

**Enablers of and Barriers to Digital Innovation Success: A Comparative
Study of Structured versus Unstructured Technology Innovation
Environments in Kenya**

A Doctoral Thesis

By

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ABSTRACT

Western theories dominate research on digital innovation in the Global South, neglecting contextual differences. Further, current research lacks focus on how structured versus unstructured innovation environments affect digital innovation success in these contexts. This study's investigation and findings centre on the phenomenon of 'digital innovation success', focusing on digital startups and innovators in Kenya. The study has two objectives: to isolate the enablers of and barriers to digital innovation success in Kenya and to compare the success factors between structured versus unstructured innovation environment. This study uses multiple cases with semi-structured interviews, document reviews, and media analysis. Kleine's Choice Framework was used as the core theoretical lens, from which a conceptual model that guided data analysis was developed. The framework enabled visualisation of digital innovation success systemically and holistically as a development outcome that digital innovators in the Global South strive to achieve. The framework was also used to identify and evaluate the conditions (agency and structure resources) under which digital innovation success opportunities emerge within structured and unstructured environments, thereby revealing their differences and similarities. The study findings in respect of the first objective revealed Entrepreneurship Support Organisations and Innovation Intermediaries as the most influential contextual factor on digital innovation success in Kenya. Results for the second objective revealed structured environment as a significant enabler of success in Kenya but warns against assuming all structures are neutral. The study's first theoretical contribution is an explanation of contextual enablers of and barriers to digital innovation success in the Global South. Second, a theoretical demonstration of how Kleine's Choice Framework can be used as a lens for Information Systems research and for building a conceptual model. The study's first practical contribution is that digital innovators can make informed decisions on the innovation environment that best fits their strengths and startup needs. Second, government and policy makers can better tailor their support for each environment. Further, the study highlights the difference between startups and MSMEs, urging tailored policies for digital startups. Third, investors can leverage the study findings to invest strategically in digital innovation ventures in the Global South.

Keywords: Digital Innovation, Digital Innovation Success, Digital Entrepreneurship, Digital Startup Innovation, Technology Innovation, Innovation Success, Barriers, Enablers, Context in Innovation Ecosystems, Choice Framework.

TABLE OF CONTENTS

1	Introduction.....	1
1.1	Research Background.....	1
1.2	Problem Statement and Research Objective	5
1.3	Research Questions	8
1.4	Empirical Context	8
1.5	Research Methodology Overview	11
1.6	Research Contributions	13
1.6.1	Theoretical Contributions	13
1.6.2	Practical Contributions.....	13
1.7	Assumptions	14
1.8	Structure of the Thesis.....	14
2	Digital Innovation Definition, Models, Theories and Success Factors	16
2.1	Introduction	16
2.2	Definition of Digital Innovation.....	16
2.3	Review of Models of Innovation.....	18
2.3.1	Linear Innovation Model	19
2.3.2	Chain-Linked Innovation Model.....	20
2.3.3	Triple Helix Innovation Model	20
2.3.4	Systems Innovation Theory	21
2.4	Digital Startups/Technology Startups/Digital Enterprises	22
2.5	Digital Innovation/Digital Entrepreneurship Success	23
2.5.1	Digital Innovation/Digital Entrepreneurship Success Parameters	24
2.5.2	ITU's Country-level Enablers of Digital Innovation Success	25
2.6	Global Landscape of Digital Innovation	27
2.7	Digital Innovation Ecosystem in Kenya.....	28

2.7.1	Overview of Digital Innovation in Kenya	28
2.7.2	National and Regional Policy Frameworks on Science, Technology, Innovation, Entrepreneurship and Education	29
2.7.3	Stocktaking of Relevant Digital Innovations in Kenya	30
2.7.4	Relevance of Models of Innovation to the Kenyan Context.....	32
2.8	Extant Research on Enablers of and Barriers to Digital Innovation Success.....	34
2.8.1	Systematic Literature Review (SLR) Approach	34
2.8.2	Thematic Analysis	34
2.8.3	Application of Systematic Literature Review	35
2.8.4	Literature Findings: Enablers of and Barriers to Digital Innovation Success ...	43
2.8.4.1	Digital Technology	43
2.8.4.2	Technology or Innovation Hubs, Business Incubators, Accelerators and Living Labs	44
2.8.4.3	Universities and Research Centres.....	45
2.8.4.4	Financial Capital	45
2.8.4.5	Intellectual Capital	46
2.8.4.6	Networks	47
2.8.4.7	Business Model	48
2.8.4.8	Leadership	48
2.8.4.9	Open Innovation, Hackathons and Code Sprints	49
2.8.4.10	Government.....	49
2.8.4.11	Culture.....	50
2.8.4.12	Discussions and Conclusions	52
2.8.5	Gaps in Literature	55
2.9	Chapter Summary.....	55
3	Theoretical Framework.....	57
3.1	Introduction	57
3.2	Resource Based-View Theory.....	57
3.3	Resource Dependence Theory (RDT).....	60

3.4	Choice Framework (CF).....	61
3.4.1	Components of the Choice Framework	63
3.4.1.1	Development Outcomes	63
3.4.1.2	Structure	64
3.4.1.3	Agency	65
3.4.1.4	Dimensions of Choice	66
3.4.2	Relevance of the Choice Framework to this Study.....	67
3.4.3	Limitations of Dorothea Kleine’s Choice Framework.....	69
3.5	Developing the Study Model (A Refinement of the Choice Framework)	70
3.5.1	Key Study Constructs	71
3.5.2	Mapping Relationships between Study Constructs.....	73
3.5.2.1	Propositions and Research Statements.....	73
3.5.3	Proposed Conceptual Framework based on Choice Framework.	74
3.5.3.1	An Explanation of the Conceptual Framework Components.....	76
3.5.3.1.1	Digital Innovation Success Factors (DISF) Component	76
3.5.3.1.2	Resource Dependency Theory	78
3.5.3.1.3	Capabilities and Degrees of Empowerment Component.....	79
3.5.3.1.4	Development Outcomes	81
3.6	Chapter Summary.....	82
4	Research Methodology	83
4.1	Introduction	83
4.2	Research Philosophy	84
4.2.1	Ontology, Epistemology, Axiology and Methodology	84
4.2.2	Research Paradigms	84
4.2.2.1	Interpretivism	85
4.2.2.2	Critical Research	85
4.2.2.3	Positivism.....	86
4.2.2.4	Post-positivism- Ontological, Epistemological and Methodological Assumptions for this Study	87

4.2.3	Objectivism versus Subjectivism.....	89
4.3	Research Design.....	90
4.3.1	Approach to Theory	91
4.3.1.1	Logical Reasoning Approaches.....	91
4.3.1.2	Qualitative Research Approach.....	92
4.3.2	Research Strategy.....	93
4.3.2.1	Multiple Case Study Research	93
4.3.2.1.1	Research Questions	94
4.3.2.1.2	Propositions	95
4.3.2.1.3	Unit of Analysis.....	95
4.3.2.1.4	Multiple Case Study Identification and Selection Approach	96
4.3.2.1.5	Description of Selected Cases	98
4.3.3	Data Collection and Analysis Methods.....	105
4.3.3.1	Data Collection Methods	105
4.3.3.1.1	Semi-structured Interviews.....	105
4.3.3.1.2	Document Reviews and Media Analysis.....	106
4.3.3.1.3	Sample Size, Saturation and Validity of Results.....	107
4.3.3.2	Data Analysis Methods	109
4.3.3.2.1	Qualitative Data Analysis.....	109
4.3.4	Theory Development Approach.....	109
4.3.4.1	Thematic Analysis (TA).....	111
4.3.4.2	A Post-Positivist Thematic Analysis – Bridging Objectivity and Subjectivity	114
4.3.4.3	Application of Dorothea Kleine’s Choice Framework in Data Analysis	122
4.3.5	Ethical Considerations	122
4.3.5.1	Researcher’s Position and Influence on the Study	123
4.3.5.2	Dynamics of Researcher and Research Participant Relationship.....	123
4.4	Chapter Summary.....	123
5	Findings.....	125
5.1	Introduction	125

5.1.1	Saturation and Validity of Results	126
5.1.1.1	Saturation	126
5.1.1.2	Validity of Results	127
5.2	Contextualization of Research Setting/Location	129
5.2.1	Macro-Context: Profiling of the Empirical Context (Kenya)	129
5.2.1.1	General Statistics about Kenya	129
5.2.1.2	The Kenya Innovation Ecosystem	130
5.2.1.2.1	The Genesis of Kenya’s Digital Innovation Ecosystem	131
5.2.1.2.2	Structures	132
5.2.1.3	Subtle Comparison of Kenya’s Digital Innovation Ecosystem with Silicon Valley	144
5.2.2	Micro Context Analysis (Agency and Capability Currency)	149
5.2.2.1	Digital Innovator/Agency- Profiling of Source or Producers of Digital Innovation in Kenya	149
5.2.2.2	Assessment of Digital Innovator Resource Portfolio (Demographics Approach)	149
5.2.2.3	An Empirical Contextualization of Digital Innovation Success Indicators	152
5.2.3	Meso Context: Innovation Environment Support Services	159
5.2.3.1	Entrepreneurship Support Organisations	159
5.2.3.2	Technology Startup Funding in Kenya	159
5.3	Analysis of Findings on Research Question One	161
5.3.1	Overview of Findings – RQ1	161
5.3.2	Empirical Research Results: Enablers of and Barriers to Digital Innovation Success in Kenya	162
5.3.2.1	Theme Relevance	162
5.3.2.2	Tree Diagram – All Themes	163
5.3.2.3	Multi-Level Theme Hierarchies	164
5.3.2.4	Analytical Exploration of Empirical Themes	178
5.3.2.4.1	Business Model	178
5.3.2.4.2	Capital	179
5.3.2.4.2.1	Financial Capital	179

5.3.2.4.2.2	Intellectual Capital	188
5.3.2.4.2.3	Non-Financial Capital	190
5.3.2.4.3	Culture	190
5.3.2.4.4	Digital Technology	191
5.3.2.4.5	Education.....	192
5.3.2.4.6	Entrepreneurship Support Organisations (ESOs): Business Incubators, Accelerators, Technology Hubs, Research Centres, Academia	193
5.3.2.4.6.1	Academia.....	193
5.3.2.4.6.2	Business Incubators, Accelerators and Technology Hubs	195
5.3.2.4.6.3	Research Institutes	199
5.3.2.4.6.4	Telcos	199
5.3.2.4.7	Government	200
5.3.2.4.8	Leadership	208
5.3.2.4.9	Networks	209
5.3.2.4.10	Open Innovation.....	209
5.4	Analysis of Findings on Research Question Two	210
5.4.1	Comparing the Success Factors between a Structured and an Unstructured Technology Innovation Environment	210
5.4.1.1	Comparative Factor 1: Slower Startup Death or Burn Rate	211
5.4.1.2	Comparative Factor 2: More Networking Opportunities	213
5.4.1.3	Comparative Factor 3: Market Validation Support.....	214
5.4.1.4	Comparative Factor 4: Business Coaching and Mentorship Support.....	215
5.4.1.5	Comparative Factor 5: Financial Support	216
5.4.1.6	Comparative Factor 6: Legal Guidance Support.....	218
5.4.1.7	Comparative Factor 7: Access to Co-working Space.....	219
5.4.2	Connecting Cases, Degrees of Empowerment, Technology Innovation Environment to Secondary DIS Outcomes (Case Based).....	220
5.4.2.1	Connecting Case-A under an STIE to Secondary DIS Outcomes	222
5.4.2.2	Connecting Case-B under an UTIE to Secondary DIS Outcomes	224
5.4.2.3	Connecting Case-C and D to a Failed Outcome	226
5.5	Proposition Testing	229
5.6	Chapter Summary.....	230

6	Discussions	232
6.1	Introduction	232
6.2	The Context Factor in Digital Innovation	233
6.2.1	Beyond Imposition: Contextualizing Theory in the Global South	234
6.3	Reframing Digital Innovation for the Global South.....	235
6.4	Study Limitations	239
6.5	Chapter Summary.....	239
7	Conclusions, Research Contributions and Recommendations for Future Studies.....	240
7.1	Introduction	240
7.2	Study Summary based on Findings.....	240
7.3	Research Contributions	242
7.3.1	Theoretical Contribution.....	242
7.3.2	Practical Contribution	242
7.4	Recommendations for Future Research	243
8	References.....	245
9	Appendices.....	272
9.1	Appendix A: ITU Ecosystem Canvas Heat Map (International Telecommunication Union, 2017)	272
9.2	Appendix B: Government Directive: Enabling Environment for Kenyan Startups	273
9.3	Appendix C: ITU Ecosystem Canvas Tool (International Telecommunication Union 2017)	274
9.4	Appendix D: Codebook.....	275
9.5	Appendix E: Research Participant Consent Form.....	278
9.6	Appendix F: Interview Guide.....	279
9.7	Appendix G: Ethical Approval from UCT	280
9.8	Appendix H: Ethical Approval from Daystar University, Kenya	281

9.9	Appendix I: Research Permit	282
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List of Figures

Figure 1-1: Layout of Thesis.....	14
Figure 2-1: Structure of Chapter 2	16
Figure 2-2: Characteristics of Digital Innovation (Ciriello, Richter & Schwabe, 2018)	17
Figure 2-3: Select Definitions of Digital Innovation.	18
Figure 2-4: Linear Innovation Model (Kline, S. J., & Rosenberg, N., 2010).	19
Figure 2-5: Chain-Linked Innovation Model (Kline & Rosenberg, 2010).....	20
Figure 2-6: Triple Helix Model of Innovation (Leydesdorff, 2012).....	21
Figure 2-7: Systems of Innovation Framework (Vega and Chiasson, 2019).....	22
Figure 2-8: ITU's Ecosystem Canvas Tool (International Telecommunication Union, 2017).	26
Figure 2-9: Literature Search and Selection Criteria	38
Figure 2-10: Number of Publications in Years (2010 to 2020)	43
Figure 2-11: Silicon Valley Innovation and Startup Model.....	51
Figure 3-1: Structure of Chapter 3	57
Figure 3-2: Desired traits of a firm's resources and capabilities (Amit & Schoemaker, (1993)	58
Figure 3-3: The Choice Framework (Kleine, 2013)	63
Figure 3-4: Conceptual Framework. A Refinement of the Choice Framework (Kleine, 2013)	75
Figure 3-5: Digital Innovation Success Factors (DISF) Component (Extracted from Conceptual Framework, a Refinement of Kleine's Choice Framework developed by Author).....	76
Figure 3-6: Capabilities and Degrees of Empowerment Component (Extracted from Conceptual Framework, a Refinement of Kleine's Choice Framework developed by Author)	79
Figure 3-7: Development Outcomes (Extracted from Conceptual Framework, a Refinement of Kleine's Choice Framework developed by Author).....	81

Figure 4-1: Structure of Chapter 4	83
Figure 4-2: Inductive and Deductive Reasoning.	91
Figure 4-3: Six Step Guide to Thematic Analysis.	114
Figure 4-4: Coding Methods.....	117
Figure 4-5: Sample Memo 1	119
Figure 4-6: Sample Memo 2	120
Figure 5-1: Structure of Chapter 5	126
Figure 5-2: Occupation of Research Participants	128
Figure 5-3: Structure Component.	133
Figure 5-4: ESOs in Kenya as of 2022.	134
Figure 5-5: Safaricom Home Fibre WI-FI Prices 2023.	140
Figure 5-6: Agency Component.....	149
Figure 5-7: Startup Life Cycle.	153
Figure 5-8: Tree Map - All Themes	163
Figure 5-9: Structured Environment Support Services (SESS)	210
Figure 5-10: High-level Themes for SESS	211
Figure 5-11: Tree Map - Structured Environment Support Services (SESS) towards Slow Startup Death or Burn Rate.....	212
Figure 5-12: Degrees of Empowerment and DIS Outcomes (Extracted from Conceptual Framework in Chapter 3 of this Thesis)	221
Figure 5-13: Profile of Cases (Extracted from Chapter 4 of this Thesis)	221
Figure 6-1: Structure of Chapter 6	233
Figure 7-1: Structure of Chapter 7	240

List of Tables

Table 1-1: Case Study Selection Criteria.....	11
Table 2-1: Stocktaking of Relevant Digital Innovations in Kenya.....	31
Table 2-2: Inclusion and Exclusion Criteria Summarised	39
Table 2-3: Count of Search Results before and after Exclusion Criteria.....	39
Table 2-4: Selected Studies by Type and Source.....	39
Table 2-5: Publication Source Distribution	41
Table 2-6: Emerging Themes.....	41
Table 4-1: Research Design Overview Methods	84
Table 4-2: Case Study Selection Criteria.....	97
Table 4-3: Selected Cases	99
Table 4-4: Document Review and Media Analysis	107
Table 5-1: Profile of Study Participants.....	127
Table 5-2: Measures or Indicators of Digital Innovation Success.....	155
Table 5-3: Theme Relevance by Case and Code Count	162
Table 5-4: Multi-Level Theme Hierarchies	165
Table 5-5: Multi-level Sub-themes under Capital Theme	181
Table 5-6: Business Incubators, Accelerators and Technology Hubs Services.....	196
Table 5-7: Multi-level Sub-themes under Major Theme ‘Government’	200
Table 5-8: Factors Influencing Choice of a STIE in Kenya	222
Table 5-9: Factors Influencing Choice of an UTIE in Kenya.....	224
Table 5-10: Proposition Testing Results.....	230

1 INTRODUCTION

1.1 Research Background

The transformative power of digital innovation on various facets of human life, society and business is a growing research agenda in Information Systems research. So digital innovation can be seen as a “fundamental and key concept in Information Systems Research” (Sanner & Nielsen, 2018, p. 1). Digital innovation involves application of digital technology to improve an existing or develop a new service embedded with software-based capabilities (Yoo, Henfridsson, & Lyytinen, 2010; International Telecommunication Union, 2017). Fichman, Santos, and Zheng (2014, p. 333) define digital innovation as “a product, process or business model that is perceived as new, requires significant changes on the part of adopters, and is embodied in or enabled by IT”.

Researchers attribute the acceleration in digital innovations to increased access to digital technologies (Ross, Mitchell, & May 2012) and connectivity between people through mobile devices (Demirkan, Spohrer, & Welser, 2016). Ciriello, Richter, and Schwabe (2018, p. 564) view digital technology as “self-referential” as it is “both the result of and the basis for developing digital innovations, enabling high scalability and low entry barriers that lead to wide participation and democratised innovation”. Digital technology forms part of Information and Communication Technologies (ICTs) that are used to create, and are a result of, digital innovation. Uber, Airbnb, Amazon, Netflix, Alibaba, Facebook, Skype, Google are some of the prominent examples of global digital innovations that have caused a disruption in their industry (Demirkan, Spohrer, & Welser, 2016). These digital innovations use and are forms of ICTs that solve a problem by enabling humans to connect, share data and information and access, deliver, and/or provide (digital) products and services.

Digital innovation is an important driver of digital economies. In developing countries, the concept of digital innovation has been manifested in various sectors albeit in an environment of ‘scarcity’ (Srinivasa & Sutz, 2008) characterized by “shortage of finance and human resources for production, exchange and consumption as well as a failure of government institutions to address these” (Ngoasong, 2018, p. 484). Mungai, Jimenez, Kleine, & Van Belle, (2018) note that bottom-up models of innovation are prominent in the Global South. Such

innovation models emanate from “individuals, small groups and communities” (Ross et al., 2012, p. 469) that see or experience a need or problem that affects them directly or indirectly. In addressing the identified society challenges through a digital innovation, a business entity is most often born if previously not existent. Digital entrepreneurship has thus been used interchangeably with digital innovation in some studies. Bogdanowicz (2015) defines digital entrepreneurship as an “economic activity that involves identification and exploitation of new ICT or ICT-enabled products, processes and corresponding markets”. Elia, Margherita, and Passiante (2020, p.5) define it as “the convergence of entrepreneurship and digital technologies” resulting to new business ventures. They note and address a gap in entrepreneurship research on the role of digital technology and the need for new definition of entrepreneurship within the context of digital economies. They emphasise the need for empirical validation of the resultant ‘interpretive model’ from their study. The study recommends research agendas, one being the need for further investigation on ‘motivating driver’ of digital entrepreneurship stakeholders. This study also uses ‘digital innovation’ and ‘digital entrepreneurship’ interchangeably.

In the last decade, digital startups or technology startups have been seen to be at the forefront of digital innovation or digital entrepreneurship. Huang, Henfridsson, Liu, and Newell (2017, p. 301) define a digital startup as a “digital venture growing by drawing on and adding to digital infrastructure to scale their business at an unprecedented pace through digital innovation”. The size of most digital startups is usually micro, small, or medium (Díaz-Santamaría & Bulchand-Gidumal, 2021). This study’s definition of digital startups or technology startups includes digital Micro and Small Medium Enterprises (MSMEs) also known as “digital enterprises” (Murage, 2018, p. xiv) that “draw on or add to the digital infrastructure to scale their businesses” (Huang, et al., 2017, p. 301). Digital startups are seen as important vehicles for economic growth (Díaz-Santamaría & Bulchand-Gidumal, 2021). In this digital era, digital or technology startups have gained more relevance as drivers of sustainable digital economies. Startup support has become strategically important for “sustainable economic development” (Díaz-Santamaría & Bulchand-Gidumal, 2021, p.1; Voicu-Dorobanțu, Jinaru, & Caragea, 2014), especially for countries in the Global South. In a (post-)pandemic world, digital startups have disrupted traditional sectors through innovation and creation of “knowledge intensive products and services” (Díaz-Santamaría & Bulchand-Gidumal, 2021, p. 1). The disruption is

also evident in the innovative business models used by these startups, which differ from traditional models. As a result, digital startups operate in “conditions of extreme uncertainty” (Díaz-Santamaría & Bulchand-Gidumal, 2021, p. 1). Such volatile business environments could potentially hinder digital startup investment and funding due to high risks. The need to understand what enables the success of digital innovations emanating from digital or technology startups is now more than ever relevant and important for digital innovation stakeholders, such as digital or technology startups themselves, government, investors, and academia.

Research on digital innovation success has mostly focused on top-down innovations or innovations that emanate from large firms’ R&D initiatives (Ross et al., 2012). The pivotal role that digital startups play in building sustainable economies necessitates the need for research focused on understanding what success means to these startups and how it can be enabled. Díaz-Santamaría and Bulchand-Gidumal (2021) note that definitions and meaning of digital or technology startup success is influenced by “multiple dimensions, different theoretical approaches and empirical contexts”. Further, they posit that current research on digital innovation success lacks a “common denominator” for what is “understood as success” (p. 1). For instance, how success is defined by researchers, or even by digital startups themselves, can be different depending on the context. The success of digital innovations in the Global south continues to be explained based on the Silicon Valley narrative and western theories that could pose contextual fit challenges and ignore the importance of the “epistemologies of the south” (Jimenez & Roberts, 2019, p.5). In a policy brief published on United Nations website titled ‘A human-centred approach to innovation to accelerate progress towards the SDGs’, Dorothea Kleine posits that the use of Silicon Valley as a guiding model on innovators and the nature of innovation could result into “insufficient framing” (Kleine, n.d.) and understanding of human beings (innovators, users and other stakeholders) and their role in an innovation process, particularly innovations that occur in other contexts. She notes the need for “perspectives from other disciplines for a more holistic understanding” (Kleine, n.d., p.2). This study focuses more on digital startups or digital enterprises and not just Micro, Small and Medium Enterprises (MSMEs), because the later can involve mere provision or distribution of already existing products and services, with no innovative technology-based value addition to their products, services, distribution process or the business. This study adopts Díaz-Santamaría and

Bulchand-Gidumal (2021, p.3) profiling of digital startups as enterprises that “have a technological base, a founder or founders, a novelty (in the product or final service provided), a company size that is either micro, small or medium, and are progressively in search for a scalable and replicable business model and seek funding to commercialise an idea”.

This study explores the digital innovation success phenomenon by assessing structured and unstructured technology innovation environments present in Kenya. Recommendations put forward towards enabling the success of digital innovations birthed by digital startups include business incubation and acceleration. Incubated digital startups mostly follow a structured innovation process defined by business incubators. There are also many digital startups who operate outside a business incubation or related environment. Such startups often define their own innovation path that usually lacks structure. The activities of both categories, which is incubated and non-incubated digital startups, result into noteworthy digital innovations with potential to contribute to growth of digital economies. Díaz-Santamaría and Bulchand-Gidumal (2021, p.3) note that business incubators, accelerators and other innovation intermediaries have been seen as “increasingly important in promoting” startups. Further, they note that it is possible that a choice between one accelerator over another could have a “significant economic difference on the performance of a startup” (p.3). They add that incubators could attract the rise of new or “unexpected” (p.3) digital startups while inducing opportunities for growth for existing startups. A study that explores digital innovation success phenomena cannot ignore the innovation environment within which such digital innovations are conceptualised, executed, and commercialised.

While it is possible to have innovation support structures outside an incubation environment, the proposed study categorizes all digital or technology innovations that occur in a controlled and governed environment such as a business incubator, a technology innovation hub, a living lab, or an accelerator as structured digital innovations. On the other hand, unstructured digital innovations include innovations that occur outside of a controlled environment such as a technology innovation hub, incubator, accelerator, living labs among other similar environments. This study recognizes other benefits incubation environments provide besides structure but did not focus on them. There is limited academic research on specific factors that enable or hinder success of digital innovations in a structured versus an unstructured innovation of environment. This study isolates and compares enabling and debilitating factors present in

these innovation environments. As both innovation environments are present in the Global South, contextualized research on digital innovation success in the South must consider ‘innovation environment’ as an important construct with potential to influence study results.

This study followed a post-positivist paradigm to isolate potential enablers of and barriers to digital innovation success in structured versus unstructured innovation environment in Kenya. Kenya is a suitable empirical location because of the existence of the phenomenon of interest, contextual fit as a developing country (Global South) and presence of reliable and adequate data about digital innovation success in the Global South. Despite the clear innovativeness of the Kenyan people and the existence of a vibrant digital innovation ecosystem (Cunningham, Cunningham, & Ekenberg, 2014) current studies on Kenya, its digital innovation ecosystem and innovation success in general are mostly practitioner reports and publications. There is a dearth of academic research on enablers of and barriers to success of digital innovation emanating from technology startups in Kenya, while comparing the factors within structured and unstructured innovation environment. This study is therefore relevant, timely and well located.

1.2 Problem Statement and Research Objective

In a (post-)pandemic world, digital innovations have gained prominence and relevance as important drivers of digital economies. Although current research on the general concept of innovation has made relevant contributions, there are not enough studies on digital innovation success phenomenon, especially in the Global South context. Díaz-Santamaría & Bulchand-Gidumal, 2021, p.1) report that “empirical context, theoretical approaches and multiple dimensions” of digital startups must be considered and defined when mapping out “factors for obtaining success”. This is because current research on digital innovation success lacks a “common denominator” on what is “understood as success” (p.3). It is not the purpose of this study to model how digital innovation success should be defined for digital startups, including those in the Global South. Rather, the focus is to map what enables or hinders digital innovation success in Kenya, based on research participants’ feedback, thereby basing the enablers and barriers on their contextual understanding or definition of digital innovation success.

Previous studies on digital innovation confirmed a lack of coherent accounts of potential enablers of and barriers to digital innovation success emanating from digital startups in the

Global South. Non-academic or practitioner-based literature (blog postings, white papers, consultancy reports) on digital innovation, digital startups/technology entrepreneurs, technology hubs in Africa (Ngoasong, 2018; de Beer, Millar, Mwangi, & Rutenberg, 2017) is more prominent. There is very limited, if any academic research on differential factors that enable or hinder ‘digital’ innovation success in a structured versus unstructured innovation environment, within a developing country context. This confirms a theoretical research gap. Moreover, most of the research on digital innovation is situated in a Global North context, especially Silicon Valley. The success of digital innovations in the Global South continues to be explained based on the Silicon Valley narrative and western theories as a lens (Mutegi & Van Belle, 2021). This may pose contextual fit challenges when applied to studies based in the Global South. In such instances, it could be erroneous to assume that the outcome of research based on literature reviews of studies from the Global North is automatically representative of, or applicable to innovations from the Global South, thereby disregarding their unique contextual conditions. The use of western theories alone as a lens to explain the digital innovation success phenomenon in the Global South could be seen as a disregard of the “epistemologies of the south” or the “ways of knowing” of the south (Jimenez & Roberts, 2019, p.5-6). This confirms an empirical research gap.

It is important to solve the above-mentioned problem because the Global South has unique conditions and ways of doing things (culture), which may potentially have a considerable direct or indirect influence on the outcome of development activities such digital innovations and digital entrepreneurship, which drive digital economies. Context is important especially for studies in emerging economies, as the Global South and Global North contexts differ in types, intensities, and attributes of innovation environments (Anderson & Ronteau, 2017; Baller, Dutta, and Lanvin, 2016; Mutegi & Van Belle, 2021). An example is Kenya’s innovation environment with unique conditions such as a volatile macroeconomic environment (Murage, 2018), scarce resources, culture, political climate, and nascent structured (incubated) and unstructured (non-incubated) innovation environments. Srinivasa and Sutzb (2008, p.1) argue that “technological innovation is a contextual process whose relevance should be assessed depending on the socio-economic condition it is embedded in”. The innovation environment comprises of several socio-economic conditions. Baller, Dutta, and Lanvin (2016) and Ngoasong (2018) agree that contextualized research on enablers of and barriers to digital

innovation success is necessary, as it is possible for ecosystems within the same country to have different digital innovation rates (International Telecommunication Union, 2017).

Also, although there exists some knowledge on individual stakeholder roles in an innovation process, there appears to be a mismatch between what the stakeholders do versus what they are expected to do as their independent or collaborative interventions are either lacking, inefficient or do not necessarily contribute to success. This confirms a practical gap. There is an urgent need to map out how the enablers and barriers can be enhanced or moderated by digital innovation stakeholders or actors towards the success of digital innovations emanating from and for the South.

This study reveals assumptions about what enables or hinders digital innovation success in the Global South. Specifically, the Silicon Valley narrative, a “power structure” (Klein & Myers, 2011, p. 78), has been used to explain digital innovation success phenomenon in the Global South. In both practitioner and academic research, there is a natural tendency to employ the Silicon Valley lens to study digital startups, digital innovation, and entrepreneurship success. This study maps out contextualized enablers and barriers characteristic of a Global South context. The outcome of this research has potential to influence favourable policy formulation, targeting of funding to support technology or digital innovators, development, monitoring, and evaluation of structured and unstructured innovation environments towards building enabling innovation ecosystems among other initiatives focused on stimulation or support of digital innovations that power digital economies in developing countries. Most importantly, by exposing the enablers of and barriers to digital innovation success prominent in structured and unstructured innovation environment, digital innovation/entrepreneurship stakeholders in the Global South, including but not limited to “digital innovators/entrepreneurs, investors, incubators and accelerators, academia and government” (Elia, Margherita, & Passiante, 2020, p. 4), can learn good practices that enable digital innovation success.

In summary, this study addresses a theoretical, empirical and practical research gap evidenced by limited academic research on contextual enablers of and barriers to Digital Innovation Success in structured (incubated) versus an unstructured (non-incubated) digital innovation environment in the Global South, to expand knowledge of digital innovation success beyond

what happens in the Global North, and to inform policy and action around creating enabling technology innovation ecosystems in the Global South.

This study has the following objectives:

1. To isolate the enablers of and barriers to digital innovation/digital entrepreneurship success in a Global South context.
2. To describe how the identified enablers and barriers compare in a structured versus unstructured innovation environment in a developing country.

1.3 Research Questions

- i. What are the enablers of and barriers to digital innovation success for digital startups in Kenya?
- ii. How do the identified enablers and barriers compare for digital startups operating in a structured versus unstructured innovation environment in Kenya?

1.4 Empirical Context

This study isolates enablers of and barriers to digital innovation success in a Global South context. Kenya was selected as a suitable empirical location because of the existence of the phenomenon of interest, contextual fit as a developing country in the Global South and presence of reliable and adequate data about digital innovation success in the Global South. Kenya has a history of innovation support, through various initiatives and government bodies set up as early as the late 60's with the inception of the Kenya Industrial Estate (KIE), which was founded by the Industrial and Commercial Development Corporation (ICDC) in 1967 (Murage, 2018). KIE's mandate include provision of financial and business support to local industries in Kenya. In the sub-Saharan region, Kenya ranks second after South Africa (classified under Global North) in the 2019 Global Innovation Index report (Cornell University, INSEAD & WIPO, 2019). Kenya's digital innovation appetite is evident in solutions such as M-pesa, a mobile banking application that has gained international recognition as a key contributor to financial inclusion of a vast, previously unbanked, population in Kenya (Ndemo & Weiss, 2016). Manning, Engelke and Klein (2018, p.7) note that Kenya "has been building a digital tech-innovation ecosystem", attributing the growth to mobile penetration. Table 2-1 includes a sample set of outstanding homegrown digital solutions by product name and/or startup/company name identified via desktop research.

The contribution of the Kenyan government on matters relating to digital innovation and entrepreneurship is evident in various programs and policy changes. In 2018, Kenya was among the first two African countries to consent to the African Continental Free Trade Area (AfCFTA) pact. The pact aims to connect 54 African countries, to build an open market free of harsh regulations that hinder trade between African countries such as taxes, quotas, tariffs among others. Though the pact has been regarded as ambitious, its ratification by the Kenyan government has been seen as a potential enabler of economic growth, consequently affecting entrepreneurship and innovation activities in Kenya. Kenya has put in place regulations, policies, and institutions whose mandate is to support and regulate technology and innovation activities, towards the attainment of its Vision 2030 and other local development goals. Kenya's Vision 2030 aims to position Kenya as a globally competitive industrial hub and middle-income economy. The vision has a pillar dedicated to Technology and Innovation as an important development agenda. The country has Science, Technology and Innovation policy and regulations as evidenced by Acts such as Science and Technology Act of 1979 - now Science Technology and Innovation Act of 2013 - and institutions such as Kenya Industrial Transformation Programme (KITP), whose focus is to develop Kenya as an Industrial Hub, Kenya National Innovation Agency and more. In addition, the government is reported to have set up funding programs to support entrepreneurship. These include Uwezo fund, Youth Fund, Women Enterprise Fund, and many others. Also, Kenya continues to benefit from Public-Private-Partnerships geared towards technology and innovation. For instance, the Kenya Industrial and Entrepreneurship Project (KIEP), a World Bank and the Kenya Government initiative, with a funding of USD \$50 million, aims to strengthen the innovation ecosystem by supporting startups, incubation hubs and accelerators through establishing or supporting linkages between startup and industry, academia, and industry among other stakeholders (KIEP, 2020).

In 2019, at the beginning of this study, the Kenya Government put out a digital economy blueprint whose mission is to transform Kenya into “a nation where every citizen, enterprise and organisation has digital access and the capability to participate and thrive in the digital economy” (Republic of Kenya, 2019, p. 7). In the same year, the Government of Kenya, through the Distributed Ledgers Technology and Artificial Intelligence Taskforce, put out a

report on ‘Emerging Digital Technologies for Kenya’. The report recommended an implementation strategy for key digital innovation use cases and applications with the potential to transform Kenya’s economy, through digital technologies such as “distributed ledger technologies (blockchain and hash graph), Artificial Intelligence, 5G wireless technology and Internet of Things (IoT)” (Ministry of Information, Communications and Technology of Kenya, 2019). The literature review and findings chapters reveal other relevant policy and regulatory frameworks geared towards promoting science, technology, research, innovation, and education in Kenya.

Kenya’s industry is actively engaged in its digital innovation ecosystem, albeit with challenges. Over the last 10 years, there has been an emergence of business incubators, accelerators, co-working spaces, and technology hubs that work with digital startups. In 2017, there were at least 27 active business incubators or technology hubs in Kenya (de Beer, Millar, Mwangi, & Rutenberg, 2017) serving a market comprising the youth (people below 35 years of age). They include iHub, @iBizAfrica, Kenya Climate Innovation Centre, NaiLab, C4DLab, Swahili Box, Akira Chix, Nairobi Garage and Chandaria Business Innovation and Incubation Centre, among others. In academia, a considerable number of institutions of higher learning do take part in Kenya’s digital innovation ecosystem through initiatives such as hosting business incubators, inclusion of compulsory course units on entrepreneurship and innovation in curriculum, among others.

Despite the clear innovativeness of the Kenyan people, government risk capital funds, a technology savvy population with a “cheetah attitude”, available business incubation support and the existence of a vibrant digital innovation ecosystem, startup failure rate is still high. Paradoxically, there are several success stories of digital startups operating in the same ecosystem. It is important to note that there exists very little empirical data to substantiate the success and failure rate of digital innovations in Kenya. A study that explores potential factors that affect success in structured versus unstructured technology innovation environment within Kenya’s Innovation Ecosystem is much needed. Further, as previous mentioned, current studies in Kenya on digital innovation and innovation success in general are mostly practitioner reports and publications. This study is therefore relevant, timely and well located.

1.5 Research Methodology Overview

This qualitative exploratory study follows a post-positivist research paradigm. The study begins with a Systematic Literature Review (SLR) to map out objective enablers of and barriers to digital innovation success. A multiple case study research strategy was then employed. The study identified 4 digital startups in Kenya (2 from a structured environment and 2 from an unstructured environment, each representing two case scenarios for each innovation environment: one a ‘successful’ innovation and another ‘unsuccessful’). Piekari, Welch, & Paavilainen (2009, p. 571) note that multiple case studies “between 4 to 10 cases increase the robustness of a finding”. Two cases representing a structured innovation environment were sourced from a database of digital startups provided by select business incubators, accelerators, and technology hubs in Kenya. This selection approach was deemed necessary as business incubators and accelerators have mechanisms of classifying their startups as either successful or otherwise based on proven context specific parameters. Two cases representing unstructured innovation environment were identified through document reviews. In addition to the success parameter, the following was put into consideration in the selection of all cases. First, the selected digital startup innovation must utilize or result in digital technology. This includes a “digital product, digital service, digital platform, digital tool, digital infrastructure, digital artifact or internet enabled service innovation” (Elia et al., 2020, p. 1). Second, the digital startup must be past the ideation stage at the time of the study. Startup literature identifies that there are 4 key stages of startup development namely, “seed, early, growth, and expansion”. This study considers digital startups past growth stage to be running a successful ‘digital innovation’. Bortolini, Cortimiglia and Danilevich (2021, p.1768) define the ideation stage as "the creative process of generating ideas and designing the business that the entrepreneur wants to develop". Third, the digital innovation must have been conceptualised, implemented, or operated within a structured and/or unstructured innovation environment in a developing country context, particularly Kenya. Table 1-1 illustrates the purposeful case study selection approach presented in greater detail under Chapter 4 on Research Methodology.

Table 1-1: Case Study Selection Criteria

Environment/ Outcome	Structured	Unstructured
Successful	Case A	Case B
Unsuccessful	Case C	Case D

Data collection was preceded by ethical approval from the University of Cape Town, South Africa, Daystar University, Kenya, and a research permit obtained from the National Commission for Science, Technology, and Innovation (NACOSTI) in Kenya (see Appendix I). Informed voluntary consent was also sought from all research participants (digital innovators, subject matter experts from government, industry, and academia) throughout the research process. A purposive sample of 21 research participants representative of key digital innovation stakeholders in Kenya were interviewed using semi-structured interviews (approximately 60 minutes long) conducted both face-to-face and online, generating over 20 hours of audio and video data. Data collection for this study began during the COVID-19 pandemic. The inclusion of online data collection procedures allowed for adherence to COVID-19 regulations such as social distancing. The online interviews increased the number of responses, especially from research participants who preferred less to no physical interaction due to COVID-19 pandemic. The approach also took into consideration other restrictions in movement that could have delayed or hindered the data collection process due to COVID-19 and the political climate in Kenya, particularly activities witnessed prior to and during the 2022 general elections.

Data analysis began with interview data transcription, coding and thematic analysis using N-VIVO qualitative data analysis software. The analysis was guided by a conceptual framework (Figure 3-4), which is a refinement of Kleine's Choice Framework (Figure 3-3). The framework enabled visualization of the digital innovation success phenomenon systemically and holistically as a development outcome that digital innovation stakeholders, particularly digital innovators in the Global South, strive to achieve. The Choice Framework was chosen as it proposes for the need for academia to take time to comprehend the "underlying principles and recurrent patterns of change" towards "intellectual theorising" (Kleine, 2013, p. 2) of technology innovation as a development process. This is because of the speed of technological innovation. The meaning of development in this case is derived from Amartya Sen's definition as "a process of expanding the real freedoms that people enjoy" (Kleine, 2013, p. 4), "to lead the kind of lives they value and have reason to value" (Sen, 2001, p.18). The Framework is therefore focused on individuals. The Framework is thus applicable to this study as individual digital innovators are central actors in a digital innovation process. Digital innovation processes in the study cases or digital startups (unit of observation) are driven by single individuals. A

human-centred evaluation of a digital innovation process, geared towards determining what enables or hinders it, would therefore focus on the digital innovator as the unit of observation, and how their capability to steer (agency) digital innovation towards a successful development outcome would be impacted by ‘structure’ and ‘choice’. The framework therefore provided a lens for examining how digital innovators leverage internal resources (agency) and negotiate for external resources (structures) to enhance their capability to achieve digital innovation success. The framework was also employed to identify and evaluate conditions under which opportunities for digital innovation success emerge within structured and unstructured technology innovation environments, thereby revealing their differences and similarities. A codebook (Appendix D) comprising a priori of codes consolidated from the results of a Systematic Literature Review presented in chapter two was also referenced to during thematic data analysis. These initial codes provided structure and focus to kickstart the coding process. A deductive logical referencing approach was followed in this cross-sectional, explorative, qualitative study.

1.6 Research Contributions

1.6.1 Theoretical Contributions

First, the study contributes to epistemologies of the South, which emphasizes on knowledge creation based on the understanding and experiences of the South, through contextualized rich descriptions of the enablers of and barriers to digital innovation success in Kenya, and how the factors compare in structured versus unstructured innovation environment. Second, the study provides a theoretical demonstration of how Kleine’s Choice Framework (Klein, 2013) can be used as a lens for Information Systems research and for building a conceptual model.

1.6.2 Practical Contributions

The study informs policy which policy makers and practitioners, especially those in developing countries, can reference towards creation of enabling ecosystems that support successful implementation of digital innovations. Particularly, government, incubators and funders of incubators can benefit from this study. Entrepreneurs or digital innovators and startup founders can gain and use knowledge on enabling and debilitating factors characteristic of both structured and unstructured technology innovation environment, to inform their decision on which environment to plug in to, in favour of their digital startup needs. Scholars and

researchers can gain insights on complex digital innovation research agendas to guide more empirical work on the phenomenon, and related concepts.

1.7 Assumptions

Current research is not clear on the difference between digital innovation success and digital startup success. The two have been used interchangeably in various studies to mean or refer to one and the same thing. This study's focus is on digital innovation success. The study is cognizant of the following: most digital startups are born out of an innovative idea that leverages or results to a technological product or service; a digital startup can release into a market one or more innovative technology products or services; digital startups often gain recognition for the success of their core 'innovative' technology product or service; a digital startup success can be based on the success of one or more of its digital innovations; it is possible that an enabler or a barrier of digital innovation success could also enable or hinder digital startup success; it is possible that there is no significant difference in studying one or the other. This study views them as related or the same, but mainly focuses on digital innovation success as a key study construct.

1.8 Structure of the Thesis

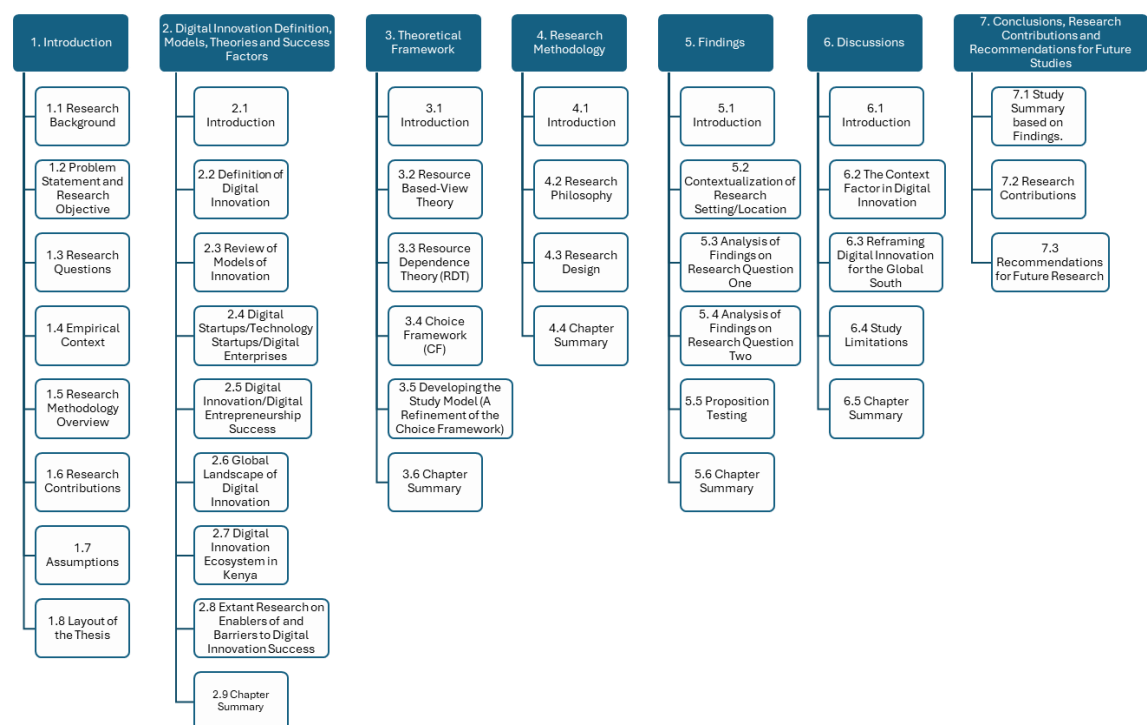


Figure 1-1: Layout of Thesis

This begins with an introduction chapter, which summarizes key sections of this thesis. Chapter 2 provides a background to the research area under study, reviews definitions of digital innovation and digital startups, models of innovation, the digital innovation ecosystem in Kenya, and concludes with a comprehensive systematic literature review and gaps in research. Chapter 3 focuses on building a conceptual framework (Figure 3-4) that can be used to explore potential enablers and barriers to digital innovation success. The conceptual framework was developed based on Dorothea Kleine's Choice Framework (Figure 3-2), concepts from the Resource Dependency Theory (RDT), the results of a structured literature review presented in Chapter 2 and researcher's own constructs derived from literature. Chapter 4 presents the study's research design approaches employed in data collection and analysis, in line with researchers philosophical and theoretical assumptions. The chapter begins by unpacking philosophical concepts of ontology, epistemology, axiology, and methodology. A comparison of various research paradigms is done against the study's paradigm, post-positivism. A detailed description of the study's research strategy, data collection and analysis models follow. The chapter concludes ethical considerations made in the study. Chapter 5 presents the study findings and a detailed discussion of results, through the sub-sections contextualization of the research setting, analysis of findings on research question one and two and concludes with proposition testing. Chapter 6 presents a comprehensive discussion of findings, which centres on the implication of the context factor on digital innovation and the need for its reframing to fit the Global South context. Chapter 7 summarizes the thesis, with a focus on the nexus between the key study outcomes and the research questions, the theoretical and practical contributions of the study, and concludes with recommendations for future research. Chapter 8 lists the study references following the American Psychological Association (APA) referencing style. Chapter 9, the appendices, attaches relevant information and material, such as Ethic Approval Letters, Research Permit, Study Interview Guide, Codebook, which could not be included under the body of the thesis.

2 DIGITAL INNOVATION DEFINITION, MODELS, THEORIES AND SUCCESS FACTORS

2.1 Introduction

The previous chapter highlighted the background, purpose, and proposed contribution of the research area under study. This chapter is a systematic account of relevant literature on digital innovation, innovation models and theories and enablers of and barriers to digital innovation success. The section also highlights key traits about the empirical location, Kenya, with a brief overview of its innovation ecosystem. The chapter presents research on potential enablers and barriers to digital innovation success. At the end, the chapter reveals gaps in literature, which form the basis for the need for this study.

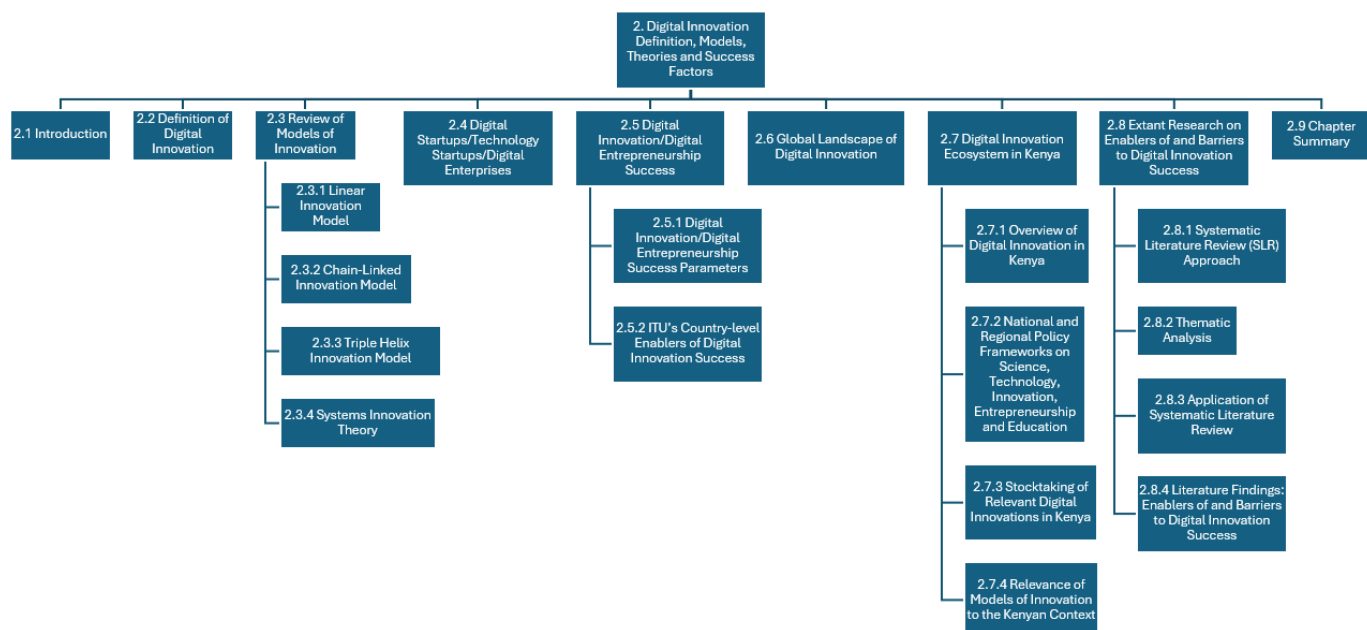


Figure 2-1: Structure of Chapter 2

2.2 Definition of Digital Innovation

Historically, up to the eighteenth century, innovators (known then as ‘novators’) were treated with great suspicion and mistrust (Manfred, 2010). Over the years, this view has changed with the rise of digital economies driven by technology innovations developed by startups. Ciriello, Richter, and Schwabe (2018, p. 3) define digital innovation as “innovating products, processes, or business models using digital technology platforms as a means or end within and across organisations”. This definition is based on characteristics of digital innovations illustrated in

Figure 2-2 adapted by Ciriello, Richter, & Schwabe (2018) from Yoo, Boland Jr, Lyytinen, & Majchrzak (2012).

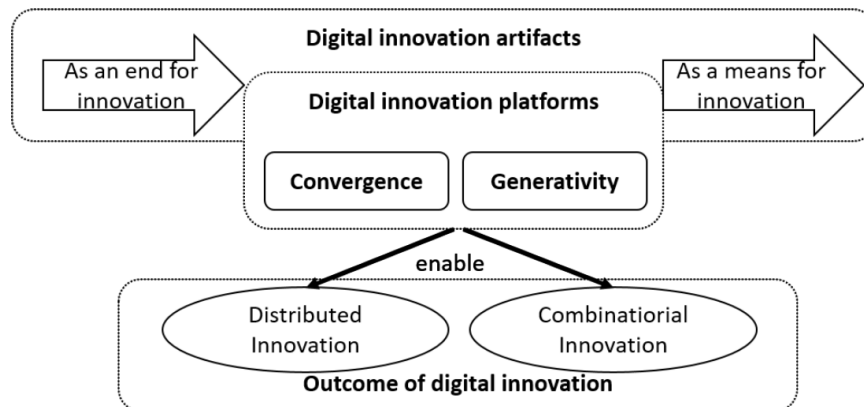


Figure 2-2: Characteristics of Digital Innovation (Ciriello, Richter & Schwabe, 2018)

Distributed and combinatorial innovations are prominent outcomes of a digital innovation process that arise from the convergence and generativity traits of digital innovation platforms (Ciriello, Richter, & Schwabe, 2018; Yoo, Boland Jr, Lyytinen, & Majchrzak, 2012). Convergence implies that the resulting digital innovation involves integration of various digital technology components (Ciriello, Richter, & Schwabe, 2018). Generativity implies that digital innovations are “dynamic, extensible and malleable” (Ciriello, Richter, & Schwabe, 2018, p. 4) as they do not follow a specific set of “tightly controlled design rules” (Um & Yoo, 2016, p. 3) due to available open interfaces (commonly known as Application Programming Interfaces or APIs) that freely allow use of other digital resources owned by other innovators. Fiet and Gregor’s (2016) study summarizes prominent definitions of digital innovation as shown in Figure 2-3.

Table 3. Digital innovation definitions in IS literature

Authors & year	Definition	Used by	Aspects Highlighted
Svahn et al. (2009, p. 3)	We refer to digital innovation as the new waves of organizational, technical, and cognitive innovation practices that follow the digitization of physical artifacts.		• Innovation practices • Digitization • Physical artifacts
Burtch et al. (2010, p. 2)	By digital innovation, we mean a broad spectrum of process and product innovations enabled by digital technology, including information systems and robotics.		• Process and product innovations • Digital technology
Yoo et al. (2010, p. 725)	We define digital innovation as the carrying out of new combinations of digital and physical components to produce novel products.	Hylving and Schultze (2013); Hildebrandt et al. (2015)	• Combinations • Digital and physical components • Novel products
Fichman et al. (2014, p. 330)	We define digital innovation quite broadly as a product, process, or business model that is perceived as new, requires some significant changes on the part of adopters, and is embodied in or enabled by IT.	Ciriello and Richter (2015); Wang et al. (2015)	• Product, process, or business model • Perceived as new • Significant changes • Adopters • IT artifact
Wang et al. (2015, p. 3)	A digital innovation refers to an idea, practice, or object that is perceived as new and is embodied in and enabled by digital technology. (based on Fichman et al., 2014)		• Idea, practice, or object • Perceived as new • Digital technology

Figure 2-3: Select Definitions of Digital Innovation.

