a short structured questionnaire was administered to a census of 114 key informants from SMEs in the ICT sector. During the second stage, six focus group discussions were used to collect data from key stakeholders in the ICT sector who included representatives from: ICT companies, ICT professional body in Botswana, government utility corporations, academia and the business community. The participants in the focus group discussions involved representatives from 55 SMEs who were identified like in the first stage using the government official list of SMEs in Botswana.

The quantitative data collected through questionnaire were analysed using SPSS while the qualitative data collected through focus group discussions and in-depth interviews were analysed using thematic tables. The results were represented using tables, pie charts, categories and narrations. The results of the preliminary survey of the project were used to characterise the ICT sector in terms of its size, key players, nature of businesses, products and services traded in, distribution of business by location and the issues that affected the sector. This characterisation was important in two main respects. Firstly, it provided a clear roadmap for the design of the main survey of the research since little information existed on the subject of e-readiness on Botswana in general and with respect to SMEs in particular. Similarly, the government had invested a lot of resources in ICT infrastructure development and was focusing on SMEs especially those in the ICT sector to diversify the economy from the dominant diamond mining to service industry. Secondly, the results of the preliminary survey of the project supported the development of a structured interview schedule that was used during the main survey of the project.

During the main survey of the research data was collected from companies that participated in the focus group discussions. From the focus group list of participants, an alphabetical name list of 55 SMEs was created. There were 43 Small-Sized and 12 Medium-Sized enterprises that were represented during the focus group discussions. For the purpose of carrying out the structured interviews, SMEs were stratified into two (Small-Sized enterprises and Medium-Sized enterprises). From the Small-Sized enterprises stratum, 20 companies were systematically selected (from the 43) taking every other member on the list. On the other hand, in the Medium-Sized enterprises stratum, all the 12 enterprises were selected for interviews because the number of respondents was small. The data collected was analysed using categories and thematic tables because it was largely qualitative. The results were presented in the form of thematic tables and through narrations.

The findings from the SMEs surveyed indicated that most of the SMEs in the ICT sector in Botswana were Small-Sized enterprises that were largely not e-ready to participate in the global electronic business environment because of several impediments such as: the lack of awareness, inadequate policy and legislative framework, poor telecommunication and electricity infrastructures, poor e-commerce infrastructure, inadequate government support, the lack of access to credit, investment barriers, the lack of critical ICT skills and more.

The major outcomes of the project include an exposition of the e-readiness status of SMEs in the ICT sector in Botswana, a road map that can assist the government of Botswana to establish a strong export-oriented ICT sector. The weaknesses and strengths of Botswana's e-readiness status with regard to SMEs are brought to the fore, thus creating awareness upon which the government can design interventions that are tailored to meet Botswana's SMEs' specific needs. Similarly, this project provides a framework upon which the government can benchmark against its counterparts in the rest of the world in order to define its investment priorities. The project also provides baseline information which the government could use to implement appropriate policy and legislative decisions in order to enhance the e-readiness of SMEs in the ICT sector in Botswana. Finally, the new integrated e-readiness tool that was developed in this project is the first of its kind to bring the different major components of e-readiness (such as enterprise, ICT, human resources, information and external environment readiness) into a single assessment tool with great attention paid to information access. The tool is also modular in design and thus can allow specific e-readiness assessment of individual segments of society to be modelled

independently of each other. The tool also enriches the qualitative aspects of e-readiness that are only minimally addressed in a few of the existing macro e-readiness assessment tools.

Among the key recommendations from the research is the need for the government of Botswana to promulgate relevant policies and implement pragmatic programmes that would enable SMEs in the ICT sector in the country to use various information technologies in order to gain access to relevant information regarding access to credit, investment opportunities, partnerships, education and training opportunities so that they can effectively participate in both the local and international markets. The policy changes and programmes to be undertaken by the government should be underpinned by an effective legislative and regulatory framework that would enable the small business firms to identify, acquire, process, organise, disseminate and apply information for competitive advantage through the effective deployment and application of ICTs.