Note. Reprinted from “What’s new about digital innovation?”, by Fielt, E., & Gregor, S., (2016), presented at the 9th Information Systems Foundations Workshop (ISF 2016), p. 6

2.3 Review of Models of Innovation

Innovation models conceptualise “how innovation activities are conducted” (Nacu & Avasilcai, 2015, p. 1784). Traditional approaches to innovation models have portrayed innovation as a “discrete, linear, and sequential process with clearly ordered, differentiated, and consecutive phases” (Ciriello, Richter, & Schwabe, 2018, p. 5). Tidd and Bessant (2018) break down the innovation process into five phases namely scanning and searching, selection of strategic innovation ideas, resourcing, implementation, and review of outcomes (optional). Desouza (2011) research on corporate innovation also known as “intrapreneurship” (p. 41), to imply ‘employee-led innovation’, categorises an innovation process into the five stages namely: idea generation and mobilisation, idea advocacy and screening to “help build an initial business case” (p. 45), idea experimentation stage where the “elasticity of the idea is tested” (p. 45), commercialisation stage that address issues concerning “how to price, package and promote ideas” (p. 46) that have passed experimentation stage, and finally the diffusion and

idea implementation stage. Ciriello, Richter, and Schwabe (2018, p. 4) note that “digital innovations rarely follow traditional logics of governance and coordination but rather emerges from opportunities available in a digital ecosystem”. This section reviews popular innovation process models.

2.3.1 Linear Innovation Model

Linear “push” models of innovation include the following stages (with slight variations in other literature): research, development/design and engineering, production or manufacturing, and marketing (Figure 2-4).

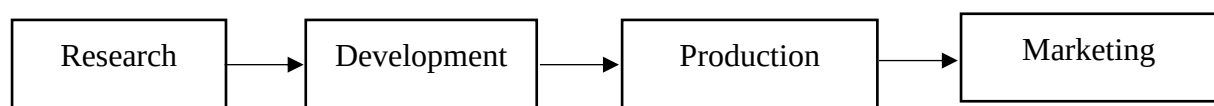


Figure 2-4: Linear Innovation Model (Kline, S. J., & Rosenberg, N., 2010).

The model is believed to have occurred in five generations, with the first generation occurring in the period between the 50’s and 60’s and were motivated by “technology push” (Nacu & Avasilcai, 2015, p. 1785). A second set variations of the model emerged between the 60’s and 70’s and were motivated by “market pull” (Nacu & Avasilcai, 2015, p. 1785). The two initial models assumed that innovation takes on a linear unidirectional approach without feedback loops (Nacu & Avasilcai, 2015).

A third generation of linear models were christened “coupling” innovation models as they were motivated by both “technology push” and “market pull” and allowed for feedback between market and research stages (Figure 2). Fourth generation models occurred between the 80’s and 90’s and were said to be “functionally integrated models of innovation”. (Nacu & Avasilcai, 2015, p. 1785). The fifth-generation models emerged in the 90’s and inculcated “processes of system integration and network operation” commonly abbreviated as “SIN” in addition to engaging external actors or innovators from industry and academia (Nacu & Avasilcai, 2015, p. 1785).

Linear innovation models have, however, been faulted to depict an erroneous nature of innovation process on empirical scrutiny. It is believed that the innovation process could be affected by several causal factors (Kline & Rosenberg, 2010; Tornatzky & Fleischer, 1990) which the model fails to consider.

2.3.2 Chain-Linked Innovation Model

The chain-linked innovation model (Figure 2-5) is initiated by a convergence of both technological advances and market demand (D). The model includes five innovation paths with feedback loops (F, f) moving from one stage to another. Innovation and product design stage initiate the chain of innovation (C). At each stage, an innovator can go through four steps that include problem analysis (1), knowledge seeking (K) (2), research if needed knowledge is unavailable (3) and implementation (4). Implementation can occur at step two (2) if needed knowledge is available. The innovation process concludes with deployment of final solution to market or scientific community (S) (Kline & Rosenberg, 2010).

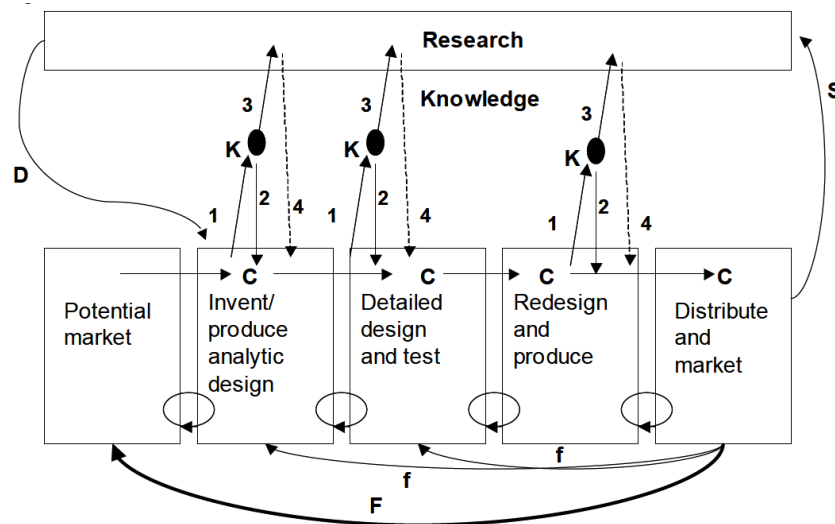


Figure 2-5: Chain-Linked Innovation Model (Kline & Rosenberg, 2010)

2.3.3 Triple Helix Innovation Model

The Triple Helix model (Figure 2-6) involving interaction between industry, academia and government was developed by Leydesdorff and Etzkowitz (1998) to replace the non-linear and linear models of innovation that conceptualised the innovation steps taken at firm level including concepts on national systems of innovation that addressed innovation process at society level (Leydesdorff, 2012). The model views communication and negotiation relations emanating from interaction between industry, academia, and government over a period as important inputs into an innovation process (Leydesdorff, 2012). The relations between the three entities influence innovation process outcomes. The model depicts innovation as an interactive process.

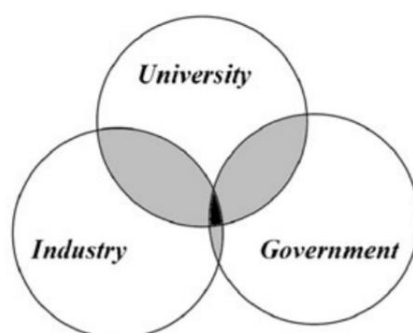


Figure 2-6: Triple Helix Model of Innovation (Leydesdorff, 2012).

Several studies have used the triple helix model in their work. Pique, Berbegal-Mirabent, and Etzkowitz (2018, p. 6) describe the model as a “spiral pattern of innovation that mirrors the complexity of activities and the multiple reciprocal relationships that take place at different points of the process of knowledge capitalization in the science/technology vector”. Their study analyses the evolution of the Silicon Valley innovation ecosystem and its impact on the roles played by government, industry, and academia in startup formation. Literature confirms that the model has been successfully used in studies based on cases in the developed world with few successful cases of similar nature in the developing world. Pique, Berbegal-Mirabent, and Etzkowitz (2018) recommend that diversity issues concerning region and culture be considered when applying the model in a different context.

The triple helix model can be extended to an N-number of helices. For instance, inclusion of ‘internationalisation’, ‘civil society’ among others as a fourth helix (Leydesdorff, 2012) forms a quadruple helix model of innovation. A consideration of the socio-ecological aspects or rather the addition of ‘natural environments of society’ to the quadruple model results into a quintuple helix model (Carayannis, Barth, & Campbell, 2012). These additional helices could also have important contributions to the technology innovation process (Pique, Berbegal-Mirabent, & Etzkowitz, 2018). Briefly, the model could be proven insufficient for studies that require deeper insights on the phenomenon under study.

2.3.4 Systems Innovation Theory

Vega and Chiasson (2019) view the ‘Systems of Innovation’ (SIs) (Figure 2-7) as a “conceptual base to understand and explain innovation processes in society”, whose structure comprises of “activities, actors, institutions and relations” (p. 244). They note that these components can “support and reinforce -or offset- one another” (p.245). Further, SIs is “an abstract and general framework which is operationalised when the researcher defines a specific system of interest”

(p. 244) for example diffusion of a digital innovation. The SIs “considers the real complexity of activities, actors, institutions and relations that exist beyond the confines of organisations, which ultimately affects innovative efforts inside organisations” (Vega & Chiasson, 2019, p.244). The applicability of the model to conduct research on digital startups is yet to be proven.

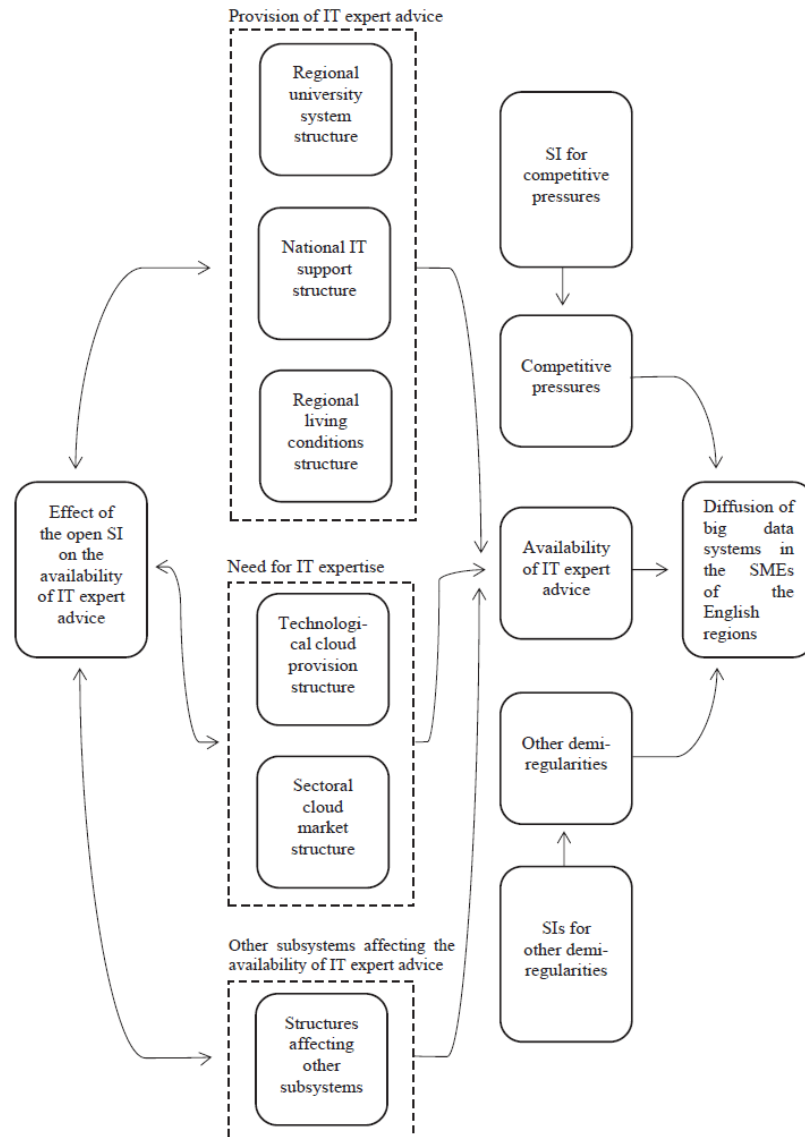


Fig. 1. SI for the diffusion of big data systems in the SMEs of the English regions.

Figure 2-7: Systems of Innovation Framework (Vega and Chiasson, 2019)

2.4 Digital Startups/Technology Startups/Digital Enterprises

In the last decade, digital startups or technology startups are seen to be at the forefront of digital innovation or digital entrepreneurship. Huang, Henfridsson, Liu, and Newell (2017) define a digital startup as a “digital venture growing by drawing on and adding to digital infrastructure to scale their business at an unprecedented pace through digital innovation” (p. 301). This

definition includes “Micro and Small Medium Enterprises (MSMEs) or also known as digital enterprises” (Murage, 2018, p. xiv) that “draw on or add to the digital infrastructure to scale their businesses” (Huang, et al., 2017, p.301).”

2.5 Digital Innovation/Digital Entrepreneurship Success

This section discusses constructs and parameters used to define, measure, or identify a successful digital innovation emanating from a digital startup. The concept of business success is broad, multifaceted and “difficult to measure” (Griffin and Page, 1996, p. 478). Stuart & Abetti, (1987) also note the need to clearly differentiate between initial versus ultimate success measures, especially for startup ventures that are known to operate in a very volatile environment. Traditionally, business success has been measured using financial parameters such as sales and profits and “technical advantage” Griffin and Page (1996, p. 478). Non-financial factors are now prominent measures of success in digital innovation/digital entrepreneurship literature. Díaz-Santamaría and Bulchand-Gidumal (2021, p. 1) note that digital startup innovation success can be defined using “multiple dimensions, different theoretical approaches and empirical contexts”. They add that the way success is defined by researchers, or even by digital startups themselves, can be different in various contexts. A digital startup can define the “objective” or “success criteria” of a product or service they provide (Griffin and Page, 1996, p. 478). Adding on to Díaz-Santamaría and Bulchand-Gidumal’s (2021) view on multiple dimensions of success, sustainability theory is a popular measure of success, especially for digital innovations emanating from users/consumers and grassroots innovators (Nielsen, Reisch & Thøgersen, 2016; Bocken, 2015). Alegre and Berbegal-Mirabent (2016, p. 1156) view innovation success as the capability to effectively address a need while maintaining economic sustainability. Ross, Mitchell, and May (2012, p. 471) use the term “progression of innovation” to mean success. Hirose (2018) views digital innovation or technology entrepreneurship success as successful commercialisation and business development, often over lengthy periods of time. Concerning ‘multiple dimensions’ of digital innovation success, startups go through four key stages of development namely, seed, early stage, growth stage, and expansion stage. At each level, various metrics can be used to define and identify success. Digital startups are sometimes viewed as new and temporary enterprises created to fill a gap. Even where such enterprises surpass the growth stage, it is possible that the innovation or business might not be scalable. In view of this, the concept of

scalability has also been used as a measure of success. The varied measures of digital innovation success in current research confirms a lack of a “common denominator” to identify and define digital innovation success (Díaz-Santamaría & Bulchand-Gidumal, 2021, p.2). The following section summarizes key parameters that could be used to define, describe, or identify a successful digital innovation. The definitions reveal a gap in literature as evidenced by the exclusion of contextual parameters and definition of digital innovation success in marginalised contexts such as the Global South.

2.5.1 Digital Innovation/Digital Entrepreneurship Success Parameters

Research on technology startup key performance indicators reveal the following as potential measures of digital innovation success:

- Revenue growth or high financial performance: Murage (2018) study on the impact of university-affiliated technology business incubators on their incumbent firms or startups reports ‘revenue growth’ as a potential measure of innovation success. He acknowledges that the reliability of this measure is dependent on honesty and willingness of startup owners to disclose such information to the public. Other researchers have also reported financial performance and a key measure of success for startups in general (Azimzadeh et al., 2013; Spiegel et al, 2015).
- Sales and profits: increased sales are reported as an indicator of success for entrepreneurs in general, including technology entrepreneurs or digital innovators. VCs and other investors consider profit as their measure of success (Oakey, 2003).
- Employment growth: Murage (2018) reports employment growth as a potential measure of success, judged by the number of jobs created (Maine et al., 2010; Banda and Lussier, 2015), directly or indirectly, by a digital enterprise because of a successful digital innovation they provide. The reliability of this measure is based on the financial capability of startups to hire and maintain talent. However, startups are known to enjoy cheap or free labour, as most of their workforce comprise of young talent on internship or volunteer basis. The number of people working to design and develop a digital innovation could therefore prove to be an unreliable measure of success.
- Patented digital innovation: Murage (2018, p. 76) reports number of registered patents, trademarks and trade secrets received by a digital startup as a potential measure of

success. In some instances, however, a patented digital innovation might not align with market needs (product-market fit) or may not be commercially viable.

- “Customer-based measures”: Griffin and Page (1996, p. 478) research on measures for product development success and failure reported “customer-based measures of success” such as customer acceptance and satisfaction as potentially most useful measure of success for a product under development, including a digital product or service. In view of this, an understanding of the problem/gap (Kim and Heshmati, 2010) or meeting customer needs (Pirolo and Presutti, 2010) could be a potential measure of success for digital innovations. The result of this is another measure of success referred to as market share and increased number of customers (Kim and Heshmati, 2010).
- Initial Public Offering (IPO): attaining IPO status as startup reported as a potential indicator of technology startup innovation success Krejci et al. (2015). A related measure is mergers and acquisitions, where a technology startup is bought off or merged with another company Hyder and Lussier (2016) and attracting additional rounds of VC capital (Baum & Silverman, 2004).

The purpose of this study is not to model how digital innovation success should be defined for digital startups, including those in the Global South. Rather, the focus is to map out enablers of, or barriers to digital innovation success, based on context-specific metric(s) or digital innovators’ own choice of what to value, and have reason to value (Sen, 2001, p.18), as indicators of digital innovation success. The context-based metrics are based on research participants’ responses collected during an empirical study done in Kenya, a developing country. The study thus agrees with Díaz-Santamaría & Bulchand-Gidumal, 2021, p. 1) that digital startup innovation success can be defined using “multiple dimensions, different theoretical approaches and empirical contexts”.

2.5.2 ITU’s Country-level Enablers of Digital Innovation Success

The International Telecommunication Union (ITU) recommends seven pillars classified as an “ecosystem canvas tool” (Figure 2-8) for evaluation of digital innovation capabilities of a country (International Telecommunication Union, 2017). The pillars comprise: vision and strategy, infrastructure and programmes, talent and champions, capital and resources, market and networks, culture, communities, regulation, and policy. The ITU tools, although aimed at

a country-level assessment, can also be informative and useful to evaluate regional ecosystems and identify stakeholder contributions in innovation environments. The pillars could be pivotal in the success of digital innovations that emerge in both structured and unstructured innovation environments. Given a certain ecosystem, combined data on each pillar would give an indication of how strong or weak the ecosystem is in relation to its capability to support digital innovations or rather measure the likelihood of success of a digital startup in that ecosystem (International Telecommunication Union, 2017). The assessment process would therefore result into a color-coded ecosystem canvas that depicts the ecosystem “heat map” as illustrated in Appendix A. Qualitative and quantitative explanations of the resultant “heat map” can be derived.

In addition to the ecosystem canvas tool, ITU (2017) has developed other innovation ecosystem assessment tools namely: “the stakeholder mapping tool, stakeholders interface canvas, qualitative interviewing tool, and recommendations and programme design tool”.

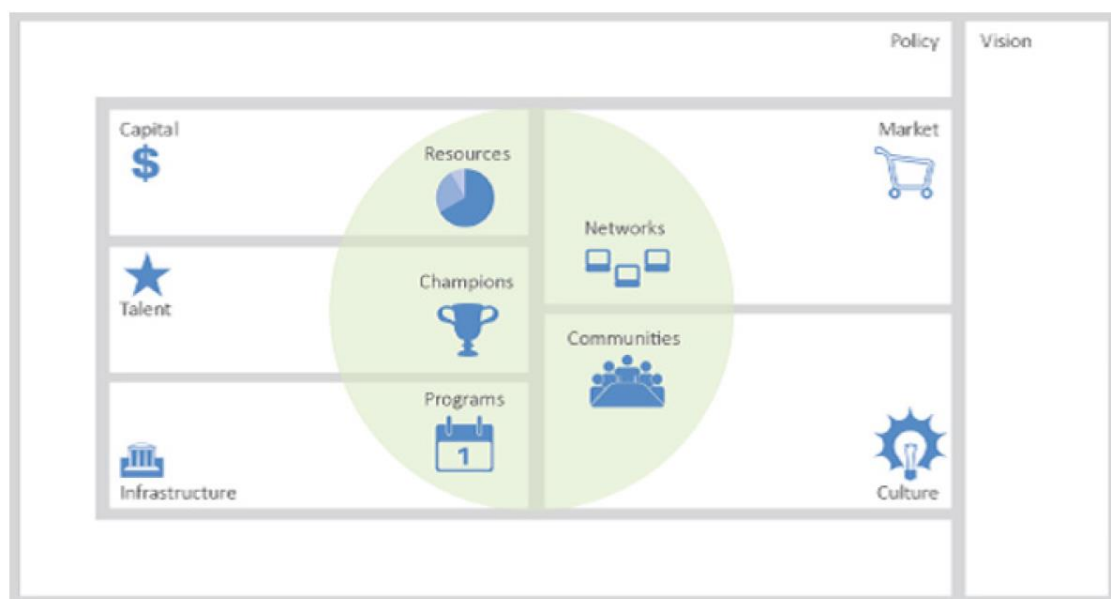


Figure 2-8: ITU’s Ecosystem Canvas Tool (International Telecommunication Union, 2017).

The ITU ecosystem assessment tools are, however, more of practitioner tools that are not grounded on academic research. This study’s goal therefore is to inform about their existence and not discuss them exhaustively.

2.6 Global Landscape of Digital Innovation

The global technological advancements that have occurred in the last 30 years have accelerated the emergence of digital innovations which have transformed most if not all sectors. The Fourth Industrial Revolution (4IR) is a popular term used to describe the paradigm shift in technology that has transformed the global world of business and innovation (Nylén & Holmström, 2015; Baller, Dutta, & Lanvin, 2016). For instance, in education, digital learning through Massive Open Online Courses (MOOCs) is making educational content accessible to a global audience 24/7.

The global economy is experiencing digital transformation giving rise to digital economies characterised by intensive use of digital technologies. Baller, Dutta, and Lanvin (2016) posit that “innovation is increasingly based on digital technologies and business models, which can drive economic and social gains from ICTs if channelled in a smart way”. Tapscott (1996) defines digital economies as networking of humans through technology that involves knowledge sharing and creativity resulting in wealth creation and social development. He considered innovation using information communication technology as a key component of digital economies. In addition, the need for digital skills is becoming inevitable and a key requirement to take part in and benefit from digital economies (Baller, Dutta, & Lanvin, 2016). Research shows some of the most prominent digital innovations have occurred in an environment of open innovation and were spearheaded by startups that re-combined existing technologies in innovative ways with financial support from venture capitalists (Ciriello, Richter, & Schwabe, 2018). For instance, Chesbrough (2003) recounts the rise of technology startup companies led and owned by former Palo Alto Research Centre ‘s (PARC) researchers who developed new, innovative, and more economically valuable products using existing technology and research created at PARC, a subsidiary of Xerox. PARC is faulted to not having met the expected value addition to its parent company Xerox because of its employment of closed innovation processes. Most of the technology’s startup “withered” with time, despite the impactful technology innovations they released in the market (Chesbrough, 2003).

Further, literature shows that developed economies are ahead concerning “environment, readiness, usage and impact” of digital innovation (Baller, Dutta, & Lanvin, 2016). Their research findings rank Europe as the digital “technology frontier” followed by Eurasia region, Latin America, and Caribbean region, MENAP region and sub-Saharan Africa closing the list with South Africa, Ethiopia, and Cote d’Ivoire in the lead. The report recommends further

contextualized research on the enablers of and barriers to digital innovation. Notably, the global digital innovation divide necessitates the need for contextualized research (International Telecommunication Union, 2017).

2.7 Digital Innovation Ecosystem in Kenya

2.7.1 Overview of Digital Innovation in Kenya

The proliferation and adoption of digital technology in developed countries appears to have undergone a gradual process. In Kenya, this has not been the case. Research shows that digital technologies such as mobile phones and the Internet, which are considered potential enablers of digital innovation, “arrived together” and were quickly adopted by Kenyan youth (people below 35 years of age) who constitute a larger percentage of the population and the unemployed (Ndemo & Weiss, 2016, p. 15). Further, they note that digital startups comprising of smart young entrepreneurs with access to digital technology and skilled software developers and computer programmers are at the forefront of digital innovations in Kenya (Ndemo & Weiss, 2016). Scarce resources, “fastest growth rates in internet usage” (Ngoasong, 2018, p. 484) and poor policies are among potential barriers to digital innovation success. Technology innovations emanating from Kenya received global attention which has contributed to its christening as the “silicon savannah” (Ndemo & Weiss, 2016, p. 7). De Beer, Millar, Mwangi, and Rutenberg (2017) argue that such catchphrases give an erroneous understanding of the complex nature of the innovation ecosystem in Kenya and recommends the use of the term “digital savannah”, a description that stays clear of the assumption that Kenya’s innovation ecosystem is like that of the Silicon Valley. Ndemo and Weiss (2016, p.18) also agree that the term “silicon savannah” implies that “not a lot of thought was put into the connotation, as if the perception of the American Silicon Valley had been taken wholesale and simply plastered onto an African scenario”.

Literature reports scarcity and collectivism as important drivers of digital innovation in Africa (Srinivasa & Sutzb, 2008; Ndemo & Weiss, 2016). In Kenya, technology incubation hubs, fibre optic connectivity, broadband penetration, and digitisation of government services have been reported as prominent potential enablers of digital innovation success (Ndemo & Weiss, 2016). Empirical evidence with qualitative explanations on their capability to enable digital innovation success is lacking (de Beer, Millar, Mwangi, & Rutenberg, 2017). In addition, comparative data on the impact of the enablers on digital innovation success in a structured versus

unstructured environment is inadequate. De Beer, Millar, Mwangi, and Rutenberg (2017) mention a 2015 report by VC4Africa that attempts to compare external investment opportunities available to digital startups in a structured versus unstructured environment, which concludes that startups in a structured environment receive “twenty-three percent” more investment than their counterparts.

Institutions of higher learning in Kenya are considerably active in the digital innovation ecosystem (de Beer, Millar, Mwangi, & Rutenberg, 2017; Ndemo & Weiss, 2016). Several universities in Kenya have included course units on entrepreneurship and innovation in their programs while some host notable business incubators. Knowledge and research contribution emanating from academia might have a role to play on innovation outcomes in Kenya. The impact of such initiatives on digital innovation success is yet to be proven. Government participation in the innovation ecosystem is also noticeable through initiatives that support digital innovation such as digital economy blueprint, Distributed Ledgers Technology and Artificial Intelligence Taskforce that recommends an implementation strategy for relevant digital innovation use cases for Kenya, government directives such as the one shown in Appendix B among others.

2.7.2 National and Regional Policy Frameworks on Science, Technology, Innovation, Entrepreneurship and Education

Over the years, Kenya has made noteworthy changes in its policy and regulatory frameworks regarding Science, Entrepreneurship, Technology, Innovation and Education. First, the Industrial Property Act of 2001 is an act of the Kenyan parliament, which encourages and protects inventions and innovations birthed in Kenya. The provisions of this Act demarcate the boundaries of a patent from application process to the rights of the patent owner, transferability procedures and more (National Council for Law Reporting & Attorney-General, 2001). Second, the Science, Technology, and Innovation (STI) Act of 2013, “facilitates the promotion, co-ordination and regulation of the progress of science, technology and innovation” in Kenya (National Council for Law Reporting & Attorney-General, 2001).

Third, the STI Policy of 2020, that seeks to steer the country towards achievement of Kenya’s Vision 2030, which is centred on building a knowledge-based economy driven by technology and innovation. Fourth, the National Research Fund (NRF), which was established under the STI Act of 2013 to address research and capacity gaps in Kenya, reports to have funded several

academic, institutional, and bilateral/multilateral research since its inception in 2015 (NRF, 2020), through research grants and technical capacity building.

Fifth, the National Commission for Science, Technology, and Innovation (NACOSTI), also established under STI Act of 2013, whose mandate is to “regulate Science, Technology and Innovation”, and advise the government on the same (NACOSTI, 2021). In addition, the Kenya National Innovation Agency (KENIA), which has been instrumental in driving research and innovation, with a special focus on Education sector, through mobilisation of key digital innovation stakeholders towards development of successful enterprises.

Further, in 2018, Kenya, alongside Ghana, was among the first two African countries to consent to the African Continental Free Trade Area (AfCFTA) pact (United Nations Economic Commission for Africa, 2020). The pact aims to connect 54 African countries, to build an open market free of harsh regulations that hinder trade between African countries such as taxes, quotas, tariffs among others. Though the pact has been regarded as ambitious, its ratification by the Kenyan government has been seen as a potential enabler of economic growth, consequently affecting entrepreneurship and innovation activities in Kenya.

Lastly, other noteworthy government initiatives include Kenya Industrial Estate (KIE), Kenya Industrial Transformation Programme (KITP), and Kenya Industrial and Entrepreneurship Project (KIEP) - a World Bank and Kenyan Government initiative with a funding of USD \$50 million, that aims to “strengthen the innovation ecosystem by supporting startups, incubation hubs and accelerators through establishing or supporting linkages between startup and industry, academia and industry among other stakeholders” (KIEP, 2020). All these initiatives operate in silos, which could pose a potential barrier to digital innovation success.

2.7.3 Stocktaking of Relevant Digital Innovations in Kenya

Table 1 categorizes a select number of digital startups and/or technology enabled innovations in Kenya conceptualised and developed under a structured, unstructured or a hybrid (structured and unstructured) innovation environment. The growth of the mobile market is believed to have been a common enabler for the success of most of these digital innovations (Ndemo & Weiss, 2016; Ester, 2017).

Table 2-1: Stocktaking of Relevant Digital Innovations in Kenya

Innovation	Description	Type of Digital Platform/Tools Used	Innovation Environment	Source
M-pesa	A mobile banking solution that enables users to perform banking transactions.	Mobile	Unstructured	(Ndemo & Weiss, 2016)
M-Ledger	An Android application that collects your M-pesa transaction data and allows you to manipulate and view reports from that data, all on your phone. Business users also have a web portal offering real-time transactions of incoming and outgoing M-pesa transactions with charts, graphs and summaries or detail by any period. This solution was acquired later by Safaricom Limited, a Telecommunications company in Kenya.	Web and Mobile Application	Hybrid	(GSM Association, 2019)
Ushahidi	A platform developed to map reported cases of violence during the 2007 Post-Election Violence in Kenya. The platform later grew into a globally used crowdsourcing platform. Currently, Ushahidi is developing open-source software to empower communities and advance social change by enabling people to develop solutions that address the common good using their software products.	Web and Mobile Application	Unstructured	(Ushahidi, 2024)
Sign-IO	An innovative assistive digital solution that enables persons with partial hearing disabilities or the deaf to communicate better with other people who do not understand sign language. The solution includes smart gloves that transmit information to a mobile application, which translates sign language into text and/or audio messages (speech) with 93% accuracy as of 2024.	Engineering, Internet of Things and Mobile Application	Hybrid	Kenya National Innovation Agency (2020)
Kytabu	A platform with digitised learning content, specifically textbooks used in Kenyan Primary Schools. Teachers and students can easily access available content via their mobile phones, tablet, and personal computers 24/7. Students can rent books via the platform	Web and Mobile Application	Structured	(Kytabu, 2023)

Innovation	Description	Type of Digital Platform/Tools Used	Innovation Environment	Source
	and make payment using mobile money.			
Medbook	“A universal health platform that allows you to securely store, access and share your digitised medical history at the touch of a button with various health stakeholders such as an insurance provider among others”.	Web and Mobile Application	Hybrid	(Medbook Kenya Limited, 2023)
M-Shule	“We know that different learners have different abilities, needs, strengths, and goals. Our artificial intelligence system understands each individual child’s competency and delivers the right lesson for them at the right time.”	Web and Mobile Application	Unstructured	(M-Shule, 2023)
MyDawa	This is the uber of all thing’s pharmacy, and Kenya’s number one online pharmacy. MyDawa has been authorised to fulfil medical prescriptions online since its inception in 2017. Customers can order their drugs online via MyDawa platform and have them delivered at their doorstep.	Mobile and Web Application	Unstructured	(MyDawa, n.d.)
MarketForce	Founded in 2018, MarketForce offers online retail services (e-commerce) where customers can buy and pay for various product and services on their platform and have them delivered in Kenya and other parts of Africa.	Web Application	Unstructured	(MarketForce, n.d.)
AfricaSokoni	A B2B2C digital marketplace for local brands to reach a wider (local and global) market for their products. AfricaSokoni also provides opportunity for financing for local MSMEs.	Web Application	Unstructured	(AfricaSokoni, 2024)
Pezesha	Pezesha (Swahili name for ‘enabler’) is an SME financing platform started in 2016.	Mobile and Web Application	Unstructured	(Pezesha, 2024)

2.7.4 Relevance of Models of Innovation to the Kenyan Context

Section 2.3 of this chapter reviewed four innovation models, namely: Linear Innovation Model, Chain-Linked Innovation Model, Triple Helix Innovation Model and Systems Innovation Theory. In section 2.7.1 on Overview of Digital Innovation in Kenya, extant research noted

that innovation in Kenya followed a different path contrary to traditional innovation models: “The proliferation and adoption of digital technology in developed countries appears to have undergone a gradual process. In Kenya, this has not been the case. Research shows that digital technologies such as mobile phones and the Internet, which are considered potential enablers of digital innovation, “arrived together” and were quickly adopted by Kenyan youth...” Some unique aspects about Kenya’s innovation ecosystem mentioned on many occasions in this thesis include:

- Scarcity of resources and infrastructure challenges, which hinder early stages of an innovation process.
- Market uncertainties and political instability, which often lead to unpredictable shifts in demand and supply.
- Underdeveloped regulatory and policy environment.

These unique aspects limit full application of the innovation models discussed in Section 2.3 and confirm the need for tailored approaches to innovation in Kenya. To begin with, the Linear Innovation Model has been faulted to depict an erroneous nature of innovation process due to its emphasis on linearity and exclusion of other casual factors such as market dynamics that affect an innovation process. Linearity fails to explain the rise of digital innovation in an environment of scarcity, where innovation arises from informal sectors, and where funded research and development would be inaccessible. The model is more focused on developed economies. Second, the Chain linked model focuses on innovation emerging from large firms, due to its strong emphasis on formal research and development common in the Global North. Innovation in Kenya appears to be driven by smaller, informal groups of digital innovators, hence the focus of this study on digital startups. Third, the triple helix model, whose application cautions that diversity issues concerning region and culture be considered (Pique, Berbegal-Mirabent, and Etzkowitz 2018), may not fit neatly to the Kenyan context. This is due to its assumption of a balanced relationship between the helices of academia, industry and government. In Kenya, the relationship between these helices is complex and may be skewed, especially in instances where one, such as the government, may have a more dominant role in the innovation process. Further, the model assumes a strong academic-industry relationship often seen in the Global North, which is backed by resources. Application of the model in a resource constrained context such as Kenya would be ineffective.

Lastly, The Systems of Innovation Model is “an abstract and general framework which is operationalised when the researcher defines a specific system of interest” Vega and Chiasson (2019, p. 244). The model is highly complex and views innovation as a systemic process with many players operating in a formal environment. Its application to the Kenyan context may require significant adaptation due to cultural and social factors, and the dominance of the informal sector in innovation activities. In summary, the models of innovation have been designed with the Global North context in mind. Their application might not fully capture the unique aspects of a context such as Kenya, a developing country in the Global South.

2.8 Extant Research on Enablers of and Barriers to Digital Innovation Success

2.8.1 Systematic Literature Review (SLR) Approach

Given the importance of enablers of and barriers to digital innovation success in this study, a systematic literature review approach was adopted to find the most relevant and highest quality literature (Rowe, 2014). The systematic literature review method (SLR) is praised for its reproducibility and capability to enable a researcher to identify, evaluate and synthesis existing literature on phenomenon of interest (Massaro, 2016). SLR is a “repeatable process that documents all available studies relevant to a research area or question” (Balaid, Rozan, Hikmi, & Memon, 2016, p. 453). In addition, Kang, Khallaf, and Hastak (2017) note that the method allows for minimisation of researcher bias.

According to Balaid et al. (2016), the SLR methodology is commonly applied to: “a) summarize available data on research area of interest; b) highlight the merits and demerits of phenomenon under study; c) identify a gap in research and d) provide evidence to support a new framework or hypothesis” (p. 453). This study summarizes available literature on enablers of and barriers to digital innovation success, identifies empirical, theoretical, and practical research gaps (Rowe, 2014).

2.8.2 Thematic Analysis

Thematic analysis (TA) is a “process of identifying patterns or themes within qualitative data” (Maguire & Delahunt, 2017, p. 3353). With TA, one can perform "semantic level" or "latent level" analysis of data to derive meaning where the former results to “surface meaning” and the later to “underlying ideas, assumptions and conceptualisations” (Maguire & Delahunt, 2017, p. 3353; Braun V., Clarke, Hayfield, & Terry, 2019). Further, Maguire and Delahunt

(2017) note two approaches to thematic analysis that is, “top-down” and “bottom-up or inductive” where the former “is driven by the specific research question(s) and/or the analyst’s focus while the latter is more driven by the data” (p. 3354). In their research, they follow a “six-phase guide” that includes the following steps: become familiar with the data, generate initial codes, search for themes, review themes, define themes and write-up” (p. 3354).

Thematic analysis is praised for its ease of use for novice researchers and flexibility, irrespective of the epistemological stance taken by a researcher (Maguire & Delahunt, 2017). The approach, while flexible and not reliant on pre-existing theoretical frameworks (Braun & Clarke, 2006), can be adapted to incorporate them. Because of this, it is faulted to have “limited interpretative power” (Braun & Clarke, 2006, p. 97). Also, the method can be used with large sets of data, which makes it efficient for studying a new or underexplored area. This study employs a thematic analysis approach to categorize relevant studies identified through SLR into themes and sub-themes as shown in Table 2-6.

2.8.3 Application of Systematic Literature Review

This study follows a phased systematic approach to literature review on enablers of and barriers to digital innovation success. The following steps were followed and adapted from Oosterwyk, Brown, & Geeling (2019).

Step 1: Planning

Given the background literature review on the concepts of digital innovation, models of innovation and innovation success, this section systematically isolates specific enablers of and barriers to digital innovation success from literature. The aspect of sustainability is prominent in most definitions of ‘innovation success’. The literature search strategy was more drawn towards studies on enablers of and barriers to sustainable innovation, with a focus on digital or technology innovation, digital entrepreneurs, user innovation, digital startups, social innovations, bottom-up innovations, and grassroots innovations.

Step 2: Selection

The review focused on literature from IS, entrepreneurship and innovation, product innovation management, innovation and technology management related peer reviewed journals and conference proceedings. The Google Scholar database was the main source of literature. The Web of Science database was also searched to ensure all relevant studies were included.

Due to heterogeneity and fragmentations in literature concerning the phenomenon under study, it was important to perform a search for enablers and barriers separately and together. The

following search terms were used over a timespan starting from 2010 to 2020: ‘enablers of digital innovation success’ OR ‘enablers of digital entrepreneurship success’ OR ‘enablers of social innovation success’ OR ‘enablers of grassroots innovation’ OR ‘enablers of bottom-up innovation’ OR ‘enablers of user innovation success’ to isolate studies on enablers. For barriers, the search strings contained one of and/or a combination of the following: ‘barriers to digital innovation success’ OR ‘barriers to digital entrepreneurship success’ OR ‘barriers to social innovation success’ OR ‘barriers to grassroots innovation’ OR ‘barriers to bottom-up innovation’ OR ‘barriers to user innovation success’. 2020 is the year when this review was conducted; although this is a while ago, it was necessary to do this prior to collecting and analysing the empirical data.

The studies on ‘user innovation’, ‘social innovation’, ‘bottom-up innovation’, ‘grassroot innovation’ or ‘digital entrepreneurship’ were included as they had some relatable results relevant to the phenomenon under study. This is because they are not driven by the “traditional research and development (R&D) and market research” (Ross, Mitchell & May, 2012, p. 469). This ensured all relevant literature was included in the review. The approach, however, had some disadvantages as the search results yielded more studies that were out of scope, thereby consuming researchers’ time. The decision to narrow the search to two databases was informed by this to ensure the emergent results were manageable.

In addition, synonyms or related terms for the words ‘barrier’ and ‘enabler’ were used to widen the search. For instance, ‘inhibitor, constraints and hindrance were used in place of the word ‘barrier’. To isolate enablers, ‘motivation, supporting mechanism, success factors, driver, catalyst, proven paths, and facilitator’ were used. The asterisks truncation symbol (*) was used to capture all variations of a word or term, especially for searches done in the Web of Science. For example, ‘inhibitor*’ would retrieve studies that used either ‘inhibitor’ or ‘inhibitors’. Studies that evaluated enablers of and barriers to digital entrepreneurs or technology-based MSMEs’ innovation success were also considered. Care was taken to eliminate MSMEs that were merely channels of distribution of existing products or services, without any innovative value addition to the product, service, distribution process or the business using technology. Initial set of papers on enablers and barriers were searched by title, topic, abstract and keywords resulting to 421 papers. Table 3 shows the distribution of the 421 papers from both databases. The papers were reviewed further by content in the introduction and conclusion sections. Papers that touched on the concept of innovation success were selected resulting to 154 papers,

having also eliminated papers not written in English language, citations, and patents. The third and final round of selection was based on full paper review, and backward and forward reference searching, with a keen focus on the results, findings section resulting to 38 papers, having eliminated duplicates. The 38 papers were considered adequate as they each had full text available, had rigor and relevance to the phenomenon under study. Particularly, they brought to light unique and similar enablers of and barriers to digital innovation success. Figure 8 illustrates the literature search and selection criteria employed.

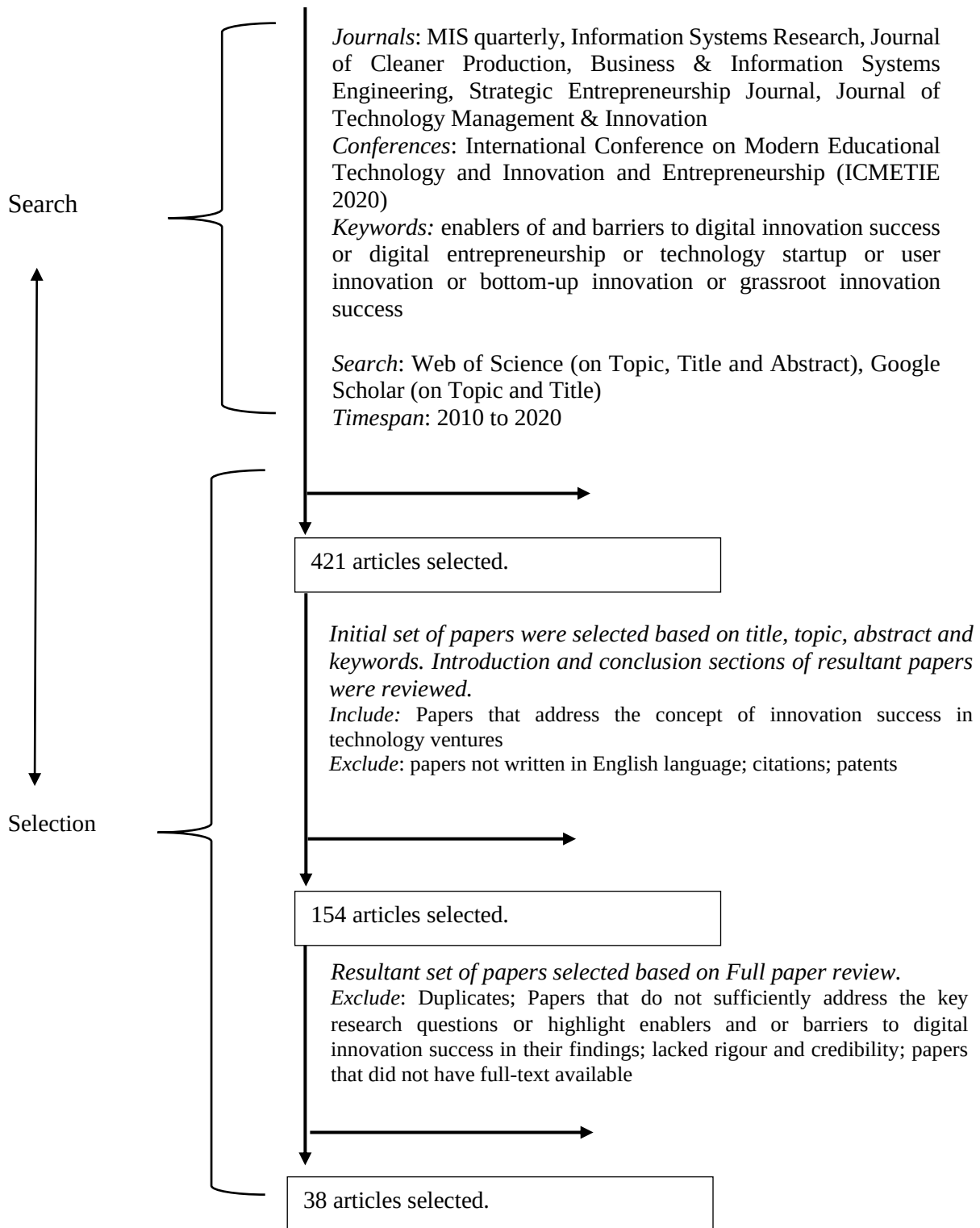


Figure 2-9: Literature Search and Selection Criteria. Source (Günther, Mehrizi, Huysman, & Feldberg, 2017)

Summary of the Inclusion and Exclusion Criteria

Table 2-2: Inclusion and Exclusion Criteria Summarised

Inclusion Criteria	Exclusion Criteria
Published within timespan 2010 to 2020 Addresses research questions Written in English Full-text available Peer-reviewed	Not within the search timespan Research questions not addressed Not written in English No full-text available Citations or Patents Lack of credibility and rigor Duplicate studies

Table 2-3 displays the count of search results for enablers and barriers from each database before and after exclusion criteria. A search on just barriers returned over 75% of similar results as the enablers' search query on Web of Science and Google Scholar. The count for barriers on exclusion of duplicates therefore includes only unique studies that had not been selected on running the query for enablers.

Table 2-3: Count of Search Results before and after Exclusion Criteria

Database	Enablers		Barriers	
	Count before exclusion	Count after exclusion	Count before exclusion	Count after exclusion
Web of Science	32	7	10	2
Google Scholar	278	26	101	3
Total Selected	310	33	111	5

Table 2-4 displays an overview of the 3 selected studies by citation, type, and publication source.

Table 2-4: Selected Studies by Type and Source

No.	Citation	Type	Publication Source
1	(Butler, Garg & Stephens, 2020)	Journal Article	Information Systems Research
2	(Andrikopoulos, 2020)	Journal Article	International Review of Financial Analysis
3	(Oranburg, 2020)	Book Chapter	Woodhead Publishing
4	(Rashid, Alzafari and Kratzer, 2020)	Journal Article	Technological Forecasting and Social Change
5	(Dana et al., 2020)	Journal Article	Journal of Small Business Management
6	(Xu, Wang & Yang, 2020)	Conference Paper	International Conference on Modern Educational Technology and Innovation and Entrepreneurship (ICMETIE 2020)
7	(Teh & Keeb, 2020)	Journal Article	East Asia

No.	Citation	Type	Publication Source
8	(Toros et al., 2020)	Journal Article	International Social Work
9	(Wang et al., 2019)	Journal Article	Frontiers in Psychology
10	(O'Kane et al., 2019)	Book Chapter	Springer
11	(von Briel, Davidsson & Recker, 2018)	Journal Article	Entrepreneurship Theory and Practice
12	(Ciriello, Richter, & Schwabe, 2018)	Journal Article	Business & Information Systems Engineering
13	(Sörvik, 2018)	Journal Article	Strategic Approaches to Regional Development: Smart Experimentation in Less-Favoured Regions
14	(Seet et al., 2018)	Journal Article	Asia Pacific Business Review
15	(Manning, Engelke and Klein, 2018)	Journal Article	Atlantic Council
16	(Drencheva, 2018)	Book Chapter	Vernon Press
17	(Cantù, Giorgia and Tzannis, 2018)	Journal Article	IMP Journal
18	(van Den Berg, C. L., 2018)	Journal Article	South African Journal of Higher Education
19	(Stroh, 2020)	Master's Thesis	University of Tübingen
20	(Ester, 2017)	Book	Amsterdam University Press
21	(Paschen, 2017)	Journal Article	Business Horizons
22	(Stephan & Drencheva, 2017)	Journal Article	The Wiley Handbook of Entrepreneurship
23	(Zaech & Baldegger, 2017)	Journal Article	International Small Business Journal
24	(Maiolini et al., 2016)	Journal Article	Journal of Technology Management & Innovation
25	(Demirkan, Spohrer, & Welser, 2016)	Journal Article	IT Professional
26	(Nielsen, Reisch & Thøgersen, 2016)	Journal Article	Journal of Cleaner Production
27	(García-Gutiérrez & Martínez-Borreguero, 2016)	Journal Article	Research-Technology Management
28	(Calcagnini et al., 2016)	Journal Article	The Journal of Technology Transfer
29	(Mas-Verdú, Ribeiro-Soriano, & Roig-Tierno, 2015)	Journal Article	Journal of Business Research
30	(Bocken, 2015)	Journal Article	Journal of Cleaner Production
31	(Fichman, Santos, & Zheng 2014)	Journal Article	MIS Quarterly
32	Baccarne et al., 2014)	Journal Article	Interdisciplinary Studies Journal
33	(Ross, Mitchell & May 2012)	Journal Article	Transportation Planning and Technology
34	(Edwards-Schachter, Matti & Alcántara, 2012)	Journal Article	Review of Policy Research
35	(Trimi & Berbegal-Mirabent, 2012)	Journal Article	International Entrepreneurship and Management Journal
36	(Yoo, Henfridsson, & Lyytinen, 2010)	Journal Article	Information Systems Research
37	(Schwartz, 2013)	Journal Article	The Journal of Technology Transfer
38	(Baron & Henry, 2010)	Journal Article	Strategic Entrepreneurship Journal

Publication Source Distribution

Table 2-5 highlights the publication source distribution summary.

Table 2-5: Publication Source Distribution

Type	Quantity
Journal articles	32
Books	1
Book Chapters	3
Conference papers	1
Thesis	1
Total	38

Several conference papers did not meet the search and selection criteria (Figure 2-9) employed in this study. For studies that did address enabler and barrier concepts of innovation, the focus was more on top-down innovations or innovations that emanate from large firm's research and development initiatives (Ross, Mitchell & May, 2012), and not digital startups, which are the focus of this study. Only one conference paper (Table 2-5) was selected that comprehensively addressed the phenomena under study and focused on innovations that emanate from digital startups or technology entrepreneurs.

Step 3 and 4: Extraction and Execution

Thematic analysis was employed at this stage. A latent-level, top-down approach (Braun & Clarke, 2006), where initial themes derived from research questions and additional themes included on in-depth systematic analysis of relevant literature, was followed. A total of 49 sub-themes – representing all influencing factors – were extracted. These could, in turn, be grouped into ten groupings or major themes. The following prominent themes (Table 2-6) were extracted. These themes will be discussed in greater detail in the findings section. The themes enabled the researcher to sort information derived from the systematic review in an orderly and coherent manner.

Table 2-6: Emerging Themes

Major (grouping) themes	Sub-themes (factors)	Citations
Business model	Innovative business models, business model design, business model management	(Trimi & Berbegal-Mirabent, 2012); (García-Gutiérrez & Martínez-Borreguero, 2016); (Bocken, 2015)

Major (grouping) themes	Sub-themes (factors)	Citations
Capital	Financial capital, Venture Capital (VC) investment, Angel Investor, startup capital, intellectual capital, human capital, social capital, psychological capital, talents, capabilities	Ester, 2017); (Manning, Engelke and Klein, 2018); (Ester, 2017); (Andrikopoulos, 2020); (Nielsen, Reisch & Thøgersen, 2016); (Paschen, 2017); (Oranburg, 2020); (Bocken, 2015); (Wang et al., 2019); (Ross, Mitchell & May, 2012); (Rashid, Alzafari and Kratzer, 2020); (Baron & Henry, 2010); (Nielsen, Reisch & Thøgersen, 2016); (Drencheva, 2018); (Stephan & Drencheva, 2017); Ester (2017)
Culture	Startup culture, entrepreneurship culture	(Manning, Engelke & Klein, 2018); Ester (2017); (Bocken, 2015)
Digital Technology	Technology, ICT, mobile penetration, internet, open-source tools and platforms, unrestricted access to information	(Maiolini et al., 2016); (von Briel, Davidsson & Recker, 2018); (Yoo, Henfridsson, & Lyytinen, 2010); (Ross, Mitchell & May, 2012); (Demirkan, Spohrer, & Welser, 2016); (Ciriello, Richter, & Schwabe, 2018); (Butler, Garg & Stephens, 2020); (Nielsen, Reisch & Thøgersen, 2016); (Fichman, Santos, & Zheng 2014)
Education and Training	Universities, technical skills, innovation and entrepreneurship curriculum, talents, competencies	(Calcagnini et al., 2016); (Nielsen, Reisch & Thøgersen, 2016); (Xu, Wang & Yang, 2020); (van Den Berg, C. L., 2018); (Manning, Engelke & Klein, 2018); (O'Kane et al., 2019); (Nielsen, Reisch & Thøgersen, 2016); (Ester, 2017); (Ross, Mitchell & May, 2012)
Government	Policy, ease of doing business, laws and regulations, government funding	(Manning, Engelke & Klein, 2018);
Incubators and Accelerators	Technology hubs, research, and innovation labs, living labs, business incubation, makerspaces, hackerspaces, accelerators	(Sörvik, 2018); (Ester, 2017); (Mas-Verdú, Ribeiro-Soriano, & Roig-Tierno, 2015); (Nielsen, Reisch & Thøgersen, 2016); (Schwartz, 2013); (Mas-Verdú, Ribeiro-Soriano, & Roig-Tierno, 2015); (Edwards-Schachter, Matti & Alcántara, 2012); Baccarne et al., 2014)
Leadership	Leadership styles, transactional leadership, laissez-faire leadership, and transformational leadership	(Zaech & Baldegger, 2017); (Ester, 2017); Nielsen, Reisch and Thøgersen (2016);
Networks	Resilient networks, business advice, linkages, informal networks (friends and family)	(Dana et al., 2020); Seet et al. (2018); (Cantù, Giorgia and Tzannis, 2018); (Ross, Mitchell & May, 2012); (Bocken, 2015); (Ester, 2017); (Nielsen, Reisch & Thøgersen, 2016)
Open Innovation	Collaboration, co-design, co-creation, co-production	(Teh & Keeb, 2020); (Stroh, 2020); (Toros et al., 2020); (Nielsen, Reisch & Thøgersen, 2016); (Baccarne et al., 2014)

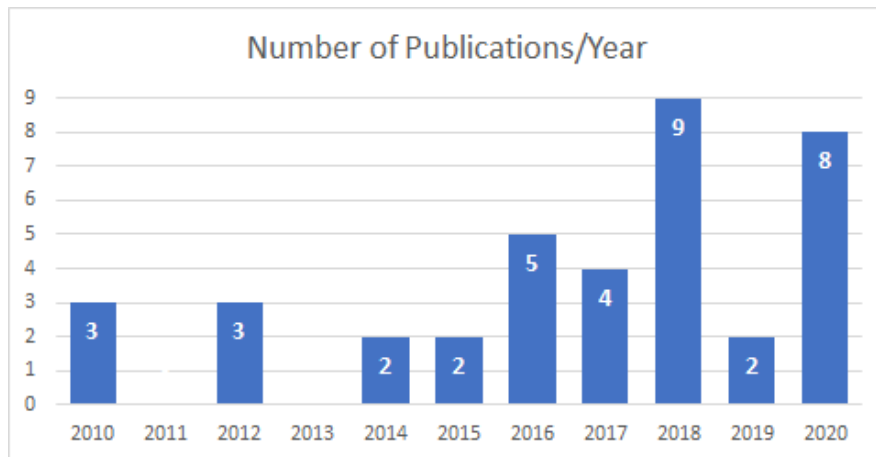


Figure 2-10: Number of Publications in Years (2010 to 2020)

2.8.4 Literature Findings: Enablers of and Barriers to Digital Innovation Success

An enabler can be defined as that which contributes to or favours innovation success (Camps & Marques, 2014). A barrier on the other hand slows down or completely hinders success. The reviewed literature brought to light the following factors that could pose as enablers and/or barriers. It is possible that a factor could pose either as an enabler or a barrier. For instance, a disengaged government that fails to create an enabling environment for digital innovations to thrive, could pose as a barrier. A government that provides such an environment could pose as an enabler.

2.8.4.1 Digital Technology

Digital technology is an important enabler of digital innovation success (Maiolini et al., 2016; von Briel, Davidsson & Recker, 2018). Digital innovation involves application of digital technology to improve an existing or develop a new service embedded with software-based capabilities (Yoo, Henfridsson, & Lyytinen, 2010; International Telecommunication Union, 2017). Researchers attribute the rise of digital innovations to increased access to digital technologies (Ross et al., 2012) and connectivity between people through mobile devices (Demirkan, Spohrer, & Welser, 2016). Ciriello, Richter, and Schwabe (2018, p. 3) posit that “digital technology is both the result of and the basis for developing digital innovations, enabling high scalability and low entry barriers that lead to wide participation and democratised innovation”. In the same breadth, Fichman, Santos, and Zheng (2014) conclude that digital innovations can be embodied in or enabled by technology. Butler, Garg & Stephens (2020) note that digital technologies have reduced start-up costs tremendously. Ease of access to digital resources, such as open data, open-

sources tool, platforms, and communities (Nielsen, Reisch, & Thogersen, 2016) may enable digital entrepreneurship success.

2.8.4.2 *Technology or Innovation Hubs, Business Incubators, Accelerators and Living Labs*

Technology hubs, digital innovation hubs (Sörvik, 2018), business incubators and accelerators are seen to provide an enabling environment that steer digital innovations to success. It is common in literature for these terms to be used interchangeably though they are heterogeneous. For instance, incubators differ from accelerators in that the former “focuses on very early-stage business ideas, whereas the primary goal of accelerators is to grow new ventures that already have a product, a business model, and even some traction” (Ester, 2017, p. 64).

The concept of business incubation has been around for decades. The first World’s business incubator is said to have been set up in the year 1959 in Batavia Industrial Centre, Batavia, New York (Hackett & Dilts, 2004). Business incubators are institutions set up to provide support services needed for “creation and development” of a company or “to accelerate the creation of successful firms” (Mas-Verdú, Ribeiro-Soriano, & Roig-Tierno, 2015, p. 3).

Hackett and Dilts (2004) define a business incubator as “a shared office space facility that seeks to provide its incubatees (that is, ‘portfolio’ or ‘client’ or ‘tenant-companies’”) with a strategic, value-adding intervention system (that is, business incubation) of monitoring and business assistance”. Business incubators can be affiliated to a university, government, civil society, a private company, a non-profit institution, or a hybrid. They can be physical spaces or virtual or both (Hackett & Dilts, 2004). They provide support services such as affordable working space (co-location) (Nielsen, Reisch & Thogersen, 2016), access to capital, training, mentoring, and coaching among other services (Schwartz, 2013; Mas-Verdú, Ribeiro-Soriano, & Roig-Tierno, 2015; British Council, 2016). Other similar initiatives that have come up in the last decade include accelerators, co-working spaces, fab labs, technology hubs, makerspaces, hackerspaces (Söderberg & Delfanti, 2015), research parks, science parks, living labs among others.

The concept of a “living lab” (Edwards-Schachter, Matti, & Alcántara, 2012) is also seen as an important enabler of success especially for bottom-up digital innovations. The Labs provide a platform for “open innovation between innovators, encourage user engagement, private and public partnerships leading to development of inclusive and sustainable innovations” (Baccarne, Mechant, Schuurman, Colpaert, & De Marez, 2014).

2.8.4.3 Universities and Research Centres

Universities and research centres have been seen to contribute to digital innovation success. Literature shows that “geographical proximity” of startups to universities and research centres could have a positive implication on performance (Calcagnini, Favaretto, Giombini, Perugini, & Rombaldoni, 2016, p. 1). Education, formal and informal, has been addressed by a myriad of studies as an important enabler where accessible or a barrier where access is limited (Nielsen, Reisch & Thogersen, 2016). Formal Entrepreneurship education in the Global North dates to the late 1940s, with pioneer programs such as “new venture enterprise management” by Harvard University. The program has been praised for its contribution to development of the US economy (Xu, Wang, & Yang, 2020).

Initiatives such as incorporation of innovation and entrepreneurship curriculum (van Den Berg, C. L., 2018) in institutions of higher learning may increase competency in running digital innovations successfully. STEM education (Manning, Engelke, & Klein, 2018) has potential to build technical competencies that can be applied in building resilient technology innovations. Ultimately, universities churn out competent talent that contribute to a sustainable pipeline of skills (O’Kane, Zhang, Daellenbach, & Davenport, 2019), which digital startups can employ or source for volunteers from that pool. Informal education initiatives can also act as enablers of digital innovation success. For instance, ‘do-it-yourself’ training bootcamps and ‘self-led self-paced’ learning are important competency building platforms on digital innovation success (Nielsen, Reisch & Thogersen, 2016).

Business incubators and accelerators inculcate training programs geared towards developing requisite skills and competencies that enable the successful implementation of an incubates technology innovation venture during incubation (Ester, 2017). Research centres on the other hand can release empirical research, information, and technology/innovations, which digital startups can leverage on. Briefly, “processing the right technical skills” (Ross et al., 2012, p. 471) and knowledge is an important enabler of success for digital startups.

2.8.4.4 Financial Capital

Financial capital is a key enabler of digital startup success (Ester, 2017). Manning, Engelke and Kline (2018) report a national investment of \$4.8 billion into Israel’s technology innovation ecosystem, thereby contributing to the success of technology innovations

witnessed in Israel. They note that the lack of technology giants in Europe, which are prominent in United States of America and China, can be attributed to the “chronic shortage of investment capital” (p. 6) because of the risk aversion of most private investors.

Research confirms startup financing in the Global North is well structured. Venture capital funding leads in Silicon Valley with established sources such as “public and private pension funds, university endowments, and foundations” (Ester, 2017, p. 48). Funding from venture philanthropists could also enable the successful implementation of digital innovations that “pursue social impact” (Andrikopoulos, 2020, p. 5). Other financing options include microloans (Nielsen, Reisch & Thogersen, 2016), crowdfunding among others. Crowdfunding not only provides financial capital but also “crowd capital” (Paschen, 2017, p. 182), an important enabler of success.

Literature confirms that some financing options may bar innovation success, especially where a funding source imposes unfavourable contractual obligations or leaves the digital startup in debt (Oranburg, 2020). Ester (2017) advocates on sourcing financing from angel and venture capitalists as opposed to “family, friends and fools”, which he considers a “vulnerable source” (p. 48). A “short-term investor mind-set” and lack of “suitable investors” (Bocken, 2015, p. 647) could also hinder success.

2.8.4.5 Intellectual Capital

Intellectual capital (Wang, Tsai, Lin, Enkhbuyant, & Cai, 2019) is an emerging area of research in entrepreneurship with important theoretical and practical contributions on digital innovation or digital entrepreneurship success. As an “intangible capital”, the literature argues that it cannot be ignored, especially in studies related to startup performance. Wang et al. (2019, p. 1) posit that three types of intellectual capital that is, “psychological capital (intra-personal attributes such as hope, optimism), human capital (personal attributes such as age or education) and relational capital (interpersonal attributes such as trustworthiness) cannot be neglected for new venture success”. Tang and Shao (2019, p. 1) report “positive psychological foundation, which is hope, optimism, self-efficacy and resilience” as potential enablers of success. Other literature refers to the “personal characteristics” of an innovator (Ross et al., 2012, p.472) as an enabler. Rashid, Alzafari and Kratzer (2020, p. 2) research on “entrepreneurial success from a behavioural lens” depicts human behaviour as a potential enabler of or barrier to digital innovation or entrepreneurship success.

Seet et al. (2018) research (conducted in a startup accelerator in Malaysia) further emphasises on the importance of human and social capital. The study reports that the “processes of ‘know-what’, ‘know-how’ and ‘know-who’ are interrelated – by knowing ‘who’, innovators learnt ‘what’ and ‘how to’ through social learning” (p. 236). Social capital is reported as an enabler were used to support commercialisation of resultant innovation (Ross, Mitchell & May, 2012).

Other behavioural studies discuss the concept of “deliberate practice” (Baron & Henry, 2010, p. 52) as an enabler where digital startups or innovators dedicate their time and effort in building resilient and successful digital innovations. Also, the level of “personal investment” or commitment (Nielsen, Reisch & Thogersen, 2016, p. 70) to the innovation process could contribute to success. “Self-interests motivation” (Drencheva, 2018, p. 11) could also be an enabler. Briefly, the innovator personality or ‘social traits and identities’ that are pro-success (Stephan & Drencheva, 2017) could have positive impact on resultant digital innovations.

In summary, as an enabler, Ester (2017) views intellectual capital as “outstanding soft skills such as creativity, flexibility, curiosity, passion, an orientation towards achievement, the ability to work in teams, openness, a willingness to share, an entrepreneurial mindset, a pro-customer attitude, being good at networking, being willing to learn, and being focused on personal development” (p. 44).

2.8.4.6 Networks

Networked digital startups have capability to birth and sustain successful technology innovations. Research found informal networks comprising of family and close friends to be a great enabler of success (Dana et al., 2020). Cantù, Giorgia and Tzannis (2018) study identifies four key types of networks relevant at each stage of startup creation as “social networks comprising of family and friends, business networks, reputational networks and co-opetition networks”. Ben White (2020) advocates on building “resilient networks for digital innovation”, especially in “times of crisis” such as the COVID-19 pandemic. Briefly, access to “business advice and network support” (Bocken, 2015, p. 647) for digital innovators could steer them to success.

Incubated digital startups are at a better advantage concerning ease of access to reliable networks (Schmitt & Muyoya, 2020). This is because the incubators or technology hubs or accelerators already have set structures and mechanisms of engagement that expose their

incubatees (digital startups or technology innovators) to networking opportunities (Ester, 2017). A good example is access to a network of mentors with expertise in various subject matter areas such as technology mentors (Woodley, Burgess, Paguio, & Bingley, 2015). Ester (2017) notes that “mentorship by experienced serial entrepreneurs can prevent startup founders from making the most common business development mistakes” (p. 46). In this case, accelerators are seen as instrumental in providing requisite support and technical advice to enable commercialisation of promising digital innovations. Briefly, “supportive intermediaries” (Nielsen, Reisch & Thogersen, 2016, p. 73) could be important enablers of digital innovation success.

2.8.4.7 Business Model

Research presents an innovative business model as a critical success factor for startups (Trimi & Berbegal-Mirabent, 2012), especially for technology-based startups that operate in “extreme uncertainties” due to the “volatility and unpredictable nature” of new technologies (García-Gutiérrez & Martínez-Borreguero, 2016, p. 47). They report business model innovation as a “more important” enabler of success compared to product or service innovation. They note that for digital innovators, building innovative business models might be a challenge as they are “specialists in technical innovation” and not “business design or management” (p. 48). In the long run, this could pose as a barrier to innovation success especially for technology innovators who fail to target and pursue the right market or rather build commercially viable digital innovations. Briefly, “failed business model” (Bocken, 2015, p. 654) may result in digital innovation failure.

2.8.4.8 Leadership

Extant literature links leadership as highly relevant to an entrepreneurial venture success, digital or otherwise (Zaech & Baldegger, 2017; Ester, 2017). Nielsen, Reisch and Thogersen (2016, p. 71) note that a “dynamic and effective” leader (founder or CEO) can influence startup success. Zaech and Baldegger (2017) study evaluates the impact of three types of leadership styles (transactional, laissez-faire, and transformational) emanating from (Bass & Avolio, 1996) research, on startup performance. ‘Transactional’ and ‘laissez-faire’ leadership are associated with ‘less activity’ or rather a “watch and wait” approach that may hinder success compared to “transformational leadership” where the leader is engaged in the day-to-day operations (p. 5).

2.8.4.9 Open Innovation, Hackathons and Code Sprints

Some of the most prominent digital innovations have occurred in an environment of open innovation and were spearheaded by startups. Open innovation (Teh & Keeb, 2020) provides opportunities for co-creation, co-design, co-production (Stroh, 2020; Toros et al., 2020) or collaboration with potential customers or other innovation stakeholders (Nielsen, Reisch & Thogersen, 2016) in the ecosystem. Teh and Keeb (2020) note that open innovation allows for exploration and exploitation of previously inaccessible knowledge and resources.

Hackathons and code sprints (Coetzee, (2010); Ross, Mitchell & May, (2012); Baccarne et al., (2014b); Toros et al., (2020)) or innovation competitions are important avenues that encourage open innovation or co-creation of digital innovations, leveraging on the diverse competencies (technical and non-technical) of collaborating innovators. Post innovation competition or hackathon support can be an enabler where innovators receive financial and/or technical support to scale their prototypes or minimum viable products (MVPs) to success. Where such support is lacking, misplaced or the value add to participating innovators is unclear, then innovation success could be hindered as resultant innovations are normally abandoned at pre-mature stages of development. Hjalmarsson et al. (2014) study focuses on understanding the constraints or limiting factors that hinder the success of innovations that emanate from innovation competitions. They bring out the concept of perceived versus actual barriers. Both types have the potential to hinder innovation.

2.8.4.10 Government

Government is an important player in influencing digital innovation or digital entrepreneurship success. On the flip side, a disengaged government that fails to create an enabling environment for digital innovations to thrive, can pose as a barrier. A dictatorial regime that imposes digital solutions or is pro “digital solutionist approach” as put by Rowe, Ngwenyama and Richet (2020, p. 545) on its citizenry can pose as a barrier to success of such innovations as this affects adoption. Initiatives such as “national R&D funding” and “economic incentives” (Manning et al., 2018, p. 16). are among key government contributions towards strengthening or building of a technology innovation ecosystem. In Silicon Valley, government funding, participation as a launching customer of technology innovations and supply of requisite resources for innovation is reported as some of the factors that have enabled digital startup success (Hess, 2020).

As an innovation market regulator (Ester, 2017) the ease of doing business is another key government role that can pose as an enabler of or a barrier to digital innovation success. A World Bank report on the ease of doing business (World Bank, 2020) notes that it takes “six times” (p. 5) longer for digital entrepreneurs in developing economies to start a business compared to their counterparts in developed economies. Further, they use up to 50% of the country’s per capita income to launch a company while their counterparts in the developed world take only 4.2%. Laws, regulations, and policy are key contributors to the ease of doing business.

2.8.4.11 Culture

Culture is an important aspect of entrepreneurial innovativeness (Manning et al., 2018). In Silicon Valley, Ester (2017, p. 35) argues that a culture that encourages and rewards innovation, openness in sharing ideas, feedback and learning, expectation to “launch disruptive technologies”, “risk taking and tolerance of failure”, “24/7 business economy”, “diversity in innovation teams” among others could be contributing factors that continue to steer new innovators towards building successful digital innovations. He concludes that such a culture could be the reason Silicon Valley has maintained its position as “the global paradise for high-tech startups” (p. 61). This does not, however, mean that failure is non-existent.

In the Global South, digital startups, especially those under a structured digital innovation environment, are said to face pressure to employ a ‘Silicon Valley startup mindset’, which is assumed to be an enabler of success. The lack of a “strong incumbent industry” (Bocken, 2015, p. 654) or an environment embedded with an entrepreneurial culture could deter innovation success.

Competent partner(s) (Sarkilahti, Kinnunen, Kettunen, Jokinen, & Rintala, 2017), a team with the right “talent infusion” (Vaidyanathan, Chatterjee, Murthy, & Naswa, 2014, p. 2) can enable digital innovation success. Ester (2017) notes that Silicon Valley startups cherish diversity in their teams as it “broadens the talent pool” (p. 61) especially where different gender, ethnicities and nationalities are engaged. Engaging such a mix of talents could enable a digital startup to “serve global consumers” more effectively (p. 61). Access to “expert volunteers” (Nielsen, Reisch & Thøgersen, 2016, p. 71), especially from universities and research centres, could also enable success.

In summary, the following major factors have emerged from the SLR: Digital Technology, Incubators and Accelerators, Capital, Business model, Leadership, Networks, Education and Training, Culture, Government and Open Innovation. Some factors can pose as both an enabler and barrier. Innovation concepts such as the triple helix model and the “Silicon Valley syndrome” amalgamates some of the factors discussed, specifically government, industry, and academia. Government and education are important components of the triple helix model of innovation discussed earlier in this study’s introduction and background sections. The model views communication and negotiation relations emanating from interaction between industry, academia, and government over a period as important inputs into an innovation process (Leydesdorff, 2012).

Factors such as Incubators and Accelerators, Capital, Networks, Culture, and Open Innovation have been attributed to the ongoing success of the Silicon Valley innovation ecosystem. Ester’s (2017) model maps out factors seen to enable, or hinder, innovation success in Silicon Valley as illustrated in Figure 2-11. The model categorises the factors into three levels: macro level (comprising of culture), meso level (venture capital funding, government, universities and research centres and support systems such as accelerators and incubators) and micro level (internal factors that include the innovative idea, team composition and marketing strategies). He notes that the effective combination of these factors could be the explanation for digital innovation success in the Silicon Valley, which has taken “many decades” to build (p. 38).

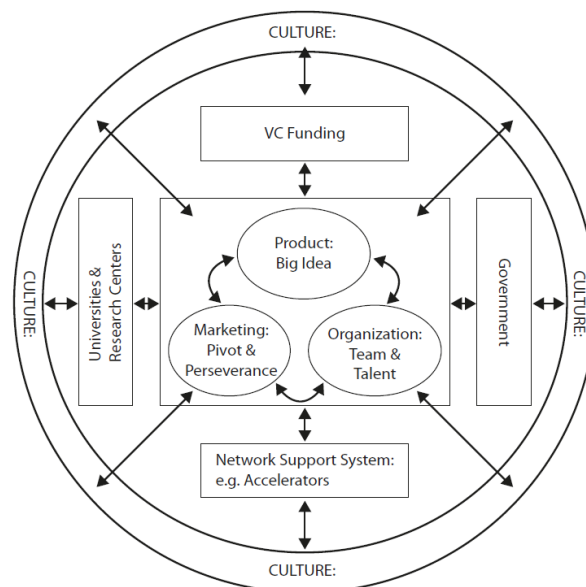


Figure 2-11: Silicon Valley Innovation and Startup Model. Source: Ester, P. (2017). *Accelerators in Silicon Valley: Building Successful Startups*. Amsterdam University Press.

A review of linkages between some of the discussed factors is important. Particularly, the linkages between incubators or technology hubs or accelerators or living labs is vital for this study as it seeks to highlight the comparable parameters between such structured innovation environments with unstructured environments. Business incubators provide support services such as affordable working space, access to capital, training, mentoring, and coaching and many more (Schwartz, 2013), which may contribute to success or failure of digital innovations ran by technologies startups who are their members.

2.8.4.12 Discussions and Conclusions

The review set out to uncover barriers and enablers for successful digital innovation. Of the shortlisted 421 academic papers, 38 papers were analysed in-depth using a Structured Literature Review (SLR) process. In total, 49 distinct factors were uncovered (Table 2-6). These were then grouped under the following major themes or headings: digital technology, business incubators and accelerators, universities and research centres, financial capital, intellectual capital, networks, business model, leadership, open innovation, government, culture, and team composition.

The review confirms that literature on digital innovation success is skewed and fragmented as it has not been addressed in a systematic manner. The search for relevant literature was complicated as there were few studies that directly addressed enablers of and barriers to ‘digital’ innovation success (Vega & Chiasson, 2019), thereby contributing to the fragmentation. The studies on ‘user innovation’, ‘social innovation’, ‘bottom-up innovation’, ‘grassroot innovation’ or ‘digital entrepreneurship’ were included in the Systematic Literature Review process as they had some relatable results relevant to the phenomenon under study.

The skewedness can be attributed to research focus on enablers of and barriers to digital innovation success in the Global North, or at the very least the predominance of publications emanating from Global North researchers. Literature confirms that context matters when evaluating enablers of innovation (Baller, Dutta, & Lanvin, 2016; Kline & Rosenberg, 2010) especially in emerging economies (Anderson & Ronteau, 2017; Antarciuc, et al., 2018). The attributes of innovation environments in the Global South may differ from those in the North. It is not clear if the same enablers and barriers present in the North apply to a developing country context, particularly Kenya, which has unique conditions. Schmitt & Muyoya (2020, p. 1) use the term “Global South” to “emphasise power relations and inequalities within the

research context” in their study on ‘innovation for sustainability in the Global South’. Thomas & Pugh (2020, p. 1639) claim a profound “knowledge gap on countries in the Global South” due to “lack of research” (p. 1633) concerning their study on ‘entrepreneurial universities’, an area which they note is dominated with case studies from the “usual suspects” (p. 1644), that is Europe and North America. Avle & Lindtner (2016) posit that technology entrepreneurs in the Global South disagree with the “discourse of their cities as emerging sites of Silicon-Valley type innovation” (p. 2233). They note that African entrepreneurs “render the narrative of catching-up-with-the-west overly simplistic, ahistorical and blind to situated practices” (p. 2233). In addition, “western theories” (Anderson & Ronteau, 2017, p. 116) pose contextual fit challenges when applied to studies based in developing countries such as Kenya. Jimenez & Roberts (2019, p.5) posit that “imposing foreign knowledge as valid and diminishing indigenous knowledge is labelled by postcolonial scholars such as Spivak (1988) as “epistemic violence”, which actively obstructs and undermines non-Western methods or approaches to knowledge as the Other”. The “epistemologies of the south” (Jimenez & Roberts, 2019, p.5) should be acceptable as a relevant explanation of a phenomenon within the Global South context. This narrow view of digital innovation success limits the understanding of this phenomena, especially when imposed on the Global South context. This study explored the enablers of and barriers to digital innovation success in Kenya, a country in the Global South. The perspectives of digital innovation stakeholders in Kenya on what enables or hinders innovation success were key in answering the research questions.

Further, research confirmed that non-academic literature (“blog postings, white papers, consultancy reports”) on digital innovation, digital startups/technology entrepreneurs and technology hubs in sub-Saharan Africa as more prominent (de Beer, Millar, Mwangi, & Rutenberg, 2017). Also, at the time of this research, there were not enough studies on differential factors that enable or hinder digital innovation success in structured (incubated) versus an unstructured (non-incubated) digital innovation environment in the Global South, which could have “different innovation intensities” (Vega & Chiasson, 2019, p. 249), processes and outcomes. This validated the need for this study, whose results are seen as valuable to future digital startups or technology innovators, government, industry, academia, and information systems research community.

The systematic literature review brought out the following prominent factors that could enable or hinder digital innovation success: digital technology, business incubators and accelerators, universities and research centres, financial capital, intellectual capital, networks, business model, leadership, open innovation, government, culture, and team composition. The review provided theory that was used as an “initial guide” in this study’s theory development (Walsham, 1995a, p. 76). As this is an explorative study, it was important to explore new and unique enabling and debilitating factors characteristic of the Global South. Based on the review, some of these factors were deficient in intensity, accessibility or existence in the Global South, a context characterised by nascent innovation environment and scarce resources. Research reports the following factors to have debilitating effects on the success of innovation in general in the Global South:

- Financial capital: Access to financial capital for entrepreneurs in Kenya remains a challenge. Despite the intermittent initiatives geared towards ease of access to financial capital for MSMEs by government and financial services sector, Muchira, Jagongo, & Simiyu (2019) assert that, Kenyan enterprises continue to fail due to “poor or lack of access to finance”. Academic research on the state of venture capitalism in Kenya and its impact on technology-based venture creation is scanty. Chirchietti (2017) research, however, claims that the low investment on startups is because “very few start-ups are investment-ready “. The study further alludes to the need for financial literacy skills training, which could potentially enable innovation success.
- Leadership: Non-academic research by print media has over the years reported top technology startups in Kenya to be led by expatriates. A 2018 article on “An infographic of Kenya's white technology startups executives sparks rage” by digetsafrica.com recounts conversations by Kenyans on twitter expressing their discontent on this matter. The report claims that technology startups that are led by “white executives” (expatriates from the Global North) appear to be more successful compared to those led by Kenyans. There lacks empirical evidence to confirm or invalidate this claim.
- Resilient networks and psychological capital: Research done by (Nkeshimana, 2018) on student startups affiliated to the United States International University, Kenya reported insignificant contribution of psychological capital and networking activities to startup success. Though this research is not representative of the entire population of entrepreneurs, particularly technology entrepreneurs - a study limitation Nkeshimana

(2018) acknowledges -, it could potentially mean that Kenyan entrepreneurs do not expose themselves to networking activities as emergent relationships are usually temporal and do not translate to business opportunities, which could in turn result to success. There is a need for empirical evidence to confirm or refute this claim.

- Education: A World Bank study on entrepreneurship education training noted that researchers continue to grapple with indefinite conclusions on the possibility of “teaching entrepreneurial success” (Robb, Valerio, & Parton, 2014). The Kenyan curriculum has begun to put more emphasis on entrepreneurship and innovation through the newly effected Competency Based Curriculum (CBC) that seeks to build a citizenry with 21st century skills, albeit with formidable criticism (Nafukho & Bunyi, 2013) and resourcing challenges. There is a dearth of research on the impact of CBC on entrepreneurship and innovation success in Kenya. This could partly be because the curriculum is new with practitioner reports as the only source of information on its impact on entrepreneurial success in Kenya.

2.8.5 Gaps in Literature

The Systematic Literature Review confirmed the following research gaps: 1) a theoretical gap on enablers of and barriers to digital innovation success in the Global South, with unique conditions different from that of Silicon Valley and other ideal innovation ecosystem models; 2) a theoretical gap on comparability of enabling and debilitating factors of digital innovation success in structured versus unstructured innovation environments.

2.9 Chapter Summary

This chapter sought to present a systematic account of relevant literature on digital innovation, innovation models and theories, and enablers of and barriers to digital innovation success. The results of the systematic literature review confirmed a theoretical gap in research, which forms the basis for this study. First, the review confirmed the need for contextualization of research on enablers of and barriers to digital innovation success, to expand knowledge of digital innovation success beyond what happens in the Global North. Second, at the time when this research was initiated, there were not enough studies on differential factors that enable or hinder digital innovation success in structured (incubated) versus an unstructured (non-incubated) digital innovation environment in the Global South, which could have “different

innovation intensities” (Vega & Chiasson, 2019, p. 249), processes and outcomes. This validated the need for this study, whose results are seen as valuable to future digital startups or technology innovators, government, industry, academia, and information systems research community.

3 THEORETICAL FRAMEWORK

3.1 Introduction

A theoretical framework provides a lens or a theoretical basis for the conduct of research. Grant & Osanloo (2014) likens it to a house blueprint that guides an academic researcher on how to construct and present knowledge. Sanner & Nielsen (2018) view digital innovation as a “central concept in Information Systems” that depicts the “transformational qualities of digital ICTs” (p. 1) on individuals, businesses, organisations, communities, economies, and societies at large. This study was guided by the Choice Framework by Dorothea Kleine (Kleine, 2013), which formed the basis for development of a conceptual framework as discussed in this chapter. The Choice Framework follows core theoretical concepts of Amartya Sen’s ‘Capability Approach’ (Kleine, 2013), to systemically and holistically analyse ICT4D projects, initiatives, and processes. Digital innovation can be considered as an ICT4D initiative and process, whose enabling and debilitating factors could be analysed through the lens of the Choice Framework. This chapter begins with evaluating theories commonly used to study innovation success while highlighting their limitation for use in this study and aspects that can be adopted to enrich the Choice Framework.

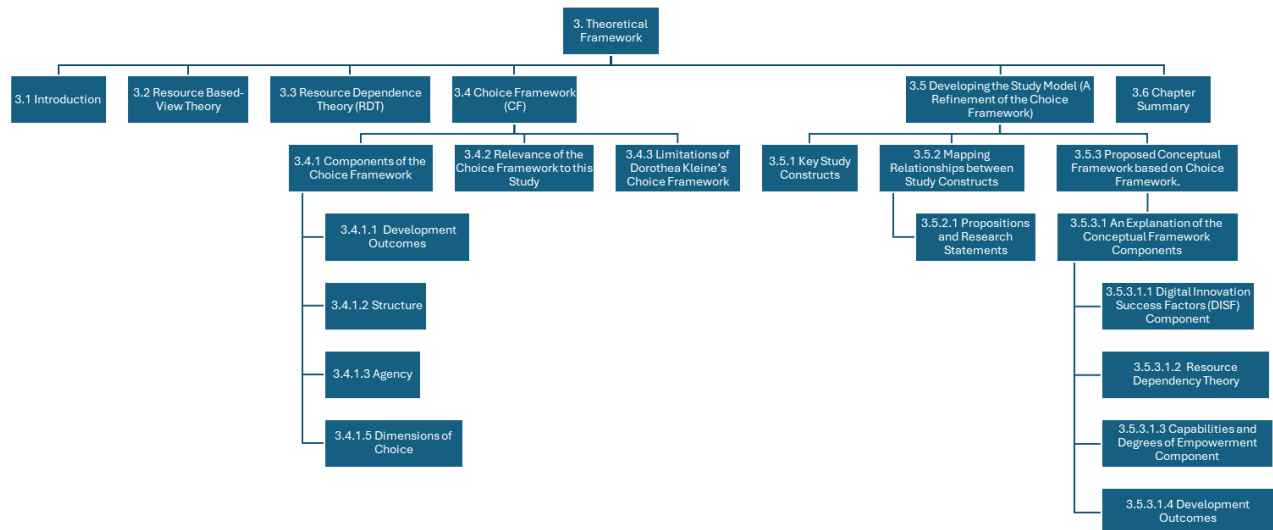


Figure 3-1: Structure of Chapter 3

3.2 Resource Based-View Theory

The Resource Based View (RBV) theory was originally proposed by Birger Wernerfelt in 1984. Since then, the theory has seen several iterations of refinement inside academic and

corporate walls. Jay Barney's interpretation of the theory remains one of the most widely used in business strategy research. RBV theory states that a firm's competitive performance is heavily dependent on its unique tangible and intangible resources, its capabilities to utilise those resources to create valuable products and/or services, which align with market needs (Barney, Wright, Ketchen Jr., 2001). RBV upholds competitive advantage as a key determinant of sustainable success (Barney et. al., 2001). To gain competitive advantage, a firm must possess the capability to exploit (access, build and maintain) its internal resources (tangible and intangible), which must be of "value, rare, inimitable, and non-substitutable" (Barney et. al., p. 625). Also, RBV assumes that the resources are heterogenous (Amit & Schoemaker, 1993), such that though firms in the same industry face similar external conditions, the differentiation in performance could be because of having different internal resources. Emphasis is more on internal capacity to exploit rather than external factors (Amit & Schoemaker, 1993). In addition, RBV suggests that resources are immobile such that it is difficult, though possible, to move them from one firm to the other. A firm with superior immobile resources at a particular point in time is seen to be at an advantage compared to its competitors.

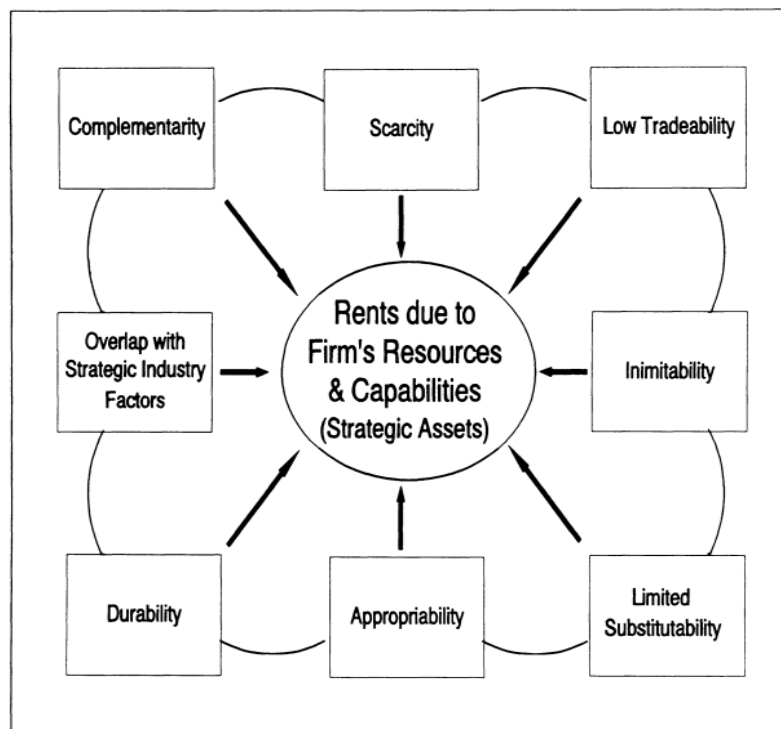


Figure 3-2: Desired traits of a firm's resources and capabilities (Amit & Schoemaker, (1993)

Applicability to this study

RBV has been reported as one of the most widely used theories to explain why some firms succeed while others do not (Hart & Dowell, 2011). As resources, capabilities and competitive advantage are at the core of RBV theory, in the context of technology startups, the theory can be used to assess potential barriers and enablers of digital startup innovation success within a resource-constrained Global South context. In such a context, a valuable intangible or tangible resource would be one that enables a startup to design and develop a commercially viable digital innovation, which is novel. Investor funding, a proprietary software tool or platform that is costly to acquire in the short term could be considered as rare resources, with potential to contribute to success for technology startups that have access. An inimitable and non-substitutable resource could be a startup founder's core technical and leadership skills, specialised talent and more. In this study, RBV can be used to explain why technology startups succeed, especially those that operate within an unstructured innovation environment.

The limitation of RBV is its focus on internal factors (Barney, 1991), which results in a narrow view of a firm's competitive environment. External factors such as the market, policy and regulation and technological advancements may also have significant impact on a firm's competitive environment. Over reliance on internal resources and capabilities may lead to firms overlooking external threats, leading to a false sense of security and vulnerability to unexpected changes in the market. Further, RBV fails to provide a methodology for identifying and measuring the true uniqueness of a firm's resources in comparison with its competitors. RBV also fails to provide for the impact of the dynamic nature of some resources on the firm's competitiveness. For instance, technological resources are widely known to have a high rate of becoming obsolete. Barney et al., (2001) cautions against such static views of resources. Barney et al. (2001) further notes that RBV fails in providing strategy for use of resources and capabilities for competitive advantage.

The RBV approach can be used to explore studies related to technology startup innovation. This is because startups often have unique resources and capabilities, which enable the development of novel innovative solutions. The limitations highlighted above, however, limit the use of this theory to this study.

3.3 Resource Dependence Theory (RDT)

The RDT, a sociological theory developed by Jeffrey Pfeffer and Gerald Salancik in the 1970s, examines the relationship organisations have with their environment and how they make decisions regarding resource acquisition. The premise of this theory is that organisations depend on their environment for resources needed to survive and succeed (Pfeffer & Salancik, 2003). RDT examines various organisational behaviours or phenomenon towards resource acquisition for survival and success. Mergers, acquisitions, strategic alliances, and organisational change are examples of phenomena examined in this theory (Pfeffer & Salancik, 2003). For instance, an organisation may build relationships with other organisations that control a key resource to gain access to the resource. To manage such dependency, the organisation may diversify their resource portfolio or build their own internal capabilities (Pfeffer & Salancik, 2003).

In the context of this study, the theory suggests that startups must manage their dependencies on internal and external resources such as funding, talent, and partnerships. RDT emphasises building relationships with key stakeholders as an enabler of success. Such relationships provide opportunities for access to necessary resources and support to navigate obstacles in the startup journey. Startups in the Global South operate in a resource scarce environment. Strategic partnerships and relationships could provide opportunities for access to scarce resources.

Applicability to this study

RDT can help identify resources that are most critical to digital innovation success, such as funding, talent, and partnerships. By understanding these dependencies, companies, or in this case digital innovators and startups, can develop strategies to manage them and mitigate the risks of resource constraints. It can also help identify strategic alliances that can be formed with other companies or stakeholders to access critical resources. These alliances can be used to leverage resources that would otherwise be too expensive or difficult to acquire on their own, particularly innovators operating in an unstructured innovation environment.

RDT also provides mechanisms for understanding dependencies on and evaluating the impact of power dynamic resulting from resource owners or users. This enables startups to employ strategies that allow them to navigate these dynamics towards success. Also, RDT can be used

to analyse the impact of digital innovation on stakeholders such as government. For instance, an understanding of the impact of government policies geared towards the support of development of new technologies or provision of funding for startups is important. By understanding these policy dependencies, digital startups can develop strategies to navigate the regulatory landscape and mitigate the risks of policy dependency. This theory can be adapted to enrich some aspects of the Choice Framework as discussed in succeeding sections.

3.4 Choice Framework (CF)

The premise of the choice framework is the need for a new approach for analysing development interventions and the impact of technologies, particularly information and communication technologies (ICTs), on development processes (Kleine, 2009), with a focus on non-economistic, human-centred (Kleine, 2013) development outcomes. Impact here could mean expansion or restriction of ‘choice’. Through the lens of the Choice Framework (CF), a digital innovation process, which involves the application of and results to digital technological product or service, can be analysed holistically and systematically, to explain how a non-economistic and human-centred development outcome such as ‘improved quality of life of a digital innovator’ or a ‘transformed digital innovator’ came about. In this study, and based on CF, such a development outcome could be regarded as a potential indicator of digital innovation success as it expands ‘choice’. Holistic analysis is made possible through understanding the complex interplay between CF components, that is, structure, agency, and choice in development. These components are discussed in detail in later sections.

The CF borrows from Amartya Sen’s Capability Framework, which posits that development ought to be appraised as people’s real freedom “to lead the kind of lives they value and have reason to value” (Sen, 2001, p.18). Sen (2001, p.3) posits that “development requires the removal of major sources of unfreedom such as tyranny” and more. The ‘value’ aspect is therefore intrinsic and uniquely defined by each person within their social, economic, and cultural context. Where an individual’s ‘values’ are influenced by a dominant power through formal or informal structures, then achievement of ‘real’ freedom or ‘choice’ as Dorothea Kleine puts it, is hampered (Kleine, 2013). Kleine, (2013) notes that ICTs can enhance or constrain an individual’s capabilities, thereby enabling or limiting sense, use and achievement of choice (Kleine, 2013), in the context of development. Her argument is that while ICTs have

the potential to expand an individual's capabilities and opportunities, they can also reinforce existing power structures and inequalities.

Briefly, Kleine's Choice Framework builds on Sen's capability framework by emphasising the importance of individual choice of desired outcomes in a development process. The framework also borrows some aspects of the Sustainable Livelihood Framework (SLF) developed by UK's Department for International Development (DFID) in the 1990s and Alsop and Heinson's work on measuring empowerment based on Sen's capability approach (Alsop and Heinson, 2005). In the SLF agency, a key dimension in the Choice Framework denoted by terms such as "capital portfolio" and "livelihood assets", is considered pivotal towards human-centred development (Kleine, 2009, p. 109).

In this study, Kleine's framework provides a lens for examining how digital innovators leverage material and non-material resources (also known as agency or capital portfolio or livelihood assets) with which they "negotiate policies, institutions and processes" (Kleine, 2013, p.43), within a vulnerability or structural context, to enhance their capability to achieve 'digital innovation success' as a 'choice'. Digital innovation success here could be seen as effective implementation and adoption of digital technologies or solutions towards achievement of non-economistic human-centred development outcomes. Other than 'choice', varied indicators of or 'achieved functionings' (Kleine, 2013) of digital innovation success (secondary outcomes) can be represented in various ways or manifested in different forms based on that which a digital innovator values and has reason to value (their development goals).

Kleine's Choice Framework comprises of five key dimensions or elements as illustrated in Figure 3-3. The framework focuses on individuals' own development outcomes and measures the degree to which they have been attained. The framework then works "systemically backwards from development outcomes through structure, agency, and choice" (Kleine, 2009, p. 113) to understand how the development outcomes have been achieved. This means that a wish list of probable secondary development outcomes must be determined beforehand, to measure and "understand how the outcomes came about" (Kleine, 2009, p. 113). Digital innovation success can be considered as a development outcome that digital innovation stakeholders have reason to value and strive for. The Choice Framework can be used to

visualise digital innovation processes by digital innovators or technology startups systemically and holistically. The framework can help a researcher understand the interplay between agency, structure, dimensions of choice to enable or constrain digital innovation success as a development outcome. The CF is a great proponent for a non-economistic view of development process, though it acknowledges that economic growth “plays an important role though not an exclusive role” in development (Kleine, 2009, p. 109). In this regard, digital innovation success as a development outcome can be represented in economistic and non-economistic measures (Kleine, 2009) such as ‘improved quality of life’ of digital innovators or innovation beneficiaries (users, consumers, government), increased income and more.

3.4.1 Components of the Choice Framework

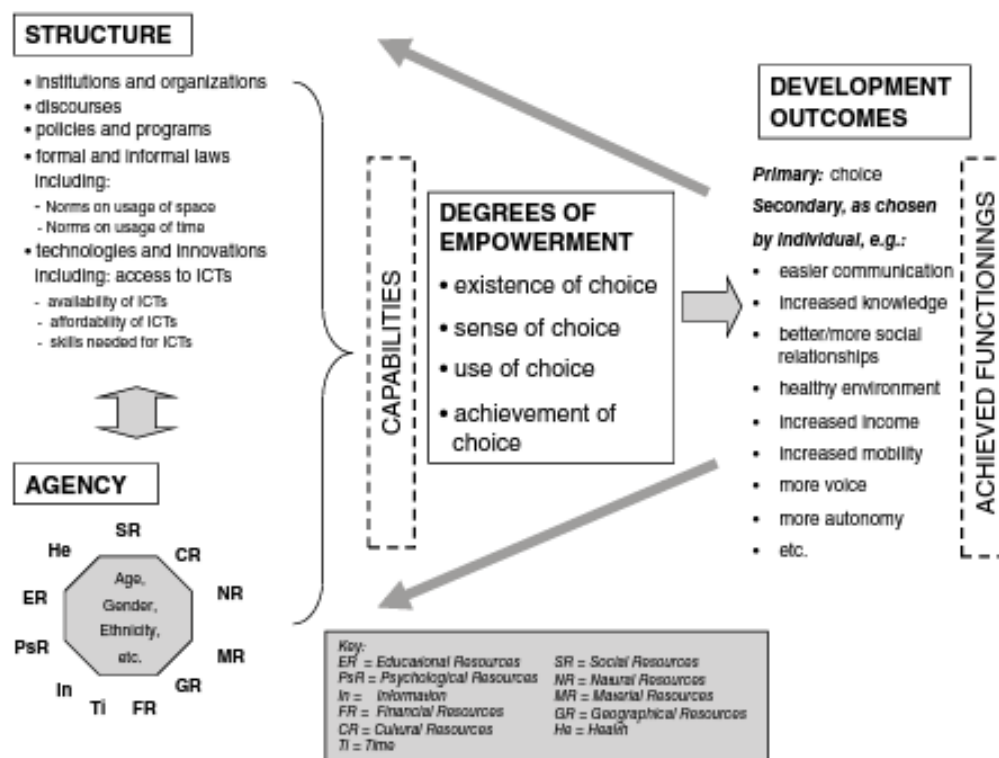


Figure 3-3: The Choice Framework (Kleine, 2013)

3.4.1.1 Development Outcomes

This element maps or measures achieved functionings or capabilities emanating from individual choice, within a given set of structural conditions and agency (Kleine, 2013). Capabilities as depicted by Amartya Sen implies ‘real freedom’ or opportunities to lead

valuable life (Kleine, 2013). Kleine, (2013) agrees with Amartya Sen, that the goal of development ought to be to improve the lives of individuals and communities, and that ICTs can play a role in achieving this goal by improving access to information, facilitating communication and collaboration through participatory approaches, and promoting economic growth. Kleine, (2013) also borrows from Sen's view of economic growth as an important, though not the only or exclusive, development goal. Borrowing from Sen's Capability Approach, development outcomes in the Choice Framework are categorised into primary and secondary outcomes, where 'choice' is depicted as both a means and the primary end to development. In other words, the 'choice' is regarded as the primary outcome, while individual development priorities are considered as secondary outcomes (Kleine, 2013), that align with the desired life that individuals value and have reason to value (Kleine, 2013). What is therefore 'valued' in the case of digital innovation success could be regarded as potential measures or mapping of 'success'.

3.4.1.2 Structure

Structure refers to the social, economic, and political systems that shape and constrain individual and collective actions. In simple terms, structure includes factors such as social norms, policies, and infrastructure, which influence 'Choice', a central concept in the Choice Framework (CF) (Kleine, 2013). The structure element recognizes that individuals and communities are not operating in a vacuum but are embedded in complex social systems that can either enable or constrain their choices and actions (Alsop and Heinsohn, 2005). In the context of ICTs and development, structure includes issues such as power dynamics, laws and regulations, cultural norms, and economic incentives or systems and institutional arrangements (Klein, 2013). Further, Klein, (2013) opines that ICTs can either reinforce or challenge existing structures, depending on how they are designed and implemented. To expound more on structure, Alsop and Heinsohn (2005) share the story of a mother who chooses to send her daughters to school but is barred by informal norms inflicted upon her by her husband and the society at large, which view girl and women education as a waste of money. In the formal realm of this case, there were no such rules, particularly from the Government. Regardless, her achievement of choice, that is, to educate her daughters, is confined.

In the context of digital innovation, enablers of success related to structure can include supportive policies and regulations, legal and regulatory frameworks that promote innovation, public-private partnerships, access to finance and investment, and infrastructure and institutional arrangements (business incubators/accelerators/tech hubs etc.) that facilitate access to technology and markets. Barriers can include inadequate regulatory frameworks, regulatory barriers that restrict the development or use of technology, institutional rigidities that limit experimentation and learning (for example study participants reported that academic research is dependent on available funding for Academic institutions in Kenya), limited access to financing, economic systems that favour incumbents over new entrants (challenges in access to financing mentioned by respondents), lack of collaboration and partnerships between stakeholders, lack of government support, limited resources, and fragmented digital infrastructure.

3.4.1.3 Agency

Agency refers to the capacity of individuals to take action to achieve their goals and transform their lives, using resources available to them within the given structure (Kleine, 2013). This construct recognizes that people are not passive recipients of technology and that their choices and actions are shaped by a variety of social, cultural, economic, and political factors (Klein, 2013). Klein also posits that agency is influenced by factors such as education, access to information, social norms, and power dynamics. ICTs can enhance agency by providing access to information and communication, enabling participation in decision-making, and facilitating collective action.

In the context of digital innovation, enablers of success related to agency can include initiatives to enhance agency such as improvement of digital literacy of innovators and users of their innovations, via increased access to information, communication, and tools. In this case, ICTs should enable digital innovators to participate in decision-making, engage with other innovators, or allow users to express their preferences and needs, through user-centred design, participatory approaches, and inclusive innovation practices that involve end-users and stakeholders. Access to affordable digital tools, and support for digital entrepreneurship may also enable digital innovation success. Barriers to success can include limited access to digital tools (because of social norms that limit access to technology or restrict certain uses, and power

dynamics that marginalise certain groups), lack of digital literacy, and inadequate regulatory frameworks.

3.4.1.4 Dimensions of Choice

Kleine (2013, p. 42) defines “Choice” as “degrees of empowerment”, which is borrowed from Alsop and Heinsohn (2005) definition as “degrees of empowerment”. Alsop and Heinsohn (2005) define empowerment as the “capacity to make effective choice” often influenced by agency, an individual’s personal resource portfolio, and opportunity structure, that is, “formal and informal contexts within which an individual operates in” (p. 6).

In the context of digital innovation, degrees of empowerment could imply the extent to which innovators are able to leverage their dynamic capabilities resulting from a portfolio of resources, including ICTs, to achieve that which they deem as ‘digital innovation success’. This element recognizes that the relationship between technology and empowerment is complex and multifaceted (Klein, 2013), and that different innovators will therefore experience different levels of empowerment depending on various factors (enablers/barriers). Degrees of Empowerment can be enhanced through measures such as training and education, access to resources, and support from government and civil society (Klein, 2013). The choice framework borrows from Alsop and Heinsohn’s work to explain the journey towards an individuals’ empowerment to choose a life worth living. Four degrees of empowerment are reported as key in this process. These “are awareness of choice, sense choice, use choice and achieve choice” (Klein, 2013).

Enablers of digital innovation success related to empowerment include technologies that enable access to information, communication, and services (education, digital skills training), as well as tools and platforms that enable participation and collaboration in digital innovation processes (agile development principle). Barriers can include technologies that are not user-friendly, do not work well in local contexts such as Kenya, or reinforce existing power dynamics and social inequalities (may be a potential difference between structured and unstructured environments) by limiting digital literacy and opportunities for participation in digital innovation processes.

In summary, Kleine's Choice Framework provides a useful tool for understanding the complex and multifaceted relationship between ICTs, development, and individual choice (Kleine, 2013). By considering the interplay of agency, structure, degrees of empowerment, and development outcomes, digital innovators can design and implement digital innovations in ways that enhance human well-being or individual agency and promote development outcomes (both social and economic), while addressing social inequalities and environmental challenges. Achievement of these things therefore could denote 'digital innovation success'.

3.4.2 Relevance of the Choice Framework to this Study

This study began by stating the limitations of using foreign theories from the Global North to study a phenomenon in a Global South context. The rationale behind this thinking is that researchers often over rely on foreign theories, thereby limiting the creation of new knowledge from the Global South. A major advantage of the Choice Framework (CF) is that it is a "living tool" that is open for modification through addition of "new elements under existing concepts or new ones" (Klein (2013, p. 51-52). This is because the CF "concepts are broadly defined in order to render the framework culturally and interdisciplinary adaptable" (Kleine, 2013, p. 52). In addition, CF's groundedness on the concept of "choice" and regard for "individual development priorities" allows for a contextualized conceptualisation of digital innovation success based on individual (digital innovator) choice of what "success" looks like to them (indicators) or what they value (Kleine, 2013), within their context (Global South). Particularly, the CF "questions the validity of outcomes that are defined a priori without consulting the individual in question" (Kleine, 2009, p. 112). Moreover, the CF advocates for a research design that begins with first understanding individuals' development goals or priorities (Klein, 2013) or that which they value and have reason to value (Kleine, 2009), as a foreground to its application. This sets apart the Choice Framework (CF) from other foreign theories. The data analysis section of this study begins with an understanding of digital innovation success as conceptualised by the research participants in Kenya. As a contribution to creation of new knowledge, this study proposed a conceptual model based primarily on the CF and the Resource Dependency Theory (RDT).

Academic research profiles the following three applications of the Choice Framework (CF) in ICT4D projects, programs and/or interventions: 1) to evaluate ICT4D projects (Kleine, 2013);

2) to explore development process and/or outcome and 3) to guide action research (Zelezny-Green, 2017). This study explores factors that enable or hinder digital innovation success as a development outcome for technology startups in Kenya, a developing country context. The Choice Framework can be used to understand digital innovation success as a development outcome that digital innovation stakeholders, particularly digital innovators, strive to achieve to lead lives they value and have reason to value (Sen, 2001, p.18). The CF considers the broader political, economic, and cultural context (Kleine, 2013) in which technology is embedded. These can include issues such as government policies, infrastructure, and international aid and trade regimes, whose impact on digital innovation success can be empirically explored. The framework therefore provides a useful lens for assessing, in a systematic and holistic way (Klein, 2013), internal and external factors that may enable and/or hinder ‘achievement of digital innovation success’ as a developmental outcome that digital innovators or digital startups operating in a structured or unstructured innovation environment in the Global South strive to achieve. The framework allows for a non-economistic view of success, a development outcome, as ‘freedom of choice’ and achievement of that which one values and has reason to value (Sen, 2001, p.18). Klein (2013) acknowledges that ‘economic growth’ plays an important role but not an exclusive role in a non-economistic view of development. Using the CF, a factor that ‘expands real freedom’ of digital innovators is seen as an enabler while one that limits real freedom is seen as a barrier towards achievement of that which an innovator values and has reason to value (their definition or indicators of digital innovation success) (Sen, 2001). Kleine (2010) notes that a non-economistic view of development is seen as a minority position. This study is of the opinion that a non-economistic view of digital innovation success within a minority context recognizes contextual measures of success. Further, the CF can be used to explore how digital innovations are perceived and used by different stakeholders, such as users, developers, and policymakers, and how these perceptions and uses are shaped by cultural and social norms.

Turning to CF’s methodological applicability to this study, the framework can be easily applied to qualitative research on a microlevel (Kleine, 2013) such as digital innovator level. This is because the foundation of the framework is applying a people-centred approach to development, where individual choice is regarded as both a means and an end to a development process (Kleine, 2013). This model is therefore applicable for individual led innovations that

are very small and dominated by a single individual, which are the unit of observation in this study. It is common practice to see studies on small ventures or micro businesses apply individual theories such as adoption theories on the micro level of a single individual. It is at this level that researchers can evaluate decision-making and behaviour in such ventures. A case in point is (Yang & Lee, 2019) study on “*enablers and inhibitors of crowdfunding adoption: Empirical evidence from startups in China*”, that evaluates, among other things, behaviour intention and decision making of entrepreneurs concerning adoption of crowdfunding. Overall, the framework can be used to analyse the impact of digital innovation on individuals and communities, and for identifying factors that contribute to digital innovation success in different contexts, including the Global South.

In summary, the Choice Framework (Kleine, 2013) can be used as a theoretical lens for visualising digital innovation success at microlevel of an innovator systemically and holistically as a development outcome that digital innovation stakeholders, particularly digital innovators in the Global South, strive to achieve. As an analytical lens, and with minimal additions to the framework, research participants responses can be analysed in reference to the dimensions or elements of the Choice Framework, specifically structure, agency, capability, degrees of empowerment, to establish how their interaction could enable or hinder digital innovation success in Kenya.

3.4.3 Limitations of Dorothea Kleine’s Choice Framework

The Choice Framework has been criticised for its surface level explanations on the interrelationships between agency, structure, degree of empowerment and outcome. This could make the process of operationalising the CF difficult for a researcher because of the complexity of its components, that is, structure, agency, and choice. Kleine (2013) acknowledges that indeed there exists a wealth of information concerning each element in the CF and recommends the need for deeper theorisation towards a better understanding of the interrelationships between elements. This study views a deeper conceptualisation of the relationship between agency and structure as important, given the resource-constrained empirical context, that is, the Global South. The Resource Dependency Theory (RDT) was included to enhance agency negotiation interactions with structure. See Figure 3-4 (the conceptual framework) for the re-envisioned CF that incorporates the RDT.