ACKNOWLEDGEMENTS

I am greatly indebted to my supervisor, Prof. Pieter A. van Brakel, who tirelessly provided me with meticulous guidance and support during the entire period of this project.

I wish to express sincere gratitude to my colleagues at the Department of Library and Information Studies of the University of Botswana who encouraged me throughout this project until it was brought to a successful completion.

Lastly, but not least, I am sincerely indebted to my wife and children - Dorah Lyaka Mutula, Barbara Lynn Mutula, Katie Musungu Mutula and Melody Namuma Mutula respectively who endured my long stay away from home while working on this project. Their understanding was critical in the successful completion of this work. To the Almighty God, I say let His name be praised!



CONTENTS

DECLARATION	i	
SUMMARY	ii	
ACKNOWLEDGEMENT	v	
LIST OF APPENDICES	xvi	
LIST OF FIGURES	xvi	
LIST OF TABLES	xvii	
1	CHAPTER 1: THE PROBLEM AND ITS CONTEXT	1
1.1	CONTEXT OF THE RESEARCH PROBLEM ON E-READINESS OF SMEs IN THE ICT SECTOR IN BOTSWANA	1
1.1.1	Information access in business enterprises	4
1.1.2	Factors affecting information access and use in business enterprises	6
1.1.3	Information access by SMEs	7
1.2	E-READINESS: HISTORY AND ORIGIN	9
1.2.1	Macro e-readiness assessments with respect to information access	10
1.2.2	Micro e-readiness assessments with respect to information access	12
1.2.3	Value of e-readiness assessments	14
1.2.3.1	Value of e-readiness assessment research for Botswana	15
1.3	RESEARCH PROBLEMS OF E-READINESS ASSESSMENT OF SMEs IN THE ICT SECTOR IN BOTSWANA	16
1.3.1	Overall research problem on e-readiness assessment of SMEs in the ICT sector in Botswana	17
1.3.1.1	Sub-problems on e-readiness assessment of SMEs in the ICT sector in Botswana	17

1.4	TOOLS, THEORIES AND APPROACHES FOR E-READINESS ASSESSMENTS WITH RESPECT TO INFORMATION ACCESS	18
1.5	SIGNIFICANCE AND JUSTIFICATION FOR RESEARCH ON E-READINESS ASSESSMENT OF SMEs IN THE ICT SECTOR IN BOTSWANA	19
1.6	METHODOLOGY FOR E-READINESS ASSESSMENT OF SMEs IN THE ICT SECTOR IN BOTSWANA	21
1.7	DELIMITATIONS OF THE RESEARCH ON E-READINESS ASSESSMENT OF SMEs IN THE ICT SECTOR IN BOTSWANA	22
2	CHAPTER 2: CURRENT STATUS OF E-READINESS ASSESSMENTS	24
2.1	INTRODUCTION	24
2.2	CONCEPT OF SMALL AND MEDIUM-SIZED ENTERPRISE (SME)	26
2.3	INTERNATIONAL STATUS OF THE SMEs SECTOR	28
2.3.1	SMEs in Europe and North America	28
2.3.2	SMEs sector in Africa and Asia	29
2.3.3	SMEs sector in the SADC region	30
2.3.4	SME sector in Botswana	33
2.4	ORIGIN OF CONCEPT OF E-READINESS	34
2.5	MACRO E-READINESS STATUS IN THE GLOBAL ENVIRONMENT	37
2.5.1	Global e-readiness status of Europe	38
2.5.2	Global e-readiness status of North and South America	39
2.5.3	Global e-readiness status of the Asia-Pacific	41
2.5.4	Global e-readiness status of the Middle East	41
2.5.5	Global e-readiness status of Africa	42