Finally, due to its holistic approach, the framework requires extensive tailoring to specific contexts before its application in a study (Kleine, 2009). This implies that the focus on individual agency and choice needs to be tailored to different contexts, as what constitutes structure, agency and choice could vary significantly across various contexts. For instance, ‘agency’ is influenced by various factors it is exposed to within its context, such as education, culture, and poverty in the case of an underprivileged and under-resourced context. Structures such as social norms, policies and infrastructure are also significantly different across various contexts. Generic application of the Choice Framework without consideration of the above could lead to misunderstanding of how the CF components interact within a given context. It could also lead to overlooking the influence of an agency’s experience or resource portfolio on ‘choice’ or decision-making process towards achievement of development outcomes. Because of the holistic approach, the framework may not work for a larger startup or organisation as it favours more an individual driven innovation. In her study on telecentres in Chile, Dorothea Kleine applies the Choice Framework in a rural context and considers culturally sensitive factors such as gender roles and traditional forms of communication (Kleine, 2009). Research shows that qualitative research methods such as interviews and document analysis enable researchers to collect detailed data that captures the complexities of an empirical context (Creswell, 2017). However, it is important to note that context definition is not exclusive to qualitative research methods and therefore quantitative methods could also be employed. Section 5.3 of this thesis focuses on contextualization of the research setting, based on data collected using semi-structured interviews, document and media analysis, to ensure correct adaptation of the Choice Framework.

3.5 Developing the Study Model (A Refinement of the Choice Framework)

This section presents proposed conceptual framework for developing and implementing successful digital innovations by technology startups. The framework is a contextualized refinement of Dorothea Kleine’s Choice Framework (CF) (Kleine, 2013). The constructs are derived from the study’s research questions, the results of the systematic literature review presented in Chapter 2, elements of Dorothea Kleine’s Choice Framework (CF) and the Resource Dependency Theory (RDT).

3.5.1 Key Study Constructs

1. **Digital Innovation Success (DIS):** This is the desired development outcome of this model and represents the successful implementation and impact of digital innovation within a developing country context, specifically Kenya.
2. **Structured Technology Innovation Environment (STIE):** This construct refers to the support, resources, and ecosystem provided to digital startups and innovators in incubators and other related environments within a developing country context.
3. **Unstructured Technology Innovation Environment (UTIE):** This represents the environment for digital startups operating outside of incubators or operating independent of innovation support environments such as incubators, accelerators, technology hubs, research, and innovation centres among other related environments.
4. **Hybrid Technology Innovation Environment (HTIE):** This represents the environment for digital startups operating both within and outside of incubators or operating independent of innovation support environments such as incubators, accelerators, technology hubs, research, and innovation centres among other related environments.
5. **Managing Resource Dependency (MRD):** This construct is derived from the Resource Dependence Theory (RDT). MRD can enable digital innovators (agency) operating in resource scarce environment to be cognisant of their resource limitations, identify critical resources needed to succeed and negotiate with structure by building strategic alliances that help address the resource constraints.
6. **Enablers of Digital Innovation Success (EDIS):** This study's Systematic Literature Review (SLR) in chapter two revealed the following factors that could influence digital innovation success in both incubated (STIE) and non-incubated (UTIE) environments:
 - Access to funding (Ester (2017); Manning, Engelke and Klein (2018); Andrikopoulos (2020); Nielsen et al., (2016); Paschen (2017), Oranburg (2020), Bocken (2015))
 - Access to mentorship and expertise (Sörvik (2018); Ester (2017), Mas-Verdú, Ribeiro-Soriano, & Roig-Tierno (2015); Hackett and Diltz (2004); Nielsen et al. (2016); Schwartz (2013); Mas-Verdú, Ribeiro-Soriano, & Roig-Tierno (2015); British Council (2016); Baccarne, Mechant, Schuurman, Colpaert, & De Marez (2014)).
 - Networking opportunities (Dana et al. (2020); Ben White (2020); Bocken (2015); Schmitt & Muyoya (2020); (Ester (2017); (Woodley, Burgess, Paguio, & Bingley (2015); Nielsen et al. (2016)).

- Infrastructure and technology readiness (Maiolini et al. (2016); von Briel, Davidsson & Recker (2018); Ross et al. (2012); Demirkan, Spohrer, & Welser (2016); Ciriello, Richter, & Schwabe (2018); Fichman, Santos, and Zheng (2014); Butler, Garg & Stephens (2020); Nielsen, Reisch, & Thogersen, (2016)).
- Regulatory support (Rowe, Ngwenyama and Richet (2020); (Ester (2017); World Bank (2020)).
- Skilled talent (Ester (2017); Nielsen, Reisch & Thogersen (2016); Sarkilahti, Kinnunen, Kettunen, Jokinen, & Rintala (2017); O'Kane, Zhang, Daellenbach, & Davenport (2019).

7. **Barriers to Digital Innovation Success (BDIS):** This study's Systematic Literature Review (SLR) in chapter two revealed the following factors that can hinder digital innovation success in both innovation environments, STIE and UTIE. These constructs may include the following as per the outcome of a Systematic Literature Review presented in Chapter 2 of this thesis:

- Lack of financial resources (Ester (2017); Manning, Engelke and Klein (2018); Andrikopoulos (2020); Nielsen et al., (2016); Paschen (2017), Oranburg (2020), Bocken (2015).
- Limited access to skilled talent (Ester (2017); Nielsen, Reisch & Thogersen (2016).
- Regulatory hurdles and bureaucracy (Rowe, Ngwenyama and Richet (2020); (Ester (2017); World Bank (2020)).
- Infrastructure limitations (Maiolini et al. (2016); von Briel, Davidsson & Recker (2018); Ross et al. (2012); Demirkan, Spohrer, & Welser (2016); Ciriello, Richter, & Schwabe (2018); Fichman, Santos, and Zheng (2014); Butler, Garg & Stephens (2020); Nielsen, Reisch, & Thogersen, (2016)).

8. **Structured Environment Support Services (SESS):** Factors that affect the level of support provided by structured environments. These may include the following as per the outcome of a Systematic Literature Review presented in Chapter 2 of this thesis:

- Funding and resources accessible to the structured environment
- Quality of mentorship and coaching
- Infrastructure in the Structured environment
- Access to networks and partnerships
- Incubator programs and services

Source: (Sörvik (2018); Ester (2017), Mas-Verdú, Ribeiro-Soriano, & Roig-Tierno (2015); Hackett and Dilts (2004); Nielsen et al. (2016); Schwartz (2013); Mas-Verdú, Ribeiro-Soriano, & Roig-Tierno (2015); British Council (2016); Baccarne, Mechant, Schuurman, Colpaert, & De Marez (2014)).

3.5.2 Mapping Relationships between Study Constructs

3.5.2.1 Propositions and Research Statements

Conceptual frameworks help with formulation and visualisation of propositions and hypothesis. According to Yin (2014), a proposition is an initial high-level version of a hypothesis. In quantitative research, the primary goal of designing a conceptual framework is to show cause-and-effect relationships between key study variables. In quantitative research, such relationships are often illustrated through hypothesis statements. Conversely, qualitative research focuses on uncovering meanings, patterns and contextual factors that influence the phenomena under study (Creswell, 2017). Propositions and research statements are often associated with qualitative research as they are more open-ended and explorative (Creswell, 2017). In both research paradigms, propositions (or hypotheses) serve as essential tools for articulating and understanding research expectations.

Research Questions:

- i. What are the enablers of and barriers to digital innovation success for digital startups in Kenya?
- ii. How do the identified enablers and barriers compare for digital startups operating in a structured versus unstructured innovation environment in Kenya?

Research Statements (RS):

This study's research questions were reformulated into the below research statements to guide the conceptual and visual design of the framework.

- a. RS1: This qualitative research aims to explore the enablers and barriers to digital innovation success in Kenya by examining the resources and capabilities of digital innovators, and experiences and perspectives of key stakeholders in the local innovation ecosystem regarding factors that enable or hinder digital innovation success.
- b. RS2: The qualitative investigation will reveal differences in the enablers and barriers to digital innovation success between digital innovators operating in structured versus unstructured technology innovation environment in Kenya.

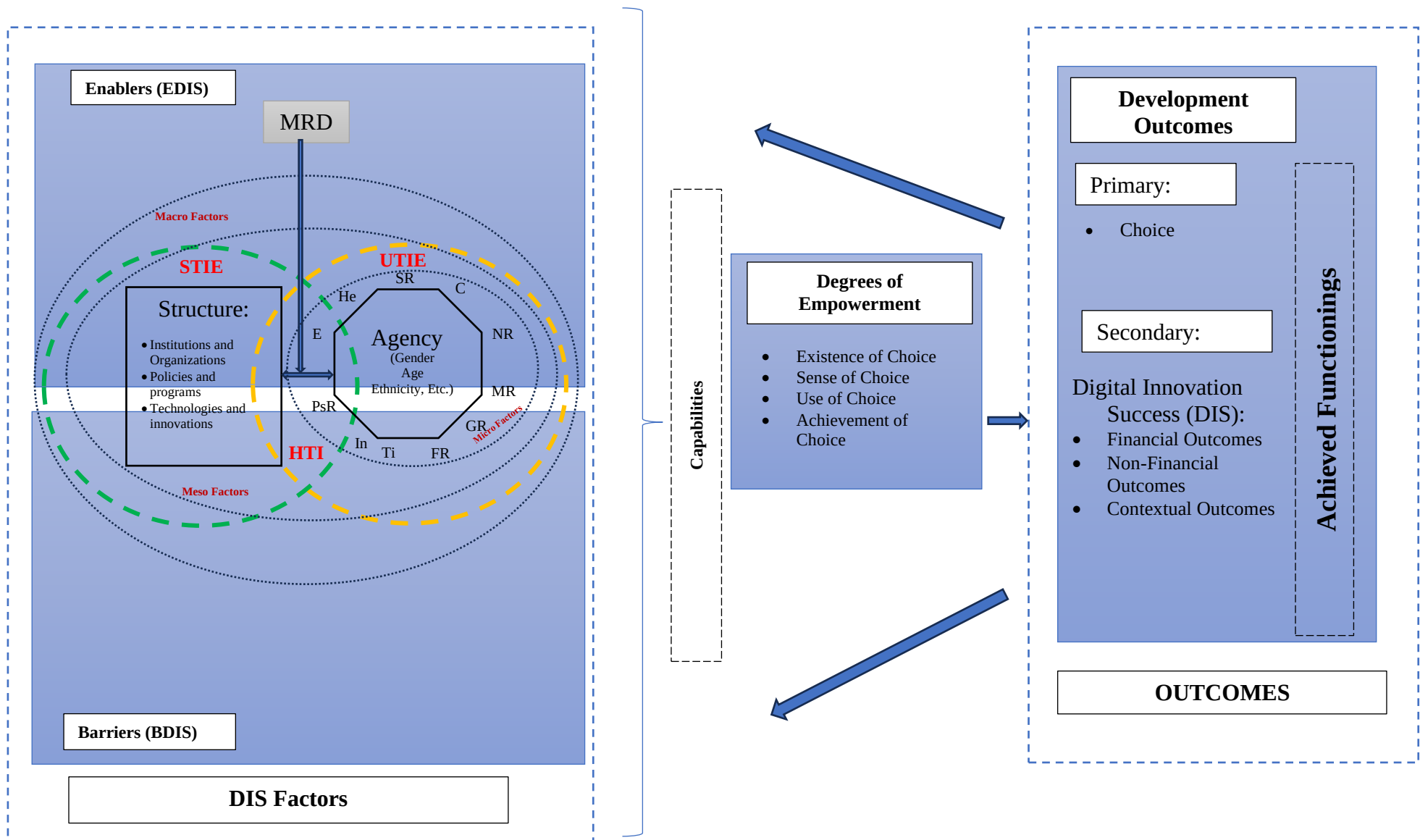
Propositions (applies study constructs):

The following propositions can be considered for this qualitative study:

- c. Proposition (P1): There will be different enablers (EDIS) and barriers (BDIS) to digital innovation success (DIS) in the Global South when compared to those in the global north.
- d. Proposition (P2): Digital innovators working in an unstructured technology innovation environment (UTIE) will face more barriers (BDIS) and have different enablers (EDIS) compared with innovators in a structured technology innovation environment (STIE).

3.5.3 Proposed Conceptual Framework based on Choice Framework.

This section presents the visual representation of the proposed conceptual framework (Figure 3-4), which is a contextualized refinement of Dorothea Kleine's Choice Framework (CF) (Figure 3-3) by introducing key concepts derived from the Resource Dependence Theory (RDT), the results of the systematic literature review (SLR) presented in Chapter 2 of this Thesis and researchers own constructs backed by literature. A combination of these theories and researcher constructs creates a more powerful and comprehensive framework for exploring digital innovation success factors, in structured versus unstructured innovation environments within a developing country context. Kleine (2013) offers the Conceptual Framework (CF) as a "living tool" that is open for modification through addition of "new elements under existing concepts or new ones" (p. 51-52). This is because the CF "concepts are broadly defined in order to render the framework culturally and interdisciplinary adaptable" (Kleine (2013, p. 52).



Key:

STIE: Structured Technology Innovation Environment
 UTIE: Unstructured Technology Innovation Environment
 HTIE: Hybrid Technology Innovation Environment
 DIS: Digital Innovation Success
 MRD: Managing Resource Dependence
 EDIS: Enablers of Digital Innovation Success

BDIS: Barriers to Digital Innovation Success
 SESS: Structured Environment Support Services

ER = Education Resources
 PsR = Psychological Resources
 In = Information
 FR = Financial Resources
 CR = Cultural Resources

SR = Social Resources
 NR = Natural Resources
 MR = Material Resources
 GR = Geographical Resources
 He = Health

Figure 3-4: Conceptual Framework. A Refinement of the Choice Framework (Kleine, 2013)

3.5.3.1 An Explanation of the Conceptual Framework Components

3.5.3.1.1 Digital Innovation Success Factors (DISF) Component

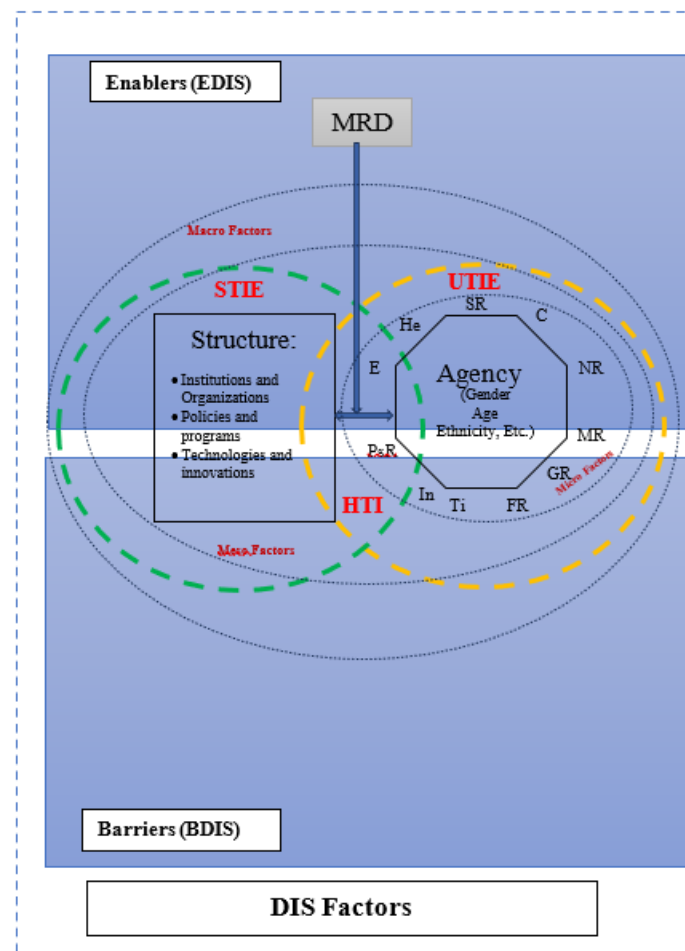


Figure 3-5: Digital Innovation Success Factors (DISF) Component (Extracted from Conceptual Framework, a Refinement of Kleine's Choice Framework developed by Author)

The DISF construct was derived from literature (Ester, 2017; Caschera, 2020). In the conceptual framework, the DSIF construct is defined by the ‘Enablers of Digital Innovation Success’ (EDIS) and ‘Barriers to Digital Innovation Success’ (BDIS) construct visualised as two competing components of the same continuum. The values of EDIS and BDIS construct are grouped into 3 themes, macro, micro and meso level factors. These themes are drawn from Jonathan Turner’s Macro-Micro-Meso Theory (Collins, 2021). In startup research, the meso level is often presented as a bridge builder between the micro and macro level factors (Ester, 2017). In this study, the macro level represents a larger scale such as national or global factors, while meso level represents organisation or community level factors and micro level represents

individual or small group factors that could influence digital innovation success. In this study micro level is presented as agency or digital innovator level factors, meso level as startup and innovation environment (STIE, HTIE or UTIE) factors, and macro level as the Kenyan innovation ecosystem (national scale) specific factors. In this sense, at micro level, the influencing factors included under EDIS and BDIS are determined by the resource portfolio of the agency, in this case the digital innovator. A well-resourced agency is more likely to experience more EDIS and hence have the capability to achieve digital innovation success. At meso level, the values of EDIS and BDIS are determined by both the components of and interplay between ‘structure’ and ‘agency’ elements of the Choice Framework (CF), manifested in various capacities in STIE, UTIE and HTIE innovation environments. At macro level, the EDIS and BDIS construct include ecosystem dependent factors unique to Kenya’s Innovation Ecosystem (KIE).

Possible values for the EDIS and BDIS construct within ‘Structured Technology Innovation Environment’ (STIE), ‘Unstructured Technology Innovation Environment’ (UTIE) and ‘Hybrid Technology Innovation Environment’ (HTIE) are listed under subsection 3.4.2 and are drawn from the results of a systematic literature review presented in chapter 2. This study does not focus on the HTIE environment but recommends it as a future research agenda. The ‘Structured Environment Support Services’ (SESS) construct (not shown in the framework) is seen as a comparative element between the STIE and UTIE innovation environments. SESS factors have been presented under subsection 3.5.1 and were also drawn from literature through a systematic literature review presented in chapter two of this thesis. This is the essence of this study’s research question two, which aims to compare the enablers and barriers of digital innovation success in STEI versus UTEI. In this study therefore, very little emphasis will be placed on the HTEI environment. This gives rise to a new research agenda that can be explored further in future research.

The Structured Technology Innovation Environment (STIE) construct includes innovation ecosystem support organisations such as business incubators, accelerators, and technology hubs. Other ecosystem support organisations such as research and innovation centres, universities, government, and digital startup funding agencies (VC funding, angel investors et cetera) are known not to offer support services to a general group of beneficiaries (digital innovators, entrepreneurs, or startup founders) (Ester, 2017) irrespective of the innovation

environment they operate in, and with little to no direct, organised, structured interaction between the benefactor and the beneficiary.

The placement of structure and agency components in the conceptual framework (Figure 3-4) illustrates their dual role as both micro and meso level enablers or barriers to digital innovation success, with influence that is unbounded by the innovation environment (STIE, HTIE or UTIE) within which a digital innovation process unfolds. For instance, at micro level, agency (representing the digital innovator) element such as educational resources (ER) could pose as a barrier if non-existent or an enabler where a digital innovator has the right technical knowledge and skills needed to build and drive successful digital innovations, irrespective of the innovation environment (STIE, HTIE or UTIE) within which they conduct the digital innovation process. However, it is possible to still fail, even with access to ER, as success is influenced by a combination of more than one factor. In a resource-constrained environment such as a developing country context, the Resource Dependency Theory (RDT) can play a moderating role in managing the interaction between agency and structure components towards creating an enabling environment for digital innovation success. The ‘Managing Resource Dependency’ (MRD) construct derived from the RDT is therefore included in the conceptual model. The RDT and MRD construct is discussed in detail in the next section. Finally, the elements within the DSIF construct play a key role towards the empowerment process of the agency (the digital innovator) (Kleine, 2009) to achieve desired development outcomes. The elements factored within the DSIF construct imply that different digital innovators will experience different levels of empowerment (Kleine, 2009) depending on various factors (enablers/barriers) they are exposed to during digital innovation development and implementation process. The degree of empowerment component is discussed in a later section.

3.5.3.1.2 Resource Dependency Theory

The Global South has been described as a resource-constrained context by various researchers. Resource constraint here excludes natural resources, which Global South countries in Africa, are abundantly endowed (Collier, 2008). This study considers synthesis of the relationship between resources and development outcome as important towards empowering digital innovators with the capability to sense and implement strategies that can lead to achievement of digital innovation success. RDT offers more conceptual richness in linking the impact of resource dependency on the outcome ‘digital innovation success’.

Moreover, the Choice Framework (CF) (Figure 3-3) emphasises the importance of a well-resourced agency that can identify and leverage other external resources towards enhancing their capability to achieve desired development outcome(s). Amartya Sen notes that these capabilities or combination of functions can only be determined by an individual themselves and not pre-determined by researcher or any other entity (Sen, 2001). In a context where resources are scarce, the RDT principles can help identify resources that are most critical to digital innovation success. By understanding these dependencies, digital startups or digital innovators can develop strategies to manage them and mitigate the risks of resource constraints. It can also help identify strategic alliances that can be formed with other digital startups or stakeholders to access critical resources. These alliances can be used to leverage resources that would otherwise be too expensive or difficult to acquire on their own, particularly innovators operating in an unstructured innovation environment. Figure 3-4 illustrates the outcome of the integration of the RDT on the CF together with researcher's own constructs. The 'Managing Resource Dependency' (MRD) construct derived from the RDT was included. MRD enables digital innovators (agency) operating in resource scarce environment to be cognisant of their resource limitations, identify critical resources needed to succeed and negotiate with structure by building strategic alliances that help address the resource constraints.

3.5.3.1.3 Capabilities and Degrees of Empowerment Component

Capabilities

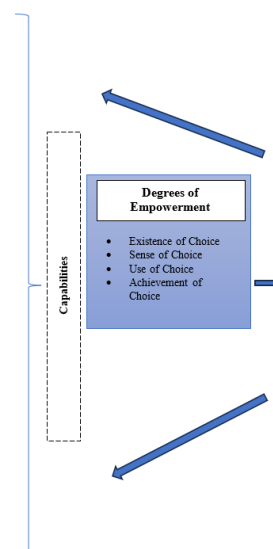


Figure 3-6: Capabilities and Degrees of Empowerment Component (Extracted from Conceptual Framework, a Refinement of Kleine's Choice Framework developed by Author)

The capabilities component as derived from Kleine's CF depict the outcome – “freedom” (Kleine, 2013, p. 23) - of a well-resourced and enabled agency, capable of recognising, pursuing, and achieving digital innovation success. Amartya Sen defines ‘capabilities’ as “alternative combinations of functionings that are feasible for an individual to achieve” (Sen, 2001, p. 75). Sen views capability as "a kind of freedom to achieve alternative functioning combinations" (Sen, 2001, p.75). Kleine, 2009, p. 109 interprets Sen's definition of ‘capabilities’ as “desired states of being or doing in the personal, social, economic, and political spheres”. To expound further on this, Sen (2001) gives a scenario of two individuals experiencing hunger, where one has ‘chosen’- freedom to be in - that state for the purpose of fasting, and the other is a victim of circumstance hunger due to their inability to afford a meal. This alludes to the possibility that individuals can have different ‘capability sets’, which provide “opportunities to achieve valued outcomes” (Sen, 2001, p. 291) or success. The conceptual model therefore recognises that even in the same innovation environment, success is not guaranteed. It is therefore possible that a digital startups’ opportunity to succeed, is influenced by its innovator's capability set, which could be important in negotiating and transforming structural factors towards attainment of digital innovation success, hence the inclusion of the Resource Dependency Theory (RDT) discussed in the previous section.

Degrees of Empowerment

The contents of this component in the conceptual model (Figure 3-4) are as illustrated in Kleine's CF framework (Figure 3-3), which was discussed in greater detail under section 3.3 of this chapter. In the context of digital innovation, degrees of empowerment could imply the extent to which innovators are able to leverage their capabilities resulting from a portfolio of resources to perceive, explore and achieve that which they deem as ‘digital innovation success’, which is accessible to all irrespective of the innovation environment (STIE, UTIE and HTEI) within which digital innovation process unfolds. This element recognises that different digital innovators will experience different levels of empowerment (Kleine, 2013) depending on various factors (enablers/barriers) they are exposed to, thereby influencing the outcome a digital innovation process.

3.5.3.1.4 Development Outcomes

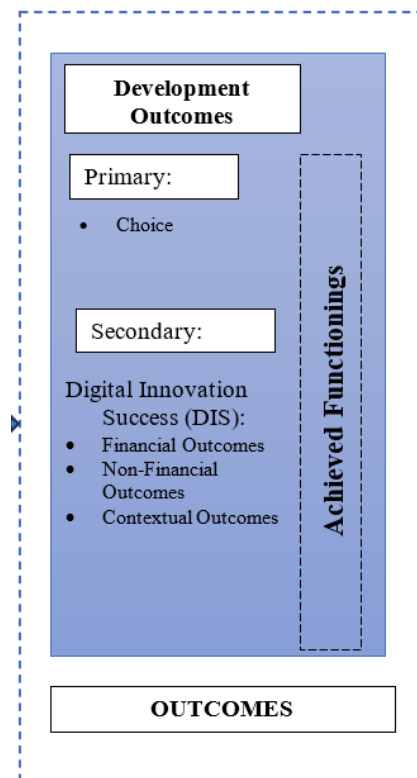


Figure 3-7: Development Outcomes (Extracted from Conceptual Framework, a Refinement of Kleine's Choice Framework developed by Author)

As previously mentioned in section 3.3 of this chapter, this element maps achieved functionings emanating from individual choice, within a given set of structural conditions and agency (Kleine, 2013). ‘Choice’ is regarded as the primary outcome, which illuminates individual development priorities referred to as secondary outcomes (Kleine, 2013), that align with the desired life that individuals “value and have reason to value” (Sen, 2001, p.18) or states of doing or being (Kleine, 2013, p. 23). In the case of digital innovation success, ‘individual development outcomes’ includes what success looks like to a digital innovator. This implies that the construct Digital Innovation Success (DIS) is uniquely defined by each digital innovator within their social, economic, and cultural context (Kleine, 2013). As the Choice Framework (Figure 3-3) works “systemically backwards from development outcomes through structure, agency, and choice” (Kleine, 2009, p. 113) to understand how the development outcomes have been achieved, it is important to identify a wish list (Kleine, 2009, p. 113) of secondary outcomes, in this case potential measures of digital innovation success as a secondary outcome. In chapter two, potential indicators of digital innovation success (secondary outcomes) in technology startups drawn from literate were listed, which include,

though not limited to the following (as they should be defined by the digital innovator themselves): revenue growth or high financial performance, sales and profits, market share and increased number of customers (classified under financial outcomes), employment growth, patents, and Initial Public Offering (IPO) (non-financial outcomes). The conceptual model (Figure 3-4) provisions for contextual secondary development outcomes, which may only be understood as ‘digital innovation success’ in certain contexts and not others, and which do not fall in the categories financial and non-financial secondary outcomes. This is the essence of this study’s research question one, which aims to explore contextual enablers of and barriers to digital innovation success in Kenya, a Global South context. It is important to note that a ‘wish-list’ of ‘contextual outcomes’ might not be the true picture of that which is desired and valued as ‘success’ by a digital innovator. This gives rise to a new research agenda that can be explored in future IS research.

3.6 Chapter Summary

This chapter focused on building a conceptual framework (Figure 3-4) that can be used to explore potential enablers and barriers to digital innovation success. The conceptual framework was developed based on Dorothea Kleine’s Choice Framework (Figure 3-3), concepts from the Resource Dependency Theory (RDT), the results of a structured literature review presented in Chapter 2 and researcher’s own constructs derived from literature. The conceptual framework guides the data analysis process of this study as a lens towards responding to the research questions. Two research agendas emerged from this chapter, which can be explored further in future research. Research that expounds more on the Hybrid Technology Innovation Environment (HTEI) construct is recommended as a suitable avenue for future research.

4 RESEARCH METHODOLOGY

4.1 Introduction

This chapter presents the research approach employed to conduct an exploratory investigation on the enablers of and barriers to digital innovation success in Kenya. The chapter contains the following sections. Section 4.2 discusses the researchers' philosophical approach which guided the selection of the research design approaches addressed in Section 4.3. Section 4.3 addresses the research strategy, purpose, approach to theory, data collection and analysis techniques, and timeframe for this study. Sub-section 4.3.3 outlines the ethical considerations for the study. Table 4-1 summarises the researcher's philosophical assumptions or worldviews, design, and research methods, as adapted from Creswell (2017).

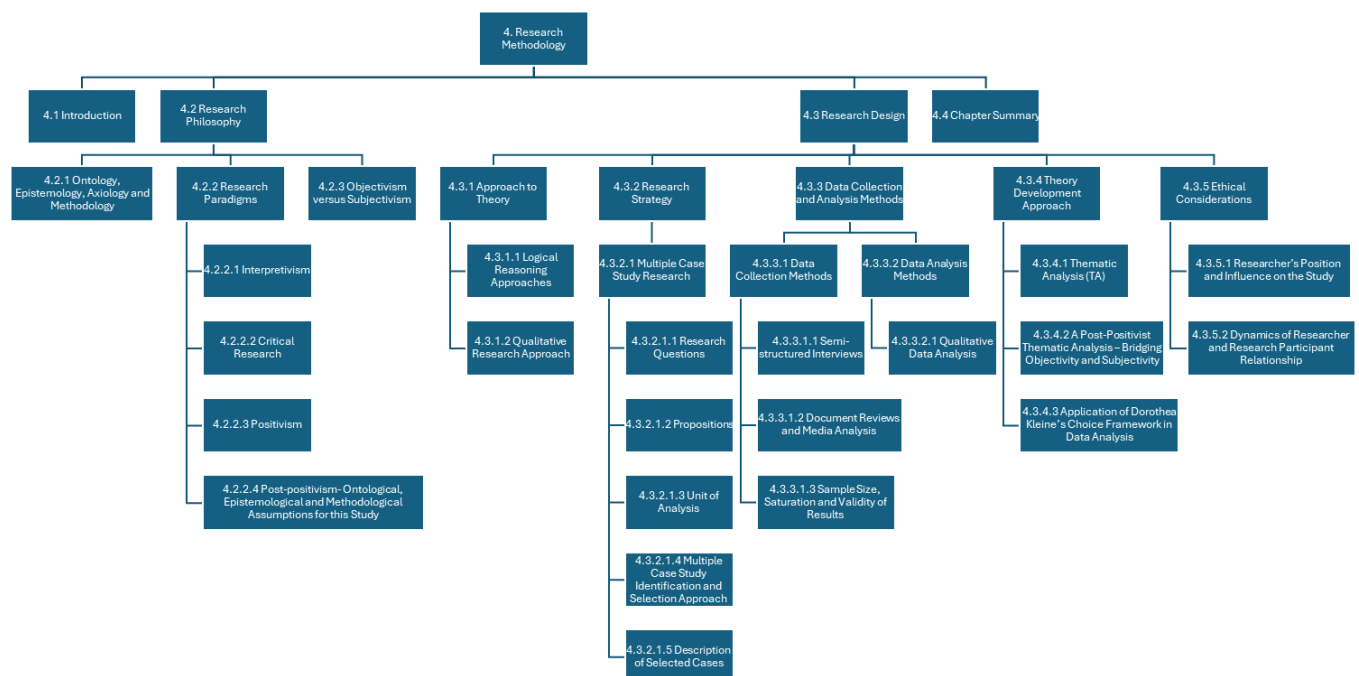


Figure 4-1: Structure of Chapter 4

Table 4-1: Research Design Overview Methods

Feature		Methodology
Philosophy	Ontology	Subjective
	Epistemology	Post-positivism
Approach		Deductive
Methodological Choices		Qualitative Approach
Strategy		Case Study
Sample size		4 case studies; 21 interviews
Time horizons		Cross-sectional
Data collection and analysis procedures		Document reviews, Media analysis, Semi-structured Interviews

4.2 Research Philosophy

Research philosophy refers to the assumptions and beliefs held by a researcher regarding the nature of knowledge, reality and how to understand reality (Kuhn, 2012), expressed through the following elements: ontology, epistemology, axiology, and methodology discussed in the next section.

4.2.1 Ontology, Epistemology, Axiology and Methodology

The conduct of scientific research is heavily influenced by a researcher's philosophical assumptions and beliefs. This section briefly discusses these research philosophy elements, that is, ontology, epistemology, axiology, and methodology, which influence the conduct of scientific research.

The philosophical aspects of ontology (nature of knowledge which could be an objective, subjective or constructed belief), epistemology (researchers belief on how knowledge is acquired for instance by observation, experience or reasoning), axiology (defines researchers beliefs on values and ethics in research, whose expression is revealed either as objectivity, neutrality or advocacy) and methodology (expresses preferred research approaches or modes of investigation which could be quantitative, qualitative or a mixed methods approach) (Kuhn, 2012). Saunders, Lewis, and Thornhill (2019) emphasise that the choice of a philosophical domain is dependent on the research questions that one seeks to answer and the personal worldview of the researcher.

4.2.2 Research Paradigms

Research paradigms help a researcher to philosophise a scientific study (Ponterotto, 2005). A paradigm encapsulates shared assumptions and meanings held by a scientific community

(Kuhn, 2012). A paradigm can be seen as a model or framework that encompasses a particular research philosophy (Kuhn, 2012). Researchers are expected to explicitly state their ‘shared assumptions and meanings’ in the form of ontological, epistemological, axiological, and methodological choices made in a study for the reader to understand the claims made throughout the study. This section briefly describes popular research paradigms which include positivism, post-positivism, constructivism (also interpretivism) and transformative research (critical realism). The section concludes by highlighting the ontological, epistemological, and methodological beliefs for this study, which align with the post-positivist paradigm.

4.2.2.1 Interpretivism

Interpretivism “adopts the position that our knowledge of reality is a social construction of human actors” (Walsham, 1995b, p. 376). The paradigm attempts to understand a phenomenon through evaluation of meanings assigned by people (Klein & Myers, 1999, p.69). It enables the evaluation of “lived experiences from the points of view of those who live it” (Schwandt, 1994, p. 221). Human beings have unique views and opinions of reality that can best be understood using an interpretivist approach. Interpretivism favours and often generates qualitative data which is subjective in nature as it includes verbal, non-verbal and/or written accounts of reality. Schwandt (1994, p. 222) mentions the need for an evaluation of both “language and actions of the actors” to derive correct interpretation of meanings, which is also enriched by the inquirer’s construction or interpretation of the meanings.

Interpretivism has been criticised for its limited generalisability as it emphasises more context and individualised meanings. This limits the applicability of interpretivist research outcomes to other contexts or populations (Shank, 2002). Its methodological approaches such as ethnography require researcher expertise and are time consuming, limiting its applicability to longitudinal studies (Denzin & Lincoln, 2011). This study takes on a cross-sectional time frame. Interpretivism is also criticised for its lack of standardised procedures to verify its findings that are based on subjective interpretations. This could invalidate research outcomes due to assumed lack of credibility of results (Smith, 1997).

4.2.2.2 Critical Research

Critical realism focuses on “explaining what we see and experience, in terms of the underlying structures of reality that shape the observable events” (Saunders, 2019, p. 147). They note that

critical realism is different from naïve realism, which posits that “what you see is what you get”. Orlikowski and Baroudi (1991) classify research as critical where a critical stance is taken toward taken-for-granted assumptions about organisations and information systems, and where the aim is to critique the status quo “through the exposure of what are believed to be deep-seated, structural contradictions within social systems” (Orlikowski & Baroudi, 1991, p. 6). Critical realism, like post-positivism, disagrees with positivist claim to an objective reality and agree on the important role that power and social structures have in shaping knowledge (Cherryholmes, 1988). Critical realism takes a more political approach as the desired outcome is to expose inequalities while post-positivism is primarily empirical, with the focus being practical improvement (Apple, 2014). This study seeks to have wider reach and practical application, particularly to influence the creation of enabling digital innovation environments, which is seen as an important contribution for the Global South. Post-positivist emphasis on practicality of research (Greene, 2005) aligns with this goal.

4.2.2.3 Positivism

Positivism is an epistemic ideology that states that authentic truth is only known through scientific instruments and methods. The approach was formulated by Auguste Comte, in the 19th century. The research outcome presents only objective reality. Researchers’ interpretations of the phenomenon under study are not acceptable contributions to the research outcome, giving no room for researcher biasness. Three outcomes are expected: 1) true 2) false and 3) meaningless (neither true nor false). The results are replicable and contain inflexible and verifiable data. In Guba & Lincoln’s (1994) words, “knowledge consists of verified hypotheses that can be accepted as facts or laws”. The inflexibility aspect implies that data cannot be changed. Positivism is purely pro quantitative research approaches. In the social sciences, positivism is criticised for its “claim to certainty”, and disregard for the contribution of cultural, political, and psychological factors on reality (Guba & Lincoln, 1994). The approach also disregards an observer’s interpretations that could have important contributions to the research outcome. This discredits the importance of researcher reflexivity. The approach is also criticised for its generalisability of results irrespective of context. This approach is therefore not suitable for this study, which values researcher reflexivity and views context as an important parameter, with potential to influence the phenomenon under study and research outcome.

4.2.2.4 Post-positivism- Ontological, Epistemological and Methodological Assumptions for this Study

Ontological Beliefs

Post-positivism is critical about positivists' belief on existence of an objective or absolute reality. Post-positivists believe that there is truth up to a certain extent, thereby dispelling positivism's claim to certainty. The post-positivism approach disregards the belief on "neutrality of knowledge", as claimed by positivist researchers. Guba & Lincoln (1994, p. 110) states that the nature of knowledge in post-positivism involves "non-falsified hypotheses that can be regarded as probable facts or laws".

The digital innovation success phenomenon is influenced by ever changing contextual and technological factors. The outcome of studying such a phenomenon would therefore be considered as a tentative explanation, which could be regarded as true at a particular point in time. Therefore, the goal of this study was to seek the most plausible explanation of the phenomenon of interest within the boundaries of a specific context, a cross-sectional time duration and research questions.

Epistemological Beliefs

Positivist epistemologies emphasise the importance of empirical observation and strict adherence to scientific methods in research. Paul Feyerabend, in his book 'Against Method' published in 1975 views this as 'dogmatic arrogance'. Thomas Khun, whose ideology on 'paradigm shifts' (Khun, 2012) has greatly influenced post-positivist's epistemic beliefs, and encouraged flexibility in methods used in knowledge inquiry. Kuhn (2012) also acknowledges the influence of social aspects in scientific inquiry, thereby challenging positivists' idea of an objective and absolute reality. This implies that, in post-positivism, some concepts are not objectively observable (i.e. observer independent) but may have different but equally valid meanings to the different actors/interviewees/research participants. The move away from positivist epistemologies is therefore believed to have stemmed from movements that valued social constructions of reality. Approaches such as "feminism, post-structuralism, ethnography, developments in qualitative research" emphasise an ethical approach to research and a non-neutral and non-dualistic view of knowledge (Ryan, 2006). Post-positivists value social constructions of reality and regard them as coherent accounts of knowledge that can be

studied and known. The approach, however, acknowledges the difficulty of measuring social reality. Saldana (2015, p. 44) quotes "good research is not just about good methods but also good thinking". Post-positivism integrates both positivism and interpretivist approaches. This gives a researcher flexibility to employ both qualitative and quantitative methods or other contextually relevant methods (Guba, 1990). However, interpretivism takes on a more radical approach in rejecting an objective reality compared to post-positivism which tries to seek truth by carefully applying useful methodologies (Guba & Lincoln, 1994).

In post-positivism, a researchers' interpretation of phenomenon under study is an acceptable contribution to research. The researcher does not approach research as an outsider but an insider. Post-positivism promotes researcher reflexivity, where researchers are expected to question or self-evaluate their own world views and assumptions about reality as well as those of the research participants. The approach is critical of extant discourse on phenomenon of interest and holds them as plausible explanations until otherwise falsified. The approach further emphasises context-based research (Letourneau & Allen (1999). This critical nature of post-positivism makes the approach comparable to critical realism, as claims made by human beings cannot be held as absolute truth. The claimant can be influenced by their own intellectual assumptions and bias (Guba, 1990) or external situations (Letourneau & Allen, 1999) or research participants.

In this study, a Systematic Literature Review was done to identify and assess the dominant discourse on digital innovation success. The review revealed the Silicon Valley Narrative and foreign theories based on the Global North context as dominant explanations of digital innovation success. As mentioned, post-positivists recognise the importance of contextualization of research and impact of human prejudices and bias in such discourses, because human beings cannot objectively study reality without the influence of their own intellectual assumptions (Guba, 1990). Therefore, such discourse cannot be viewed as generalisable or absolute truth. They are regarded as plausible explanations until otherwise falsified. Also, post-positivists emphasise the construction of new meanings and new knowledge (Guba, 1994). This study was able to unearth new contextual meanings and knowledge of what digital innovation success means within the Kenyan context. The study also reports new knowledge on contextual factors that enable or hinder digital innovation success in Kenya.

Methodological Assumptions

Post-positivism recognises the need to incorporate scientific and non-scientific instruments and methods to study reality. In post-positivist research, multiple research methods can be used to study a phenomenon of interest (Guba & Lincoln, 1994), which provides for method triangulation (Denzin & Lincoln, 2011) which contributes to reliability and validity of research outcomes. This study employed semi-structured interviews and multiple case studies to collect in-depth insights on digital innovation success phenomena in Kenya. Piekkari, Welch, & Paavilainen (2009, p. 571) note that multiple case studies “between 4 to 10 cases increase the robustness of a finding”. In addition, the use of multiple data collection instruments provides for data triangulation (Patton, 1999), which also contributes to validity of research findings (Guba & Lincoln, 1994; Denzin & Lincoln, 2011). The researcher is expected to be critical about the appropriate methods to use to respond to research questions. While difficulties in verification of findings remains a key challenge in interpretivist research, method and data triangulation in post-positivist research helps reduce risk of researcher and research participant biasness, which contributes to reliability of data and replicability of findings (Fossey, Harvey, McDermott, & Davidson, 2002; Shank, 2002).

This study approached digital innovation success as a socially constructed phenomenon which could be studied through an exploration of stakeholder views, opinions, and experiences, while allowing for researcher reflexivity. Data triangulation strategies, through use of various data collection methodologies (Patton, 1999), provided for research rigor by alleviating concerns on verifiability and replicability of study outcomes (Shank, 2002) that could emerge on complete reliance on subject accounts as undisputable truth. Specifically, data from semi-structured interviews, document reviews, and media analysis were used to reduce the risk of purely subjective accounts. In addition, during data transcription, the researcher sought the services of an experienced transcription typist, which further eliminated the risk of researcher subjective accounts of the interview recordings and provided for investigator triangulation (Flick, 2022). A post-positivist research paradigm was followed in this study.

4.2.3 Objectivism versus Subjectivism

There are two opposing domains of philosophical assumptions commonly held by researchers, namely objectivism and subjectivism (Saunders, Lewis, and Thornhill, 2019). Objectivists hold

the ontological view that there is only one single reality, which is external to researchers and other social actors (Saunders, Lewis, and Thornhill, 2019); Kuhn, 2012). The social actors' views or interpretation of reality does not change or influence it. Their epistemological belief is that knowledge is acquired by observation, where facts and numbers are seen as acceptable knowledge (Saunders, Lewis, and Thornhill, 2019, p. 135). Axiologically, objectivists take a "value free" approach, where a researcher is detached from the research process as their values and opinions do not influence the research outcome. It is the dominant research position adopted in the natural sciences (Saunders, Lewis, and Thornhill, 2019).

On the other hand, subjectivists believe in 'multiple realities' (Saunders, Lewis, and Thornhill, 2019) that emanate from the social constructions of human actors, including those of a researcher. Knowledge can be acquired through "use of language, conceptual categories, perceptions, consequent actions" (Saunders, Lewis, and Thornhill, 2019, p. 137), verbal and non-verbal or written accounts that are context specific and influenced by the meanings human actors attribute to reality (Saunders, Lewis, and Thornhill, 2019, p.135). A researcher is immersed in the research process. Their interpretations of phenomenon under study are acceptable contributions to the research outcome. This is a position commonly adopted in social science research. This study follows a subjectivist ontological approach, which is largely the ontological belief held by post-positivists.

4.3 Research Design

The definition of research design is a crucial stage of any study. Yin (2014) defines a research design is a plan that guides a researcher through data collection, analysis, and interpretation. Yin (2014) recommends the following research design items be clearly defined for case studies at the onset:

1. "a study's research questions,
2. its propositions, if any,
3. its unit(s) of analysis,
4. the logic linking the data to the propositions, and
5. the criteria for interpreting the findings (p.20).

The fourth and fifth components of the list above are said to be the most "least developed in case studies" (Yin, 2014, p.25). The two components are interlinked and "represent the data

analysis steps in case study research” (Yin, 2014, p.25). This chapter defines the above research design elements in greater detail in succeeding sections.

4.3.1 Approach to Theory

4.3.1.1 Logical Reasoning Approaches

There are four logical reasoning approaches namely induction, deduction, abduction, and retroduction. This section reviews two opposing approaches commonly used in research and concludes with the selected approach for this study. Deductive reasoning approach moves from general to specific conclusions (Trochim & Donnelly, 2001). The outcome of deductive reasoning is always true, if the premises are true and logical rules are strictly followed (Trochim & Donnelly, 2001). The end goal of abductive reasoning is often to empirically test the validity of an existing theory (Trochim & Donnelly, 2001). Inductive reasoning involves making generalised conjectures based on observed patterns or trends (Trochim & Donnelly, 2001). It employs a bottom-up approach where data collected (primary and/or secondary) is used to build broader themes and develop theory or new knowledge. The approach moves from specific observations to general conjecture (Trochim & Donnelly, 2001). In this approach, the end goal is to build theory. Briefly, inductive reasoning is a data-driven approach while deductive reasoning is theory-driven (Clarke, Braun, & Hayfield, 2015).

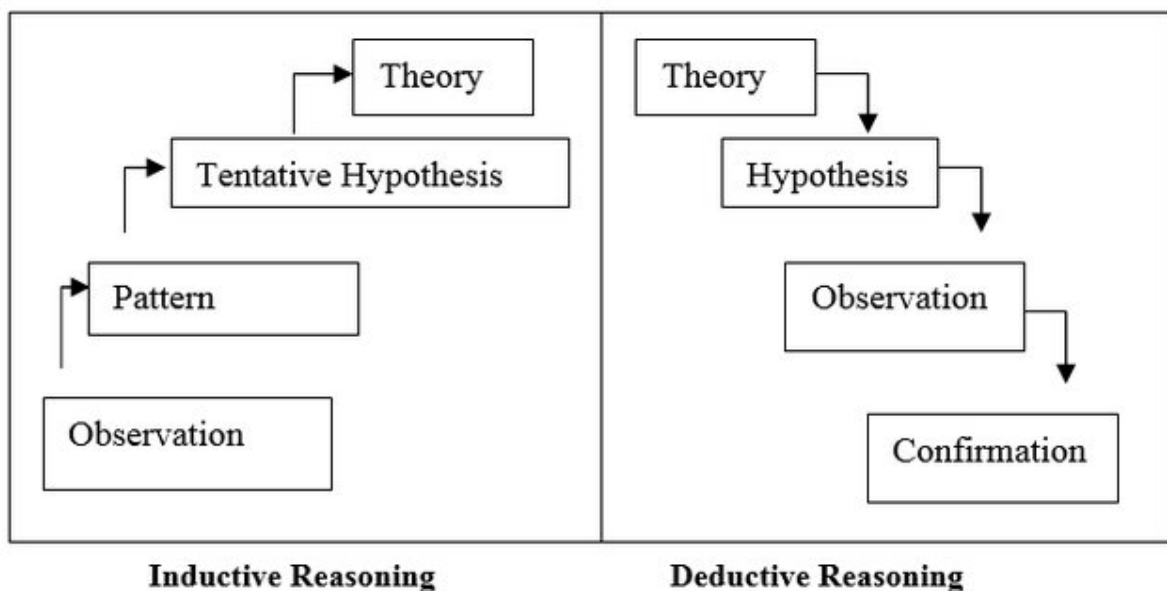


Figure 4-2: Inductive and Deductive Reasoning. Adapted from Trochim & Donnelly, (2001)

- e. This study employed a deductive logical reasoning approach. Deductive reasoning was followed in the design and application of the conceptual framework (Figure 3-4), which

is a contextualized refinement of Dorothea Kleine's Choice Framework (CF), which formed as a lens for the study, and an evaluation of the following propositions:

- *Proposition (P1): There will be different enablers and barriers to digital innovation success in the Global South when compared to those in the Global North.*
- *Proposition (P2): Digital innovators working in an unstructured technology innovation environment (UTIE) will face more barriers (Barriers to Digital Innovation Success (BDIS)) and have different enablers (Enablers of Digital Innovation Success (EDIS)) compared with innovators in a structured technology innovation environment (STIE).*

4.3.1.2 Qualitative Research Approach

This study assumed a qualitative exploratory research approach to isolate enablers of and barriers to digital innovation success in Kenya, a Global South country, where such research is in nascent stages. Further, the study sought to compare the factors within structured versus unstructured innovation environment, in a developing country context (Kenya), following a post-positivist epistemic stance. Qualitative approach is often used to answer research questions “about experience, meaning and perspective from the viewpoint of a research participant” (Hammarberg, Kirkman, & de Lacey, 2016), which provides for contextualization of research findings. It allows for “detailed description of the phenomenon of interest in the language of the research participant” (Trochim, 2006). The aspect of contextualization is important to this study, which seeks to isolate enablers of and barriers to digital innovation success in a Global South context. Also, qualitative approach allows for comparison between entities (Gelo, Braakmann, & Benetka, 2008). This is important as the second research question explores and compares enabling and debilitating factors within a structured versus unstructured innovation environment. Briefly, the approach is appropriate to this exploratory study, which follows a post-positivist epistemic stance. It considers researcher's interpretation as acceptable contribution to research (Trochim, 2006). Further, the approach allows for data validation through testing by study participants or use of multiple data sources (Cresswell & Plano Clark, 2011). This study employed multiple data sources where other than semi-structured interviews, documents and media analysis were also used. A purely empirical approach majorly inclined towards an objective ontological perspective may not be relevant for this study.

Reasons for selecting a qualitative approach:

1. Data can be collected from a small number of research participants who have subject matter expertise and knowledge of the phenomenon under study. The goal here to collect deep insights (Sutton & Austin, 2015).
2. A qualitative approach aligns with the study's thematic analysis approach, which was used to evaluate the opinions of digital innovation stakeholders who were also research participants. The goal is to produce detailed descriptions of the phenomenon under study based on the opinions of the research participants (Sutton & Austin, 2015).
3. A qualitative approach is appropriate in answering "how" questions. In response to the second research question, the researcher was able to show the differences between structured and unstructured innovation environments through a case study research strategy.

4.3.2 Research Strategy

The study followed a multiple case study research strategy to guide data collection, analysis, and interpretation. The following sub-sections define key research design elements for case study research as recommended by Yin (2014) which include: "defining the research questions, study propositions, case description and unit of analysis, logic linking data to propositions and criteria for interpreting findings" (p.20).

4.3.2.1 Multiple Case Study Research

Yin (2014, p.13) defines case study as an "empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident". It "allows the exploration and understanding of complex issues" (Zainal, 2007, p. 1) within a specific context. Piekkari et al (2009, p. 569) note that the purpose of case study approach is to "confront theory with the empirical world". Case study approach is independent of the nature of research. It can be used in exploratory, descriptive, and explanatory research. With exploratory research, a case study approach provides initial insights on the phenomenon under study (Piekkari et al, 2009; Tellis, 1997).

Case studies can include a single or multiple cases. Single cases are used to confirm or challenge a theory, or to represent a unique or extreme case while multiple case approach "strengthen the results and increase confidence and robustness of theory" (Tellis, 1997, n.p.). Piekkari, Welch, & Paavilainen (2009, p. 571) add that multiple case studies "between 4 to 10

cases increase the robustness of a finding”. Case studies are often used in studies with “‘how’ and ‘why’ questions” (Yin, 2014, p. 21). This investigation employed a multiple case study approach. Particularly, for purposes of effective comparison between enablers of and barriers to digital innovation success in a structured versus unstructured environment, multiple case studies gave more genuine results (Tellis, 1997). Multiple case studies follow a “replication logic”, while “individual case study consists of a ‘whole’ study, in which facts are gathered from various sources and conclusions drawn on those facts” (Tellis, 1997, n.p.). Tellis (1997, n.p.) adds that a “case study protocol is essential” in multiple case studies. The protocol comprises of the following four sections:

1. “An overview of the case study project (objectives, issues, topics being investigated)” Tellis (1997, n.p.)
2. “Field procedures (credentials and access to sites, sources of information)” Tellis (1997, n.p.). Documents, interviews, and observation are among top data sources for case studies.
3. “Case study questions” Tellis (1997, n.p.) which guide the researcher during data collection and on selection of data sources.
4. “A guide for case study report (outline, format for the narrative)”, though Tellis (1997, n.p.) acknowledges that case study reports do not follow a specific outline as is with other research reports.

Yin (2014, p. 9) notes lack of rigor as a common limitation of case study research strategy, especially in situations where a researcher allows “biased views to influence the direction of the findings and conclusions” or fails to follow a “systematic process” in the conduct of research. Further, Yin (2014, p.10) warns that the approach can be time consuming especially if a researcher uses “lengthy narratives” in writing cases. The approach is praised as an “all encompassing” research strategy, with provisions for “the logics of design, data collection and analysis” (Yin, 2014, p.13). Further, Yin (2014) notes that the approach allows for a combination of qualitative and quantitative methods.

4.3.2.1.1 Research Questions

The selection of case study research approach is dependent on the type of research questions under study. Yin, 2014 notes that the approach is most appropriate for investigating ‘how’ and ‘why’ research questions. Case studies provide context and grounding (Eisenhardt, 1989), which is important in understanding what is happening in complex situations or answering

‘what’ exploratory questions (Yin, 2014). Further, case studies provide for more robust answers to ‘what’ questions. This is because case studies allow for use of a variety of data collection methods (Yin, 2014) such as semi-structured interviews and document reviews, which provides for data triangulation (Patton, 1999), which in turn enhances trustworthiness and credibility of findings. The case study research strategy was therefore seen appropriate for this study as it enabled the researcher to answer the following questions:

- i. What are the enablers of and barriers to digital innovation success for digital startups in Kenya?
- ii. How do the identified enablers and barriers compare in structured versus unstructured innovation environment?

4.3.2.1.2 Propositions

Propositions direct attention to specific focus areas to be investigated within the scope of a study (Yin, 2014). It gives a study purpose or the right direction to take (Yin, 2014), which research questions may fail to explicitly specify as they are often general and ambiguous. The following propositions, which apply to the study constructs presented in chapter 3, can be considered for this exploratory qualitative study:

- f. Proposition (P1): There will be different enablers and barriers to digital innovation success in the Global South when compared to those in the Global North.
- g. Proposition (P2): Digital innovators working in an unstructured technology innovation environment (UTIE) will face more barriers (Barriers to Digital Innovation Success (BDIS)) and have different enablers (Enablers of Digital Innovation Success (EDIS)) compared with innovators in a structured technology innovation environment (STIE).

4.3.2.1.3 Unit of Analysis

Proper definition of primary research questions guides the selection of the unit of analysis or case (Tellis, 1997). Yin (2014) likens a ‘case’ to the ‘unit of analysis’, and adds that it can be an individual, an event (e.g. an implementation process) or an entity (e.g. a program, a project, an organisation). Yin (2014, p. 22) notes that the definition of “unit of analysis (and therefore of the case) is related to the way the initial research questions have been defined”. It is therefore important to accurately define the primary research questions in a way that “favours one unit of analysis over another” (Yin, 2014, p. 23), to select the most appropriate one for a study.

Literature can guide one in defining the unit of analysis (Yin, 2014). This study conceptualizes the unit of analysis and unit of observation as the level at which data is collected and analysed. The unit of analysis indicates the ‘who’ or ‘what’ is being studied. The unit of observation indicates the ‘who’ or ‘what’ one is collecting data from. This study sought to investigate ‘digital innovation success’ phenomenon, with technology or digital startups in Kenya as the primary unit of observation, through the perspective of digital innovators and other stakeholders. The primary unit of analysis for this study is “digital innovation success”. Digital or technology startups, digital innovators (founders and co-founders), digital startup mentors, incubation or accelerator managers/administrators among other relevant digital innovation stakeholders form the units of observation for this study.

4.3.2.1.4 Multiple Case Study Identification and Selection Approach

Yin (2009, p. 45-51) provides a guide for multiple case identification and selection. He cautions against treating multiple case studies as multiple respondents when selecting the cases, as the former follows a replication logic and the latter a sampling logic. In defining this study’s cases, the researcher followed Yin (2014, p.12) recommendation that “the essence of a case study, the central tendency among all types of case study, is that it tries to illuminate a decision or set of decisions: why they were taken, how they were implemented, and with what result”. The description of this study’s cases illuminates steps or decisions taken by digital or technology startups towards building successful digital innovations, while highlighting why and how the decisions were taken. Such detailed case description enabled the researcher to begin to explore potential context-based enablers and barriers of digital innovation success.

As mentioned earlier, this study agrees with Díaz-Santamaría and Bulchand-Gidumal (2021) definition of digital startups as enterprises that: “have a technological base, a founder or founders, a novelty (in the product or final service provided), company size that is either micro, small or medium, are in search of a scalable and replicable business model and seek funding to commercialise an idea” (p.2) into a successful digital innovation. Considering this, four (4) digital or technology startups were investigated, where 2 represented digital innovations emanating from a structured environment, which have succeeded (1) or failed (1). The other 2 startups represented digital innovations emanating from an unstructured environment, which have succeeded (1) or failed (1). Therefore, the success parameter greatly influenced case selection. It is also important to note that the digital startups were selected based on a digital

innovation they have implemented either successfully or unsuccessfully, as the unit of analysis for the study is ‘digital innovation’.

Cases representing a structured innovation environment were sourced from a database of startups provided by select business incubators, accelerators, and technology hubs in Kenya. This selection approach was deemed necessary as business incubators and accelerators have mechanisms of classifying startups as either successful or otherwise based on proven context specific parameters. The cases representing unstructured innovation environment were identified through document reviews. Table 4-2 illustrates the purposeful case study selection approach.

Table 4-2: Case Study Selection Criteria

Environment/ Outcome	Structured	Unstructured
Succeeded	Case A	Case B
Failed	Case C	Case D

In addition to the success parameter, the following selection criteria were applied. First, the selected digital or technology startup innovation must utilise or result to a digital technology (or rather a digital innovation). This includes a “digital product, digital service, digital platform, digital tool, digital infrastructure, digital artifact, or internet enabled service innovation” (Elia et al., 2020, p. 1). Second, the digital startup must be past the ideation stage at the time of the study. Bortolini et al. (2021, p.1768) define the ideation stage as "the creative process of generating ideas and designing the business that the entrepreneur wants to develop". Third, the digital innovation must have been conceptualised and/or implemented within a structured and/or unstructured innovation environment in a developing country context, particularly Kenya.

Innovation success research brings out the concept of sustainability, especially of innovations emanating from users and grassroots innovators (Nielsen, Reisch & Thøgersen, 2016; Bocken, 2015), to imply success. Alegre and Berbegal-Mirabent (2016, p. 1156) view innovation success as the capability to effectively address a need while maintaining economic sustainability. Ross, Mitchell, and May (2012, p. 471) use the term “progression of innovation” to mean success. Hirose (2018) views digital innovation or technology entrepreneurship success as successful commercialisation and business development, often over lengthy periods

of time. Griffin and Page (1996, p. 478) research on measures for product development success and failure reported “customer-based measures of success” such as customer acceptance and satisfaction as potentially most useful measure of success for a product under development, including a digital product or service. In view of this, an understanding of the problem/gap (Kim and Heshmati, 2010) or meeting customer needs (Pirolo and Presutti, 2010) could be a potential measure of success for digital innovations. This study used “customer-based measures of success” Griffin and Page (1996, p. 478) for the selection and categorisation of cases under unstructured innovation environment. This is because the definition more closely aligns with the foundations of the conceptual framework (Figure 3-4) presented in Chapter 3, which is a refinement of Dorothea Klein’s Choice Framework (Figure 3-3), which proposes for a non-economistic and human-centred development outcome, in this case indicators of digital innovation success. Selected “successful” cases also had to have been in operation for at least 3 years.

Case Identification and Selection Approach
Step 1: Map out a list of potential cases, through document reviews and information search from entrepreneurship support organisations (ESOs) or innovation intermediaries.
Step 2: Shortlist 4 cases based on the following criteria: i. Utilises or results in digital technology. ii. Operates/has operated in a structured, unstructured or hybrid innovation environment. iii. Domiciled in Kenya. iv. Successful or unsuccessful (based on: “customer-based measures of success” Griffin and Page (1996, p. 478), a definition that more closely aligns with the foundations of the conceptual framework (Figure. 3-3) presented in chapter 3, which is a refinement of Dorothea Klein’s Choice Framework (Figure. 3-2), which proposes for a non-economistic and human-centred development outcome, in this case indicators of digital innovation success.

4.3.2.1.5 Description of Selected Cases

In defining this study’s cases, the researcher followed Yin (2014, p.12) recommendation that “the essence of a case study, the central tendency among all types of case study, is that it tries

to illuminate a decision or set of decisions: why they were taken, how they were implemented, and with what result”. The description of this study’s cases illuminates steps or decisions taken by digital innovators or technology startup founders towards building successful digital innovations, while highlighting the outcome of these decisions regarding success. Such detailed case description enabled the researcher to begin to explore potential context-based enablers of and barriers to digital innovation success in Kenya. Table 4-3 profiles the 4 cases selected for this study. In describing the cases, the researcher observes the strong connection between ‘digital startup’ and ‘digital innovation’, pointing out that startups emerge from a core innovative concept. Startups often take up the brand name of this central innovative idea. When dissecting the cases below, it was imperative to outrightly specify which entity was being described, that is the company (the startup or legal entity under which the commercial aspects of an innovation would be ran) or the product (the digital innovation), though some aspects may be interlinked. The names of the four technology startups were kept anonymous for privacy reasons as per the provisions of ethical approval acquired before data collection. Briefly, multiple case study approach was appropriate for this study as it enabled contextualized evaluation of what enables or hinders digital innovation success for innovations conceptualised and implemented within a structured and/or unstructured innovation environment in Kenya, a Global South context.

Table 4-3: Selected Cases

Case	Industry	Innovation Environment (Structured/ Unstructured)	Status (Successful/ Unsuccessful)	Source
Case A	Retail	Structured	Successful	Business Incubator
Case B	eHealth	Unstructured	Successful	Online Information Search
Case C	AgriTech and FoodTech	Structured	Unsuccessful	Business Incubator/ Technology Hub
Case D	Fintech	Unstructured	Unsuccessful	Online Information Search

Brief Case Study Description: Case A

Case A is a digital innovation in the retail/e-Commerce industry that has gained recognition over the years as Kenya’s number one online gift store solution. The digital startup behind Case A (whose name is also the same as Case A brand name) was founded by two young Kenyan innovators in 2012, within a structured innovation environment, specifically a university-based business incubator. Case A was created to address a gap in the market, where most gift shops

followed a traditional brick and mortar model, limiting the addressable market to a handful. The startup started off as a company that did gifting, with flowers and small memorabilia as their main retail model, using social media platforms such Instagram, Facebook among others. This helped the startup build a community of people who were able to appreciate and grow their brand, based on Case A. Later, they developed their first website to facilitate the retail process more efficiently. According to one of the co-founders, Case A initial financing was USD \$3 only and through innovation, technology and continually reinvesting and anchoring down the startup on its core objectives, the founders, because of Case A, were able to grow the startup right up to more than \$1,000,000 valuation within the first 8 years of operation. As of 2022, the startup was reported to have reached a higher valuation (about USD \$2 to \$3 million annual turnover), without any external funding or financial support from local or foreign investors. The founders credit the success to their commitment to digital and strategic innovation of Case A along their startup journey.

One of the founders noted that building Case A to the success that it is now was no small feat. In its nascent stages, the founders decided to join a local business incubator, which they say helped them refine their business idea and model of Case A, which they deem pivotal towards digital innovation success. As the company began to grow within the first year of operation, the need for a big storage space necessitated their move from their cubicle in the incubator to a physical shop with a back-office storage space.

The journey to million-dollar valuation was not devoid of challenges, obstacles, and setbacks. According to the founders, some of the key challenges faced included difficulty in building customer trust in e-commerce business. Kenyans and other Africans are reported to have little to no trust on e-commerce sites due to perennial cases of theft. The founders decided to focus more on marketing and building trust for their brand. Access to funding to bootstrap their idea was a challenge. The founders report that it was quite difficult getting banks to sign off, even on an overdraft on their early-stage startup days. Startups in Kenya are still seen as very risky business. Most financial institutions are risk averse. To navigate financial capital challenges, the founders of Case A sought funding from a local Savings and Credit Cooperative Organisation (SACCO). Getting the right partners, particularly providers of secure online payment gateways, was also a challenge. Initially, Case A had only PayPal as the sole payment option on the e-commerce platform. They later managed to include M-pesa as a payment option, which a big percentage of their addressable market preferred. Challenges in access to

proprietary web application development tools, which could guarantee data security and capability to scale as number of transactions and users grew, was another hurdle they had to deal with in the early stages. Due to limitations in funding access, Case A was initially developed on top of Magento, an open-source ecommerce software now (2022) known as Adobe Commerce. The platform proved inefficient for a gifting business model on which Case A was built on, which would experience unexpected peak orders, necessitating the need for flexible system resources that change (increase or reduce) with changes in the number of transactions. As the company grew, the founders decided to migrate the application to Shopify, a proprietary cloud-based e-commerce platform. Shopify was able to give Case A the flexibility made possible via Software as a Service (SaaS) model.

Case A also reported challenges in hiring skilled talent at the onset due to lack of funding, forcing founders to take up multiple roles to fulfil the online gift orders. The founders reported that period as very stressful. The founders also dealt with limited technical and business administration knowledge necessitating the need for online learning using platforms such as Google, YouTube and other e-Learning platforms that offer business management and accounting courses for free. The founders reported that navigating through the regulatory framework remained a challenge for Case A at the time of this study, particularly border customs. They noted that such unfavourable border customs could hamper their expansion plans to other countries in East and Central Africa, other than Kenya, their headquarter for all offline operations. Case A is now in the process of pivoting into a marketplace digital solution, which the founders view as a key indicator of digital innovation success. This case represents a successful digital innovation within a structured technology innovation environment.

Brief Case Study Description: Case B

Case B is a digital innovation in the e-health industry. The digital startup behind Case B (whose name is also the name of the startup) is domiciled in Kenya, Africa. The startup was founded in 2018, by two co-founders, one a Kenyan national and the other a foreigner. Initially, the founders were looking to solve a very rudimentary problem in the Kenyan market that affected medical practitioners and patients in Kenya. The problem Case B sought to address is to connect jobless or underemployed medical practitioners with patients who found current healthcare service unsatisfactory. Kenya has an oversupply of medical practitioners, whose service is not felt at the ground level. Patients complain of poor service delivery of the current

healthcare system. At the same time, practitioners complain of poor pay. On graduating from medical school, most are forced to do other businesses (that align or do not align with their profession) to supplement their income or due to joblessness. According to one of the founders, Case B was born as an idea that sought to leverage technology to deliver timely and quality health care to patients at the comfort of their homes. Through Case B, a mobile application based digital solution, a patient can request a doctor, get matched to the relevant doctor who would then visit and examine the patient at the comfort of their home. That idea changed over time, as the founders quickly realised after the launch that some assumptions, they had made proved not to be true. The assumption that people (Kenyans) would request for on-demand healthcare services was erroneous. Instead, they realised that most people would prefer to schedule an appointment ahead of time as opposed to real-time service. There being no real-time service delivery, the founders decided that they would advise all users of their platform with medical emergencies to seek the service of any accessible health institution.

One of the founders noted that a defining moment for Case B, which contributed to its success, was when COVID-19 hit, and Kenya went into lock-down. Most businesses were forced to close shop temporarily. This was immediately after Case B's official launch into the market. At this period, the target market was very sceptical letting any strangers in their homes. The founders had quit their jobs to run Case B full-time. There being no option for failure, the founders had to re-think their business model to accommodate the COVID-19 pandemic. Luckily, the government released some regulations for re-opening of businesses and offices, which required all employees to be tested for COVID-19 before going back to work. Case B took this opportunity to partner with a medical laboratory that was conducting tests for COVID-19. Case B could then extend the COVID-19 testing services to offices and businesses that had been allowed to operate. The founders took this opportunity to sensitise people about the innovation and services offered through their innovation, that is, Case B. They had potential clients try their service, and level of care.

The founders' decision to partner with the medical laboratory, which is a globally renowned healthcare service provider, was mainly to legitimise Case B's business model. This would give more users the confidence and willingness to try their service. Fortunately, the investor who invested in Case B, had also invested in other startups. One of those startups was a medical laboratory already operating in Kenya. The founders were able to connect easily since they had the same investor. Having the same investor also eased the revenue share discussion. Other

than the medical lab, the startup also managed to partner with tourism companies, which enabled them to expand their service to patients in remote areas, particularly patients on Safari or tour.

In addition to collaborating with the right partners, the founders were intentional about the skill set of the team behind Case B. Being a health technology startup, Case B had at least one founder handling the technology side of the business and another the health side, and overall business administration. According to the founders, finding the right talent mix of people for all the different pillars of their company made sure that Case B was running smoothly, and no one department could pull the entire company down. Case B had a multicultural and multidisciplinary team. Further, the founders acknowledge that the two rounds of funding, pre-seed, and seed, which they got early on accelerated the growth of Case B and allowed the founders to quit their formal employment to work on Case B full-time. The early-on funding also contributed to the founders' decision to not join a business incubator, an accelerator, or a technology hub. The founders, however, acknowledge that had they been incubated, they would have most likely launched Case B earlier than they did, as they would have attracted funding much faster. Despite having operated in an unstructured technology innovation environment, one of the founders acknowledged the positive contribution of individuals who work in or with entrepreneurship support organisations such as business incubators, government, industry, and academia to Case B. They note that the contributions of such individuals steered Case B to the success that it was at the time of this study period. In addition, they noted that the decision to work full-time on Case B also accelerated product development and go-to-market. Concerning government policy and regulations, Case B operates within the rules and regulations provided by the Ministry of Health, which they have managed to navigate successfully, albeit with challenges here and there. This case represents a successful digital innovation within an unstructured technology innovation environment.

Brief Case Study Description: Case C

Case C was a digital innovation in AgriTech (technology enabled agribusiness) and FoodTech (technology enabled food business) sectors. The startup behind Case C (that also uses Case C as company name) was domiciled in Kenya. The startup was founded in 2010, having built Case C, an SMS-based mobile application, to connect small-holder farmers with other farmers and potential buyers of their agricultural produce. The digital platform (Case C) provided

information on market prices for various agricultural produce to local farmers on a subscription basis. The goal was to eliminate the middleman, stabilise prices and increase farmer productivity. Case C operated in and with the support of local technology hubs and co-working spaces. Operating within a structured innovation environment afforded the founders with office space, networking, and funding opportunities. In addition to prize money won at the early stages of the startup, Case C was able to attract funding from three major investors totalling USD 235,000 combined. Case C began as a hackathon idea that went ahead to win best Application national award in Kenya. Case C was awarded prize money worth Ksh. 1 million (approximately USD 10,000 in period ending 2010). The founder decided to channel the seed capital into bootstrapping the idea, which was novel in the Kenyan context. After 3 years of operation, Case C co-founder challenges led to exit of two co-founders, leaving one co-founder to manage all the operations of Case C. The exit of the two co-founders had a big impact on the operations of the company which ultimately contributed to high customer churn rate, loss of income among other operational challenges. This case represents an unsuccessful digital innovation within a structured technology innovation environment.

Brief Case Study Description: Case D

Case D was a digital innovation in the fintech industry. The technology startup behind Case D (who company brand name is also Case D), was domiciled in Kenya. Case D was an innovative mobile application solution that provided mobile money users in Kenya with a means of monitoring their transactions via easy-to-read mobile-banking statements for literate and illiterate consumers. In its idea stage, the mobile application was submitted in a technology competition hosted by the leading mobile-banking services provider behind M-pesa at that time, which saw it win an award as best financial application plus a monetary reward of Ksh. 100,000/- (approximately USD 1,000 for the period between 2010 and 2011). Just before going to market, the founders decided to seek partnership with a leading Telco in East Africa, a move which would have catapulted Case D to a successful digital innovation. After several discussions and months of waiting for feedback, the founders had to let go of their innovation, as the potential partner decided to take up the idea and build a similar application in-house. This rendered their solution redundant and uncommercialisable. The founders note their delay in patenting their idea as a key contributing factor to the turn of events. In addition, they pointed out that Case D's dependency on a technology giant's data and systems for it to be fully

functional could have also rendered their solution irrelevant. Further, the founders noted that, had they gone through a business incubation program, they would have possibly learnt how to protect their idea early. Working under a business incubator could also have made access to the right partner easier, especially regarding negotiating a valuable deal with the technology giant, towards the successful implementation and commercialisation of their innovation, Case D. This case represents an unsuccessful digital innovation within an unstructured technology innovation environment.

4.3.3 Data Collection and Analysis Methods

This research was conducted within a PhD study timeline. The data collection stage begun with application for ethical approvals from the University of Cape Town and the National Commission for Science, Technology, and Innovation (NACOSTI)'s approved Ethics Review Committee in Kenya. The researcher sought ethical approval from Daystar University in Kenya, which has a NACOSTI accredited Ethics Review Board, and whose fees were reasonably affordable to the researcher, and with a favourable turnaround time. As part of the prerequisites, the researcher sent a research proposal detailing the proposed research methodology, copy of research participant interview guide (see Appendix F) and research participant consent form to Daystar University Ethics Review Board. Recommendations from the review required that the researcher also acquire a research permit from NACOSTI before data collection begins. Application for the research permit was done online, via NACOSTI website. A key requirement for this application was the document confirming ethical approval from the University of Cape Town and Daystar University Ethics Review Board. The researcher was granted a research permit to collect data in select counties in Kenya (Nairobi, Kisumu, Kiambu and Machakos), where the digital innovation phenomenon was believed to be more evident because of urbanisation. These locations were also relatively accessible to the research, considering limitations in financial resources and PhD timelines.

4.3.3.1 Data Collection Methods

4.3.3.1.1 Semi-structured Interviews

Tellis (1997) reports interviews as an important data source for case study research approach. In this study, in-depth semi-structured interviews were used to collect “background information” from a purposive sample of 21 research participants (Hammarberg et al., 2016) that is, subject matter experts and digital innovation stakeholders in Kenya. The structured

aspect of the interviews comprised broad and specific exploratory questions on Kenya's digital innovation ecosystem and enablers of and barriers to digital innovation success. Initially, the interviews were conducted face to face and recorded using the Otter mobile application. This application would provide an initial transcript, which the researcher found unreliable as it had many grammatical errors. This could be attributed to the unique lingo of English speakers in Kenya. This being a post-positivist study, which allows the use of context relevant methods (Guba, 1990), the research employed online interviews to accommodate the COVID-19 social distancing regulations. Most of the interviews were conducted using licensed version of Microsoft Teams video conferencing software, whose transcription gave more complete transcripts, in terms of grammar and understanding the unique nuances of the English language spoken by the locals (Kenyans), with minimal errors. The duration of the interviews were approximately 60 minutes. Having interviewed 20 research participants, I had over 20 hours of voice and video data, with autogenerated transcripts that were further revised to produce readable single-spaced English transcripts that were up to 13 pages long.

The interviews were administered to Founders/co-founders, CEOs, COOs, CFOs, directors, and managers of digital startups in Kenya operating in a structured, hybrid or unstructured technology innovation environment. Also, academics, with—expertise in either (or all) Information and Communication Technology, Entrepreneurship and Strategic Business Management, were interviewed. Industry experts with at least 5 years' experience in entrepreneurship, mentorship, and training of start-ups both in a structured and unstructured innovation environment were also engaged. A purposive sampling strategy was therefore used to identify research participants based on the selection criteria. Table 12 under Chapter 4 details the profile of all the 21 research participants engaged in this study and Appendix F presents sample interview guide used in this study.

4.3.3.1.2 Document Reviews and Media Analysis

Document reviews and media analysis (blog posts, YouTube Videos) were also done to complement data collected via semi-structured interviews. This helped isolate “distributed or private knowledge” (Hammarberg et al., 2016) on potential enablers of and barriers to digital innovation success in Kenya. Most importantly, multiple data sources are provided for data triangulation thereby contributing to the validity of results. Table 4-4 displays lists of documents and media reviewed in this study.

Table 4-4: Document Review and Media Analysis

Title	Type	Source/Author
First Quarter Sector Statistics Report Financial Year 2023/24.	Report	Communications Authority of Kenya (CA)
Mapping of the Kenyan Innovation Ecosystem-Validation Workshop Report	Report	Konza Technopolis
UNESCO Science Report. The Race Against Time for Smarter Development.	Report	Lewis, Schneegans and Straza, (2021)
Mapping of the Kenyan Innovation Ecosystem - Key Findings, Conclusions and Recommendations	Report	UNDP Accelerator Lab, Konza Technopolis, Association of Countrywide Innovation Hubs and African Centre for Technology Studies (ACTS)
Creating A Vibrant Innovation Ecosystem.	Report	Konza Technopolis
State of Tech Innovation in Africa 2021: Report Launch	YouTube Video	AfricArena
Ecosystem Enabler Organisations (ESOs) Needs Assessment	Report	The Association of Startup and SMEs Enablers of Kenya (ASSEK)
Ron Conway (Angel Investor) at Startup School 2012	YouTube Channel	Y Combinator
About Case [A/B/C/D]	Website; Brochures; News Articles; Incubator Portfolios	Case A; Case B; Case C; Case D
Kenya Diaspora Remittances Rise to Sh42 Billion in March	News Article	allAfrica.com
African startups have raised over \$4bn. in 2022	News Article	TechCabal

4.3.3.1.3 Sample Size, Saturation and Validity of Results

Research shows that sample size selection strategy and criteria in qualitative research is not as straightforward as is the case of quantitative studies. In qualitative research, the concept of “saturation” is used as a measure of accuracy concerning sample size selection. Morse (2000) defines “saturation” as “the point at which no new information or themes are observed in the data from the completion of additional interviews or cases”. He notes that estimating a sample size needed to reach saturation in a study is dependent on factors such as “the quality of data, the scope of the study, the nature of the topic, the amount of useful information obtained from each research participant, the number of interviews per research participant, the use of shadowed data, and the qualitative method and study design used.”

Malterud, Siersma, and Guassora (2016) note that the decision regarding sample size in qualitative research is sometimes dependent on other factors other than arriving at a point of

“saturation”. They propose following an “information power” approach informed by factors such as “(a) study aim(b) sample specificity(c) use of established theory(d) quality of dialogue, and (e) analysis strategy”. They posit that “the larger information power the sample holds, the lower the N (sample size) is needed, and vice versa”. A broad ‘study aim’ demands a large sample compared to a narrow aim. A sample whose specificity or “knowledge and experience” is dense translates to a smaller size compared to a sparse specificity. A study backed up by strong theoretical background requires a smaller sample size compared to one with limited theoretical backing. Building new knowledge requires a large sample. Studies with clear and strong communication between research participants and researchers may require small sample size. Also, a study’s analysis approach can determine sample size. For instance, studies that employ in-depth analysis techniques need a small sample size. A “cross-case analysis” approach would require a larger sample.

Ando, Cousins and Young (2014) note the need to have a prior codebook for validity of results. This study’s data collection stage was preceded by a comprehensive systematic literature review process, whose result was an initial codebook (Appendix D) with 49 unique factors that could potentially enable or hinder digital innovation success. The factors were further grouped into 10 major groupings or themes as shown in table 6 (refer to literature review section).

As part of the research participant identification strategy, the following criteria were applied. First, the research participant needed to be a digital start-up founder, co-founder, CEO, COO, CFO, director, senior developer (or the equivalent) with experience in conceptualising and/or running digital innovations (successfully or unsuccessfully) in either or both structured and unstructured innovation environment in Kenya. These research participants were sourced from digital startups in Kenya including those selected as case studies. Also, subject matter experts from industry and academia were engaged. Experts from academia were required to have expertise in either (or all) Information and Communication Technology, Entrepreneurship and Business Innovation. Selected industry expert had at least 5 years’ experience in mentorship and training of digital start-ups both in a structured and an unstructured innovation environment. Ethical approval and research participant consent was sought before engaging a research participant. Research participants were made aware that they could opt out or withdraw from the research pre-maturely. No personally identifiable information was published in this thesis or articles resulting from this study.

4.3.3.2 Data Analysis Methods

This is the final step for case study research design elements, which combines two steps: “the logic for linking the data to the propositions” and “the criteria for interpreting the findings.” (Yin, 2014, p.25). There are different qualitative data analysis methods available for use in an IS study. The choice of which method to use is dependent on a study’s aim and objectives. In the case of an exploratory case study research, Yin (2014, p.25) views data analysis as the process of “logic linking of data to propositions, if any, or purpose”. In other words, the researcher should “explain what will be done with the collected data” Yin (2014, p.26). Exploratory studies without propositions must state a purpose, and a criterion by which the exploration can be judged successful (Yin, 2014, p.21). For instance, it could be pattern matching to confirm or deny previously defined propositions or research purpose. This study uses thematic analysis (presented in detail in the following section), which goes beyond pattern matching to understanding underlying meaning and significance of patterns with data collected Braun and Clarke (2019).

4.3.3.2.1 Qualitative Data Analysis

This study follows Braun and Clarke (2006) six-step thematic analysis method and Saldana (2015) guide on thematic coding. This study’s analysis began with a process called coding. Coding enables a researcher to “label, reorganise, group or categorise and link” data that “look alike” or “feel alike” based on researchers cognitive reasoning and world view, to derive “meaning and develop most plausible explanation” (Saldana, 2015) for the phenomenon under study. Briefly, the data analysis process in this case involves pattern seeking and explanations of why the pattern exists (Saldana, 2015). This section explains the data analysis process followed, and tools used in this study.

4.3.4 Theory Development Approach

Coding is a common strategy for theory development in qualitative studies. Coding transforms large sets of qualitative data such as those from semi-structured interviews and document reviews into manageable and meaningful units for further analysis (Saldana, 2015). A code is “a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data” (Saldana, 2015, p. 4). He further notes that coding in qualitative analysis is “not a precise science but is primarily an interpretive act” (p. 5) where codes are “researcher-generated constructs” (p. 17) representing a researcher’s interpretation of the data collected, with aim of “pattern detection, categorisation,

theory building, proposition development” (p. 292) among other reasons. There is no specific “formula or algorithm” (Saldana, 2015, p. 9). to follow when coding as the process is highly interpretive. However, this “heuristic/exploratory problem-solving and cyclical” (Saldana, 2015, p. 9) process is usually guided by a “lens”, “angle” (p. 8) or worldview through which a researcher interprets the phenomenon under study. A lens could refer to “gender, social class, race/ethnicity” that a research participant or researcher resonates with” (Saldana, 2015, p.8). Therefore, a grounded theorist’s coding approach on a given excerpt of data may result in a different code compared to a critical theorist’s code for the same data extract. The lens or worldview influences a researcher’s approach to data collection - that is, how they frame their questions, what questions they ask - and analysis, that is how they interpret the data, and the study findings. Saldana (2015, p. 16) notes that “what gets coded is units of social organisation” such as “cognitive aspects or meanings, inequalities, roles, relationships, organisations, cultural practices” et cetera. Further, all coding is seen as a “judgement call” based on researchers’ prejudices (Saldana, 2015, p.8).

This study used the proposed conceptual framework (Figure 3-4) as a lens. The conceptual framework is a refinement of Dorothea Kleine’s Choice Framework (Figure 3-3), that is cognisant of the importance of contextualization of research. This study also followed a post-positivist approach, which is cognisant of the importance of contextualization of research and impact of human prejudices and bias in a study. The aspect of contextualization was important to this study, which sought to isolate enablers of and barriers to digital innovation success in a Global South context.

Research to date has erroneously used coding and analysis interchangeably. Saldana, 2015 agrees with Charmaz (2001) who views coding as a process that “generates the bones of” a researcher’s analysis. Therefore “coding is not synonymous to analysis”, but rather is part of analysis (Saldana, 2015). Further, Saldana (2015) cautions against using codes, categories, and themes interchangeably as they are uniquely different. A code is seen as a connector or “link between data to idea and idea back to data”. Therefore, codes are used to “compute meaning” while categories “impute meaning” (Saldana, 2015). Categories and subcategories are seen as summative words or phrases that group codes to “consolidate meaning” (Saldana, 2015). However, (Saldana, 2015) notes that it is possible for a code to fall under one or more category

or subcategory. Such instances complicate data analysis. It is therefore advisable to have each code in a single category. This would require the researcher to be highly reflective during the coding process, which may involve cycles of “re-coding and re-categorisation” (Saldana, 2015, p.12). The decision on whether to code some or an entire data corpus is mostly at the discretion of the researcher. Some researchers code what they deem as “relevant text” or “key moments” while others “cherry pick” (Saldana, 2015, p.18) passages to be coded for thematic analysis later.

Themes “can be a phrase or a sentence emerging from coding, categorization, and analytic reflection, though they are not in themselves coded” (Saldana, 2015, p.198). The following section discusses the Thematic Analysis methodology which was employed in this study. The Braun & Clarke (2006) Thematic Analysis approach was followed to give the process structure and rigor.

4.3.4.1 Thematic Analysis (TA)

Braun and Clarke (2006, p.79) define thematic analysis as “a method for identifying, analysing and reporting patterns or themes within data”. Maguire and Delahunt (2017, p. 3352) define it as a “process of identifying patterns or themes within qualitative data”. Braun and Clarke (2006, p.78) view thematic analysis as a “foundational method” that every researcher should learn. The methodology equips one with fundamental qualitative analysis skills necessary to conduct any other type of qualitative analysis. They note that the methodology involves “thematizing meanings” (Braun & Clarke, 2006, p.78), where themes are representations of noteworthy aspects of data in relation to research question(s). Further, they praise it for its flexibility as it can be “applied across a range of theoretical and epistemological approaches” to provide “rich and detailed” analysis of data (p.5). It can be used for “both inductive (data-driven) and deductive (theory-driven) analyses” Braun and Clarke (2006, p.83). The flexibility aspects favour this methodology over Grounded Theory (GT) approach which Braun and Clarke (2006, p.80) describe as “theoretically bounded”. This study benefits from a strong, empirically validated theory that comprehensively addresses the core variables or phenomena within the scope or domain of this PhD research. This makes TA an ideal approach for the study.

Identifying and Selecting Themes

Braun and Clarke (2006) define themes as representations that capture important aspects of data concerning the phenomenon under study. At theme identification and selection stage, they assert that frequent occurrence of a potential theme does not make it crucial or validate its relevance to a study. Also, there are no specifications on the required proportion of data Braun and Clarke (2006, p.82) to validate the existence of a theme. In some studies, it is common to see researchers use descriptive words to quantify theme relevance or existence. Words such as “number of participants”, “many respondents” (Braun & Clarke, 2006, p.83) among others can be used as evidence that selected themes emerged from data and are thus valid. Considering this, they note that theme selection approach is not cast on stone but dependent on researcher preference. However, they emphasise consistency in the theme selection approach chosen within a particular study.

Approaches to Theme Identification and Analysis

Semantic versus Latent Level Thematic Analysis

Braun and Clarke (2006) discuss two types of data analysis approaches when using thematic analysis. First is semantic level analysis, which involves rich summarised descriptions of emergent themes from all data. Second is the latent level approach, which includes rich descriptions of a certain aspect of data or a theme or a group of themes. Semantic level analysis is common in studies with word limitations in the final report such as a thesis or an article.

Top-down versus Bottom-up Theme Identification Approaches

Braun and Clarke (2006) confer two approaches of identifying themes or patterns in data. The first approach involves deriving themes from data and is referred to as inductive or bottom-up approach. The approach is said to be like Grounded Theory methodology as it is “data-driven” (Braun & Clarke, 2006, p.83) and steers away from “fitting into pre-existing coding frame or researchers’ preconceptions” (p.83). Nonetheless, they acknowledge that it is impossible for a researcher to ignore their epistemological beliefs and assumptions. The bottom-up approach is faulted for its lack of ‘reliability’ to research questions.

Second, the deductive or theoretical or top-down approach is driven by researchers’ epistemological beliefs and assumptions. The approach provides “fewer rich descriptions” of

data under review but more “detailed analysis of a certain aspect” of data under review (Braun & Clarke, 2006, p.84). Also, it is guided by the research questions, which may “evolve through the coding process” (p.84), thereby traversing the boundary between top-down approach and bottom-up or inductive approach.

The appropriate approach is dependent on researcher’s analysis goal: to answer the research question (top-down or theoretical approach) also known as a deductive approach or to shape the research question by allowing it to evolve as the thematic analysis process progresses (bottom-up approach), also known as an inductive approach. In this study, a priori of codes had been consolidated before data collection based on the results of a Systematic Literature Review presented in chapter two. The initial codes were useful during data analysis as they provided structure and focus, at the beginning of thematic analysis. The analysis process was also guided by a conceptual framework (Figure 3-4) presented in chapter 3, which was a refinement of Dorothea Kleine’s Choice Framework (Figure 3-3). The researcher also allowed new themes to emerge from data. This was seen as important in ensuring that context-based factors were captured from the opinions of research participants to bring a deeper understanding of the phenomenon in the current empirical context or richer descriptions of the phenomenon. However, the deductive approach was predominantly followed to generate multi-level hierarchies of themes regarding digital innovation success.

Braun and Clarke (2006) Guide to Thematic Analysis

Braun and Clarke (2006) six steps guide provide easy to follow steps for conducting thematic analysis. They emphasise that the guide need not be followed linearly but recursively to ensure effective analysis. This iterative nature provides for some level of validation and reliability of the qualitative data analysis process in this study. Briefly, Figure 4-3, extracted from Braun and Clarke (2006, p. 86-87), provides summarised descriptions of the six steps to conducting Thematic analysis.

Phase	Description of the process
1. Familiarizing yourself with your data:	Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas.
2. Generating initial codes:	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
3. Searching for themes:	Collating codes into potential themes, gathering all data relevant to each potential theme.
4. Reviewing themes:	Checking if the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic 'map' of the analysis.
5. Defining and naming themes:	Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme.
6. Producing the report:	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.

Figure 4-3: Six Step Guide to Thematic Analysis. Adopted from Braun & Clarke, (2006)

4.3.4.2 A Post-Positivist Thematic Analysis – Bridging Objectivity and Subjectivity

Thematic analysis can be done in three different ways: coding reliability (Boyatzis, 1998), “reflexive or organic coding” (Braun & Clarke, 2006, p. 91) and use of codebooks (Boyatzis, 1998) with constructs of interest for the researcher (Creswell, 2017). This study combined Braun & Clarke (2006) reflexive coding approach (a subjective approach that acknowledges researcher subjectivity or the influence of their background and worldview on analysis, and the influence of context on participant interpretations of reality (Willig & Rogers, 2017)) with Boyatzis (1998) use of a codebook (Appendix D) comprising of initial objective themes previously identified via a systematic literature review (Chapter 2), and through the lens of Dorothea Kleine’s Choice Framework re-interpreted into a conceptual framework (Figure 3-4) that includes researcher’s constructs of interest. This aligns with post-positivism epistemological and ontological assumptions.

Post-positivism promotes researcher reflexivity, where a researcher can question or self-evaluate their own world views and assumptions about reality as well as those of the research participants. Reflexive organic coding approach allows a researcher the flexibility to code, un-code, and re-code data extracts as the analysis progresses. Such flexibility provides for reliability of results. Triangulation through use of multiple data collections methods such as semi-structured interviews, document reviews and media analysis enabled the researcher to fact check respondent’s responses. This corroboration of findings helped increase credibility of results (Denzin & Lincoln, 2011). Ultimately, this process enabled the structuring of themes into multi-level hierarchies (Table 5-4), where subordinate and superordinate themes are shown to illustrate underlying relationships between themes, which reveals their contribution to the overarching concept of digital innovation success.

Step 1: Familiarise Yourself with Data.

This step involves actively reading and re-reading through data first to familiarise with the data and second to isolate initial meanings and patterns during transcription. When dealing with verbal data, it is recommended that one transcribes the data to written format before analysis. The transcription process results into a “verbatim account” of “verbal and non-verbal (coughs) utterances” Braun and Clarke (2006, p.88). This enables a researcher to familiarise his/herself with and understand key aspects of the data before actual thematic analysis.

Coding process in this study was preceded by the following preparatory work, as recommended in (Saldana, 2015): formatting data layout, pre-coding by for instance highlighting or underlining key statements that were related to codes in the codebook (Appendix D) previously generated using systematic literature review, preliminary coding as you collect and format data by jotting down key words and phrases, being cognisant of study aim and research questions”. In this study, a verbatim transcription of all interview data was done using Microsoft Word. The verbatim transcription ensured originality of information as shared by the participants irrespective of use of multiple languages. As most of the research participants were Kenyans, there were few instances where local languages such as Swahili and a unique English lingo combining both languages were used. Also, the local names of things and places were maintained. The researcher sought the services of a transcriber, whose role was to edit initial transcripts auto generated by Otter, a proprietary mobile application for audio recording of face-to-face interviews, and Microsoft Teams transcripts, autogenerated during recording of online interviews. All autogenerated transcripts and audio recordings were collated and shared with the transcriber and Academic Supervisor via a secure Google Docs folder. To minimise errors, the transcriber would listen to the audio recordings of the interviews conducted by the researcher and review and edit the autogenerated transcripts. Thereafter, the researcher would review each edited transcript, while comparing them with the original audio recording to check for any errors that the transcriber might have introduced or missed during the transcription. Any grammar or syntax errors or point of clarifications were added to the transcripts where necessary in between braces or opening and closing brackets to denote researcher definitions, explanations, or additions. This came in handy during final data analysis. Overall, the transcription generated 21 transcripts, which were up to 13 pages long, with single spacing.

Step 2: Generate Initial Codes.

This involves extracting interesting pieces of data in a systematic manner and grouping them into codes related to phenomenon under study “manually or using a software application” (Braun & Clarke, 2006, p.89) such as NVIVO. The codes can emerge from data (bottom-up approach) or theory (top-down approach). There is flexibility to return to the coding step to ‘un-code’ and ‘recode’ a data extract as many times as researcher sees fit.

This study used both deductive and inductive coding approaches. Initial guiding codes were based on the results of a systematic literature review previously done before data collection. These themes guided the initial coding process. The researcher also allowed new codes and themes to emerge from data, thereby following an inductive approach.

Saldana (2015) presents 33 coding methods (see Figure 11) that can be used in a study. He acknowledges the difficulty in deciding which methods to use and advises that one aligns with the “nature and goal of a study, the research questions, the paradigmatic and methodological assumptions, coding and priori goals” (p.69) and more. Further Saldana (2015, p.69) posits that

“no one can claim full authority on the best way to code qualitative data”.

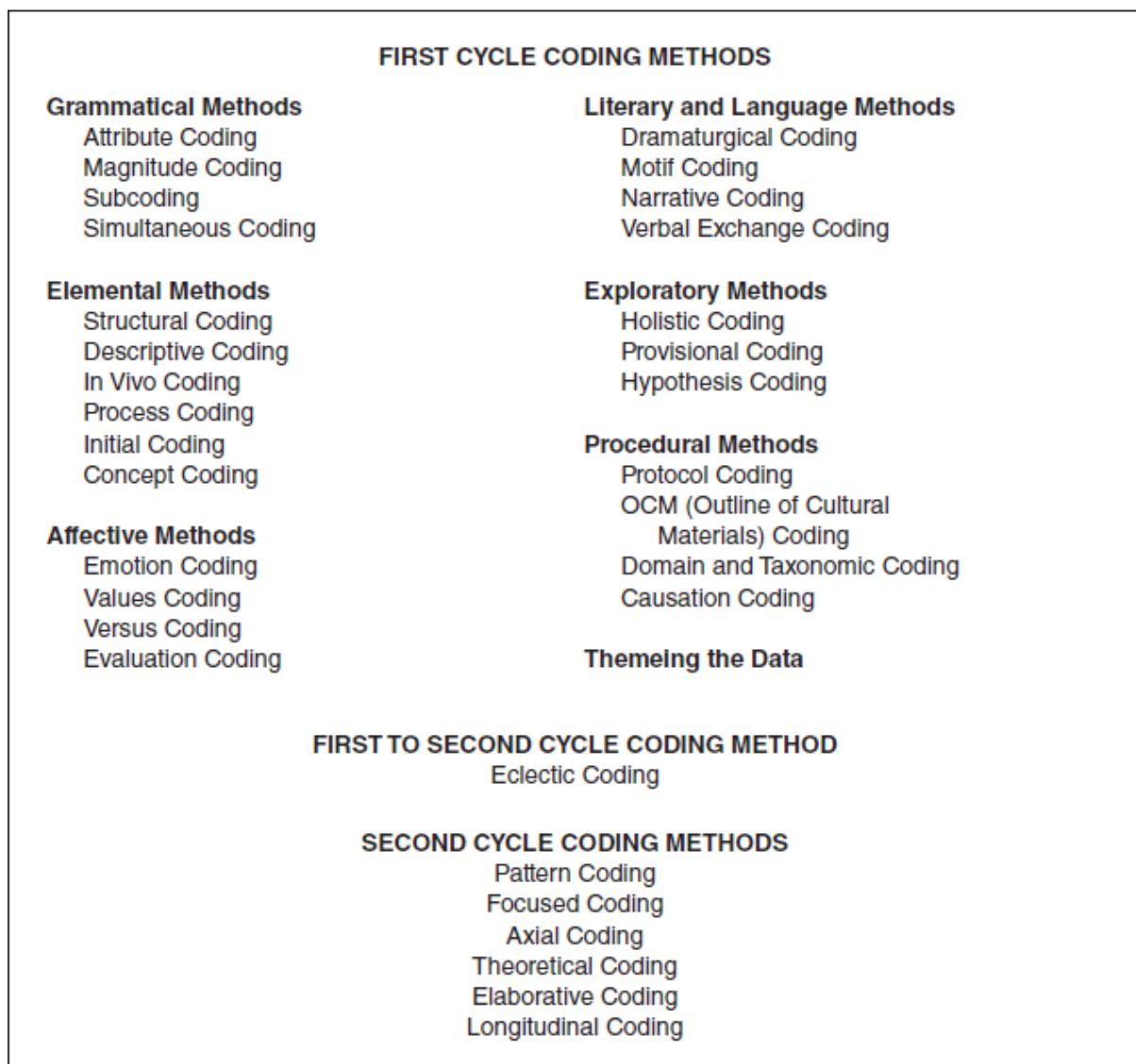


Figure 4-4: Coding Methods.

Note. Reprinted from “The coding manual for qualitative researchers “, by Saldana, J., (2015), p. 59.

Elemental coding methods were dominantly used in this study in the first cycle of coding. The method “consist of foundation approaches to coding qualitative text” (Saldana, 2015, p.80). Attribute coding was also used to bring out research participants subject matter area of expertise or influence as digital innovation stakeholders in Kenya. This was seen as important in ensuring reliability of data sources. This approach is also relevant for a study that uses multiple sources of data such as semi-structured interviews, document reviews, media analysis and more (Saldana, 2015), which this study followed. Such codes come in handy during analysis particularly when generating queries based on demographic data. This also helped

define the empirical context, an important recommendation made by Dorothea Kleine for proper operationalisation of the Choice Framework concepts. Simultaneous coding was also applied in instances where a data excerpt was coded with multiple codes (Saldana, 2015). This was applied in data excerpts that touched on more than one area of interest in the study.

In this study, the NVIVO software was used for thematic coding. The researcher allowed the themes to emerge freely (Braun and Clarke, 2006), and in line with constructs of interest for the researcher (Creswell, 2017) as per the codebook (Appendix D) generated from the results of a Systematic Literature Review presented in Chapter 2 of this thesis and key constructs reflected in the conceptual framework (Figure 3-4), which re-interprets Dorothea Kleine's Choice Framework (Kleine, 2013). Descriptive coding, an elemental coding method, was therefore used at this stage. The initial codes ("topic-based nouns" (Saldana, 2015, p.78)) were derived from a codebook (Appendix D) resulting from a Systematic Literature Review. It is important to note that descriptive coding here was used sparingly because the approach lacks depth regarding evoking meaning and deeper understanding of research participants' "human conditions" or what is going on their life (Saldana, 2015, p.78) during analyses. This is because the codes are generally "topic-based nouns or labels" (Saldana, 2015, p.78). In this case, codes that are "verbs" or "gerunds" (p.78) were preferred as they better encode human conditions. To complement the descriptive coding approach, the researcher employed In-Vivo coding method to generate new codes from data (verbatim descriptions or phrases from respondents). This helped to bring out research participants "perceptions, opinions, conditions, and social actions" (Saldana, 2015, p.298) concerning digital innovation success in their own words and without introducing any bias or loss of meaning on translation. Also, a key goal of the study was to compare enablers and barriers of digital innovation success between structured and unstructured innovation environments. This informed the decision to employ descriptive coding, which supports a comparison analytic goal (Saldana, 2015) in a qualitative study.

During the coding process, the researcher took care not to over code or under code data. However, in this study, the researcher often followed line-by-line initial coding on most interview transcripts. Line-by-line coding promotes more trustworthy results as it minimises researcher bias (Saldana, 2015, p.24). Saldana (2015), however, advises on the importance of evaluating the outcome of "detailed line-by-line coding" (p.115), which may hinder the effectiveness of the process. Instead, a researcher can focus on coding the "most important part

of data collected or key moments or relevant data” as opposed to “coding everything” (Saldana, 2015, p.18). In addition, reuse of codes was ensured in data extracts that elicited similar perspectives or opinions from research participants. Reuse of codes is a deliberate step towards reinforcing patterns in data (Saldana, 2015). Pattern coding in the second cycle of coding was therefore made easier.

Also, as a post-positivist researcher, the researcher ensured to include analytic memos to capture any reflective thoughts about a code or a passage or a research participant interview. Saldana (2015) views analytic memos as an important tool to capture researchers’ thought process, code choices, their world views about the phenomenon under study, research participant’s social actions, that is “their routines, rituals, rules, roles and relationships” (p.47), emergent categories, themes and theories, notes about existing theories, connections and overlaps in the codes/categories/themes, comparison of findings with other contexts, challenges of the study, ethical and personal dilemmas, possible answers to the research questions, recommendations for future studies and more. These memos come in handy during actual analysis and can also be coded and “generate codes and categories” (Saldana, 2015, p.54). Figure 4-5 and Figure 4-6 show sample memos written by researcher during coding and analysis:

Sample Memo 1

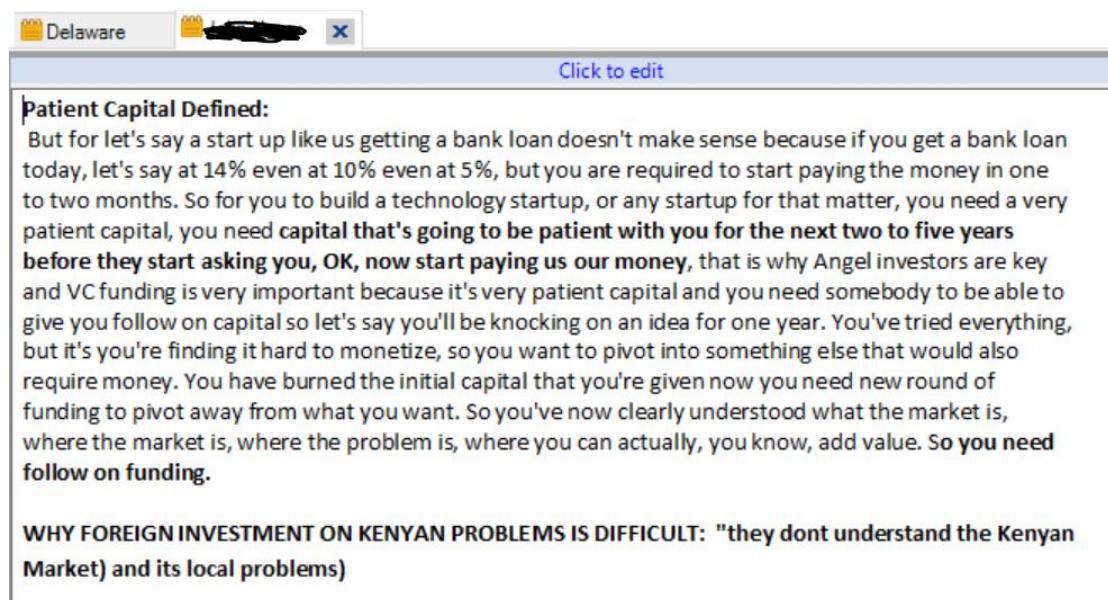


Figure 4-5: Sample Memo 1

Sample Memo 2

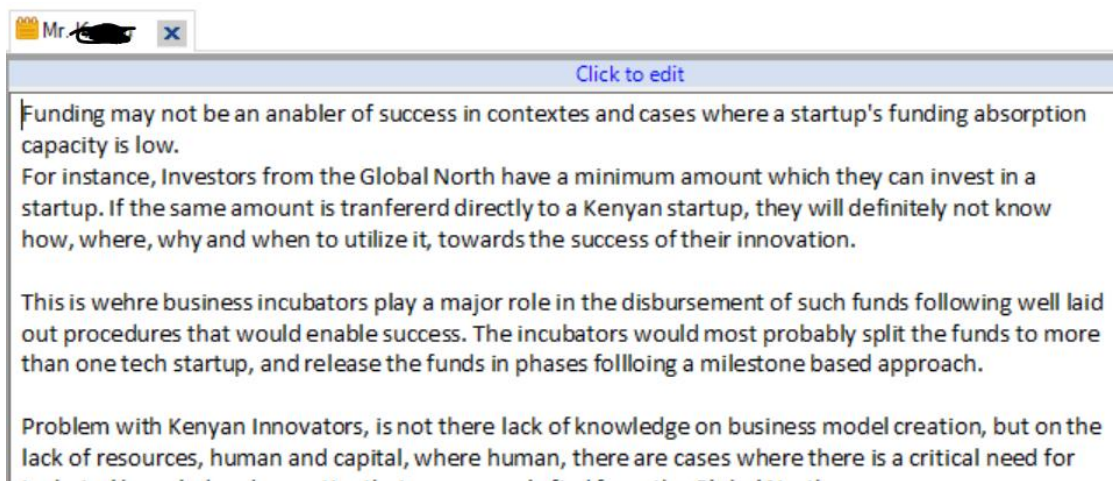


Figure 4-6: Sample Memo 2

Step 3: Searching for Themes.

This step involved putting related or similar codes together into potential core themes. This step helped minimise redundancies, particularly in sections of the data set that had been coded using In Vivo coding. With In Vivo coding, verbatim descriptions or phrases would be picked as is from the transcripts. The probability of different respondents describing the same thing using different words or phrases was relatively high for some interview questions.

Step 4: Reviewing Themes and Relationships.

Iterative Theme Refinement:

In this step, the researcher iteratively reviewed all themes and data extracts coded under them based on data saturation and coherence (Braun & Clark, 2019). Data extracts that were wrongly coded were uncoded or moved under the relevant themes. The researcher was very keen to review each theme to ensure correctness and completeness as well as check for and eliminate any redundancies. The researcher also followed Bryman (2016) approach to negative case analysis where data that contradicts emerging themes is sought to minimise bias. Willig and Rogers, (2017) recommendation on the importance of theme abstraction to resolve surface level explanations helped the researcher to seek deeper meanings and connections between themes. Before settling on a theme, data triangulation and documentation of coding decisions were made using Memos introduced credibility to the thematic analysis process in this study.

Exploring Relationships between Themes:

Axial coding techniques were followed in order to reveal relationships between themes. Strauss and Corbin (1990) notes that axial coding is a great coding technique that enables a

researcher to explore how themes interact with each other, influence each other, and change over time. The technique was applied within a post-positivist paradigmatic worldview, whereby the influence of the researcher's interpretations on emerging relationships was acknowledged and measures taken to ensure rigor. The following axial coding steps were taken:

1. Selection of major themes: Initial high-level key thematic categories, backed by data excerpts, were identified, based on the following three guiding principles: i) causal, where a researcher is able to understand what might have caused a theme to emerge; ii) temporal, where a researcher is able to understand how a theme could have evolved over time and; iii) spatial, where a researcher is able to unearth any spatial factors that may have influenced the occurrence of a theme, such as context or location. For instance, this study believes that it is possible to find unique factors characteristic of the Global South context, which enable or hinder digital innovation success. Under Chapter 5 on findings, the researcher demonstrates factors unique to the Global South context using the '@' symbol under Table 5-4.
2. Identifying relationships between themes: the researcher also sought to understand connections between themes, which gave rise to linkage themes such as "financial capital" and "de-risking mechanisms".
3. Identifying sub-categories for themes: having identified the relationships between themes, it was easier to break down a theme into related sub-categories. For instance, the theme "attract financial funding" had sub-category "foreign investment" and more.
4. Build a hierarchical model: Having identified themes, their relationships, and sub-categories, it was easier to map them out in a tree diagram as shown in Figure 5-8.

Step 5: Defining and Naming Themes.

This step involved refining the words or phrases used in labelling some themes, to ensure that they were descriptive enough to give intended meaning in line with researcher data interpretation and analysis. There was not much work here as a lot of themes had been defined and named well in steps 3 and 4 were already descriptive enough.

Step 6: Write up - Producing Report.

Findings from the analysis were presented into coherent statements supported using select data extracts that were clear, expressive, and complete in answering the research questions, and that aligned with reviewed literature. Visuals such as hierarchy maps, tree maps, tables and world cloud were used to further explain the findings. This is presented under Chapter 5 on Findings.