2.5.6	Global e-readiness status of the SADC region	45
2.5.7	Botswana's ICT infrastructure: Implications for e-readiness status	50
2.5.8	Drivers for ICT infrastructure development in Botswana	60
2.5.8.1	E-readiness status in Botswana	61
2.6	GLOBAL STATUS OF E-READINESS OF SMEs	65
2.6.1	E-readiness of SMEs in North America	65
2.6.2	E-readiness of SMEs in Europe	66
2.6.3	E-readiness of SMEs in the Middle East	69
2.6.4	E-readiness of SMEs in the Asia-Pacific	70
2.6.5	E-readiness of SMEs in the Caribbean	70
2.6.6	E-readiness of SMEs in Africa	71
2.7	GLOBAL E-READINESS COMPETITIVENESS OF SMEs	73
2.7.1	North America: e-readiness status and business competitiveness	76
2.7.2	Western Europe: e-readiness status and business competitiveness	78
2.7.3	Eastern Europe: e-readiness status and business competitiveness	79
2.7.4	The Asia-Pacific: e-readiness status and business competitiveness	80
2.7.5	Latin America and the Caribbean: e-readiness status and business competitiveness	81
2.7.6	The Middle East and Africa: e-readiness status and business competitiveness	82
2.7.7	SADC: e-readiness status and business competitiveness	83
2.8	CONSTRAINTS AND CHALLENGES OF DEPLOYING E-READINESS INFRASTRUCTURE	84
2.9	GLOBAL STATUS OF ICT AWARENESS, LITERACY AND SKILLS AMONGST SMEs	87
2.9.1	Europe: status of ICT awareness, literacy and skills amongst SMEs	89

2.9.2	North and South America: status of ICT awareness, literacy and skills amongst SMEs	91
2.9.3	Asia-Pacific: status of ICT awareness, literacy and skills amongst SMEs	92
2.9.4	The Caribbean: status of ICT awareness, literacy and skills amongst SMEs	93
2.9.5	Africa: status of ICT awareness, literacy and skills amongst SMEs	93
2.10	MEASURES NECESSARY FOR PROPELLING SMEs TO E-READINESS STATUS	96
2.11	THEORETICAL FRAMEWORK OF E-READINESS	98
2.11.1	Rogers diffusion of innovation theory	99
2.11.1.1	Rogers' model application for e-readiness assessments	102
2.11.2	Technology acceptance model	103
2.11.2.1	Technology acceptance model application to e-readiness assessments	106
2.11.3	Information utilization potential (IUP) model	106
2.11.4	E-readiness decision adoption process	108
2.12	CONCLUSION	111
3	CHAPTER 3: METHODOLOGIES AND TOOLS FOR E-READINESS ASSESSMENTS	115
3.1	INTRODUCTION	115
3.2	STATUS OF METHODOLOGIES AND TOOLS FOR INVESTIGATING E-READINESS ASSESSMENTS	117
3.2.1	E-readiness ranking tool of the Economist Intelligence Unit (EIU)	118
3.2.1.1	Economist Intelligence Unit global e-readiness rankings of countries	119
3.2.2	Readiness Guide for Living in the Networked World	122
3.2.3	Readiness for the Networked World	123
3.2.4	APEC's E-Commerce Readiness Guide	123

3.2.5	Risk E-Business tool (Ready? Net.Go)	124
3.2.6	Mosaic's Global Internet Diffusion Framework	125
3.2.7	World Information Technology International Survey of E-Commerce	126
3.2.8	SADC E-readiness assessment tool	127
3.2.9	The World Bank e-readiness tool	128
3.2.10	International Records Management Trust E-readiness tool	128
3.2.11	e-Europe Action Plan model for building skills in an information society	130
3.2.12	Global Technology Index (GTI)	131
3.2.13	Negotiating the Digital Divide Guide	131
3.3	MICRO E-READINESS ASSESSMENT TOOLS AND METHODS	132
3.4	INFORMATION LITERACY COMPETENCY MODELS	133
3.4.1	American Library Association (ALA) information literacy standards model	133
3.4.2	Society of College, National and University Libraries (SCONUL) information literacy model	136
3.4.3	World summit on information society declaration of principles	137
3.4.4	IFLA model of information society	139
3.4.5	Information society index	139
3.5	COMPARATIVE ASSESSMENT OF CURRENT E-READINESS MEASUREMENT TOOLS	140
3.5.1	Strengths and weaknesses of e-readiness assessment methods and tools	149
3.6	SUITABILITY OF THE EXISTING E-READINESS ASSESSMENT TOOLS	155
3.7	DESIRABLE CRITERIA FOR THE PROPOSED TOOL FOR E-READINESS ASSESSMENT	158
3.8	MAPPING EXISTING E-READINESS AND INFORMATION LITERACY COMPETENCY MODELS TO THE PROPOSED E-READINESS TOOL	158