4.3.4.3 Application of Dorothea Kleine's Choice Framework in Data Analysis

This study began by stating the limitations of using foreign theories from the Global North to study a phenomenon in a Global South context. The rationale behind this thinking is that researchers often over rely on foreign theories, thereby limiting the creation of new knowledge from the Global South. A major advantage of the Choice Framework (CF) is that it is a “living tool” that is open for modification through addition of “new elements under existing concepts or new ones” (Klein (2013, p. 51-52). This is because the CF “concepts are broadly defined in order to render the framework culturally and interdisciplinary adaptable” (Kleine, 2013, p. 52). The application of Dorothea Kleine's Choice Framework can be a daunting task because of its many components (Klein, 2013). Kleine (2013) notes that the practical application challenges of the Choice Framework in her study on Telecentres in Chile, was due to the many components of the framework. Largely, the CF components were very relevant and provided for consideration of possible factors that could enable or hinder digital innovation success, from a people-centred perspective. A conceptual framework that re-interprets the component of the CF enabled the researcher to minimise the complexity and allow for a contextualized application of CF constructs and concepts to a Global South context. The researcher, however, found it necessary to re-interpret the framework to comprehensively explore digital innovation success phenomena in a Global South context, particularly Kenya. This gave birth to a conceptual framework (Figure 3-4) presented in chapter 3 of this thesis.

4.3.5 Ethical Considerations

The conduct of this study was guided by the ethical requirements stipulated in the University of Cape Town's Ethics Code of Practice for Research. Prior to data collection, the researcher received ethical approval from the University of Cape Town (see Appendix G), and Daystar University, Kenya (see Appendix H). The researcher also acquired a research permit from the National Commission for Science Technology and Innovation (NACOSTI) Kenya (see

Appendix I), an additional ethical requirement prior to data collection in Kenya. Informed voluntary consent was sought from all research participants (digital innovators, subject matter experts from industry and academia) throughout the research process. Only anonymised data was published in articles and this thesis document. Briefly, the study ensured to safeguard the rights, privacy, and confidentiality of all research participants.

4.3.5.1 Researcher's Position and Influence on the Study

Post-positivism is cognisant of a researchers' influence in the outcome of a study, due to their own background knowledge. The researcher has over 10 years' experience working with innovators, digital innovation stakeholders, and entrepreneurship and innovation enabler organisations through research and project management roles taken up in ICT research and innovation projects traversing various counties in Kenya. The researcher has also participated in and organised several hackathons funded by agencies such as the UN-Habitat, Microsoft, Oracle, AWS, Equity Bank and Safaricom for local digital innovators in Kenya since 2010. The interpretations of the findings by the researcher may therefore be influenced to a considerable extent by their work experience in Kenya.

4.3.5.2 Dynamics of Researcher and Research Participant Relationship

The researcher was cognisant of their perceived influence especially when interacting with research participants who had less experience in the subject matter under study. The researcher sought to empower all research participants through informed consent forms, transparency, and opportunities for feedback during the long interview process. The anonymity of research participants was guaranteed, which created an open environment for the participants to respond to difficult questions with ease, without fear or favour.

4.4 Chapter Summary

This chapter presents the study's research design approaches employed in data collection and analysis, in line with researchers philosophical and theoretical assumptions. The chapter begins by unpacking philosophical concepts of ontology, epistemology, axiology, and methodology. A comparison of various research paradigms is done against the study's chosen paradigm, that is post-positivism.

This qualitative exploratory study takes on a multiple case study research strategy, where 4 cases (digital innovations) representing structured and unstructured technology innovation are presented in detail. The data collection stage begun with application for ethical approvals from the University of Cape Town, Daystar University in Kenya and a research permit from National Commission for Science, Technology, and Innovation (NACOSTI).

This study approached digital innovation success as a socially constructed phenomenon which could be studied through an exploration of stakeholder views, opinions, and experiences, while allowing for researcher reflexivity. Data triangulation strategies, through use of various data collection methodologies (Patton, 1999), provided for research rigor by alleviating concerns on verifiability and replicability of study outcomes (Shank, 2002) that could emerge on complete reliance on subject accounts as undisputable truth. Specifically, data from semi-structured interviews, document reviews, and media analysis were used to reduce the risk of purely subjective accounts. In addition, during data transcription, the researcher sought the services of an experienced transcription typist, which further eliminated the risk of research subjective accounts of the interview recordings and provided for investigator triangulation (Flick, 2022). A post-positivist research paradigm was followed in this study. Thematic Analysis was conducted on data collected through NVIVO, a Qualitative Data Analysis Software (QDAS). A conceptual framework that is a refinement of the Dorothea Kleine's Choice Framework was used as a lens for data interpretation.

5 FINDINGS

5.1 Introduction

This study sought to unearth what enables and hinders digital innovation success in the Global South. The Conceptual Framework presented in chapter three under Figure 3-4, which is a refinement of the Choice Framework, was used as a tool for analysing the data collected through semi-structured interviews from a purposive sample of 21 research participants from Kenya, document reviews and media analysis. The theoretical lens provided a people-centred approach through which the phenomenon of interest could be studied.

The study views digital innovation success as a socially constructed development outcome that digital innovators and other innovation stakeholders in an ecosystem desire to achieve and/or provide an enabling environment for, through various ‘development’ initiatives. A post-positivist data analysis approach was followed. Kuhn (2012) acknowledges the influence of social aspects in scientific inquiry. In post-positivist research, some concepts are not objectively observable (i.e. observer independent) (Guba & Lincoln, 1994) but may have different but equally valid meanings to the different actors/interviewees/research participants (Crotty, 1998). In post-positivism, a researchers’ interpretation of phenomenon under study is an acceptable contribution to research. The researcher does not approach research as an outsider but an insider. Post-positivism also promotes researcher reflexivity, where a researcher is expected to question or self-evaluate their own world views and assumptions about reality as well as those of the research participants (Finlay, 2002).

The findings presented in this chapter include the outcome of semi-structured interviews conducted with 21 research participants including informants from 4 cases defined in the research methodology chapter, document reviews and media analysis. Thematic analysis was conducted on collected data. The analysis was guided by the conceptual framework (Figure 3-4), which is a refinement of Dorothea Kleine’s Choice Framework (Figure 3-3), and contents of a codebook (see Appendix D) comprising a priori of codes consolidated from the results of a Systematic Literature Review presented in chapter two. These initial codes provided structure and focus, at the beginning of the coding process. The framework and codebook together enabled the researcher to know what to look out for during data analysis. In addition, the researcher allowed new codes to emerge from data. This was seen as important in ensuring that context-based factors were captured from the opinions of the research participants to bring a deeper understanding of the phenomena within the empirical context under study, that is

Kenya. A deductive logical referencing approach was thus majorly followed in this study. This section is structured as follows: a discussion on approach used towards saturation and validity of results, a contextualization of research location, and analysis of findings on research question one and two and concludes with testing of propositions.

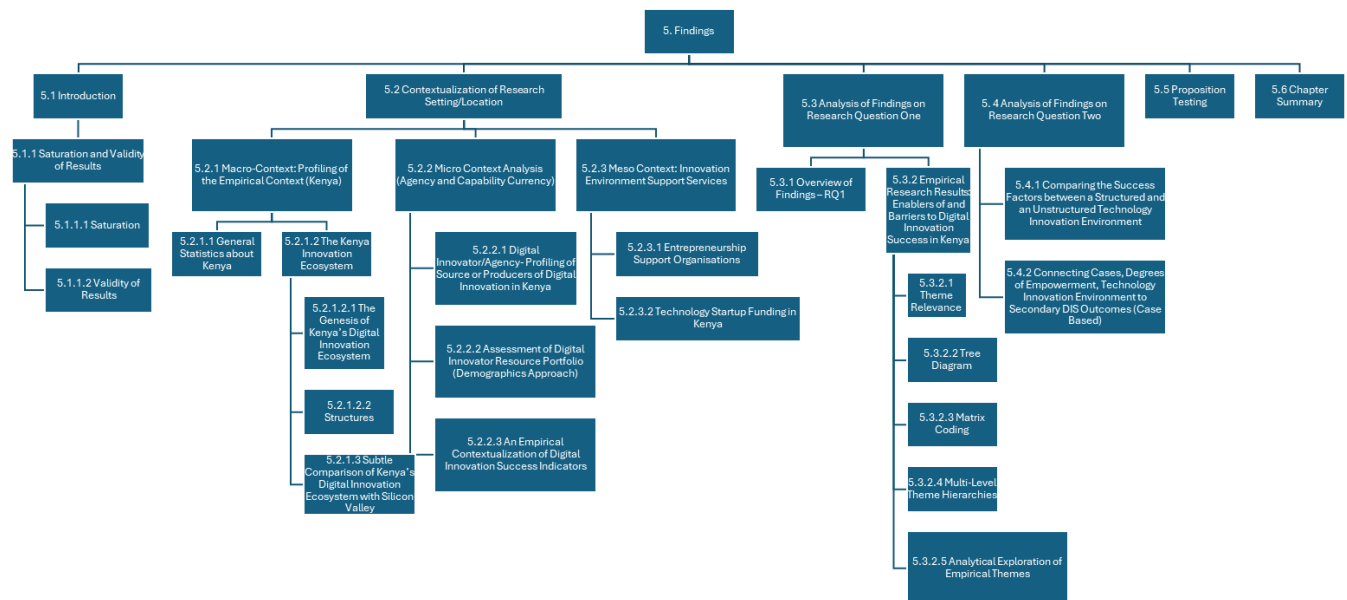


Figure 5-1: Structure of Chapter 5

5.1.1 Saturation and Validity of Results

5.1.1.1 Saturation

As mentioned previously in the research methodology chapter, Ando, Cousins and Young (2014) and (Boyatzis, 1998) note the need to have a prior codebook (see Appendix D) as a starting point to justifying sample size or point of saturation and for validity of results. This study's data collection stage was preceded by a comprehensive systematic literature review process, whose result was an initial codebook (see Appendix D) comprising 49 unique factors that could potentially enable or hinder digital innovation success. The factors were grouped into 10 major groupings or themes as shown in Table 2-6 (refer to literature review section in chapter two). This initial codebook (Appendix D) informed the demographic profile of the research participants, particularly their role.

To identify a “saturation” point – “where no additional information in terms of a higher-level concept and definitions of concepts in a codebook” (Ando, Cousins, & Young, 2014, p. 2), the resulting themes, as reported by the respondents, were compared against the initial codebook (see Appendix D), and any unique factors not in the codebook were recorded and categorised

as context specific factors that enable or hinder digital innovation success in Kenya. These context specific factors are discussed further in succeeding sections of this chapter.

5.1.1.2 Validity of Results

Piekkari, Welch, & Paavilainen (2009, p. 571) note that multiple case studies “between 4 to 10 cases increase the robustness of a finding”. In addition, the use of multiple data collection instruments provides for data triangulation (Patton, 1999), which also contributes to validity of research findings (Guba & Lincoln, 1994; Denzin & Lincoln, 2011).

Method and data triangulation in post-positivist research helps reduce risk of researcher and research participant bias, which contributes to the reliability of the data and replicability of findings (Fossey, Harvey, McDermott, & Davidson, 2002; Shank, 2002). Further, to contribute to validity of results, the researcher carefully selected research participants who are well known thought leaders or subject matter experts on matters digital or technology innovation, incubation, and entrepreneurship in Kenya (Table 5-1). This was important in ensuring an acceptable degree of credibility of respondent feedback. In addition, this also ensured that the quality and "amount of useful information obtained from each research participant" (Morse, 2000, p.) was high, and therefore saturation was reached with 21 respondents. Table 5-1 and Figure 5-7 presents details of the profile of the research participant. Research participant anonymity was ensured by eliminating personally identifiable information such as their names, organisations they work for and more.

Table 5-1: Profile of Study Participants

Research Participant Role	Identification Code	Gender	Years of Experience
Digital Innovator/Technology Start-up Founder	SF1	Male	14
	SF2	Female	10
	SF3	Female	15
	SF4	Male	15
	SF5	Male	8
	SF6	Male	8
	SF7	Male	15
	SF8	Male	15
Incubator/Accelerator/Technology Hub Manager	HM1	Male	20
	HM2	Female	15
	HM3	Male	15
	HM4	Female	10
	HM5	Female	16
Mentor	M1	Male	30+

Research Participant Role	Identification Code	Gender	Years of Experience
	M2	Male	12
Government (Civil Servant)	GOV1	Male	30+
Academia	AC1	Male	12
	AC2	Male	20
Venture Capitalist	VC1	Male	15
Industry	IND1	Female	20
	IND2	Female	12

Note: Some respondents had expertise in more than one area. For instance, one respondent had experience in government, where they continue to serve, as well as academia. The dominant subject matter expertise was considered in estimating the years of experience. Some respondents had international entrepreneurial experience and/or exposure.

Key:

SF1 – Start-up Founder 1

HM1 – Hub Manager 1

M1 – Mentor 1

GOV1 – Government 1

AC1 – Academia 1

VC1 – Venture Capitalist 1

IND1 – Industry 1

The quality of data collected from the 21 research participants provided for saturation and validity of results. Figure 5-2 shows the occupation of the 21 research participants.

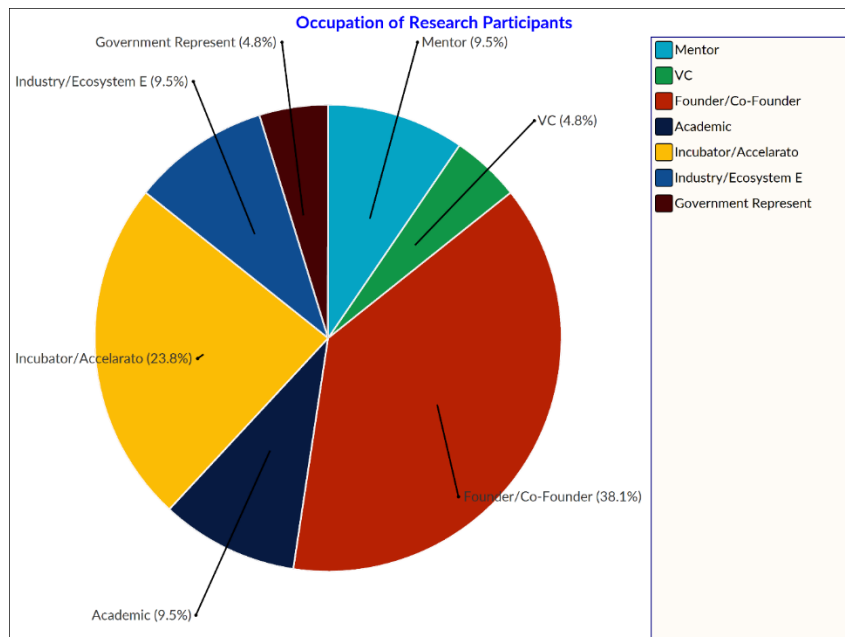


Figure 5-2: Occupation of Research Participants

5.2 Contextualization of Research Setting/Location

Contextualization of IS research is important as it sets the scene for the reader. This study's conceptual framework is a refinement of Dorothea Kleine's Choice Framework. Generic application of the Choice Framework (CF) without consideration of context could lead to misunderstanding of how the CF components interact within that context (Kleine, 2013). This section maps key elements of the research context or the empirical location using the Choice Framework as a lens. The goal is to set the scene by giving a background to the outcomes of analysis of the research findings presented in succeeding sections. In the Choice Framework, context is seen as comprising agency and structure. This section's evaluation of Kenya's innovation context therefore focuses on agency (digital innovators and resources and capability currency (Kleine, 2009)) and structures (institutions and organisations, policies, norms, and digital technology).

5.2.1 Macro-Context: Profiling of the Empirical Context (Kenya)

5.2.1.1 *General Statistics about Kenya*

Kenya, located in East Africa, is reported as one of the largest economies in the Sub-Saharan Africa, making it the economic hub of the East and Central Africa. In 2023, IMF ranked Kenya as the 5th largest economy in Sub-Saharan Africa (International Monetary Fund, 2023). Kenya has positioned itself as a leading innovation hub in East and Central Africa, with Nairobi, its capital city, reported as one of the top tech cities in Africa that hosts many tech hubs, over 97% of the local startups, talented entrepreneurs and is home to regional offices for top global technology companies such as IBM, Google, Microsoft, Amazon and more (Startup Genome, 2023). In 2021, Kenya was reported to have 70 innovation and technology hubs that support digital innovators and entrepreneurs to start, build and grow their technology startups (Lewis, Schneegans and Straza, 2021). Cameroon follows with 28, Uganda 19 and Rwanda 12 technology hubs (Lewis, Schneegans and Straza, 2021, p. 511). Kenya has put commendable efforts in strengthening its innovation ecosystem, through initiatives geared towards upgrading its Science, Technology, and Innovation (STI). Specifically, Kenya has setup several STI support institutions over the years mentioned in later sections of this Chapter.

Kenya is bordered on the West by Uganda, South by Tanzania, North by Ethiopia, North-West by Southern Sudan, North-East by Somalia. On the South-East, the country has a coastline of

the Indian Ocean, through which trade with outside world (Romans, Greeks, Arabs, Chinese among others) was reported from as early as the 4000 B.C. At the beginning of this study, the 2019 Kenya Population and Housing Census reported a population of 47,564,296, which 23,548,056 were males and 24,014,716 were females (Kenya National Bureau of Statistics, 2019). As of 2022, the World Bank reported the population of Kenya as approximately 54 million, with a median age of 19.6 (young population) with 30.7% of the population settled in urban areas.

5.2.1.2 *The Kenya Innovation Ecosystem*

This section profiles the Kenya Innovation Ecosystem (KIE) at the time of data collection and analysis, that is, in 2022/23. The conceptual framework (Figure 3-4), a refinement of the Choice Framework (CF), was used to guide the profiling of the study context, following CF's 'structure' and 'agency' elements such as institutions and organisation, policies and programs, norms, and agency (demographic data profiling) to inform researchers analysis of the phenomenon under study (digital innovation success). The questions below were posed to enable the researcher to map the research context:

SAMPLE – Interview Questions

Q: Who is a digital innovator in Kenya? Paint us a picture or describe the profile of a digital innovator or digital start-up in Kenya.

Q: Describe the digital innovation ecosystem in Kenya? What is it characterised by?

Q: Who are the key players in Kenya's digital innovation ecosystem that support digital start-ups?

Q: How does the digital innovation ecosystem in Kenya compare to that in Silicon Valley and other ideal models in Africa such as the Silicon Cape? What are its unique traits?

In response to these questions, data derived from semi-structured interviews and augmented with data from document reviews and media analysis, informed the profiling of the research context. The data also enabled the researcher to establish key characteristics of Kenya's innovation ecosystem to allow for subtle comparison of the ecosystem with other "ideal models" such as the Silicon Valley, especially because of the christening of Kenya as the "Silicon Savannah". The goal here was to place the emphasis on 'context matters' when evaluating enablers of innovation (Baller, Dutta, & Lanvin, 2016; Kline & Rosenberg, 2010) especially in the Global South (Anderson & Ronteau, 2017; Antarciuc, et al., 2018). As

previously mentioned, following the Choice Framework (CF) components, key thematic areas of interest in defining the context were: agency (of the source or producers of digital innovation that is a Kenyan digital innovator, their inherent traits and resource, structures that constitute the Kenya Innovation Ecosystem particularly governance structures with a focus on institutions and organisations, norms on usage of space and time, information and communications technologies and policy and legislation. Data collection through semi-structured interviews was concluded in September 2022. Information from document reviews was included to compliment and fact check research participants' responses. The feedback is summarised in the succeeding paragraphs in this section.

5.2.1.2.1 The Genesis of Kenya's Digital Innovation Ecosystem

Kenya's Digital Innovation Ecosystem is reported to have been pioneered by the rise of innovation Hubs and accelerators such as iHub, Growth Africa and Nailab, and University technology incubation centres such as the University of Nairobi's C4DLab and Strathmore University @iBizAfrica between the years 2006 and 2011. One respondent noted that as of 2022, Kenya possibly had the *"largest concentration of hubs within the African continent."* [HM1]. This claim is confirmed by a UNESCO report that quotes Kenya to have "the most tech hubs in Central and East Africa (70), followed by Cameroon (28), Uganda (19) and Rwanda (12)" (Lewis, Schneegans and Straza, 2021, p. 511).

Innovation activities driven by telecommunications companies such as Safaricom were also reported as key contributors to the rise and early growth of Kenya's digital innovation ecosystem. Mobile phone and mobile internet penetration were reported as key catalysts of initial innovation activities in Kenya. Kenya also prides itself in having the largest under-sea fibre optic cable in East and Central Africa, an initiative spearheaded by Telecommunication Service Providers Association of Kenya (Tespoke), which is "a professional, non-profit organisation representing the interests of ISPs and other telecommunication service providers in Kenya" (Tespoke, 2022), through the Kenya Internet Exchange Program (KIXP), "the facility which keeps Kenyan Internet traffic in Kenya" (Tespoke, 2022). Kenya is reported to have 6 submarine fibre cables namely: The East African Marine System (TEAMS), which was first to arrive in Kenya in 2009, the Eastern African Submarine Cable System (EASsy), Lion2, Djibouti Africa Regional Express 1 (DARE 1) and lastly the Peace Cable launched in March 2022. These were reported by research participants as noteworthy government initiatives to

enable access to affordable high-speed internet towards development of a knowledge-based digital economy, driven by digital innovations.

“In Kenya, we have, I think by the end of this year (2022) we will be having 6-7 under-sea Fibre Optic Cable coming to Nairobi. Why? Because the government is making sure that connectivity and Internet speed is accessible to many...If you look at our Internet penetration for Kenya, I think it is the highest in the continent. And most of it is by the mobile phone.” [HM3]

Mobile network penetration is said to have led to the proliferation of digital innovations in Kenya, most of which were FinTech solutions. In the last quarter of 2023, the Communications Authority of Kenya (CA) reported a mobile penetration rate of 132.7% (CA, 2023). CA (2023) reported a mobile money subscription rate of 75.2%, which translates to 38.1 million mobile money subscriptions. During the study, M-pesa, a mobile money banking solution, was reported by most respondents as the pioneer of the wave of FinTech based digital solutions, with other innovations building on its APIs to deliver financial services to a previously unbanked population, through mobile applications.

“I think the biggest majority of all our innovations is around the Fintech space. This is being spurred by the high cost of money transfer from this country to our neighbouring countries, even within the African continent. We also have a very big rise in freelancers and one of the biggest challenges these freelancers face is how do they can get paid for online jobs. So, we (Kenya) are having a lot of activity around the money transfer area.” [SF7]

“Of course, it came with the disruption, and the pieces that came with M-pesa, and the fact that we could digitize money and move it around in our mobile phones.” [VC1]

5.2.1.2.2 Structures

Institutions and Organisations

The ‘structure’ element is a central concept in Kleine’s Choice Framework, which explains the context within which human development occurs. Structure refers to the social, economic, and political systems that shape and constrain individual and collective actions (Kleine, 2013). The ‘structure’ element recognises that individuals and communities are not operating in a vacuum but are embedded in complex social systems that can either enable or constrain their choices and actions (Alsop and Heinsohn, 2005). This section focuses on formal governance structures in Kenya, particularly those that prioritise and aim to advance Science, Technology, and Innovation within the country. These structures play a pivotal role in shaping and influencing digital innovation activities across Kenya.

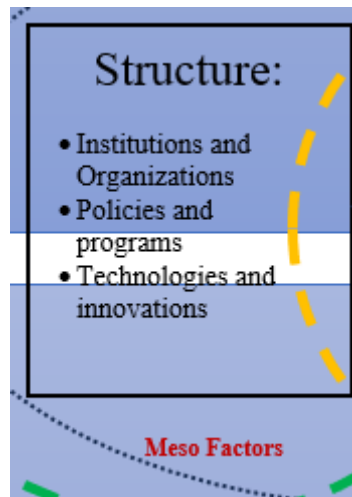


Figure 5-3: Structure Component. Extracted from the Conceptual Framework based on the Choice Framework

Initial innovation activities in Kenya are reported to have begun in 1947, with the setup of the Central Laboratory by the colonial government. The Lab was managed by the Kenya Industrial Management Board (KIMBO). It was setup to support industrialisation efforts in Kenya, “through innovation, adoption and adaptation and transfer of technologies” (KIRDI, 2022). It was later rebranded to the East African Industrial Research Organisation (EAIRO), which was then disbanded after the fallout of the East African Community, leading to the birth of the Kenya Industrial Research and Development Institute (KIRDI) in 1979, formed via an Act of Parliament (KIRDI, 2022). To support rural industrialisation, the Kenya Industrial Estates (KIE) was established in 1967 just after Kenya gained Independence. KIE’s model of operation is reported to be like that of a business incubator, whose initial goal was to provide physical space and financing to SME’s. As reported on their website, KIE has trained over 4,000 SMEs, supported the setup of at least 35 incubators and science perks nationwide and financed SMEs to the tune of Ksh. 20 million (KIE, 2022). Other noteworthy industrialisation support institutions include, the Industrial and Commercial Development Corporation (ICDC) established in 1954 and Industrial Development Bank in 1973 to support local, job creating business ventures via financial support. The industrialisation and innovation promise of these structures are reported to have hit a roadblock between the early 80’s and late 90’s due to the Structural Adjustment Programs. Even with the establishment of other support structures such as the Kenya Kountry Business Incubator (Kekobi) in 2001 and Kenya Industrial Property Institute (KIPI) in 2022, tangible technology-based innovation by Kenyans for Kenyans began to emerge from 2008, with the establishment of innovation hubs such as iHub.

In 2022, it was reported that Kenya had over 200 innovation and technology hubs (UNDP, 2022). Figure 5-4 lists some hubs in Kenya as presented in a UNDP (2022) report on *Mapping of the Kenyan Innovation Ecosystem - Key Findings, Conclusions and Recommendations*.

Hubs	Incubators	Accelerator	Co-working spaces
1. Makueni Innovation Hub: Makueni 2. Mashinani Hub: Nyamira 3. Mt. Kenya Hub (MHub): Nyeri 4. iHub: Nairobi 5. Pawa254: Nairobi 6. Rift Valley Innovation Center: Baringo 7. Ubunifu Hub: Nakuru 8. Eldohub: Usain Gishu 9. Lake Hub: Kisumu 10. Wise Hub: Kisumu 11. Border Hub: Busia 12. Dlab Hub: Uasin Gishu 13. Circular Innovation (CIH): Nairobi 14. BitHub: Nairobi	1. Startup Lions- Turkana 2. Coelib Center- Nakuru 3. Sote Hub (Voi): Taita Taveta 4. Mt. Kenya Hub (MHub) 5. Innovation Incubation & Entrepreneurship Center (IIEC): Nairobi 6. The Entrepreneurship Hub: Nairobi 7. GrowthHub: Nairobi 8. IBizAfrica (Strathmore University): Nairobi 9. Nallab: Nairobi 10. Cisco EDGE Incubation Centre (UoN): Nairobi 11. Chandaria BII (KU)- Nairobi 12. Kenya Country Business Incubators (KeKoBi)	1. Ubunifu Hub: Machakos 2. Bay Hub: Homa Bay 3. Pangea Accelerator: Nairobi 4. The Entrepreneurs Hub: Nairobi 5. Growth Hub: Nairobi 6. mLab East Africa: Nairobi 7. Sinapis Group: Nairobi 8. Mara Launchpad Incubation Center	1. Nakuru Box: Nakuru 2. Kikao64: Uasin Gishu 3. Mt. Kenya Hub (MHub): Nyeri 4. Nomad Lounges Limited: Nairobi 5. Nairobi Garage: Nairobi 6. Mombasa Works: Mombasa 7. Nomadic Hub: Nairobi 8. Totosci Holdings Ltd: Kirinyaga 9. Coast Team Innovators (CTI): Mombasa 10. Workable Nairobi: Nairobi 11. IKIGAI: Nairobi 12. The Twig: Nairobi
		Marker-Spaces 1. Gearbox: Nairobi 2. KIRDI 3. Close the Gap 4. Constituency Industrial Development Centers	

Figure 5-4: ESOs in Kenya as of 2022. *Note.* Reprinted from “Mapping of the Kenyan Innovation Ecosystem”, by United Nations Development Programme [UNDP], (2022).

The National Research Fund (NRF), the National Commission for Science, Technology, and Innovation (NACOSTI), the Ministry of ICT, Innovation and Telecommunications, the Kenya National Innovation Agency (KENIA) are among the key institutions that drive the Science, Technology, and Innovation agenda of the Government, towards achievement of knowledge based digital economy, and transformation of all sectors through technology. These institutions run various innovation programs and initiatives. The Ministry of ICT, Innovation and Telecommunications in particular, runs programs such as the Ajira Digital Jobs Program, whose goal is to equip young people with digital skills needed to participate in the online gig economy and earn a living. These institutions acknowledge resourcing challenges, which limit their reach to a larger population. Awareness creation on available programs, how to access or participate in these programs remains a challenge.

VCs that have supported at least two startups in Kenya, as per a 2023 website article on xyzlab.com include: Factor[e] Ventures, Savannah Fund, Acumen Fund, Shaka Ventures, Chandaria Capital, Global Innovation Fund, Cornerstone Enterprises, Zephyr Acorn, AFZA Capital, Yunus Social Business, Goodwell, Novastar Ventures, TLcom Capital and Lateral

Frontiers (Liman, 2023). The article also lists the following angel investors in Kenya, who invest either individual or as a network of investors on a startup: The Nairobi Business Angel Network, African Business Angel Network (ABAN), Kenya Investment Network, Viktoria Business Angels Network (VBAN), and Rising Tide Africa (Liman, 2023). Other key stakeholders that contribute to Kenya's innovation ecosystem include: the innovators who include both individuals and institutions such as academia and research centres, government, banks, and ecosystem support organisations such as business incubators, accelerators, co-working spaces, makerspaces, and technology innovation hubs (private and government affiliates).

Formal and Informal Norms

Norms on Usage of Time and Space

This section explores how formal and informal norms on usage of time and space, elements that are part of the 'structure' component of the Choice Framework, may affect digital innovation success. The formative years of the Kenya Innovation Ecosystem were driven by Fintech digital solutions, which was attributed to increased mobile money penetration rate resulting from increased mobile subscriptions at that time. During that time, in addition to a myriad of other social economic opportunities and challenges, a large portion of the population was unbanked.

"We (Kenya) are very vibrant in innovation creation because the space is there, the problem is well understood, and there is freedom to try out things. They(innovators) are young and vibrant (the ones who are trying out things) and they may not necessarily need a lot of capital." [AC2]

The brick-and-mortar banking model was inaccessible to many due to the stringent requirements needed to open and run a bank account. Respondent *IND1* highlighted the challenges of bank financing: *"So, first, you are dealing with a system that is super regulated. So, the frustration of getting money out of a structured bank is a barrier."* The low literacy levels of the unbanked at that time also contributed to the rise of fintech digital solutions, that did not require heavy documentation and filling in of long forms written in the English language. These factors created a new market, with mobile-based banking solutions gaining prevalence at that time. It is no surprise that fintech digital solutions remain the most funded and highest performing sub-sector in Sub-Saharan Africa, particularly in Nairobi, Kenya, which is globally known for Fintech in the startup scene (Startup Genome, 2023).

“I started off as a banker. And so, what really pushed the idea of 'Stawika' (from the name 'Strength') was the disruption and the pieces that came with M-pesa and the fact that we could digitise money and move it around in our mobile phones. So, giving it a foundation, I will go back to smartphone penetration in Africa, case in point Kenya as a hotspot for fintech solutions. So, we looked at ourselves in the bank, a brick-and-mortar model, and we were looking at literally being constrained to money in a particular system and the many people we were sending away because of stringent bank financing requirements. This brings me to major enabler of innovation success, which is new markets.” [IND1]

Digital innovation activities were therefore led by, or in co-creation with, telecommunications companies, whose subscribers were seen as core users of such digital innovation solutions. These telecommunications companies created ‘spaces’ such as coding bootcamps, hackathons and ICT competitions, which were seen as launch pads for creating successful digital innovations at that time. Their APIs also made innovation in fintech solutions more accessible to both tech and non-tech entrepreneurs.

“I founded one of the projects that I did, called Startup P (real name hidden) ...which was a way for Mobile Money App X [real name hidden] users in Kenya to access their Mobile Money App X statements. At that time, Mobile Money App X did not have a way for people to get statements. There was no communication from Mobile Money App X, either by e-mail or other means for clients to get their statements. So, I came up with an innovative application that could fetch that information from a user device (mobile phones). I had focused on Android platform, being the major mobile device Operating System used by majority of Kenyans at that time. And it was a very interesting application. We got so many people using it. And that is how I started my journey of providing financial inclusion services.” [SF8]

“Startup M (real name hidden), which recently raised \$40 million dollars, Telco B (real name hidden) invested some money in them.” [SF4]

As technology and innovation hubs gained prevalence, these spaces were also embraced by many digital innovators and entrepreneurs in Kenya in early years between 2006 to 2009. The hubs were seen as oracles of knowledge on innovation that one could tap into to build successful technology startups, a new concept at that time. In later years, after 2009, the industry began to actively promote intrapreneurship and innovation activities, which gave rise to more experienced digital innovators. This calibre of innovators believed in their capability to create successful businesses that leveraged technology independently or rather outside of a structured technology innovation environment. Their resource portfolio (age, educational resources, financial resources, psychological resources, time) worked in their favour, and they could therefore confidently resign from their well-paying 9 to 5 white-collar jobs to start a company of their own.

“I mean where the idea came from is a group of bankers that have been in the banking industry. I started off as a banker. But for me personally working in that bank queue, being a banker in that building and looking at just how much time it takes to serve customers, drove us to think of a better way of providing financial services. So, we decided to recreate the credit process.” [IND1]

“...and a good case in point is Mr. X (name hidden), founder of XYZ Tech Startup (name hidden), who quit a high paying job, a C-level job in Coca Cola, to set up another logistics driven company called XYZ. And for an investor, that is a yes, because I am looking at him and thinking, this guy clearly knows his stuff. He can mobilise some capital to test his hypothesis in the marketplace.” HM3]

In Kenya, the norms around pursuing a career as a technology startup owner is yet to be appreciated as a credible profession that could earn one a living, especially by parents. This problem is common with fresh graduates, who are expected to get “real jobs”, particularly white-collar office jobs. Parents in Kenya still hold professions such as being a doctor, lawyer, engineer, architect, and others alike in higher regard compared to being a digital innovator. Getting the financial support of parents to actualise an idea into a commercialisable digital innovation is a daunting task. This could be attributed to the startup economy not being mainstream as noted by one research participant:

“But I also think the startup economy in Kenya has not gone mainstream! If I, myself, I have a child that is in university, and she or he has graduated, I cannot give them the amount of money I was paying for tuition to go start a business of their own.” [HM3]

Also, in Kenya, they are very few known success stories of digital innovators, which further raises more suspicion on the financial stability of digital innovators. One research participant noted that:

“...but what is lacking is a success story of how a small business, started by two or three people (Kenyans), became a multibillion company. That is the missing spark. And this M-pesa story, as a startup, is overshadowing local stories where people are solving real problems, and those solutions could become big businesses in future.” [SF4]

In conclusion, the norms around starting technology startups that address local problems that would otherwise be seen to lie within the mandate of the local or central government can be seen as a contributing factor the rise of digital innovations in several sectors in Kenya.

“But our set up as a country has provided an opportunity for the private citizens to see how best they can be able to solve problems. This is because we are under a government that does not have the capacity to solve majority of the issues its citizens are experiencing.” [HM2]

Information and Communications Technologies (ICTs)

1. Access to ICTs

Initial digital innovation activities in Kenya between the period 2006 to 2010 are reported to have been spearheaded by the mobile network penetration. The decreasing costs of mobile handsets at that time might have contributed to the rapid growth of mobile network penetration in Kenya. Before this wave, the mobile phone (feature phones) was seen as an item accessible to only the elite in Kenya because of how expensive they were. Musembi (2015) reports that a single mobile handset was valued at approximately USD \$3995 in 1992, when mobile phone services were first introduced in Kenya. In 1999, seven years later, only 15,000 subscriptions had been reported for the mobile phone services in the entire country (Musembi, 2015). A comparison of the subscriptions against the population was not possible due to lack of official statistics on the population of Kenya in 1999, as the process was marred with political and ethnic challenges. However, in the same year, Safaricom, a mobile telecommunications company in Kenya, projected a subscriber base of 3 million by 2020 (Musembi, 2015), which they surpassed with a record of over 19 million subscribers in 2013 (Communications Authority of Kenya, 2013). The other three prominent service providers at that time recorded a total of 11 million subscribers in the same period (Communications Authority of Kenya, 2013). Musembi (2015, p.2) notes that the liberalisation of the telecommunications industry in 1998 brought about an Act of Parliament in Kenya may have contributed to the increased adoption of mobile technology services at that time. Exact figures on total national mobile subscriptions in Kenya remain a challenge as one individual may own more than one mobile handset each with its unique identifier or SIM toolkit. Alternatively, it is common practice or norm in Africa to have a single mobile handset shared by one or more households (especially rural areas) or more than one person. In summary, in Kenya, the mobile handset has emerged as more than just a communication tool to a service delivery tool in Kenya as witnessed by the continued development of mobile-based digital solutions.

In regard to Internet access via Wireless Networks, a digital innovator located within urban and semi-urban areas in Kenya will most likely have access to the Internet, either through mobile data bundles using a smartphone, or Wi-Fi connection available in social spaces open to the public such as shopping malls, restaurants, hotels, and formal spaces such as schools, co-working spaces/Incubators/Innovation Hubs or Home Fibre Wi-Fi connection available in well populated residential areas.

“I think by the end of this year (2022), we will probably be having 6-7 under-sea Fibre Optic Cable coming to Nairobi. Why? Because the government is making sure that connectivity,

Internet speed, is accessible to many. If you look at our Internet penetration for Kenya, I think it is the highest in the continent (Africa). And most of it is by mobile phone. But what I can tell you is, there is a consistent effort to invest in the infrastructure capability in Kenya.” [HM3]

There have been other initiatives geared towards increasing access to ICTs for the youth such as the One-to-one Laptop Project of 2013 for Standard One pupils in public Primary schools. This project suffered major criticisms and challenges, limiting its actualisation.

2. Affordability of ICTs

Affordability of ICTs here is presented based on the minimum monthly wage of an unskilled worker in Kenya. In 1999 for instance, the Kenya National Bureau of Statistics (KNBS), in its Economic Survey report of 2004, unskilled workers’ minimum monthly wage rate was approximately Ksh. 2, 886. Such individuals therefore could not possibly afford the “cheapest” mobile handset valued at Ksh. 300,000.00 (Musembi, 2013). In succeeding years, the wage rate increased, while price of mobile handsets reduced, which may have empowered more people to purchase a basic feature phone or a smartphone depending on financial capability. As of July 2022, the minimum monthly wage rate for unskilled workers in Kenyan cities (Nairobi, Mombasa, Kisumu and Nakuru) was reported to be at Ksh. 15, 201.65 (Central Organisation of Trade Unions, Kenya (COTU-Kenya), 2022). In the same year, the cheapest feature phone price range was between Ksh. 3,100 to 11,200 (Price in Kenya, 2022), while smartphone prices ranged between Ksh. 5,000 to Ksh. 30,000/- (Savostore, 2022). Also, it is possible that COVID-19, which contributed to job loss for many skilled and non-skilled workers, may have impacted the purchasing power of Kenyans negatively. Empirical data on the impact of COVID-19 on affordability of ICTs in Kenya is recommended to qualify this observation made by the researcher, a resident and citizen of Kenya.

It is common in Kenya for university students, who form a considerable percentage of digital innovation community, to hack into accessible WI-FI network within the vicinity of their hostels or spaces of residence. This could be because of the high cost of installation and monthly charges that one would need to pay for their own private WI-FI connection. In 2023, Safaricom, a prominent home fibre or WI-FI network connection provider in Kenya, would charge between Ksh. 2,900 to Kshs. 12,499 (which was approximately USD \$18.24 to \$78.61 then) for their WI-FI home fibre packages (Figure 5-5). This cost is considerably high for a university student with little to no disposable income, who relies on a weekly allowance of up to Ksh. 500 (USD \$3.14) from a low-income parent/guardian.

In addition, most institutions of higher learning, particularly public institutions, Wi-Fi connection range is limited to facilities such as lecture halls, seminar rooms, computer labs, library and meal serving areas. Wi-Fi accesses for students living in school hostels is limited or unstable. Those living outside the school face even greater access challenges as most providers of external student accommodation do not consider the need for a strong Wi-Fi connection. It is until recently, 2022, that Kenya has seen the rise of modern student accommodations such as Qwetu and Qejani, who provide dedicated strong Wi-Fi connection among other services for its dwellers.

In a bid to increase access, telecommunications companies in Kenya, now provide lower rates for data (mobile Internet access) bundles based on parameters such as a subscriber's age, historical data on 'average basket value' or 'data and airtime' purchase value in a single transaction. The target audience that often benefits from such incentives are most likely young and/or economically challenged subscribers, who form a considerable percentage of the digital innovation community in Kenya.

Package	Speed	Monthly Cost	Validity Period
Bronze	5mbps	2900/-	30 Days
Bronze Plus	5mbps	3400/-	30 Days
Silver	10mbps	3999/-	30 Days
Silver Plus	10mbps	4999/-	30 Days
Gold	20mbps	5699/-	30 Days
Gold Plus	20mbps	6699/-	30 Days
Diamond	40mbps	11499/-	30 Days
Diamond Plus	40mbps	12499/-	30 Days

Figure 5-5: Safaricom Home Fibre WI-FI Prices 2023.

Note. Reprinted from Safaricom Website <https://www.safaricom.co.ke/media-center-landing/frequently-asked-questions/safaricom-home-fibres>.

Accessibility to technology tools such as personal computers remain a challenge in Kenya. This could be because of the cost of purchase, which ranges between USD \$ 400 to USD \$

1500 for a good laptop that meets the system requirements needed to develop software and run a company's day-to-day operations for a technology startup business. In 2010, the Government of Kenya, through the then Ministry of Information and Communication, rolled out a laptop financing initiative dubbed 'Wezesha Laptop Project' for students enrolled in recognised institutions of higher learning in Kenya. 'Wezesha' is a Swahili word that means "to enable". The initiative sought to not only increase access to technology through affordability (with students receiving rebates of up to 15 to 33% for each purchase from a verified vendor) but also promote digital skills, innovation, and entrepreneurship. Access to a personal laptop was seen as a key catalyst for student led innovation and entrepreneurial venture building. This program, whose goal was to offer subsidised laptops to 15,667 (ICT Works, 2010) Kenyan university students, was undoubtedly instrumental in early student led innovation activities in Kenya.

Moving to affordability of other software tools and platforms needed to develop a technology solution, open-source tools were reported as the first choice for digital innovators in Kenya who were just starting out. Nielsen, Reisch, & Thogersen (2016) points out that ease of access to digital resources, such as open data, open sources tools, platforms and communities may enable digital innovation/entrepreneurship success. In Kenya, access to open-source tools was reported as both an enabler and a barrier. The barrier aspect was reported due to scalability challenges of open-source tools and platforms, especially as the startup operations grew. This is explained further in later sections under sub-section 5.3.

3. Skills needed for ICTs.

Research on top ICT skills for the future includes technical skills such as AI and Big Data analytics, machine learning, design and user experience, cybersecurity, networks, programming, and general technological literacy (The World Economic Forum, 2023). The report further lists critical thinking, creativity, curiosity, and lifelong learning as among core soft skills that will be highly sought after in any sector or economy in future. Kenya is reported to have a young technology savvy population, with talented entrepreneurs (Startup Genome, 2023). Most research participants reported that the population of Kenya comprises of a young (persons between ages 18 to 35, who comprise about 75% of the population as at 2022), vibrant, well-educated mass that is technologically savvy. This implies that a large portion of the

Kenyan population have (or can build) capability (agency, through possession of Educational Resources (ER) (Kleine, 2013)) for appreciation and appropriation of existing and new digital solutions.

“... also, our end users are very literate people. The solution that we developed became very easy. We didn't have to explain much, we didn't have to translate. We just gave out the USSD code and users would figure their way in and out of the application. As much as we developed user guides and all that, they were not in demand, and neither would we get so many queries about the solution. We think that the literacy levels of Kenyans did also help there.” [SF8]

The Government of Kenya has initiated and continues to roll-out initiatives geared towards empowering the youth, who comprise majority of the population in Kenya, with digital skills. Examples of such initiatives include but not limited to the Ajira Digital Skills Program, Jitume ICT Labs, an initiative launched in 2023 to provide access to computers, internet, and digital technologies per region, and the Kenya National Digital Master Plan 2022-2023, whose core objective is to upskill more than one million Kenyans with digital skills needed to actively participate in a digital economy. Challenges in successful implementation of these initiatives remain due to limited resources and poor management.

During the 2022 Jamuhuri Day (Independence Day) celebrations, the Government of Kenya made commitments towards creating infrastructure and enabling environment for ICTs and technology innovation to build a progressive and inclusive digital economy. One area they aim to focus on is free training on ICTs for youth via partnership with Arizona University.

4. Policy and Regulation

In the Choice Framework, policy and regulation are defined as structures instituted by individuals to facilitate achievement of choice, action, or agency. Responses from semi-structured interviews revealed the following policies and regulations as key enablers and/or barriers towards achievement of digital innovation success by technology startups in Kenya.

First, several research participants mentioned the Startup Bill of 2021, most of whom believed that the benefit of the bill was yet to be realised at the time of data collection. One research participant stated that the bill was disconnected and misaligned with the nature of technology startup business operation and digital innovation management in general. Other research participants were of the view that legislation of innovation, or the lack thereof, could have both positive and negative effects:

“The lack of legislation is a good thing for innovation. The lack of ‘supporting’ legislation may be wrong and may be bad in the long term.” [AC2]

“Oh, they are (referring to the Government of Kenya) ‘coming up with a new law’, to regulate innovation! It will be the first time in the history of mankind that somebody has decided to legislate innovation!” [M1]

“Innovation has always gone ahead of regulation. So, that also gives room for the innovators to figure out quickly where the mistakes, the wins and the don’ts are, before they are regulated. So that has been of great support as it has facilitated the speed of innovation in Kenya.” [HM2]

“...the other one that is in Parliament is the Startup Bill. Because we want first the government to recognise that there is something called a startup. It is not the same as an SME. The SME is more traditional, while startup is dynamic. It is using technology to rapidly scale and enhance its value proposition.” [IND2]

The Industrial Property Act of 2001, the Science, Technology, and Innovation (STI) Act of 2013, the STI Policy of 2020 and Kenya’s Digital Economy Blueprint of 2021, whose core purpose is to transform Kenya into “a nation where every citizen, enterprise and organisation has digital access and the capability to participate and thrive in the digital economy” (Republic of Kenya, 2019), were touched on as are noteworthy legislations that continue to impact Kenya’s digital innovation ecosystem in many ways, most often positively. Generally, government policy and regulation of technology startup innovation was reported to be at nascent stages. Research participants noted that technology startups have been excluded by extant policies and government regulation as the start-up model is often confused for the traditional Micro-Small and Medium Enterprises (MSMEs) business model. Also, the respondents noted that because of how stringent tax policies are in Kenya, a lot of digital enterprises are domiciled in other markets.

“It is unfortunate that because of how stringent our tax policies are in Kenya; a lot of businesses are domiciled in other markets. So, most startups right now, or rather the trend in Africa, is to domicile your Company in Delaware. This is because Delaware has a lot of tax incentives, which favour startup businesses. This is because no matter how much money a startup has raised, the money is not supposed to be ‘burned’ to create the business.” [SF4]

The Government of Kenya is setting up a smart city called Konza Technopolis, a “flagship project” under Kenya Vision 2030, to build up on the knowledge and innovation capital of Kenya. The expected outcome of the Konza project has been and still is the transformation of Kenya into a knowledge-based economy with a “vibrant innovation ecosystem” (Konza, 2019).

Kenya is a member of the African Continental Free Trade Area (AfCFTA). The AfCFTA is reported as the “largest free trade area by population covering 1.3 billion people with a combined GDP of \$ 3 trillion” (International Monetary Fund, 2023, p.13), is expected to have positive impact on digital innovation activities in Kenya. The envisioned reduction in border restrictions could potential open-up technology startups to larger markets. Also, the envisioned increased access to cross-border financing could address the finance access challenges reported by research participants.

“So, remember Kenya is part of the East African Community (EAC) community. So then how can we start having those regional markets discussions. Right now, there's something on there after African Continental Free Trade Area (AfCFTA). So, how can Kenya become competitive in terms of even having those discussions of the free trade Africa, free trade agreement? How can we start selling goods across different countries because also that will help them and scale and even now have a wider customer base, and they will be able to generate even more money.”
[HM3]

5.2.1.3 Subtle Comparison of Kenya’s Digital Innovation Ecosystem with Silicon Valley

According to Kleine (2013), individuals achieve desired development outcomes by using their agency to engage with social structures developed by individuals themselves. Innovation environments such as incubators, accelerators, technology innovation hubs, makerspaces and other related spaces are examples of structures created by individuals to spur and support innovation activities within an ecosystem. The conceptual framework presented in chapter 3 adds a new element, the Resource Dependency Theory (RDT), to Dorothea Kleine’s interpretation of the relationship between ‘agency’ and ‘structure’ in the Choice Framework. RDT can help identify resources that are most critical to digital innovation success, such as funding, talent, and partnerships. By understanding these dependencies digital innovators and startups can develop strategies to manage them and mitigate the risks of resource constraints. It can also help identify strategic alliances that can be formed with other companies or stakeholders to access critical resources. These alliances can be used to leverage resources that would otherwise be too expensive or difficult to acquire on their own, particularly innovators operating in an unstructured innovation environment. Briefly, in a resource-constrained environment such as a developing country context, the Resource Dependency Theory (RDT) can play a moderating role in managing the interaction between agency and structure components towards creating an enabling environment for digital innovation success.

A 2023 Global Startup Ecosystem report ranks Silicon Valley as the No.1 startup ecosystem, followed by New York and London who both hold second position globally. The report noted that there were no innovative ecosystems from Sub-Saharan Africa in the top 30+ positions. Cape Town was recognised as part of the top 100 emerging ecosystems (Startup Genome, 2023). During this study's data collection stage, most research participants profiled the Kenya innovation or startup ecosystem as nascent, though more vibrant than that of its neighbours. One research participant noted that *"the startup economy in Kenya has not yet gone mainstream"* [HM3] as is the case in Silicon Valley and Silicon Cape (South Africa). Further, the research participant added that venture building is for the privileged population. Majority of digital innovators in Kenya hail from underprivileged backgrounds. Silicon Valley on the other hand was noted to be "spoilt with funding".

"But when I compare Silicon Valley, I will say those people are spoilt. Those people are recycling money around speculation; speculation is not bad. I mean, that is what the forex, not forex, stock market is all about." [HM2]

"Most of our young people their parents have no money to support them. They do not have resources. The Silicon Valley and even Silicon Cape where I have been, you find a lot more mzungus (people of White ethnicity), they have had some support. Here (in Kenya) you can find somebody who is living in Kibera (largest slum in East and Central Africa) comes daily to some co-working space, they do not even have transport, and I used to give fare to some of them at IHUB whenever they came to IHUB. Yeah, in terms of background there's a huge difference". [GOV1]

"...we're still at the beginning levels where Europe and the Silicon Valley were." [HM2]

For African founders to access foreign investment, most respondents noted that the ability to speak the language of the foreign investors when pitching or having a foreign co-founder could potentially increase chances of funding acquisition. One respondent referred to such funding as "white capital", a new concept that academic researchers are beginning to explore.

"Because if you have a team of founders that are mixed, that I think we have had discussions around foreign founders, and how there is clearly a track record with them raising more money. Why is that? Perhaps there is need to look a lot deeper than to say it is foreign founders, it is foreign founders from certain countries. Americans are way more likely than Europeans to raise money. If we look at it, it is not necessarily a gender issue there. Perhaps male versus female does not really play the role. American, white founders for sure there is a difference." [HM1]

“We're not yet spoilt but we are now starting to raise bigger tickets. But I would like to see that more African founders being respected and that they are also given the room to continue growing...” [HM2]

“That's how you get mzungus (persons of white ethnicity), they perfect, and they go look for money from Silicon Valley through their network and they get it. I have been saying it is not a problem when mzungus get money and we do not. But there is a whole, you know, every university now is doing research on white capital, you know...and what not...” [GOV1]

Another challenge reported as a barrier towards VC funding from abroad to local startups, it the belief that the Kenyan market is not large enough for a tech startup to build a billion-dollar business. One research participant commented that:

“You know, one of the biggest problems with the raising funds from VC firms from you know, from the US, Silicon Valley and the rest is that they strongly believe, or rather they have this thesis that the Kenyan market is too small. Even if you are running an MPESA, MPESA is already making a billion dollars a year, right? But if we, if you are running a product exactly like M-pesa, it is almost impossible to ever convince them that the Kenyan market alone is big enough. So, most of them turn down a lot of startups because they think they are just focusing on Kenya, so it is like to raise funds from them you need to have presence at least in Nigeria or you know other key markets that they believe will give you a bigger market. So, I think it is more just slowly working on that narrative. The Kenyan market depending on the type of business that you are running, you could build a billion-dollar company right here (Kenya). MPESA itself is a billion-dollar product right here (Kenya)” [SF6]

Moving to successful exits and pivoting, research participants reported that as a challenge, as very few technology startups manage to pivot or exist successfully in Kenya compared to other ideal models such as the Silicon Valley. This in turn reduces available local funding options for homegrown solutions.

“A little bit missing, perhaps that we also would love to have seen more successful exits where tech entrepreneurs exit, and they exit with enough money to then start reinvesting into the next generation. I do not think we are seeing that to the extent that we needed, and I think this is a problem. Western ecosystems have been able to do very well here. Because the best people to invest often into the next generation are the ones that came before.” [HM1]

“Within our Kenyan context, there is this whole idea once you get funding, you have made it and what you are seeing is majority of the guys are getting funding and then there after they fizzle out.” [SF7]

“Most successful tech startups in Kenya are financed by foreigners, you would find all these leading brands are having some roots in foreign land.”. [SF8]

Kenya's positioning as an innovation hub was attributed to "a lot of hype". One respondent described Kenya's innovation ecosystem as an "ego system". A UNESCO report published in 2021, however, acknowledges Kenya as an innovation hub that houses 70 technology hubs, largest number than any other country in East and Central Africa. In 2022, it was reported that Kenya had over 200 innovation and technology hubs (UNDP, 2022). Such positioning has been seen to have positive impact, particularly influencing several global technology giants such as IBM, which established one of two of its research centres in Africa, in Kenya (Lewis, Schneegans and Straza, 2021). The other one is based in South Africa. The attraction of such foreign global technology giants could imply the position of Kenya as leading innovation hub in the region is more than just "hype". Still, some research participants did not agree.

"A lot of hype, unfortunately. I prefer to call it the Kenyan "ego system" as well as the "ecosystem", where a lot of people sit in a room and just listen to each other patting each other on the back. We lost the opportunity to be truly the leading technology destination for Africa when we allowed it to be a grant driven initiative. And that is why today, Nigeria and South Africa are moving in leaps and bounds, and we are playing catch up." [M1]

"And there's hype. There is generally actual hype around the digital space as well. And with the hype comes, you know you will find this funding coming in, supporting the tech development, this hype around everything innovation, let's go digital. So that that's also something that they hype itself that makes either external party or citizens or non-citizens get geared towards, you know, the digital innovation being a big factor as well." [HM4]

One research participant was very critical of Kenya's lack of a game plan when it comes to ensuring that local technology startups do bring economic value that is sustainable.

"I think at a national level we are doing; you know, it is like we do not have a game plan! A lot of the startups that we are working with are social enterprises. They are coming to solve massive social issues. It is within that conversation of moving from aid-to-trade. But my question then is, as we do that, are we creating wealth? Where does this wealth end? Are we going to see ourselves in a situation of economic slavery? Because our wealth now is going inside NASDAQ and then the Securities Stock Exchange and all these other global financial capitals and the Trickle-down economics of it. There is a huge need to re-evaluate and ask a lot of tough questions in terms of do we understand how money moves, how to create value, how to create jobs and how to create wealth locally?" [HM3]

One research participants disagreed with the notion that Kenya as a leading innovation hub in the East African region is just "a lot of hype", because of the responsiveness of its citizens to digital innovation over the years compared to its neighbours.

"So, look at the incentives that were being given in Tanzania to help people send money using mobile banking applications and they were not interested. In Uganda also, they were not

interested. But Kenya showed interest from the onset, because so many vendors are working here. The consumer market is driving the innovation.” [AC2]

However, a comparison with other ideal models such as the Silicon Valley and the Silicon Cape may justify the “hype” notion.

“And based on my initial assessment of how we measure success as a country, South Africa checks in a lot of the boxes and I'm like super proud of looking at that because to me, I think we need our government to go down there and learn how we can imitate a lot of that.” [HM3].

“...if I can do a general analysis of the ecosystem, I'll say it is characterised with very many innovative ideas. But very few success stories come from the various ideas or hubs that we have across the country. so, we have a very vibrant, I'll call it startup ecosystem, especially from idea stage, but we are not doing very well when it comes to the success stories that are coming from all these conversations.” [SF7]

To conclude on a positive tangent, one research participant vividly describes Kenya’s digital innovation ecosystem as follows:

“... an ecosystem comprising of different players. There are entrepreneurs at the centre of it all and there are stakeholders who are enablers and provide different contributions towards the ecosystem. There is academia, who are the pipeline of, you know, human resource-students who go through the institutions who are keen on entrepreneurship...There are financial institutions who are keen to invest or rather provide their products to entrepreneurs or any other interested up takers of their financial products. And there are, entrepreneur support organisation...that work with entrepreneurs to ideate ideas and create innovative product that are anchored or supported by technology. There are also regulators, government agencies... that provide different regulation and standardisation that might be required when you are putting together [digital] solution. For example, in the health sector there are bare minimum[regulations] that you need to adhere to [as a digital innovator]. If you are putting consumer-based product, you will have to adhere or rather comply to certain standards that Kenya Bureau of Standards might require you to before you churn out your product to the market. There are trainers and mentors who are key domain experts that work with entrepreneurs through the hubs or the support organisation if any, or directly sought after by entrepreneurs. And to me also there are, you know digital tools, digital companies, and technology companies in the in the ecosystem that are key contributing factors to making available or digital opportunities and digitisation itself being a process and access of tools like Internet because they are key in digitisation process.” [M2]

5.2.2 Micro Context Analysis (Agency and Capability Currency)

5.2.2.1 Digital Innovator/Agency- Profiling of Source or Producers of Digital Innovation in Kenya

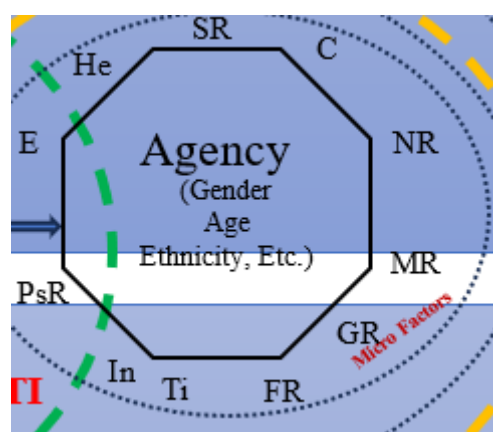


Figure 5-6: Agency Component. Extracted from the Conceptual Framework based on the Choice Framework

This section maps the resource portfolio of a digital innovator in Kenya, in reference to the 11 resources by Dorothea Kleine, which are included in the Conceptual Framework, a refinement of Kleine's Choice Framework. The 11 resources include Educational Resources, Psychological Resources, Information, Financial Resources. Cultural Resources, Time, Social Resources, Natural Resources, Material Resources, Geographical Resources and Health (Kleine, 2013).

5.2.2.2 Assessment of Digital Innovator Resource Portfolio (Demographics Approach)

The population of Kenya comprises of a young (persons between ages 18 to 35, who comprise about 75% of the population as at 2022), vibrant, well-educated mass that is technologically savvy. This implies that a large portion of the Kenyan population have (or can build) capability (agency, through possession of Educational Resources (ER) (Kleine, 2013)) for appreciation and appropriation of existing and new digital technologies to build and use innovative technology solutions.

"... also, our end users are very literate people. The solution that we developed became very easy. We didn't have to explain much, we didn't have to translate. Just give out the USSD code and somebody will figure out by themselves a way out. As much as we developed user guides and all those, they were not in demand, and neither would we get so many queries about the solution. We think that the literacy levels of Kenyans do also help there." [SF8]

“The skill set that I learnt most of it came from Google. There is a lot that I had to learn from Google: how to handle money, how to handle finances, how to price a product that's possibly something no one tells you.” [SF2]

This age group is described as young, ambitious, hot-blooded fellows yearning for success through entrepreneurial exploits, thereby earning the name the “cheetah generation”. Kleine, (n.d.) regards education and psychological resources such as “ability to envision, curiosity and entrepreneurial spirit” as key enablers for attaining “positive sustainable developmental” outcomes, in this case digital innovation success. According to Kleine (n.d.) psychological resources that enable human agency could be pivotal in the success of human-centred innovation process. Individuals who are endowed with such resources are seen to approach any life endeavour, including innovation, with the belief and confidence that they can always make it work or succeed. This phenomenon, as quoted in Kleine (n.d., p.3), is referred to a “self-efficacy”, a concept coined by psychologist Alfred Bandura, which could potentially explain digital innovation success in nascent ecosystems that are often resource strained, especially in the realms of financial and technical resources. Majority of digital innovators in Kenya were reported to hail from poor backgrounds. Despite the glaring financial challenges, Kenyan innovators continue to be driven and are resilient towards achieving digital innovation success.

“Most of our young people in Kenya, their parents have no money to support them. They do not have resources. The Silicon Valley and even Cape where I have been, you find a lot more mzungus, they have had some support. Here you can find somebody who is living in Kibera comes daily to some workspace, they do not even have transport, and I used to give fare to some of them at IHUB whenever they came to IHUB. Yes, in terms of background there's a huge difference.” [GOV1]

“So, we pushed hard and that month we made, that specific period we made more than \$1000 and that was unheard of for us because it was not like we had that much of customer reach at that point. I think our customer database did not have more than 100 people. So being able to make such sales within 2-3 days was massive.” [SF2]

“So, what we envisioned...changed over time, or there are some assumptions that we made that after we launched proved not to be true. So, like the assumption that people would request for on demand healthcare services, was not true. Most people would prefer to, instead of real time, be able to schedule ahead of time for the appointment. So, patients didn't automatically resonate well... with that feature. So, we made changes... We have managed, in the two years we have been in operation, to service slightly over 25,000 patients” [SF5]

Further, the population was noted to have a good amount of international exposure or foreign influence, “...Kenyans I think as well are relatively internationally minded” [HMI], which some respondents credit as the reason for their innovativeness compared to their neighbouring

African countries. However, some respondents view ‘foreign influence and international mindednesses’ of innovators as an obstacle towards the development and success of homegrown solutions that address local problems. They note that this has led to importation of foreign solutions to solve local problems, which could be attributed to the low innovation success rate due to product-market fit challenges. One respondent discredited claim of M-pesa as a homegrown solution. He further noted that its success can be attributed to the phenomenon referred to as “beginners’ luck” within a context characterised by a nascent innovation ecosystem with a large population of unbanked.

“When we went out bragging everywhere about M-pesa, M-pesa, M-pesa, yet, even from the core, we did not write the code. Yes...It was not written in Kenya and was not written by Kenyans. So, and that's our problem. We have lied to ourselves all the way, sadly to even the president, that M-pesa was a Kenyan initiative. It was not.” [M1]

The impact of foreign influence is twofold, positive, and negative. Case in point is the erroneous view of who a successful digital innovator looks like Kleine (n.d., p.3) reports that the Silicon Valley model depicts a digital innovator as a “white, young, male entrepreneur”, who is often deemed as “successful by entrepreneurial standards”, which include amassing vast personal wealth resulting from their entrepreneurial exploits. The model further depicts this white, young, male entrepreneur as narcissistic. In the view of human-centred innovation, such framing of success and the profile of a digital innovator is seen to propagate inequality, which is detrimental to sustainable development goals geared towards reduction of inequalities. The framing is said to propagate an individualistic view of what digital innovation or digital entrepreneurship success should look like, which could potentially promote a society that values achievement of personal goals, aspirations, and accomplishments, even at the expense of the common good of all.

Further, foreign influence and funding were reported as potential reasons why most African Unicorns (startup with a valuation of more than one billion US dollars (StartupBlink, 2022)) are headquartered outside Africa, which is seen as the modern-day brain-drain in the Global South.

“I think it is interesting somebody shared early in the week that if you look for those African unicorns and look at how few of them now are headquartered...how few of them have their leadership team here in Africa, apparently that is very few if any. And that is a realisation nobody has, and we still call them African. But what makes them African apart from the fact that the founders came from Africa? But that means that the value and the profit, everything goes out of Africa, is Africa then well served? Or should we potentially look at a different model where it becomes with a certain level of pride, but also an incentive that you stay in your

country, as opposed to leave, because then this is just the next level of brain drain, we are seeing.” [HMI]

5.2.2.3 An Empirical Contextualization of Digital Innovation Success Indicators

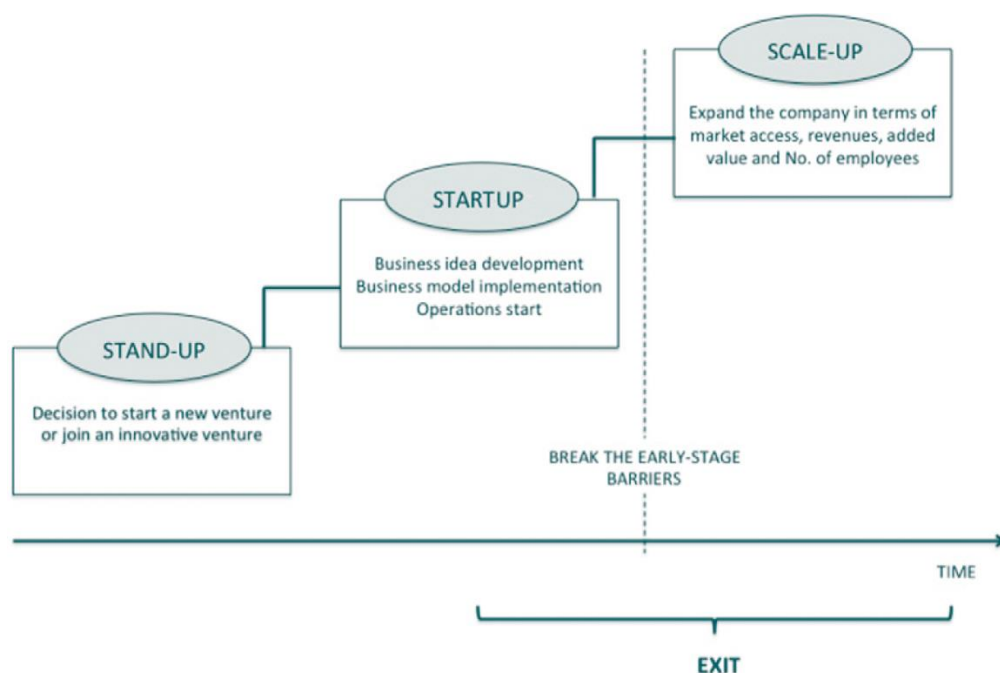
This study's conceptual framework is a refinement of Dorothea Kleine's Choice Framework (CF). Analysis based on the constructs of the CF framework begins from the outcome working its way backwards to the systemic relationship between structure, agency, and choice components (Egessa, Ogara, & Liyala, 2020). Further, the CF advocates for a research design that begins with first understanding individuals' development goals or priorities (Klein, 2013) or that which they “value and have reason to value” (Sen, 2001, p.18), as a foreground to its application. This section presents research participants' understanding and knowledge of Digital Innovation access (DIS). This sets the scene for the analysis of findings presented in succeeding sections.

The following question was posed to the research participants during the interviews: “What does digital innovation success mean for digital innovation stakeholders in Kenya?” The contextual understanding of what digital innovation success really means to innovators and innovation stakeholders in the Global South could reveal a unique narrative, regarding their desired development outcome, which epistemologies of the Global North may have excluded through years of research. Digital startup innovation success can be defined using “multiple dimensions, different theoretical approaches and empirical contexts” (Díaz-Santamaría and Bulchand-Gidumal, 2021, p.1). Further, Díaz-Santamaría and Bulchand-Gidumal, (2021) add that the way success is defined by researchers, or even by digital startups themselves, can be different in various contexts, hence the inclusion of ‘contextual measures of success’ in the conceptual framework (Figure 3-4). Also, they note that the varied measures of digital innovation success in current research confirms a lack of a “common denominator” to identify and define digital innovation success (Díaz-Santamaría & Bulchand-Gidumal, 2021, p.1).

This section highlights findings on key indicators of achievement of Digital Innovation Success (DIS) as a development outcome for technology startups in Kenya based on feedback from 21 research participants that were interviewed in 2022. A contextualization of what digital innovation “success” means was deemed important to allow the researcher to identify context-based enablers and barriers to digital innovation success. This way, a clear understanding of research participants' responses regarding factors that influence success or failure of digital innovations, or directly impact the reported indicators of innovation success, would be

established. Briefly, the resultant enablers and barriers would be contextualized to Kenya's innovation ecosystem, based on the contextualized meaning of digital innovation success and in consideration of the impact of the innovation environment within which such innovations were birthed or operated in, that is structured or unstructured innovation environment.

The Choice Framework recognises the importance of defining development outcomes in consultation with the individuals or communities affected by the development process, as their priorities and values may differ from those of external actors. Table 5-2 summarises research participants' responses on key indicators of Digital Innovation Success (DIS). The indicators confirm that success is a moving target. Success means attainment of different milestones, goals, or objectives for different technology startups at each startup growth stage (see Figure 5-7 on lifecycle of startups) and in respective of context. The indicators can be considered as potential measures of attainment of the development outcome 'digital innovation success', within the Choice Framework by Dorothea Kleine. Further, the indicators confirm a gap in literature as evidenced by context specific definitions and/or indicators of success often excluded by researchers.



Source: Own elaboration, adapted from WEF (2014)

Figure 5-7: Startup Life Cycle. Source: Pisoni, A., & Onetti, A. (2018). When startups exit: Comparing strategies in Europe and the USA. *Journal of Business Strategy*

It is important to note that most research participants held the view that the measures or indicators of digital innovation success commonly used in Kenya are more foreign as opposed

to localised metrics that align with local realities, knowledge and understanding of success in digital innovation or digital entrepreneurship. The indicators reveal a non-humanistic understanding of innovation success that is based more on parameters related to economic growth. Kleine, (2013) recommends a human-centred approach in evaluating the impact of digital innovation processes that stays clear of an industrial and economic view. Kleine (n.d.) adds that a human-centred approach to innovation focuses more on promoting, enhancing, and enabling human qualities and skills towards innovation success. Such an approach recognises the pivotal role of a human being in an innovation process, a gap that most research on innovation continues to ignore. Kleine (n.d., p.1) argues that current research has focused more on issues such as “innovation systems, policies, mechanisms, and funding” while neglecting the role of people in an innovation process. An understanding of the role of people in innovation processes would inform various forms of learning initiatives (formal and informal) geared towards nurturing specific human qualities and skills needed to achieve innovation success (Kleine, n.d.). Such human qualities and skills include: “curiosity, creativity, motivation, open-mindedness and an entrepreneurial spirit” (Kleine, n.d., p.6).

“We have adopted a lot of, like, the western side of thinking in terms of like how we should think about success metrics. But more localised metrics [are] important as well and creating this local knowledge...” [SF3]

Table 5-2: Measures or Indicators of Digital Innovation Success

<i>Indicator of Success (DIS Secondary Outcomes)</i>	<i>Definition</i>	<i>Data Excerpts</i>
Financial and Non-Financial Indicators		
Product Market Fit; Problem/Solution Fit	“Right product features that meet real customer needs” (Giardino, Wang, & Abrahamsson, 2014) or innovating or building something that people want. “First solution aligns with real customer needs” (Giardino, Wang, & Abrahamsson, 2014) Customer satisfaction	“Then there is this other success where you finally can get the product market fit or getting your product to the product market fit stage....” [SF7] “I guess product market fit; are you really solving a problem that people consider important, like M-pesa. So, solving the right problem and solving the problem in the right context for example in Kenya, you know of course M-pesa doesn't work in many other places because the principle of sending money is universal, but the how you send the money, you know the circumstances have to be reflective of how the Kenyan market is so you have to find the right problem and solve it in the right context. That is a part of success.” [SF4] “Popularity of whatever tool you have created. By popularity of course, that would mean, how widely the product or service is used.” [AC1] “Then also usage, of course usage is always a good metric to determine whether the problem that you are solving is real or not.” [SF4]
Pivoting	“a reiteration of problem/solution fit” to align with “real customer needs” (Giardino, Wang, & Abrahamsson, 2014), often leading to “building or innovating a new product”	“OK. When we changed the idea, we thought of a way for corporate clients to get the integrations to X... because that is what our research had revealed as the pain point and that time X API’s (Application Programming Interface) were not developed” [SF8] “And in any startups, the success of it was not how much money they raised. The success of it is how they expanded, how they pivoted, how they sustained it.” [IND1]
Funding Acquisition (Seed Funding, Pre-Seed, Series A, Series B)	Receiving one or more series of funding could be regarded as success.	“...and, with time other people betting on you. The fact that other investors are willing to bet on you for a longer runway is also a measure of success. It means you are on to something, even if you are not profitable now. That is also a measure of success.” [HM2]

<i>Indicator of Success (DIS Secondary Outcomes)</i>	<i>Definition</i>	<i>Data Excerpts</i>
Revenue/Paying Customers	Income generated because of successful commercialisation (Hirose, 2018) or purchase of an innovative product, process, or service.	"Attracting investment will definitely be success." [HM1] "Impact with no revenue is a hobby. It is a hobby! So, let's not lie to each other." [M1] "I think obviously revenues are good indicator of success and I think they are good indicator in any business. So, if you are not generating revenues, if you are not profitable, you could have revenues but are not profitable like Startup J (name hidden) is turning in a lot of cash, but I do not think they are profitable yet. So, profitability, as a foundation metric for any businesses is important." [SF4] "...what success looks for like for a SaaS company is...you need to have consistent monthly revenue, MRR right. Your monthly revenue is consistent..." [SF3] "...revenue from your users is a very great measure of success... revenue from your customers is quite key, the fact that they are willing to pay for it..." [HM2]
Break-even	"Describes the relationship between fixed (F) and variable (price (P)/unit (u) minus variable costs (VC)/unit (where VC is variable production [VPC] and sales, marketing, and operational costs [VSMO]) so a firm can identify the number of units to reach the breakeven point ()".	"...so, the African Indigenous Kenyan founder will be asked so when are you going to break even, you know, for most of the investors, that's when they will start seeing their profit and that has been the measure of success, especially if they are receiving money from Venture capital or equity or convertibles." [HM2]
Initial public offering (IPO)	"The IPO has been used as a measure for startup performance since conventional measures for performance, such as profit or sales, are not available for very young firms." (Chang, 2004). It is reported as a valuable form of "equity financing" for startups (Schechtman, 2021).	"And success for you is either like IPOing as a business..." [SF4]
Mergers and Acquisitions (M&As)/Buyout	"For high-growth venture-capital-backed companies, exits (through buyout or mergers and acquisitions) are often considered the goal of building a	"And success for you is either like...a merger and acquisition..." [SF3]

<i>Indicator of Success (DIS Secondary Outcomes)</i>	<i>Definition</i>	<i>Data Excerpts</i>
<i>Viable Business Model</i>	profitable venture. These ventures are intended from the beginning to harvest the financial value created by the business at some point in the future and return capital to early investors.” (Pisoni & Onetti, 2018) Business model defines the roadmap that a company will take to build, deliver, and capture value. Innovative business model is critical success factor for startups (Trimi & Berbegal-Mirabent, 2012), especially for technology-based startups that operate in “extreme uncertainties” due to the “volatility and unpredictable nature” of new technologies (García-Gutiérrez & Martínez-Borreguero, 2016, p. 47). Bocken (2015, p. 654) notes that “failed business model” may result to digital innovation failure.	“Interest from key players. So, most big players like a proven concept. So, the moment you notice a big company coming in, showing some interest, maybe they want a merger or maybe to buy your idea I think that's also part of digital innovation success.” [AC1] “So, for me, when I look at success as an entrepreneur, specifically as tech entrepreneur, it is building a viable business model that can scale across multiple markets...a successful sustainable business model that can scale across multiple geographies, whether it is in logistics, whether it is in supply chain, whether it is in active healthcare, EdTech. Can that business run on its own without future funding? Can it clean...Uh, run. Uh, run seamlessly right, as time goes by...So, for me, success is like viable business models across the continent.” [SF3] “I think the biggest advantage for it was it was a model that could be monetised from day one strongly. That means it was able to fund itself to make sure that it can get to market.” [SF6]
<i>Partnership with Industry Leader(s)/Key Players</i>	An alliance with an industry leader with potential to generate financial and non-financial mutual benefits	“There would be interest, interest from key players. So, most big players like a proven concept. So, the moment you notice a big company coming in, showing some interest, maybe they want a merger or maybe to buy your idea, I think that's also part of digital innovation success”. [AC1] “They actually had to get CBK licenses or partner with large banks to actually get to where they want to be taken” [SF3]
<i>Foreign market reach/Launch into other market</i>		“I think to be able to scale and grow the business, grow beyond Kenya, grow regional, as a minimum, grow continental perhaps... If you can sell your product or services beyond Africa, that would be a massive success.” [HM1] “And success for you is either like...I'm growing 10X (10 times) across the continent.” [SF4]

<i>Indicator of Success (DIS Secondary Outcomes)</i>	<i>Definition</i>	<i>Data Excerpts</i>
Team growth	Team growth is defined here as acquisition of new talent who join the startup at various capacities.	"Team growth, okay. So, I would assume that if an innovation starts small by maybe one or two members, and after its launch, we have a bigger team that also could point to digital innovation success." [AC1]
Addressing an emerging opportunity	A digital solution that addresses an emerging opportunity or problem, with or without making money	"...addressing an emerging opportunity. Our challenge as a country has been youth unemployment, the idea that we have startups and people making innovations and they may not be successful but that is a success factor. That is a success factor you cannot dispute it." [AC2]
Transformation of the innovator	Transformation of the innovator here includes growth arising from experience gained through a failed or successful digital innovation process.	"The transformation of the innovator to me is a successful factor. Young guys came here (university-based incubator), developed their product, their minds have been opened, they are now doing other things, they may not continue with the Innovation, but it has sparked in their mind new entrepreneurship ideas." [AC2]
Growth of an Innovation Ecosystem	Growth of an innovation ecosystem brought about by the rise of multiple active digital innovations.	"As a country, how do we measure success? We need to measure it by understanding. What is the good that we have seen from these companies? Are they creating jobs in our economy? Are they building local value chain?" [HM3] "The development of the startup community, however small, sometimes Vibrant sometimes Dying, is a success factor. The development of incubators in themselves, in whatever state of development they are, is a success factor. The interest of government in startups and digital innovation, to me is a success factor. The change of the market population, which is the consumer market, towards digital products, towards digital innovation, first in use of money transfer, is an indicator of success." [AC2]

5.2.3 Meso Context: Innovation Environment Support Services

5.2.3.1 Entrepreneurship Support Organisations

The Kenya Innovation Ecosystem has an active community of entrepreneurship support organisations such as Business Incubators, Accelerators, Technology Hubs, Research Centres, and Academia. The contribution of these ESOs on digital innovation success in Kenya has been dissected in greater detail under sub-section 5.3. As mentioned earlier, a 2021 UNESCO report quotes Kenya to have “the most tech hubs in Central and East Africa (70), followed by Cameroon (28), Uganda (19) and Rwanda (12)” (Lewis, Schneegans and Straza, 2021, p. 511). In 2022, it was reported that Kenya had over 200 innovation and technology hubs (UNDP, 2022). Briefly, businesses incubators, accelerators and technology innovation hubs provide structured environment support services (SESS) such as business coaching and mentorship, co-working space, financial support, market validation, networking opportunities, legal guidance, knowledge centres on how a technology startup can succeed within a given context, clear growth strategy and acceleration support (Figure 5-10). Research centres and academia are also reported to play an active role in the innovation ecosystem. A more detailed analysis of the contributions of these entrepreneurship support organisations is presented in succeeding sections.

5.2.3.2 Technology Startup Funding in Kenya

Despite being ranked as the 5th most largest economy in Sub-Saharan Africa (International Monetary Fund, 2023), Kenya, like most countries in Africa, continues to deal with foreign debt crisis (Lewis, Schneegans and Straza, 2021), which exacerbates the country’s existing social and economic challenges. However, the social and economic challenges are seen as both a hindrance to digital innovation success and an opportunity to build innovative digital enterprises as they are “*many problems to solve*” [HM2]. Most technology startup founders hail from underprivileged backgrounds compared to their Silicon Valley counterparts. Sustaining a technology startup becomes a challenge especially as the innovators also have personal social and economic needs which they must meet. Where such needs are unmet, it could lead to misappropriation of seed funding. In other ideal models, technology startup seed funding includes salaries for the founders.

“But the majority are at a stage where they need money to buy lunch. This is where we wanted the government to step in. At that seed level, government needs to provide them with some assistance.” [GOV1]

“Okay, financing is a very difficult thing to come across in Kenya” [SF8]

Challenges regarding access to bank credit were also mentioned by several the respondents. One respondent pointed out that “... the cheapest credit to manage to get for entrepreneurs from my own experience as being maybe 10% but I think in the US [it] is like 4%” [IND2]. In the same breadth, several respondents noted that many technology startups in Kenya are ideally “social enterprises solving massive social issues” [HM3]. The gravity of these social issues could imply that one social problem is so big to solve such that billions of dollars in foreign investment could be pumped into the market as seed funding for many technology startups with viable solutions to the problem. The negative implications of aid to trade narrative were raised by some respondents, noting that it fosters corruption. This is because aid money is given with no recourse (Moyo, 2009). The recipients of such funds are at liberty to use the monies for their own personal needs. When funds meant for trade and economic development pass through the same channel, the probability of misappropriation could be higher.

“A lot of the startups that we are working with are social enterprises. They are coming in solving massive social issues. It is within that conversation of moving from aid to trade.” [HM3]

“I think it is more of the problems we have that are driving people to be more innovative” [HM2]

“And here in Kenya, they are three companies which have been funded to a tune of almost \$300 million dollars. There is Soko Mama, Market Force, Soko Watch, which rebranded to some name I have forgotten. They are all solving the same underling problem, because the problem is so big that you can pump in a billion dollars into this market and still make a lot of money by just solving that issue.” [SF4]

Because of the focus on social issues, one respondent referred to Kenya’s innovation ecosystem as a ‘big begging basket’, that is ‘NGO and grant driven’. The drawback of this is that the focus is shifted away from building commercially viable digital innovations that address real-life local issues to solutions masked with impact agenda or development goals to attract ‘aid’. There are various studies on the issue of ‘aid for trade’ in developing countries. Overall, these studies indicate that aid could shift focus away from real developmental outcomes due to systemic challenges such as extreme poverty and corruption (Moyo, 2009). In Kenya, respondents reported that founders of grant driven digital innovations or digital enterprises most often than

not use the funds for other things other than on the start-up. Because of opportunity for misuse of funds, respondents noted that local investors find it difficult to invest in such start-ups, as their focus is more on Return on Investment (ROI) as opposed to demonstrating impact or addressing SDGs and other development goals.

“Research was done, which looked at Bangalore and Nairobi’s innovation ecosystems. Nairobi’s ecosystem was reported to be NGO and grant driven. The Bangalore innovation ecosystem was built on business. There were no grants. They solved problems for Indian businesses. An Indian startup will never mention an SDG in a pitch. Never. They will never mention social impact. They will show you the money. A Kenyan startup, on the other hand, will list you the various SDGs that they are trying to address. And then hopefully, at the end, they will mention how much money they want, not how much money they can generate. So, we are one big begging basket. And what has now happened is the Nigerians, who have understood the model better, are now coming into the Kenyan ecosystem and taking it over. And it all started by them buying iHub. The number of Kenyan startups that have gotten funding by Nigerian investors are more than Kenyan startups that have gotten investment from Kenyan investors.” [M1]

5.3 Analysis of Findings on Research Question One

5.3.1 Overview of Findings – RQ1

Through the lens of the conceptual framework (Figure 3-4), a thematic analysis was conducted on data collected from 20 research participants, document reviews and media analysis. The outcome of the analysis generated a multi-level hierarchy of themes presented in Table 5-4 to explain what enables or hinders Digital Innovation Success (DIS) in structured versus unstructured technology innovation environments in Kenya (STIE and UTIE). The STIE, UTIE and DIS constructs were defined in chapter three and forms part of the conceptual framework. They will be referred to in succeeding sections.

In a first analysis round, 60 Digital Innovation Success Factors (DISF) (DISF construct defined under chapter three and part of the conceptual framework (Figure 3-4)) were reported and classified as level 1 sub-themes (Table 5-4). These 60 DISF were subsumed under 14 major grouping or themes, 10 of which had been previously identified via systematic literature review and 4 that emerged from data during analysis. 2 out of the 4 context-based themes were recorded as part of the top 3 most relevant themes (Table 5-3). A second round of deeper analysis of research participant transcripts generated four levels of sub-themes subsumed under the 59 factors, after several iterations of merging, rearranging, and removing themes. Under level 2, 58 sub-themes were included, which in turn subsumed 79 sub-themes (level 3). The 79 subsumed 63 other sub-themes (level 4), which finally subsumed 11 others classified as level

5 sub-themes. Table 5-4 maps out these multi-level theme hierarchies. Figure 5-8 visualises all themes in a tree map.

5.3.2 Empirical Research Results: Enablers of and Barriers to Digital Innovation Success in Kenya

5.3.2.1 Theme Relevance

Table 5-3 displays the most common themes by case and code count. The ‘capital’ theme was the most referenced theme by respondents, with 24 case (research participants, document reviews and media analysis) mentions and 161 data excerpts. The ‘innovation ecosystem’ theme had 22 unique case mentions and 96 data extracts. ‘ESOs and Innovation Intermediaries’ had 20 unique mentions and 99 supporting data extracts. ‘Government’ theme was the third most mentioned of 20 cases with 80 code counts, followed by ‘Wrong focus of innovation ideas’ with 15 case mentions supported by 52 data excerpts. ‘Digital technology’ theme was mentioned theme in 11 cases and 35 data excerpts to support the relevance of this theme to digital innovation success phenomena. In summary, 29 unique sources of information, including 21 research participants, document reviews, and media analysis were referenced with 557 data excerpts being quoted to support emerging themes.

Table 5-3: Theme Relevance by Case and Code Count

Theme Relevance by Case and Code Count		
Name	Files (Case Count)	References (Code Count)
Major Themes (Enablers + Barriers)	29	557
Business Model	3	3
Capital	24	161
Culture	4	4
Digital Technology	11	35
Education	2	4
ESOs and Innovation Intermediaries	20	99
Government	20	80
Innovation Ecosystem	22	96
Leadership Styles	2	5
Natural Disasters	1	1
Networks	4	8
Open Innovation	4	5
Other Minor Themes	3	4

Theme Relevance by Case and Code Count		
Name	Files (Case Count)	References (Code Count)
Wrong Focus of Innovation Ideas	15	52

Context specific themes that emerged, or that were not in the initial codebook developed from the results of a systematic literature review (Appendix D) include: ESOs and Innovation Intermediaries, Innovation Ecosystem, Natural Disasters, Wrong Focus of Innovation Ideas, and other minor themes consisting of sub-themes ‘Impact Driven Innovation’, ‘Market not Ready’, ‘Trend Setters’ and ‘Value of Piloting’. These themes are discussed in greater detail in succeeding sections.

5.3.2.2 Tree Diagram – All Themes

Figure 5-8 visualises all themes and sub-themes in a tree map. The same data is displayed in table format under Table 5-4. Capital, ESOs and Innovation Intermediaries, Innovation Ecosystem, Wrong Focus of Innovation Ideas and Digital Technology and visibly the most referenced themes as shown in Figure 5-8.

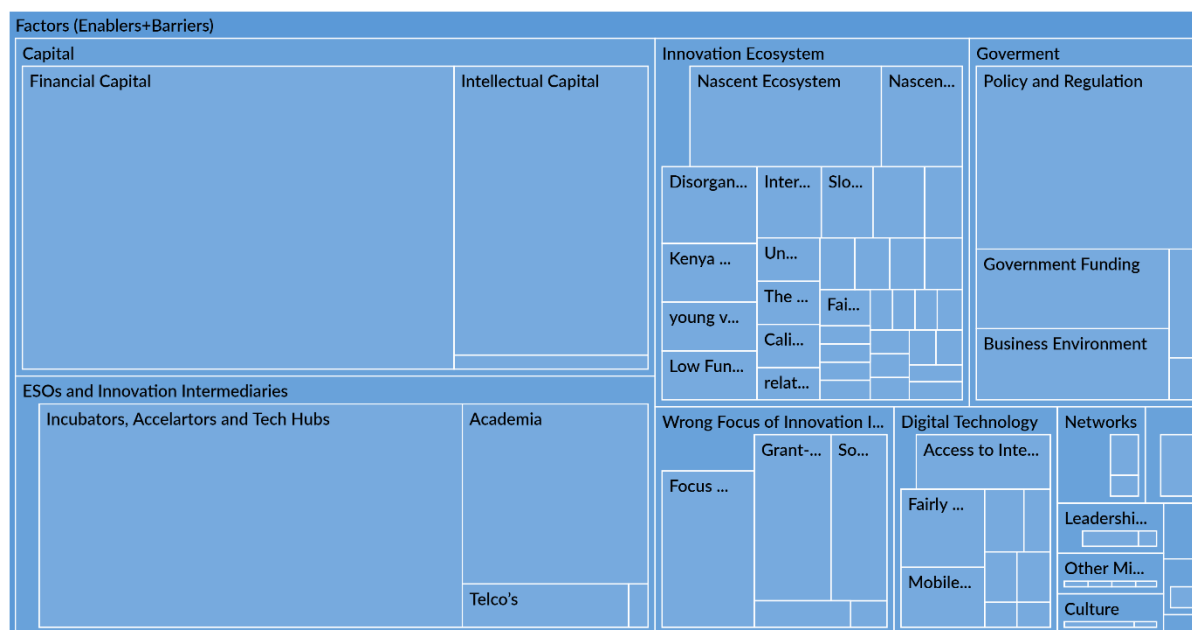


Figure 5-8: Tree Map - All Themes

5.3.2.3 *Multi-Level Theme Hierarchies*

Table 5-4 maps out multi-level theme hierarchies that emerged from qualitative thematic data analysis of semi-structured interviews, document reviews and media analysis using NVIVO software.

Table 5-4: Multi-Level Theme Hierarchies

Major Theme	Sub-themes				
	Level 1	Level 2	Level 3	Level 4	Level 5
Business Model	*@-Lack of Understanding of the Start-up Business Model				
+Capital	+Financial Capital	+Attract and Secure Funding	+Early Funding attracts follow on funding		
			*@- +Few Investable Startups		
			+Foreign Investment	*@-+Foreign Cofounders	
				*@-+Incorporate in Delaware	
				*@-Lack of Confidence of African Founders	
				*@-+Language of Foreign Investors when Pitching	
				@-Post-investment Structure	
			+Global Visibility as enabler		
			-High Risk Non-Investable Startups		
			-Lack of Knowledge on Available Funding		
			@+Startup Success Stories as an attraction mechanism	@-Re-investment from successful local startup-exists	
			-Pitching Right	@-Dealing with Valuation Challenges to secure Investment	
				-+ROI for Investor	
				@-+Financial Management Skills	
				*@+Understand the value chain of local financial market	

Major Theme	Sub-themes				
	Level 1	Level 2	Level 3	Level 4	Level 5
				*+Sound startup valuation	
			@-Startup structured for target investment		
			-+Track record		
		@Available and Accessible Financing	@+Available Financing Options	-+Bank Credit	
				@+Continued Reinvestment	
				Family and Friends	
				@-+Impact Investment	@-Impact Money not useful in venture building in the long run
				@-+Innovation Grants	
				@+Patient Capital	-+Angel Investor
					@-+Private Equity
					-+Venture Capital Investment
				+Personal Savings	
				@+Revolving fund	
				@+SACCOS	
				@-Founder Greed	
			@-Access Challenges	@-General Hesitance to Invest in Local Startups	
				@-Limited Local Investors	@-Limited Local Founder Re-investment

Major Theme	Sub-themes				
	Level 1	Level 2	Level 3	Level 4	Level 5
				*@-Perceived Lack of Financing	
				*@-Stringent Fundraising Requirements	
		@*Structures or Pipeline to encourage investment	*@-+Awareness and Education of Local Investors		
	*Intellectual Capital	Human Capital	*@+De-risking Mechanism	*@+Pool Investment as a De-risking Measure	
			*@+Investment Pathway		
			Age of Innovator		
			Partners	*@-Challenges in Securing Partner for Unstructured Innovators	
				+Right Partners	
				+Team Composition	
			Talents and Capabilities	*+Apprenticeship	
				*+Benefit Sol Co-founder and Single Founder Risk	
				*-Lack of basic training on bookkeeping	
				*-Limited Technical Knowledge	*-+Domain Expertise
					+Sensitisation of Innovators on IP
				*@+Right Governance Structures	
				+Right Talent Mix	
				*-+Talent Wars	
			*+Work Experience		
		Psychological Capital	*Hard worker		
			+Mindset	-Dependent	

Major Theme	Sub-themes				
	Level 1	Level 2	Level 3	Level 4	Level 5
				*Independent	
			*Passion and Commitment		
			*Resilient		
	*Non-Financial Capital	*@-Limited Test Tools and Environment			
+Culture	*Entrepreneurial Culture				
	*@-+Openness to Foreign Ideas				
+Digital Technology	*+Access to ICTs	*+Access to Information			
		*+Access to Internet			
		*+Mobile Penetration			
	*+Affordability of ICTs	+Open-Source Software			
		*+Technological Competitive Edge			
	*+Skills needed for ICTs	*-+Fairly Tech-savvy society	*@+Culture of Learning through tech		
			*-+Know-how and utilisation of knowledge.		
		*+Rapidly Changing Technology	*+Speed of implementation		
	*@+Hype around Digital and Digital Transformation				
+Education	*+Access and equity				

Major Theme	Sub-themes				
	Level 1	Level 2	Level 3	Level 4	Level 5
	+Focus on Technology and Innovation				
*+ESOs and Innovation Intermediaries	+Academia	*+Alumni Networks as an Enabler			
		*Curriculum behind			
		*@De-linked from Startup			
		+Developing and Providing Talent			
		*@Heavily Commercial more than talent development			
		+Influence Policy and Regulation			
		+University Research	*+Commercialisation of Academic Research		
			-Conducting Research		
			*@Delays in Publishing Research		
			*Lack of Resources and Funding	*@Academics overwhelmed with lecturing	
			*Limited Research Skills		
			*@Research to graduate not solve problems		
	+Incubators, Accelerators and Tech Hubs	*@Operational Challenges	*+Digitisation and Digitalisation of their services		
			*+Cap on Number and Type of Startup to be Supported		
			*@Foreign Concepts		
			*Hub Administration		

Major Theme	Sub-themes				
	Level 1	Level 2	Level 3	Level 4	Level 5
			*@-Lack Financial Strategy		
			@*-Operating in Silos		
		*@-Sustainability Challenges	*@-Dependency on Donor Funding		
			*@-Resource Challenged		
			*-Support to Enablers		
		*@-Relevance Challenges	*@-Becoming irrelevant by the day		
			*@-+Joining driven by startup	*-Founder Loose Control of Startup	
				@*-+Joining Driven by Need for Financing	
				*-Unfavourable Terms and Conditions for Startups	*-Unfavourable Equity and IP Demands
					*@-Unfavorable Rules
		*-Support Services to tech Startups	**Business Coaching and Mentorship	*Business Model Re-engineering	
				*Guidance on Full Business Cycle	
				*Mentorship	
				**Peer to peer learning	
				**Buddying	
				*Platform for exchanging ideas	
				*Technical guidance	
			*@*Slow Startup Death or Burn Rate		
			*Clear Growth Strategy		
			*Co-working Space		
			*Customised Support		

Major Theme	Sub-themes				
	Level 1	Level 2	Level 3	Level 4	Level 5
			*Exposure to New Markets		
					*+Leverage on Hub Name to Secure Funding
			*Financial Support	*+Internal Startup Fund	*Linkage with Financiers
				*+Remuneration Strategies for Founders	
				*+Leverage on Hub Name to Secure Funding	
				*Linkage with Financiers	
			*Ideation support		
			*+Influence Policy		
			*+Knowledge Centres		
			*Legal Guidance	*Compliance Support	
			*Market Validation	*Product Market Fit Analysis	
			*Networking Opportunities	*Platform for Investors and other Enablers	
			*+Startup Acceleration Support		
			**Team Formation Support		
	*+Research Institutes	*@+Great research no innovation			
	*+Telco's	*@-Challenge Honouring IP			
		*@-Holding back innovation if it is potentially threatening their business			

Major Theme	Sub-themes				
	Level 1	Level 2	Level 3	Level 4	Level 5
		*@Provide Infrastructure			
+Government	+Business Environment	*-Barriers to entry			
		*+Attracts Foreign Investment	*@Flexible regulatory regime for foreign investment		
		*@Innovation Capacity Building			
		*+Supporting Infrastructure			
		*@Un-stable Political Environment			
	*+Global Visibility Facilitation for local startups	*+Access to Market			
	+Government Funding	*+Financial Capital	*@Innovation Fund		
			*@Our government is broke		
			*@Support via Individuals		
		*+Non-financial Capital	*+Government Funded Physical Facilities		
			*@Lack of Publicly Accessible Test Environment and Tools		
		*+Structures to Enable Funding	*@De-risking mechanism		
			*+Enabling environment for foreign investment		
			*@+Policy and regulation around retaining local wealth		
			*@+Protective Regulations for Diaspora Investment		
	+Policy and Regulation	*@Lack of Definitive Structure to Lobby	*Outdated Policy and Regulatory Frameworks		

Major Theme	Sub-themes				
	Level 1	Level 2	Level 3	Level 4	Level 5
		Government Support for Startups	*@+Slow or Delayed Regulation Impact		
		*@-Qualification as a compliance			
		Tax Reliefs	*-Border Customs Challenges		
			-Tax Breaks		
		*@+Tax Structuring Knowledge	*-Non-compliance		
			*+Sectorial Regulations Awareness		
			*-Uninformed Founders on Laws and Regulations		
		*@+Under Regulation as an Enabler	*@+Gaps not serviced by government as opportunity		
		Uninformed Legislation			
		*@+Value Chain Oriented Policy and Regulatory Framework	*-+Policies for Angel Investor Network		
			*-+Policies for Startups	*+Access to Credit	
				*@+County regulatory toolkits	
				*@-+Data Protection Act	
				*@+Incorporation Requirements that align with Structuring of Tech Startups	
				*@+Policy to Recoup Failed Investments	
				*@-+Startup Bill	
				*@+Startup Participation in Policy Formulation	
			*@+Policies for Tech Hubs, Accelerators, Incubators		

Major Theme	Sub-themes				
	Level 1	Level 2	Level 3	Level 4	Level 5
+Leadership Styles	-Lack ability to select and put together a team				
	-Transformational				
+Networks	+B2B Matchmaking				
	+Social Network				
+Open Innovation	+Hackathons				
*+Innovation Ecosystem	*Nascent Ecosystem Challenges	*@-Venture building is for privileged people			
		*@-Stiff Competition with Global Brands			
		*@-Startup economy has not gone mainstream			
	*+Middle-income Economy				
	*+Biased towards FinTech				
	*+Largest concentration of hubs within the African continent				
	*Challenges in Converting Great Ideas into Successful Innovations				
	*Slow uptake	*@-Longer Sales Cycle			
		*Slow Adoption of Innovation Outputs			

Major Theme	Sub-themes				
	Level 1	Level 2	Level 3	Level 4	Level 5
	*+Structure for partnerships, research, and innovation				
	*A culture of importation as opposed to local production				
	@*-Limited Diaspora Investment				
	*@-Caliber of Entrepreneurs	Social Financial Responsibilities			
	*+Fairly Tech Savvy				
	+Internet Access				
	*@+Mobile penetration				
	*@-Low Funding Absorption Capacity				
	*@-Underprivileged Backgrounds of Innovators				
	*@-+Many problems to solve				
	*+The Triple Helix still works				
	*@-Management and growing stage Challenges				
	*-Lack of supporting legislation	*+Lack of legislation is a good thing for innovation.			

Major Theme	Sub-themes				
	Level 1	Level 2	Level 3	Level 4	Level 5
	*-Less Priority for Research and Innovation				
	*@-Need for Foreign Co-founders to Access Capital				
	*-Brain Drain-African Unicorns Headquarter outside Africa				
	*+International influence	*@-+Relatively internationally minded			
	*@+Kenya Positioning as an Innovation Hub	*@+More vibrant than its neighbours			
	*@-Low Purchasing Power				
	*@-Disorganised Ecosystem				
	*-Nascent Ecosystem	*-Relatively weak on Angel investors			
		*@-Unicorn Type of Entrepreneurs Lacking			
		*@-Necessity entrepreneurs.			
		-Scarce Resources			
*@-Wrong Focus of Innovation Ideas	*@-Hyper Local Problems that cannot be scaled				
	*@-Grant-driven ecosystem	*@- One big begging basket.			

Major Theme	Sub-themes				
	Level 1	Level 2	Level 3	Level 4	Level 5
	*@-Solving Foreign Problems instead of local problems				
*-Natural Disasters					
	*@-+Impact driven Innovation				
*Other Minor Themes	@-Market not ready				
	@+Trend setters				
	*+Value of Piloting				

5.3.2.4 Analytical Exploration of Empirical Themes

5.3.2.4.1 Business Model

In the systematic literature review section, business model was reported as an important factor that could enable or hinder digital innovation success, particularly for technology or digital startups, which, as (Díaz-Santamaría & Bulchand-Gidumal, 2021, p.1) put it, operate in “conditions of extreme uncertainty”. Such volatile business environments could potentially hinder digital startup investment due to high risks. This theme however was not particularly prominent from the responses of research participants. However, a small number of interviewees agreed with the view that business model innovation is important for the success of technology startup innovations in Kenya and could also be used as a measure of digital innovation success.

“So, for me, when I look at success as an entrepreneur, specifically as a tech entrepreneur, it is building a viable business model that is able to actually scale across multiple markets.”
[SF3]

“When people are willing to take a bet on you and give you financing to build that railway, it means you are onto something, and it is believable. And truly there is a business model that can be sustainable.” [HM2]

In addition, it was noted that there exists a knowledge gap on the part of digital innovators and innovation intermediaries (for example Government) in Kenya on the difference between business model for Small Medium Enterprises (SMEs) and that of digital startups. The comment below comprehensively explains this view. A notable gap in access to "suitable investors" or financing that understands the business model for local technology startups was reported by several research participants as a barrier to Digital Innovation Success (DIS).

“Okay, you see, SMEs are the traditional business where you have a good/service, you sell, the client pays you. A startup is more innovative because you found a problem and used technology to accelerate it. An example is M-pesa, it is in Fintech, and it is using technology to enhance its value proposition. So, it is connecting to customers and then it keeps iterating. So even if you look at the life cycle, it is not the same as traditional SMEs, where you can track the growth on an incremental level. With a startup it is different, it can be very disruptive. It is rapidly changing, you can end up having 0 customers to 1000 within a week and then next thing you know, you have crossed to different geographies, because technology has no boundary, it has no time zone.” [IND2]

5.3.2.4.2 Capital

Capital was one of the most prevalent themes mentioned by research participants. Particularly, there was a consensus on the importance of financial capital in enabling digital innovation success, particularly in a context characterised by scarce resources and many social problems to solve. The analysis revealed multi-level sub-themes (Table 5-4), which the researcher found to be meaningful representations of the contextual issues around capital and its impact on digital innovation success in Kenya. These were grouped into three major sub-themes listed under level 1 in Table 5-4 namely: financial capital, intellectual capital, and non-financial capital, which had been identified through systematic literature review. A deeper analysis of the sub-themes generated four other levels of sub-themes, which revealed that most views on capital had a negative connotation, thereby depicting issues around it as more of a barrier and less of an enabler of digital innovation success for technology startups in Kenya.

5.3.2.4.2.1 Financial Capital

Under financial capital, the following key sub-themes were identified: attract and secure funding, available and accessible financing, and structures to encourage investment. To begin with, the following financing options were reported as available for digital startups in Kenya, though with noteworthy access challenges: family and friends, personal savings, bank loans, Savings and Credit Cooperative Societies (SACCOs), venture capital, angel investment, private equity, innovation grants and impact investment - a new concept where startups with strong social, economic and environmental impact attract funding, irrespective of presence or lack thereof of a commercial sense of their innovation.

“The other thing that is coming up is something called impact investing. So, with impact investing, it is about looking at your business’s impact on either the social, economic, or environmental aspects of society. So, sometimes you may not have a strong commercial business model, but because you are so impact driven you get investment.” [IND2]

Regarding impact investment, a small number of research participants argued that it is not useful in the long run, particularly in a context where a digital innovator is also dealing with personal social and economic challenges. In impact investment, common digital innovation success indicator is achievement of desired ‘impact’. As noted by research participant IND2 above, impact driven technology startups often lack a strong commercial business model. An innovator plagued with personal social and economic challenges may not have the capability to see the innovation through to fruition, as they also need and must meet their social-economic

needs that require money. The desired impact may therefore not reach many in the long run, as such innovations are often neglected by the innovator once they receive initial investment. Innovations emanating in resource-constrained contexts where innovators hail from underprivileged backgrounds would therefore require the “right investment” that is well guided towards innovation success. The right investment could mean inclusion of a monthly stipend for the founders to sustain them and empower them to focus on the success of the innovation. An analysis of cases of successful social impact projects may reveal strategies used to navigate the social-economic challenges of the innovators.

“Here you can find somebody (innovator) who is living in Kibera (largest slum in Africa) walks daily to some co-working space. They do not even have transport. I used to give them fare.” [GOV1]

“We carried out a survey among 1500 lenders, and the clear conclusion was that what we were catering for was what we would call ‘necessity entrepreneurs.’ So, they were not entrepreneurs that were looking to grow big businesses that could employ a lot of people and create economic growth. They were typically very small family businesses that were trying to serve the immediate family needs. And there is nothing wrong with that.” [HMI]

“...where they provide seed funding to the ideas that they feel have the potential to scale, and one of the core ingredients in that seed funding is a salary for the founders, because that is another thing I have realised is killing our entrepreneurship ecosystem. We have young guys with brilliant ideas who are required to work on those ideas for 24 months without a salary. For sure, we are human beings. We have basic needs and all that. So, if I am not able to pay my bills, there is no way I am going to concentrate on that idea until it pays me.” [SF7]

“Impact money generally says, for example: ‘we are going to do engagement for farmers to increase their yield.’ Tech startups have been doing that for 100 years. But we have never heard a single tech startup succeed in this kind of way, because if you are helping farmers increase yield in Kakamega (a county in Kenya), the minute they (innovator) make money, they buy a boda-boda (motorcycles used in ferrying people at a fee in Kenya) and they neglect the farm. Nobody really wants to be a farmer.” [VC1]

The following issues arose concerning the sub-theme ‘attract and secure funding’. First, several research participants noted that early-stage funding for local startups remains a challenge. A common view among research participants was that this poses as a major barrier, particularly because early-stage funding enables startups to bootstrap their ideas into commercially viable solutions, thereby steering their digital innovations towards success. One research participant added that early funding attracts follow-on funding from the same or other investors.

“So, the funding is needed in some areas to be catalytic for startups and for innovation in the tech space to happen. And then you need investors as well. I think we have relatively good amount of later stage investors; the pain points are over that very early bit.” [HM1]

“I do not think we have an issue with funding for investment, but we do have a challenge with funding at the very early stage. This is at the Angel stage or at the MVP (Minimum Viable Product) stage or at the prototyping or product market validation stages.” [SF3]

In order to attract and secure funding, the following were reported as key pre-requisites on the part of digital innovators: early-stage funding to attract follow-on funding, knowledge of available funding options, ability to pitch right to both local and foreign investors while demonstrating the return on investment factor for the investor, commendable track record, financial management skills, a good understanding of the value chain of local financial market, sound startup valuation, global visibility and structuring your startup towards target investment of interest. Table 14 presents some research participants’ responses concerning the pre-requisites. The Digital Innovation Success Factor (DISF) was defined under Chapter 3 and included in the conceptual framework (Figure 3-4). A categorisation of the overall feedback on each pre-requisite is given to denote the dominant factor as either an enabler (+) or a barrier (-) or both ($\pm$), within the context of Kenya.