3.9	THE PROPOSED INTEGRATED E-READINESS ASSESSMENT TOOL	165
3.9.1	Components of the proposed e-readiness tool	167
3.9.2	Mapping proposed integrated e-readiness tool to the interview schedule	172
3.10	KEY ASPECTS OF THE NEW INTEGRATED E-READINESS MODEL	179
3.11	KEY VARIABLES IN THE NEW INTEGRATED E-READINESS TOOL	181
3.11.1	ICT use and awareness	182
3.11.2	Digital literacy	183
3.11.3	Information access	183
3.11.4	Perception	184
3.11.5	Sophistication of use	184
3.11.6	Information needs	184
3.11.7	Communication channels	185
3.11.8	External business environment	185
3.11.9	Affordability and connectivity	185
3.11.10	ICT skills	185
3.12	CONCLUSION	186
4	CHAPTER 4: METHODOLOGY AND RESEARCH DESIGN	188
4.1	INTRODUCTION	188
4.2	RESEARCH DESIGN	190
4.3	POPULATION AND SAMPLING PROCEDURE	192
4.3.1	Sampling procedure: preliminary survey of the research	192
4.3.2	Sampling procedure: main survey of the research	194
4.4	DATA COLLECTION PROCEDURE	195

4.4.1	Data collection procedure: preliminary survey of the research	196
4.4.2	Data collection procedure: main survey of the research	198
4.5	DATA ANALYSIS AND PRESENTATION OF FINDINGS	198
4.5.1	Data analysis and presentation of preliminary survey findings	198
4.5.2	Data analysis and presentation of main survey findings	199
4.6	MEASURES OF INSTRUMENTS	199
4.6.1	Measures of reliability	200
4.6.2	Measures of validity	200
4.7	ETHICAL DIMENSION OF THE RESEARCH	202
4.8	CONCLUSION	202
5	CHAPTER 5: INTERPRETATION OF FINDINGS	204
5.1	INTRODUCTION	204
5.2	DISCUSSIONS AND INTERPRETATION OF RESULTS	206
5.2.1	Conversational interviews model	206
5.2.2	Power relations model	206
5.3	INTERPRETATION OF FINDINGS ON E-READINESS OF SMEs IN BOTSWANA	207
5.3.1	Enterprise readiness context	208
5.3.1.1	Core ICT business of SMEs in the ICT sector in Botswana	208
5.3.1.2	Status of e-readiness strategies in SMEs in the ICT sector in Botswana	210
5.3.1.3	Information related exports by SMEs in the ICT sector in Botswana	213



5.3.1.4	Market share of the SMEs in the ICT sector in Botswana	216
5.3.1.5	Compliance with international quality standards by SMEs in the ICT sector in Botswana	217
5.3.1.6	Value attached to information by SMEs in the ICT sector in Botswana	218
5.3.1.7	Information management unit(s)/post(s) among SMEs in the ICT sector in Botswana	220
5.3.1.8	Status of information management post(s) in SMEs in the ICT sector in Botswana	222
5.3.1.9	Status of ICT and information strategies among SMEs in the ICT sector in Botswana	222
5.3.1.10	Capacity building strategies in SMEs in the ICT sector in Botswana	224
5.3.1.11	Adequacy of ICT skills among SMEs in the ICT sector in Botswana	225
5.3.1.12	ICT budgetary allocation among SMEs in the ICT sector in Botswana	227
5.3.1.13	Level of ICT integration in SMEs in the ICT sector in Botswana	228
5.3.1.14	Online business transactions implemented by SMEs in the ICT sector in Botswana	230
5.3.1.15	Promotion of ICT use within SMEs in the ICT sector in Botswana	232
5.3.1.16	Adequacy of electricity supply to SMEs in the ICT sector in Botswana	233
5.3.1.17	Qualifications and prior ICT experience of CEOs in SMEs in the ICT sector in Botswana	234
5.3.1.18	Ways by which SMEs in Botswana promote their ICT products and services	235
5.3.2	Human resources readiness context	236
5.3.2.1	Information literacy competencies of staff in SMEs in Botswana	236
5.3.2.2	ICT awareness among SMEs in the ICT sector in Botswana	239
5.3.2.3	Attitudes of staff towards ICTs in SMEs in Botswana	240
5.3.2.4	Adequacy of technical support in SMEs in the ICT sector in Botswana	242
5.3.2.5	Level of ICT usage by staff in SMEs in the ICT sector in Botswana	244
5.3.3	Information readiness context	245

5.3.3.1	Information needs of SMEs in the ICT sector in Botswana	245
5.3.3.2	Sources of information for SMEs in the ICT sector in Botswana	246
5.3.3.3	Means of disseminating information by SMEs in the ICT sector in Botswana	247
5.3.3.4	Information storage and retrieval tools used by SMEs in the ICT sector in Botswana	249
5.3.3.5	Local content generation by SMEs in the ICT sector in Botswana	250
5.3.3.6	Information sharing among SMEs in the ICT sector in Botswana	250
5.3.3.7	Records management practices in SMEs in the ICT sector in Botswana	251
5.3.3.8	Information management standards used by SMEs in the ICT sector in Botswana	252
5.3.3.9	Level of information currency used by SMEs in the ICT sector in Botswana	253
5.3.3.10	Compliance with information security procedures by SMEs in Botswana	254
5.3.3.11	Barriers of access and use of information by SMEs in the ICT sector in Botswana	255
5.3.4	ICT readiness context	258
5.3.4.1	Uses of the Internet within SMEs in the ICT sector in Botswana	258
5.3.4.2	Quality of Internet connectivity in Botswana: implications for SMEs in the ICT sector	260
5.3.4.3	Availability of websites within SMEs in the ICT sector in Botswana	261
5.3.4.4	ICT infrastructures within SMEs in the ICT sector in Botswana	262
5.3.4.5	How SMEs in the ICT sector in Botswana keep abreast of developments in ICTs	263
5.3.4.6	Type of Internet connectivity within SMEs in Botswana	263
5.3.5	External environment readiness context	264
5.3.5.1	Legal and regulatory framework in Botswana: implications for SMEs in the ICT sector	265
5.3.5.2	Quality of network access in Botswana: implication for SMEs in the ICT sector	267
5.3.5.3	Affordability of ICTs by SMEs in the ICT sector in Botswana	269

5.3.5.4	Taxation regime in Botswana: implications for SMEs in the ICT sector	271
5.3.5.5	Trade and investments obstacles experienced by SMEs in the ICT sector in Botswana	273
5.3.5.6	Level of government support to SMEs in the ICT sector in Botswana	274
5.3.5.7	Universal access in Botswana: implications for SMEs in the ICT sector	276
5.3.5.8	Competition policy and consumer protection in Botswana: implications for SMEs	277
5.4	THE NEW INTEGRATED E-READINESS TOOL: IMPLICATIONS FOR SMEs READINESS ASSESSMENTS	279
5.5	SUMMARY AND CONCLUSION OF INTERPRETATION OF FINDINGS	280
6	CHAPTER 6: CONCLUSION AND RECOMMENDATIONS	283
6.1	INTRODUCTION	283
6.1.1	Sub problem 1: International status of e-readiness of SMEs	285
6.1.2	Sub problem 2: ICTs used internationally by SMEs	285
6.1.3	Sub problem 3: International status of methodologies for investigating the e-readiness of SMEs	286
6.1.4	Sub problem 4: The level of e-readiness amongst SMEs in the ICT sector in Botswana with regard to their ability to identify, acquire, process, organize, disseminate and apply information	287
6.1.5	Sub Problem 5: Measures needed to propel SMEs within the ICT sector in Botswana to achieve e-readiness status in order to be able to identify, acquire, process, organize, disseminate and apply information if they had not yet achieved such status	287
6.2	CONCLUSION AND KEY RESEARCH OUTCOMES	287
6.3	KEY RECOMMENDATIONS ON E-READINESS ASSESSMENT OF SMEs IN BOTSWANA	289
6.3.1	Enterprise readiness context recommendations	289
6.3.1.1	Core ICT business of SMEs in the ICT sector in Botswana	289

6.3.1.2	Compliance with international standards by SMEs in the ICT sector in Botswana	290
6.3.1.3	Business strategy / information management integration in SMEs in Botswana	290
6.3.1.4	Capacity building practices among SMEs in the ICT sector in Botswana	291
6.3.1.5	ICT Integration throughout business among SMEs in the ICT sector in Botswana	292
6.3.1.6	Electricity inadequacy to SMEs in the ICT sector in Botswana	293
6.3.1.7	E-readiness status of SMEs in the ICT sector in Botswana	294
6.3.2	Human resources readiness context recommendations	295
6.3.2.1	Information management competencies among SMEs in the ICT sector in Botswana	295
6.3.2.2	ICT awareness among SMEs in the ICT sector in Botswana	295
6.3.3	Information readiness context recommendations	296
6.3.3.1	Information access by SMEs in the ICT sector in Botswana	296
6.3.3.2	Information sharing among SMEs in the ICT sector in Botswana	296
6.3.3.3	Information security practices among SMEs in the ICT sector in Botswana	297
6.3.4	ICT readiness context recommendations	297
6.3.4.1	Internet connectivity in SMEs in the ICT sector in Botswana	297
6.3.4.2	Internet use in SMEs in the ICT sector in Botswana	298
6.3.5	External environment readiness context recommendations	299
6.3.5.1	Legal and regulatory framework in Botswana: implications for SMEs in the ICT sector	299
6.3.5.2	Level of government support to SMEs in the ICT sector in Botswana	300
6.3.5.3	Competition policy and consumer protection in Botswana	301
6.4	FUTURE RESEARCH DIRECTION	302
	REFERENCES	304

APPENDICES **325**

Appendix 1: Self-administered questionnaire to characterize SMEs in the ICT sector in Botswana	325
Appendix 2: Focus group discussions guide to characterise the SMEs in the ICT Sector in Botswana	329
Appendix 3: Structured interview guide for the main survey of study	330
Appendix 4: Findings of preliminary survey stage 1 through a short questionnaire	343
Appendix 5: Findings of focus group discussions	370
Appendix 6: Main survey findings on Small-Sized enterprises (<50 employees)	377
Appendix 7: Main survey findings on Medium-Sized enterprises (>50 employees)	398
Appendix 8: List of acronyms and definition of terms	417

FIGURES

Figure 1: Government data network (GDN) national coverage	52
Figure 2: Microwave network in Botswana	56
Figure 3: Innovation adoption curve of Rogers	99
Figure 4: Agriculture and Food Canada micro e-readiness model	132
Figure 5: Components of the proposed new e-readiness tool	181
Figure 6: Year of establishment of SME in Botswana	358
Figure 7: Control of firm	362
Figure 8: Place where products and services are sold	363

TABLES

Table 1: ICT Investment within Government of Botswana	50
Table 2: Americas: e-readiness rankings in 2004	119
Table 3: Western Europe: e-readiness rankings in 2004	120
Table 4: Asian-Pacific: e-readiness rankings in 2004	120
Table 5: Eastern Europe: e-readiness rankings in 2004	121

Table 6: Africa and the Middle East: e-readiness rankings in 2004	121
Table 7: Summary of macro e-readiness assessment tools	141
Table 8: Summary of strengths and weaknesses of e-readiness assessment tools	152
Table 9: Mapping e-readiness and information competency models to the proposed e-readiness tool	159
Table 10: Mapping of new e-readiness tool to interview schedule	172
Table 11: Focus groups	195
Tables 12-74: Findings of preliminary survey stage 1	343