Table 5-5: Multi-level Sub-themes under Capital Theme

Theme: Capital				
Level 1 Sub-theme: Financial capital				
Level 2 Sub-theme: Attract and secure funding				
No.	Level 3 Sub-theme	Description	Data Extract	Dominant DISF Categorisation (+, -, $\pm$)
1	Early funding attracts follow-on funding	Impact of inadequate early-stage funding reported to hinder follow-on funding.	<i>“De-risking and early on attracts follow on funding. If there has been someone who believed in you, it comes out as a validation for your business and therefore you have higher chances of attracting further follow on funding....” [HM5]</i>	-
2	Knowledge of available funding options	Kenyan technology innovators or startup founders faulted to lack requisite knowledge of available and accessible funding options.	<i>“I think the other reason is people have different businesses and different other avenues of earning money and are not sensitised on startups investment. That you can come up with an idea and people invest in your idea.” [SF5]</i> <i>“Investors invest in very specific things; an energy investor will not invest in a Fintech company. A Fintech investor will not invest in a mobility company and smart founders know that.”</i>	-

Theme: Capital				
Level 1 Sub-theme: Financial capital				
Level 2 Sub-theme: Attract and secure funding				
No	Level 3 Sub-theme	Description	Data Extract	Dominant DISF Categorisation (+, -, ±)
			<i>They will have at least one or two conversations with investors, and they are able to extrapolate information very fast. And when they make a mistake, they use those mistakes to inform their next decision.” [VC1]</i>	
3	Pitching right	Kenyan technology innovators or startup founders reported to lack ability to “communicate the language of the investor”, articulate their ideas, give accurate and sound valuations of their startups, and ascertain their ability to manage funds effectively (financial management skills) to attract funding.	Financial skills: “you need to understand the value chain of this financial market because if you do not understand what is driving the investor’s decision making, and the person that comes after the investor, all the way to private equity, all the way to the IPOs, that value chain, and understanding what the incentives re for each player, each actor in that value chain, and then you work backwards” [HM3] “You need your CFO to know how to fundraise, how to write a deck, how to tell a story, and so on and so forth.” [SF4] Communication skills: “It is the network. I talk to people virtually everywhere, those in the diaspora and Silicon Valley. The role of networks, and even understanding the funding process, is key. Here (in Kenya) they (innovators) just come up and pitch. They need to go in forums where other innovators are pitching, to learn what happens in pitch, what investors want, how to present, and how to get the best speaker to make a presentation. You find with the western world innovators will come like 5 people and will get someone who speaks very well to pitch.” [GOV1] “And also, you must understand how to sell... So, we are lacking sales skills at the core.” [SF4] Valuation: “Even investment fund raise was also a very cumbersome process because there were not a lot of startups that you could benchmark with to estimate valuations of similar companies. You could only look at global companies and benchmark with them. But you must understand that again when you are in this part of the world (Kenya), the users are very different from East and West Africa to South Africa.” [SF3]	-
4	Track record	Having a track record of proper utilisation of	<i>“If I have a child that is in university, and she or he graduates, I cannot give them the money I am paying for tuition and tell them to go start a</i>	-

Theme: Capital				
Level 1 Sub-theme: Financial capital				
Level 2 Sub-theme: Attract and secure funding				
No	Level 3 Sub-theme	Description	Data Extract	Dominant DISF Categorisation (+, -, ±)
		funds was reported as important in attracting follow-on funding.	<i>business of their own. So, you really expect a stranger to come and give you money? And based on what?" [HM3]</i>	
5	Knowledge of local financial market	Most technology startup founders and innovators reported to lack basic knowledge of local financial market.	<i>"...and then you need to understand the value chain of this financial market" [HM3]</i>	-
6	High Risk Non-Investable Startups	Technology startups reported as high-risk thereby discouraging investors from funding them without a government endorsed de-risking mechanism.	<i>"And then there are funds the government has that they give to businesses. They only give to those SME's; they do not understand the term "startup". When you say a startup, to them it means we're trying something of high risk and it might not succeed, so they are only giving money to those SMES which they have seen (business model is well understood), or they have started getting revenue." [SF1]</i>	-

Overall, for Kenya's digital innovation ecosystem to attract local and foreign investment, research participants recommended the following: global publicity of successful homegrown digital startup innovations, re-investment by successful local startup-exists into early stage and growth stage local innovations, de-risking mechanisms and structures to attract and protect local, diaspora and foreign investment.

"A little bit missing that we also would love to have seen more successful exits where tech entrepreneurs exit, and they exit with enough money to then start reinvesting into the next generation. I do not think we are seeing that to the extent that we needed, and I think this is a problem." [HM1]

"The other thing also is internationalisation. How are we able to promote and talk about the startups that we have in Kenya?" [IND2]

"So, I think I said founders who are successful can reinvest into new founders." [SF1]

“The more you (innovator) do it, the better you become at it. And then you also start getting awards. They may not be monetary awards, but that also enhances your profile and increases your chances of being seen by an investor because the more visible you are, the higher the chances of an investor finding you on the Internet and directly reaching out to you.” [IND2]

Concerning structures to encourage investment, many research participants suggested the following as potential mechanisms to attract and encourage investment in digital startup innovation. First, there is need for awareness creation and education of local investors on digital innovation as a viable investment opportunity. Second, considering the high-risk nature of digital startups, the need for a de-risking mechanism for local and foreign investment was reiterated as a potential enabler. Third, an investment pathway that considers the nature of local digital startups and which provides a trenched funding disbursement approach was recommended as a potential enabler. It was noted that such trenched funding disbursement approaches are common in business incubators, thereby benefiting digital startups that operate in a structured innovation environment.

“The other bit that I think can be of importance is educating or rather creating awareness on startup investment for the local investors. Building on local angel investments, a lot of angel investment education on how to invest in startup ventures instead of investing in assets and land. De-risking structures that can encourage local investment can include investing in pools as angels to consolidate a huge unit amount that can be channelled to startups, putting in place post investment structure, with follow up and trenched disbursements to reduce malpractice and mismanagement of funds.” [HM5]

Perspectives around the issue of attracting and securing funding, as expressed by the research participants, confirmed key funding challenges that digital startups in Kenya face at pre-seed and seed stages. First, it was reported that there is a general hesitance to fund digital startups in Kenya. A justification for this view, as pointed out by some research participants, was that Kenya has few “investable” digital startups. Instead, as one research participant puts it, there are more “necessity entrepreneurs” in the ecosystem whose funding absorption capacity may not match that of the investors’. Funding may not be an enabler of success in a context or a case where a technology startup's funding absorption capacity is low. Considering this, an investment ready startup is one that can utilise several rounds of funding towards successful ideation and commercialisation of a digital innovation.

“So, as much as we might say there is no sufficient investment, on the other hand, there are people who are looking to invest, but there are no sufficient businesses pipelined for investment.” [HM5]

“...here was a company that was interested in supporting innovations in the energy area, and they were saying they want to invest at the lowest 250,000 dollars per innovator, per start up. That is Ksh.25 million Kenya Shillings. Which start up or innovator in Kenya can absorb 25 million Kenya Shillings? None! So, the absorption capacity is very low. The absorption capacity is about \$10,000 dollars, maximum \$15,000 dollars.” [AC2]

The following quote addresses the challenges of investing in an ecosystem with more “necessity entrepreneurs”. An ecosystem with empowered entrepreneurs, who are well resourced and capable of channelling majority of the funding received from an investor to grow their businesses, is more likely to attract serious investment, as the likelihood of ROI for the investor is higher.

“What we learned from 30 interviews with entrepreneurs was that access to finance was the perceived biggest obstacle to grow or to even start. I will come back to why I emphasise the word ‘perceived’. Then a little bit by chance, in 2007 a little bit after the survey and study, we were connected to an emerging Danish peer-to-peer lending platform and became their first partner here in Kenya in 2007. For us, that was a means to try and see whether we could address that access to finance those entrepreneurs had been talking to us about. So, we became the first partner of this platform here and ran this platform from 2007 to 2011. In 2011, we carried out a survey among 1500 lenders, and the clear conclusion was that what we were catering for was what we would call ‘necessity entrepreneurs’. So, they were not entrepreneurs that were looking to grow big business that could employ a lot of people and create economic growth. They were typically very small family businesses that were trying to serve the immediate family. And there is nothing wrong with that. It just was not our DNA right fit. So, we opted to step out of this at the end of 2011, and then went back to the drawing board and decided what we wanted to do. So, we decided to focus on fewer high potential entrepreneurs that want to grow big business and will have ambition for doing so. Entrepreneurs understand that money is part of the equation for growing your business, but you need a lot of other input to be able to grow and scale your business. And this then gave birth to our flagship activity, which is an accelerator program in Kenya.” [HM1]

Tied to the investment readiness issue is “founder greed”, which one research participant noted to be a potential reason for limited investment on digital startups in Kenya, thereby posing as barrier to digital innovation success. ESOs such as incubators and accelerators can manage such malpractices, through mechanisms such as trenced disbursements, where funding is related to innovators when they meet a certain milestone.

“Why startups in Kenya are not thriving is some founders are greedy! So, you get investor money, and you assume it is your money. You buy a car, move to a big house, and whatever you pay yourself is a very high salary. You (innovator) do not really understand you were given this money to build a business. That is part of why startups fail.” [SF4]

“...trenched disbursements of investments, to reduce the malpractice or mismanagement of funds.” [HM5]

Commenting on funding access challenge, one research participant was keen to point out the difference between funding access for digital startups in Kenya versus those in Silicon Valley, noting that the latter are “spoilt” with funding from early stage. Research confirms an abundance of startup capital in Silicon Valley as evidenced by the large pool of VC firms and Angel Investors who are actively looking to invest in startups (Ester, 2017). Further, investors in Silicon Valley have been reported to be less risk averse compared to those in Global South countries such as Kenya. This could be because of the stable regulatory and business environment in the North, such as what we see in Delaware, which gives the investors’ confidence in the possibility of ROI. Also, VCs and angel investors in the Silicon Valley hold several pitch events in the Silicon Valley, which exposes the innovators to more funding opportunities. ESOs such as accelerators and incubators in Silicon Valley are reported to have more funding channels and initiatives geared towards empowering an innovators capability to attract funding at various stages of startup development. Financial support from “family, friends and fools” (Ester, 2017) is also adequately accessible in the Silicon Valley.

“In Silicon Valley, you can easily get a million-dollar funding. You can get a good amount at the idea stage. Locally, you need to have proven the model for you to even come close to that.” [SF4]

“But when I compare Silicon Valley, I will say those people (innovators) are spoilt. Those people are recycling money around speculation; speculation is not bad. I mean, that is what the stock market is all about. I mean you speculate; you try to look at the trends, and the performance of a particular company.” [HM2]

“So, the environment, I would say is, is different in that things take a bit more time here (Kenya). In other countries, you would find startups getting funded a bit faster.” [SF5]

Third, local investment was reported to be at a low by most research participants. Diaspora community investment was said to be lacking, negligible and not well enabled. To address the gap, some respondents recommended the need for a de-risking mechanism to enable and protect diaspora investments that support innovative entrepreneurship activities in Kenya. De-risking mechanisms may also make startup investment at early stage more attractive, by bridging the gap between risk-averse investor and a technology startup (Wu, 2016, p. 22), thereby empowering more success stories. Angel investors often invest small amounts of money and do so at early stage compared to VCs, who have more access to capital and hence high-risk appetite and capacity (Wu, 2016). In the Global North, particularly the United States of America (USA), investors are required to meet a net worth of at least USD \$ 1 million,

which should not include value of assets such as primary residence or have an annual income of at least USD \$ 200,000 for the last 2 years before being registered as an investor (Wu, 2016, p. 22). The importance of setting such a criterion in Kenya may enable Government to put out de-risking policy and regulation, or initiatives that target the right group of investors. Local investment and reinvestment by successful local startup exits were also reported to be at a low. These three sources of funding were seen as potential enablers of digital innovation success for local technology startups.

“... we need to have a discussion on how we get local people to invest in Kenyan startups and even for them to see the value of that. But so far, it is mainly foreign investment because it is very hard to find a local person investing in a local startup. It is very rare.” [IND2]

“...we have seen founders who exited, and they sold their companies, and made good monies, but we are not seeing them reinvesting the money into local startups...” [SF1]

In the case of Government funding, one research participant pointed out that the challenge in securing the funding is because technology startups are seen as “high-risk non-investable ventures”, whose business model is not well understood or most often assumed to be like that of Small and Micro Enterprises (SMEs). More start-up friendly funding was recommended as a potential enabler of success.

“And then there are funds the government has, which they give to businesses. They only give to those SMEs. They do not understand the term ‘startup’. When you say a startup, to them it means we (innovators) are trying something that is high risk and might not succeed. So, they are only giving money to SMEs, which the business model is well understood, or they have started getting revenue.” [SF1]

Lastly, it was reported that there exist “stringent fundraising requirements” for technology startups in Kenya, which could bar innovation activities and progress. It is common to find many digital startups that are not compliant with certain requirements such as proof of payment of taxes and more. This boils down to the lack of knowledge on policy and regulation, business management and more on the part of the innovator.

“Otherwise, raising capital in Kenya is very difficult. I cannot tell you it is easy.” [SF8]

“...to fund raise, you must be registered, must be paying taxes, must have a data roll (how you have organised your company data)” [IND2]

5.3.2.4.2.2 Intellectual Capital

The intellectual capital sub-theme was lightly touched on as an enabler of digital innovation success by the research participants. Issues around human capital such as access to talent and skills, access to right /strategic partners and innovator's technical skills were presented as key enablers of digital innovation success for local technology startups. Regarding talent and skills, it was reported that the Kenyan population comprised of a young, fairly, tech savvy population capable of leveraging on digital technologies to solve a myriad of social problems affecting the Country and the East African region. Talent wars between digital startups and large firms was noted as a challenge that could potentially hinder innovation success. This is because digital startups are not able to match the highly competitive job offers with enticing perks that large conglomerates operating in Kenya offer. There are instances where working at a tech startup is more advantageous, because of less formal and dynamic teams, and more opportunities for personal growth. However, in Kenya, the churn rate of talent in tech startups to corporate is seen to have increased in the last 7 years, which could be attributed to the rising number of tech job openings emanating from technology giants such as Microsoft (MARI program), Metta (through Andela program), AWS among others, who have opened regional offices or programs targeting tech talent in Kenya.

“The other thing that we need is solid talent in the market. Talent wars have been happening for years and years. There is nothing new right now but finding the right talent to be the first ten members of your team is extremely important.” [SF3]

On the part of the innovator, age and work experience were reported as important components of intellectual capital that could enable or hinder digital innovation success. Age is an important agency resource in Dorothea Kleine's Choice Framework (Figure 3-3). Two research participants, who have worked with digital startups for more than 20 years, pointed out that global statistics show that mature digital innovators or digital startup founders are more likely to successfully run an innovative venture compared to young people. This claim goes against the common belief that young people are more likely to succeed in a tech venture as they are likely to be more tech savvy, creative, agile, (Shane & Venkataraman, 2000), and have less family distractions and responsibilities (Azoulay, Jones, Kim & Miranda, 2020). Azoulay et al. (2020) reports the rise of “ageism” in Silicon Valley, as evidenced by the preference of most investors on tech startups led by young founders. On the contrary, the more mature innovator is said to be more invested in success. Azoulay et al. (2020) study on the influence of age on

venture success in the USA revealed that age does indeed matter. They report that middle-aged entrepreneurs, with a mean age of 45 years from the data sampled, are more likely to succeed in new ventures, even in the technology sector and successful firm' exists. Work experience, reliable human capital, social capital, and financial capital were among key reasons that favour a mature founder (Azoulay et al., 2020). The same is reported to be true in the Kenyan context, where young innovators are resource constrained. Non-academic articles agree with the claim that mature founders are more likely to achieve venture success than young founders. One such article is a 2022 LinkedIn article on “Older Founders: 5 Reasons Why 50-Something Entrepreneurs Are More Successful” authored by Ellen Kocher.

“We tend to look at entrepreneurs as being young people coming out of university and recent graduates. If you look at the statistics, I think the global statistic from LinkedIn is that the average age of the successful entrepreneur is early 40s to mid-40s. That means by that age, whatever you came with in terms of network from university and whatever else you came with, is still important, but it is not as important as when you are a recent graduate.” [HM1]

“Statistics have shown that if you are in your 40s, especially 45, the age of 40 to 45, more mature people are running stable businesses and startups compared to the younger innovators or entrepreneurs. So, the younger ones are seeing that they have time to keep on experimenting. They have also not had experience of what it means to painfully fail when things are dependent on you, and you have responsibilities. So, when you have fewer personal responsibilities, you can easily take risks, so therefore if an idea fails, you can easily abandon it. But the others, yes, they understand risk, but they are more intentional because they have all these tools that they have built with time that can help them to cushion some of this risk even as they are taking up those risks.” [HM2]

In the case of right partners, most research participants were of the view that collaboration with strategic partners, who can support the operationalisation of a digital innovation in a local and global scale could potentially lead to digital innovation success. Strategic partnerships are important for tech startups that often operate in fast-paced volatile environments. The conceptual framework (Figure 3-4) presented in chapter, which adopts Dorothea Kleines' Choice Framework, (Figure 3-3) which emphasises on the importance of a well-resourced agency that can identify and leverage other external resources towards enhancing their capability to achieve desired development outcome(s). RDT principles can help identify resources that are most critical to digital innovation success. By understanding these dependencies, digital startups or digital innovators can develop strategies such as exploring strategic alliances with stakeholders who have access to critical resources.

“We did not have the money to set up a lab. So, what we did instead is we partnered with another lab...”

“When I started Company [ABC] in 2015, I think I was very self-aware in the sense that I did not want to be a sole founder. So, I was talking to multiple people to see if I could join forces with them to find a co-founder. So, I met my cofounder in San Francisco.” [SF3]

Regarding psychological capital, a sub-theme of intellectual capital, issues around innovator mindset (independent or dependent), diligence, resilience, passion, and commitment were reported as important traits that could help local digital innovators steer their innovations to success. The conceptual framework (Figure 3-4), a refinement of the Dorothea Kleine’s Choice Framework (Figure 3-3), presents psychological capital as an important agency resource that may empower a digital innovator to achieve Digital Innovation Success (DIS).

“The success of a business as much as yes, someone in an incubation has a slightly higher advantage, the success of any business comes down to consistency, passion and grit of the entrepreneur who is running the institution.” [SF2]

“It took us about a year to be able to get a proper client.” [SF8]

“The other one is that the ones who go through the incubator probably have a different kind of mindset. Yes, they want to innovate, yes, they want to solve a problem. But also, there is a bit of a dependency kind of mindset That they cannot be able to bootstrap by themselves.” [HM3]

5.3.2.4.2.3 Non-Financial Capital

Finally, test tools and environment were reported by one research participant as an important non-financial capital that could enable the success of capital-intensive digital innovations. However, these seem to be lacking, inadequate and inaccessible for technology startups in Kenya.

“But the biggest factor here is capital and tools. Who gives you an environment to go and test compression of methane in Kenya? You need to go to someplace in Germany to do that testing!” [AC2]

5.3.2.4.3 Culture

Moving on to culture, many research participants reported that Kenyans have a culture of innovativeness, with a commendable knack for business and entrepreneurship. In addition, it was also reported that there is a general openness to foreign ideas and innovations. Some research participants were of the view that the innovativeness of Kenyans could be attributed

to “foreign influence and international mindedness” of the digital innovators, which they argue could also play out as a barrier to digital innovation success. International minded innovators were reported to push foreign solutions to the local market, where they do a few customisations, which often fail to align with the demands and user profile of the Kenyan context. To quote the research participants, it was reported that most of the imported foreign digital solutions do not perform well in the local market due to product-market fit challenges. Also, the ease of assimilation of foreign ideas was reported to be a potential hindrance to the success of homegrown solutions as foreign solutions have a competitive advantage in terms of resources.

“So, our environment has also built a particular culture where we are always looking for ways of advancing ourselves commercially, trying to improve our living standards. So, it is also the culture of the Kenyan people to always be on the move, to know what is new. The fact that we integrate very easily with people of other nationalities, then it becomes very easy to even know what is happening and integrate some of those ideas into our environment. Our culture also has provided room for openness, so it is a mixture of certain elements.” [HM2]

“Kenyans I think as well are relatively internationally minded.” [HM1]

5.3.2.4.4 Digital Technology

Turning now to the digital technology theme, which is included as an important structure element in Dorothea Kleines’ Choice Framework (Figure 3-3), most research participants gave positive feedback, quoting notable developments in Kenya, which have led to increased access to Information and Communication Technology (ICTs), a key enabler of digital innovation access. First, increased mobile penetration rate, spearheaded by Telcos that continue to expand their network coverage to previously unreached rural areas, was reported to be an enabler due to increased access to the Internet. In addition, the fibre optic cable was also mentioned as an enabler, as it has made it possible for digital innovators to access high speed affordable Internet. Affordability here is based on the purchasing power of majority of community of innovators in Kenya. Compared to the high cost of mobile internet, fibre enabled Internet connection is considered favourable for running company operations that require high speed affordable Internet. In summary, Internet access was seen as key enabler, which provides a digital opportunity for information access and consumption, thereby contributing to the rise and empowerment of a technology savvy population with capacity to innovate successfully.

“We have been able to grow this business through technology right up to more than \$1,000,000 dollar valuation.” [SF2]

“Mobile phones and mobile networks have increased Internet penetration because according to statistics for 2020 to 2021, it shows almost 115% mobile penetration. Meaning that everybody has access to a mobile phone. With increased mobile penetration, it means that the biggest percentage of the population have access to Internet, which translates to access to digital opportunity and information that is globally available.” [HM5]

Research participant HM5 further noted that elimination of the barrier of access to digital technology does not necessarily guarantee innovation success. There is a gap in proper utilisation of knowledge of digital tools and platforms, particularly to innovate.

“To build that up, it means that the level of entry to uptake and utilise digital opportunities have really increased with access (to digital technology) because access is the biggest barrier. If that is addressed, then we move to the next level of know-how and utilisation of knowledge. There is a huge segment or demographic that have access to information, have access to the Internet, but they have not able to utilise it in a manner that can be useful.” [HM5]

Second, access to open-source software was reported as both an enabler and barrier. As an enabler, open-source tools are seen to support resource strained digital innovators or startups to build and test their innovation before going to market. As a barrier, limitations on usage in terms of number of users or transactions that can be supported (scalability or elasticity), and data integrity challenges were reported as key concerns.

“The challenge was the fact that it was an open-source kind of platform. It was very easy for us to not have integrity in terms of the data that the clients were giving us, and it was also difficult to continue to scale. You know, the issue with being a gift shop is you are a very seasonal business. So, there are days when you do your average normal orders like maybe 100 to 200 orders every day. But when it comes to a very peak period like Valentine's Day, we will easily do 2000 to 3000 orders on that single day. So being able to allocate resources that enable your digital platform to expand to allow that kind of traffic within a day and contract within the next day, that proved to be one of the hardest hurdles that we would cover and that's why we went with Shopify eventually because Shopify basically allocates to us the bandwidth we would require at that point in time and when the higher peak periods came they were able to expand without hurting us as a business and still compressed when we didn't really need. That was very key to us initially. I think our website crashed for more than three days consecutively because of how much traffic was coming in on those specific days.” [SF2]

Third, as technology changes rapidly, the challenge of speed of implementation on the part of the innovators was reported as a potential barrier to success.

“One thing that we have learnt also with technology products is that the speed of implementation is very important. You must be quick in executing your idea.” [SF8]

5.3.2.4.5 Education

Turning now to education theme, another key element under agency resources in the Choice Framework (Figure 3-3), most research participants indirectly mentioned formal education

offered in tertiary institutions in Kenya as an important enabler to DIS, particularly when used to build digital and entrepreneurship skills. McCarrick and Kleine, 2019 are of the view that the focus of educational institutions should take a more humanistic approach that stays clear of treating learners as mere human capital. Instead, the focus should be holistic and geared towards imparting all round change in human “behaviors, thoughts and feelings”. This prepares learners for developmental outcomes such as digital innovation success.

Notwithstanding the inherent culture of learning reported in Kenya by some research participants, access to education for all was reported as a challenge, quoting low transition rates from primary level education to secondary school, and ultimately to institutions of higher learning.

“We do not have 100% transition to high school. Also, we do not have 100% transition to university. And there are loopholes of attrition that are not necessarily addressed.” [HM5]

University curriculum was also faulted for being behind, thereby creating a skills gap in science, technology, research, and innovation. More details on this issue are presented under the Academia sub-theme.

5.3.2.4.6 Entrepreneurship Support Organisations (ESOs): Business Incubators, Accelerators, Technology Hubs, Research Centres, Academia

Entrepreneurship Support Organisations (ESOs) was a new theme that emerged from data and was the second most relevant theme as presented in Table 5-3. This theme amalgamates digital innovation or digital entrepreneurship intermediaries that are seen to provide services that could potentially enable or bar digital innovation success as reported by research participants. These include business incubators, accelerators, technology hubs, research centres and academia. These intermediaries provide a structured innovation environment.

5.3.2.4.6.1 Academia

The traditional role of academia has been to spearhead scientific research and innovation that can improve business processes and human life. In Kenya, university research was reported to be at a low, citing limited researchers (lecturers are overwhelmed with daily teaching hours), funding challenges, inadequate researcher skills and a disconnect between researchers and the realities of local problems, as most research initiatives in academia are foreign funded.

One research participant pointed out that in Kenya, academia is so “de-linked” from startups, which hinders reuse of research outcomes by startups to build successful innovative ventures.

In other words, and as highlighted by another research participant, university research remains inaccessible to local innovators as it is either; locked up in some university digital library, with stringent access requirements or is too complex to be understood by a layman. The research participant added that such research needs to be “dumbed down” for it to be consumed by “mama mboga” (a female vegetable seller in Kenya). Challenges in publishing and commercialising research emanating from academia were also reported. Most of the research from students was said to be disconnected from the realities of local problems, as the focus is more on graduating and not solving real-life problems affecting Kenyans. The research participants concluded that solutions that emerge from such research have a limited chance of success. Stringent intellectual property requirements by universities were also reported as potential barriers to publishing of academic research for consumption by public, including digital innovators.

“I have given talks to Deans of a university trying to explain to them that the research they have sitting in their departments can be turned into cash. But then what the universities need to do is to drop requirements such as 80% of the ownership of any IP belongs to the university. And I say 80% of a queen cake is negligible. 10% over a two-kilo cake is much more.” [M1]

In addition to knowledge creation, Kenyan universities were reported as centres of learning, whose core mandate is to impart relevant knowledge and skills. However, many research participants noted that University curriculum in Kenya appears to be misaligned with local and global market talents and skills needs. Also, as technology is progressively changing, it was argued that University curriculum may not keep up fast enough. This further widens the digital skills gap, limiting available talent with technical skills needed to run successful venture or skills that digital startups could employ. Research participants also noted that more needs to be done concerning churning out research that can influence policy and regulation towards digital innovation success.

“Universities are a good pipeline of giving out innovations.” [IND2]

“...You know Siri, what we use in iPhones, which is a Stanford innovation lab project. The COVID-19 vaccines we use such as AstraZeneca, is an Oxford innovation. Again, what are our (Kenya) universities doing for the last 100 years.” [VC1]

“So, what I would say we need to do is to get our research work that is sitting in institutions of higher learning, dumbed down, so that entrepreneurs can understand what findings were there. Let us make it available to entrepreneurs and the so-called startup founders, because the research already identifies a problem and provides a solution. So, the question now becomes,

how do you then take those two, and put technology so that we can do what took the West 50 years, we can do it in a year? That one is a hard nut to crack!” [M1]

“I will say that Universities are playing the role of developing talent that then becomes the innovators of these new solutions. But also, some of the universities are now looking at research. Unfortunately, it is not self-generated research, most of what we have seen in universities (in Kenya) is according to what other ‘parties’ (foreign entities) want to fund for research! We want to see a future where the universities can now have those brains and that talent that wants to initiate research that has been vetted (peer reviewed).” [HM2]

“For me, I think where academia has been important is in policy making. If academia can work very closely with government to reinforce and expedite some of the policies that help the growth of the Startup ecosystem then, I’m all for that.” [SF3]

“Universities are not spending any money on startups when money comes for startups. They ‘eat it’ (corruption)!” [VC1]

5.3.2.4.6.2 Business Incubators, Accelerators and Technology Hubs

As mentioned previously in the introduction chapter, business incubators, accelerators, and other Entrepreneurship Support Organisations (ESOs) and innovation intermediaries have been seen as “increasingly important in promoting” digital startups (Díaz-Santamaría and Bulchand-Gidumal, 2021, p.2). The conceptual framework (Figure 3-4) introduces the Structured Environment Support Services construct, which may contribute to DIS in some cases, as not all incubated digital innovations succeed. In Kenya, Business Incubators, Accelerators and Technology Hubs were reported by research participants to provide the following support services, albeit with operational and sustainability challenges: co-working space, ideation and funding support, market validation and exposure to new markets, networking opportunities, clear growth strategy and customised support. Some research participants argued that such support services could potentially slow down the death rate of technology startups operating within such structured innovation environment. Also, business incubators were reported to be centres of knowledge on matters digital startups and digital innovation. Such knowledge if properly harnessed could inform initiatives, and influence policy and regulation geared towards digital innovation success. Table 5-6 lists sample support services and data extracts from analysed interview transcripts.

Table 5-6: Business Incubators, Accelerators and Technology Hubs Services

No.	Support Service	Data Extract	Factor Reported in Empirical Context	Dominant DIS Outcome (+, -, ±)
1	Business coaching and mentorship	<i>“So, the beautiful thing about being in an acceleration program or incubation is that you get more support or guided feedback. Incubators organise forums on tax, forums on regulation, forums on compliance for SME and startups so it becomes easier for you to get that guided support on how or what to do.” [IND2]</i> <i>“The ones who go through the incubator, there is a bit of a dependency kind of mindset, that they cannot be able to bootstrap by themselves.” [HM3]</i> <i>“So, with an accelerator or incubator, you get direct access to mentors, you get direct access to advisors, so people can help you to set up your company.” [SF5]</i>	Yes	±
2	Co-working space	<i>“Some of the good things you get from an accelerator is number have office space. That means you have a physical location. That is an advantage. You will have enabling facilities and infrastructure such Internet, Boardroom, you know, all those things.” [SF1]</i>	Yes	+
3	Financial Support	<i>“I have also seen a lot of us Tech innovation hubs starting to also operate as investors.” [HM3]</i> <i>“First of all, you will use our name, therefore you are likely to get more funding.” [AC2]</i> <i>“if you are in one of these incubators or accelerators or VCs, you definitely have an advantage and do not have an issue fundraising.” [SF6]</i>	Yes	+
4	Market validation	<i>“Our job is typically working with startup founders, helping them to understand, is there a market, can you validate this market? How do you get your product market fit right? How do you build a business that you are going to monetise?” [HM3]</i>	Yes	+
5	Networking opportunities	<i>“The other advantage is you have a community of innovators with whom you can share ideas. Even when you are looking for co-founders, it is easier to get a co-founder from an accelerator because there are many guys you meet and interact with on a daily.” [SF1]</i>	Yes	+
6	Legal guidance	<i>“So, for instance, when it comes to issues to do with governance, issues to do with legislation within a company, those are things that being in a</i>	Yes	+

No.	Support Service	Data Extract	Factor Reported in Empirical Context	Dominant DIS Outcome (+, -, ±)
		<i>structured environment might push you to get early on.” [SF2]</i> <i>“So, with an accelerator or incubator, they help you to do any due diligence that needs to be done, from business to legal to investments as well.” [SF5]</i>		
7	Knowledge centres	<i>“...incubator and accelerator, being knowledge centres and consolidation of experience, research and insights into you what is happening.” [HM4]</i>	Yes	+
8	Clear growth strategy	<i>“I think, a startup knowing what the growth path is, the next step, or a structured approach and pipeline...” [HM1]</i> <i>“If we had gone through the route of incubator, we would most likely have launched or gone to market earlier than 2020.” [SF5]</i>	Yes	+
9	Acceleration support	<i>“...that time could have been cut significantly lower compared to us joining an accelerator, which could take us to the next level.” [SF5]</i>	Yes	+

However, some research participants expressed concerns on the financial and technical capacity of some business incubators in Kenya. They reported that some incubators in Kenya, often after 6 to 10 years of existence, are not able to run basic incubator operations, forcing them to change their business model entirely to that of a technology startup to attract funding. It was reported that those that continue to operate as incubators or accelerators, are forced to do other income generating businesses to execute their core mandate as Entrepreneurship Support Organisations (ESOs). Some research participants pointed out that the operational inefficiencies could be attributed to dependency on donor funding, a lack of a financial strategy and sustainability plan, and poor implementation of the business incubation and acceleration models which are seen as foreign concepts. Also, other incubators were said to operate in Silos, locking out other ESOs with whom they could collaborate as a sustainability strategy. Kenya however is reported to have 70 innovation and technology hubs that support digital innovators and entrepreneurs to start, build and grow their technology startups (Lewis, Schneegans and Straza, 2021) compared to other countries in East and Central Africa, which could potentially balance off this barrier.

Touching on the relevance challenge, some research participants added that the interest to join incubators by most mature digital startups in Kenya was at a low compared to 10 years ago. Research confirms that a choice between one accelerator over another could have a “significant economic difference on the performance of a startup” (Díaz-Santamaría & Bulchand-Gidumal, 2021, p.2). Respondents reported that in Kenya, the decision to join an incubator is increasingly being driven by the innovator’s decision to want to join and not the perceived value of working under an incubator or accelerator. Local digital startups are aiming for international accelerators such as Y Combinator. One research participant reported to have been successfully admitted to Y Combinator.

The operational and relevance challenges, as pointed out by many research participants, could hinder digital innovation success, particularly in instances where a nascent technology startup is forced to exit the incubator or accelerator pre-maturely.

“So, the accelerator-incubator situation, while not being bad, our thinking is that an entrepreneur needs to know what they are going to do in an accelerator because half the things that most people go to be taught in accelerators are available on the Internet. If an entrepreneur is not always in a constant posture of learning, that is a problem. It is very few times you teach someone how to be a good startup founder, who can say ‘I took three classes there now I am brilliant startup founder!’ Most people go to accelerators and incubators to find money, not for education. And most accelerators and incubators do not have money. So now you have a catch 22 situation. Some of them ask you for stocks for your company. So, you gave away stock, you did not get any money, you are poorer today than when you went in the incubator or accelerator!” [M1]

“But I think the incubation hubs in Kenya, as in most of other markets, have become less and less important as more and more VC (Venture Capital) money is coming directly to the startup. So, people today have more avenues of reaching an investor community.” [SF4]

“So, we basically are borrowing what we have seen working elsewhere and trying to adopt it to our environment.” [HM2]

Moving to other issues mentioned by the research participants, it was noted that the support offered by some incubators or accelerators in Kenya, especially those that are primarily impact driven, may not always align with what a digital startup needs to thrive. Addressing this issue, one research participant commented:

“Impact driven accelerator or incubator takes the company, sometimes, away from what their core product should be. So, for example an investor can only invest in you if 50% of your employees are women...” [VC1]

5.3.2.4.6.3 Research Institutes

Recent studies report research institutes as important innovation intermediaries that could steer digital startup innovation towards success. De Silva, Howes, and Meyer (2018) reports Research and Technology Organisations (RTOs) as “significant innovation intermediaries and key actors in Europe’s system of innovation” (p. 47). In Kenya however, research institutes were reported as centres of “great research, but no innovation”. This presents them as more of a barrier rather than enablers of DIS.

“We have one of the largest research institutes, the National Research Institute for Agriculture in Africa. We are still not secure. The Kenya Medical Research Institute (KEMRI) is the largest Research Institute for Health. Our drug security is very wanting. Our life expectancy and our health statistics are still, and comparable with the least developed economies. So, that gap is because of our inability to innovate. Not because we are not doing amazing research. We do great research, especially within our Research Institutes. But that is all they know and understand. They do not understand the business, the policies, and the incentive mechanisms within the STEM field. The Kenya National Innovation Agency (KENIA) has a lot of work to do to put in place those systems and structures because, again, it is about understanding how money flows” [HM3]

5.3.2.4.6.4 Telcos

In Kenya, innovation activities driven by telecommunications companies such as Safaricom were reported as key contributors to the rise and early growth of Kenya’s digital innovation ecosystem. Mobile phone and mobile internet penetration were reported as key catalysts of initial innovation activities in Kenya as early as 2006. The mobile network penetration is said to have led to the proliferation of digital innovations in FinTech as previously explained in this chapter. M-pesa, a mobile money banking solution, is reported as the pioneer of this wave, with other innovations building on its APIs to deliver financial services to a previously unbanked population, through mobile applications.

“Of course, it came with the disruption and the pieces that came with M-pesa and the fact that we could digitise money and move it around in our mobile phones.” [IND1]

Despite the Telcos monumental infrastructural initiatives that catapulted Kenya’s digital innovation ecosystem to its current state, some research participants noted barriers of digital innovation success driven by the same Telcos. In particular, the research participants labelled some Telcos in Kenya as angry sharks who have a challenge in honouring intellectual property (IP) rights of some local digital startups, who got to them for partnership or funding. The Telcos were also accused of holding back innovation often led by digital startups, especially if the innovation is perceived as a potential threat to their business.

“I think Company [XYZ] whether right or wrong, has a reputation of not always honouring IP. We have seen examples where they are interested in holding back innovation if it is potentially threatening their business. Large corporates, at times, are enemies of innovation. If it is not benefiting their business, they would want to use whatever means they have to proactively put a hold up on to these innovations.” [HM1]

5.3.2.4.7 Government

Literature reports government as key digital innovation stakeholders, which enrich an innovation ecosystem (Sun et al., 2019). The Government of the Republic of Kenya has made noteworthy contributions towards creation of successful digital innovations as previously discussed in earlier chapters of this thesis. Key sub-themes that emerged under major theme ‘Government’ include ‘role of government in providing a conducive business environment’, ‘funding’, ‘favourable policy and regulation’ and ‘customised support for individual innovators. Government-led infrastructural developments were also reported as potential enablers of success. In the 2022 Jamuhuri Day (Independence Day) celebrations, the Government of Kenya made, through the then President, made commitments towards creating infrastructure and enabling environment for ICTs and technology innovation as a means of building a progressive and inclusive digital economy. Expansion of the fibre optic cable to increase internet access to previously unreachable areas, free training on ICTs for youth via partnership with Arizona University dubbed project “Innovation Jamuhuri” and delivery of government services online were among other key commitments made by His Excellency the President of Kenya, Dr. William Ruto during the 2022 Jamuhuri celebrations (Republic of Kenya, 2022).

Commenting on the issue of business environment, research participants reported the following aspects shown in **Table 5-7** as potential enablers of or barriers to digital innovation success (DIS) for technology startups in Kenya.

Table 5-7: Multi-level Sub-themes under Major Theme ‘Government’

Major theme: Government Sub-theme: Business Environment		
Sub-descriptor	Data Extract	Dominant DISF Categorisation (+, -, ±)
Barriers to entry	<i>“Barriers to entry...the ton of regulations that you must go through before even setting up your own company in Kenya. That</i>	-

Major theme: Government Sub-theme: Business Environment		
Sub-descriptor	Data Extract	Dominant DISF Categorisation (+, -, ±)
	<i>discourages a lot of people from even trying to start their own company or approach investors.” [SF5]</i> <i>“The process of registering businesses in Kenya sometimes is long. You will expect that as a startup, within a day, you have your company registered. But that's not the case.” [SF1]</i>	
Foreign investment	<i>“Kenya seems to be attracting foreign investment and foreign companies who come and establish here. So, that international presence locally helps to spur innovation because it is very easy to be linked with another innovator or partner from another country. So even in terms of scaling your idea, it is very possible to do that.” [IND2]</i>	+
Innovation capacity	<i>“If you look at AJIRA (a government led training initiative on digital skills), they give them (innovators) free training.” [IND2]</i>	+
Supporting infrastructure	<i>“Government has done everything you need. High Speed Internet. You have mobile phones and 4G network across 80% of this country.” [M1]</i> <i>“... if you go back to the early 2000s when the New Partnership for Africa's Development (NEPAD) was being created, Kenya has taken in investment in mega ICT Infrastructure. In Kenya, I think by the end of this year (2022), we will probably be having 6-7 under-sea Fibre Optic Cables coming to Nairobi. Why? Because the government is making sure that connectivity, Internet speed, is accessible to many.” [HM3]</i>	+
Unstable political environment	<i>“If anyone is looking to go into that market, one thing I will recognise is it is a highly politicised kind of environment. So I (as an innovator) need to be aware that I am in an industry where policy changes at times, because of political interests.” [SF2]</i>	-

Other sub-themes that emerged under the Government major theme addressed issues concerning the role of government in providing financial and non-financial capital to local digital innovators, implementation of mechanisms to attract and protect foreign and diaspora investment, and implementation of enabling policy and regulation. Touching on the issue of government funding, there was consensus on the need for government to set up an innovation fund for local technology startups only. This was seen as a potential enabler of digital innovation success as existing funding frameworks have been modelled for traditional businesses and MSMEs, which excludes technology startups.

“And then there are funds the government has, which they give to businesses. They only give to those SMEs. They do not understand the term ‘startup’. When you say a startup, to them it

means we (innovators) are trying something that is high risk and might not succeed. So, they are only giving money to SMEs, which the business model is well understood, or they have started getting revenue.” [SF1]

In the case of structures to enable investment, most research participants noted the following measures as key in attracting and protecting local, foreign and diaspora investment. First, the need for policy and regulation around retaining local wealth and the trickled down economics of it was reported as a potential enabler. Second, some research participants noted the need for protective regulations for diaspora investment, and sensitisation of the diaspora community on the opportunity of investing in digital startups. According to an article on allfrica.com website, Khs. 42.05 billion was sent home by Kenyans in the diaspora in March 2022 (Nyawira, 2022). Third, an enabling environment for foreign investment was also reported as key.

“When you look at the successful market for investment across the world at a global level, look at Israel, look at Estonia, and look at US. It comes from an enabling environment, and, where the government puts efforts to create structures to enable funding. What do I mean by this? For example, a government should create a de-risking mechanism where it says if you are having abc range of growth and you are doing x within y sector, you will be injected z amount of money. But you must be within q parameters, such as you might have work with a local practitioner or something.” [HM3]

“Because with this kind of organisation and structure, when one wants to invest, they will find a pipeline within certain structures. So, if we have a structured way of knowing who is supporting startups and who they are, then that means we can attract investors who would want to work with us because we are able to provide the businesses that are coming from the country.” [HM5]

Lastly, a de-risking mechanism for local, diaspora and foreign investment was reported as an important enabler when implemented. As previously mentioned, Wu (2016) reports that the United States of America (USA), investors are required to meet a “net worth of at least USD \$ 1 million”, which should not include value of assets such as primary residence or have an annual income of “at least USD \$ 200,000 for the last 2 years” before being registered as an investor (Wu, 2016, p. 22). Maintaining such a database of investors could inform the Government of de-risking measures for different categories of investors by the Government. In Turkey, institutions such as the Turkish Technology and Innovation Foundation are reported to provide a de-risking mechanism for foreign investors such “Portage, Manhattan Venture Partners, and 500 Startups” (Startups Watch Istanbul & Presidency of the Republic of Turkey Investment Office, 2023, p. 18), through co-investment on local startups. One research participant shared a successful case scenario of another de-risking mechanism in Turkey, which

is registration and “accreditation of angel investors by the Ministry of Treasury and Finance in 2013 (Startups Watch Istanbul et al., 2023, p. 8), which enables better targeted Government’s de-risking support for legitimate investors.

“If I am in Turkey, and I am an angel investor, one of the things that government does is they get you to register as an Angel investor” [VC1]

Research participants also noted that the government has a role in marketing local digital innovations on a global scale. Such global visibility, backed up by the government, was seen as a potential enabler of digital innovation success. It was however noted that this is yet to be fully actualised.

“The other thing is helping startups access market, by linking with other government agencies that can help them scale or even access regional and international market. So, remember Kenya is part of the East African Community (EAC) community. So, the question is how can we start having that regional market conversation? So how can Kenya become competitive in terms of having discussions that favour digital startups, through the free trade agreement or the African Continental Free Trade Area (AfCFTA)?” [HM3]

On the issue of policy and regulation, the research participants raised several enabling and debilitating factors. First, some research participants reported that under regulation, which they note could pose either as a barrier or an enabler for local digital startups. As an enabler, one research participant commented that under regulation creates an opportunity for unrestricted innovation activities to occur.

“We are under a government that may not have the capacity to solve most of the issues that its citizens are experiencing. This has provided an opportunity for the citizens to start thinking of how best they can start solving their problems. Also, our set up as a country has provided an opportunity for the private citizens to see how best they can be able to solve problems.” [HM2]

Under-regulation could also imply that the government does not fully understand the technology startup economy as was noted by one research participant.

“But my main concern is that from a policy perspective, a lot of it has happened with traditional SME thinking. For us to go to that next level, we really do need to have specific policies that cater for the startup economy.” [HM3]

The government was also faulted for uninformed regulations on Kenya’s digital innovation ecosystem. For instance, most research participants were critical of the ICT Practitioner Bill of 2020, whose provisions require licensing of all ICT practitioners who meet specific qualifications including an undergraduate degree in the field. They noted that this would bar great innovators with potential to create successful digital innovations from operating in the

country. One research participant added that the lack of understanding of the digital innovation ecosystem and its players may lead to legislation of uninformed policy and regulation. Kleine, (2013) however points out the daunting challenges in formulation of policy or regulation on technology innovation due to the speed at which technology innovations are birthed and grow and eventually become obsolete.

“But also, in the same breath, we have seen the government trying to come up with certain regulations or policy that is supposed to regulate Startups. As I said earlier, you cannot regulate something that is not certain or you do not know how, where or if it exists. That means then the basis of wanting to regulate it is faulty in the sense that you do not understand what you are regulating. So, that on its own becomes a barrier. I’m referring to the ICT bill that was supposed to regulate who is referred as an ICT practitioner because you cannot regulate it. We have seen startup founders who have been successful with startups not because they had the highest education in the land but because they had creativity and an understanding of the market they wanted to serve. Not the degree they got in school. So, putting a certain qualification as compliance hinders success.” [HM5]

“ICT Practitioner Bill, which is very archaic in the sense that if you look at Kenya’s talent ecosystem, there are a lot of self-taught developers. Asking Software developers to have a university degree, which to begin with they cannot afford, will not advance us in terms of innovation and economic growth if the bill is made policy.” [SF3]

“Oh, they are ‘coming up with a new law’, to regulate innovation! It will be the first time in the history of mankind that somebody has decided to legislate innovation!” [M1]

The need for regulation to monitor and manage monopoly was raised by one research participant, who noted that lack of regulation could pose as a barrier to digital innovation success (BDIS):

“I think we have had this conversation with other startups. There needs to be some proper regulation around monopoly. There are some key services like payments in Kenya that needs to be demonopolized as much as possible. This will enable products to come into the market to bring competition, which certainly improves services for consumers and improves pricing as well. There is a big problem there. We are all aware that The Central Bank of Kenya (CBK) is working on this. They have already rolled out their 2021-2025 plan that focuses on trying to make sure that they are more entrants trying to provide payments services so that we are not entirely reliant on M-pesa.” [SF6]

Concerning taxes, most research participants agreed that tax breaks and other related tax policies including favourable border customs could potentially enable digital innovation success. The research participants raised concerns on the stringent tax policies in Kenya, which have led to local digital startups with unicorn potential being domiciliated in other markets such as the state of Delaware in the US. Delaware favours the “organisational structuring” of

digital startups (Bryan Springmeyer, 2018), has “tax friendly business environment”, has law courts designated for corporate cases only with a ton of laws on how to deal with disputes between investors, stakeholders and startup founders, and provides privacy to a company in case of litigation (Kellen Luey & Clifford A. DeGroot, 2020) regarding what data they are legally obliged to provide or not. Several research participants noted that the friendly business environment present in Delaware aligns with conditions for funding given by most foreign investors to local technology startups. The investors include venture capitalists, angel investors and startup accelerators (Kellen Luey & Clifford A. DeGroot, 2020).

“...it is unfortunate that because of the how stringent our tax policies are in Kenya; a lot of businesses are domiciled in other markets. So, most startups right now, or rather the trend in Africa, is to domicile your Company in Delaware. This is because Delaware has a lot of tax incentives, which favours startup businesses. This is because no matter how much money a startup has raised, the money is not supposed to be ‘burned’ to create the business.” [SF4]

Commenting on the Delaware incorporation issue, one research participant noted a gap in regulation, which is further exacerbated by the lack of understanding of the structuring of technology startups by government:

“How you incorporate a kiosk (small grocery shop ran by a sole proprietor-an MSME), how you incorporate a general merchant such as a logistics company versus a tech company is very different because the structuring of a technology company always starts with issuing less shares and then you dilute over time as you attract more capital. But the way the government views this is that it is almost a defined split, where each director owns X amount of shareholding and every time you have C-12 form (business registration form in Kenya), you must indicate the share split. If you compare the memorandum of understanding that is typically written in Kenya versus one that you will get from Delaware, for technology companies, that is a different thing because even in technology companies, you need ESOPS (Employee Stock Ownership Plan). ESOPS contains information of employee share split. So, you need to allocate some shareholding to employees. Employees are not directors. But in Kenya, you need directors to be your shareholders and not employees. So, there is no provision for your employees to be shareholders, which is common in technology companies, as the C-12 form is not structured that way. [SF4]

Despite several positive comments on the benefits of incorporating in Delaware, some research participants noted the negative impact, particularly on the economy and startup founder autonomy. Speaking about this issue, one research participant pointed out that the Delaware arrangement may limit startup founder freedom to run their digital startup their way as they may be forced to follow stringent and unfavourable rules and regulations from foreign investors.

“For instance, if I get funded by a venture capitalist from the US, one of the things I will be asked is if I have registered my startup in Kenya. But I also must register with the same startup in the US. The US now becomes the main one or the headquarters. The one in Kenya where the startup started becomes a subsidiary of the mother company registered in the US. Now, that is not a good thing! But if we have our own venture capitalists, you register your company in Kenya, and it remains a Kenyan company.” [SF1]

Still on the issue of policy and regulation, some participants pointed out that most local digital innovations lack knowledge and understanding of laws, policies and regulations that affect them. This could hinder the success of their innovations. Incubators, accelerators, technology hubs and academia were alluded to as key vehicles in filling the knowledge gap. One research participant noted that the government, through agencies such as Association of Startup and SMEs Enablers of Kenya (ASSEK), did roll out the country regulatory toolkit for startups. The toolkit is meant to enable end to end compliance by technology startups.

“But if an entrepreneur just goes right ahead and they have not looked at the trends that have been in that industry, specifically legislation - I'm insisting on legislation in Africa because legislation sometimes is one of the things that we (technology startup founders) really overlook - and then it hits us later on with either fines or an inability to pass a certain point because we do not have the right certifications. So, that plays a major role in whether a business is going to succeed or not.” [SF2]

“...educating these startups in terms of what is required as per the law, when you employ new employees, those kinds of things. But from a regulatory point of view.” [SF7]

“...the regulation in terms of how you (innovator) structure your business to align with tax regulations, if government is taking 30% of your revenues, even though your revenues or margins are paper thin, then you cannot run the business.” [SF4]

“The county regulatory toolkit, which also helps to disseminate information. So, the county regulatory toolkit is really looking at compliance end to end.” [IND2]

The Data Protection Act of 2022 and the Startup Bill, 2021 were also mentioned as key policies that have impacted local digital startups both positively and negatively. The Data Protection Act was reported as “strenuous” and costly for digital startups to implement.

“The most recent one that was launched on Thursday, Data protection Act. If you look at it, it is very strenuous because it has a lot of implication on how people will use data, because if you are talking about technology, then you are always collecting data. You have different tentacles trying to collect information everywhere. So, then, even as a startup, you must start thinking how to remain compliant with the data laws while at the same time trying to survive. So, there are some policies which are quite strenuous as they need resources to implement. For instance,

the Act requires you to hire a Data Officer. I mean who (innovator) has money to hire a Data officer within their startup?” [IND2]

On the other hand, the Startup Bill was reported as a potential enabler of DIS by some research participants:

“But then recently we have seen a positive thing that is coming up, that is, the startup bill. We have not seen the impact, but we hope that the startup bill is going to make some kind of regulations that are going to ensure that the startup ecosystem in Kenya thrives.” [SF1]

In addition, one research participant recommended enactment of value chain-oriented policies and regulations as potential enabler of digital innovation success in Kenya. This way, specific policies that cater for each digital innovation stakeholder that is, technology startups, angel investors, business incubators, accelerators among others, could create an enabling environment for each to thrive individually and together towards digital innovation success. For instance, policies to recoup failed investment were noted to be a great enabler of digital innovation success, as it would attract both local and foreign angel investment.

“So, to me that thinking of how we build a community of Angel investors needs to be happening. The second thing is, why is it not happening? Do we have the policies in place? For example, if I’m in Turkey, and I am an angel investor, one of the things that Turkish government does is get you to register as an Angel investor. The second thing is if I deploy capital in a startup, then they are aware that I have deployed capital in this startup. And if that company is one of those that sink and do not go very far, I am able to recoup that loss from my personal income tax. So that de-risking is quite significant for Angel investors technology startups.” [VC1]

Concluding on the matter of policy and regulation, there was consensus on the need for government to actualise the development and implementation of technology startup policies that address the following issues. First, involvement of startups in policy formulation was noted as a potential enabler. Second, policy on proper structuring of bank credit for ease of access by the technology startups could be a potential enabler.

Moving now to patents, still under the Government major theme, several research participants commended the government for “waiving hefty patent fees” (Mwazighe, 2022) for both MSMEs and startups. In an article published on Nation Media Group website, the waiver is a collaborative effort between the Kenya Industrial Property Institute (KIPI) and the World Intellectual Property Organisation (WIPO), through the “inventor assistance program”, which “exempts financially under-resourced inventors who are youth below 35 years” with commercially viable inventions, from paying patent fees (Mwazighe, 2022).

“And literally, the president suspended the fees for patent.” [M1]

Lastly, some research participants pointed out that the government has failed when it comes to creating structures to support innovators at an early stage. Also, others believe the government has done enough to support digital innovation. One respondent pointed out that there should be less begging for government support, whose sole contribution is legislation and tax, adding that the government itself is resource strained, as witnessed by the huge foreign debt owed as of 2022.

“If you think about Safaricom becoming as big as it is, you know and M-pesa, for example, was not necessarily a closure product, but it became too big to fail, and I have seen this in some of the investments I have made in Nigeria. You know a government is not taking a company seriously when they give them half-ass [less useful/limited] license then when they are too big, the same government begins to show interest in the company, and invites them at the table to ‘talk’” [VC1]

“We cannot try and create our enabling environments the way Netherlands or the US have created theirs. Our government is broke! So, expecting them to put together funds, and they cannot even pay salaries, is expecting something that is unachievable right now. So, while they should be the biggest stakeholder in this, you know, for example like Kigali, which is giving people office space, full tax rebates, accelerated business registration, though not necessarily money, but they are at least trying to support innovators and entrepreneurs. But instead of doing that, Kenya is trying to do the opposite.” [VC1]

“There are only two things government knows how to do, legislation and tax. Do not expect anything else from your (innovator) government.” [M1]

5.3.2.4.8 Leadership

In the systematic review section, leadership was presented as highly relevant to entrepreneurial venture success, digital or otherwise (Zaech & Baldegger, 2017; Ester, 2017). In the interviews conducted, the leadership construct was the least addressed. Issues of financing and policy took precedence and dominated the discussions. Commenting on leadership, one research participant noted that their decision to follow a transformational leadership style was due to lack of funding to employ required human resources.

“When I think back to it, it was a stressful time. I recall there was a time when a customer would call and ask, ‘how far is my order?’ and I would say, ‘please allow me to patch you to logistics’. Then I would keep quiet for two seconds and then continue with the conversation, using a different tone, as if a different person was speaking: ‘Hi, this is logistics. Let me check on your order.’ The same person, just a different voice, because you want the customer to understand and feel comfortable giving you their money but at the same time you do not have the resources to prove that you are worthy of that investment to begin with. So, it really called

for a lot of play here and there until we were able to hire our very first employee, within 8 months of being in business. With time, we got a second employee. [SF2]

5.3.2.4.9 Networks

Business to business (B2B) matchmaking, founder meetups and social networks were the most mentioned concepts concerning the networks' theme. B2B matchmaking and founder meetups have now become common networking avenues, which are commonly organised by business incubators, accelerators, and technology hubs. Such events were reported as an enabler as they provide a platform for peer-to-peer learning between startups, facilitates partnerships of mutual benefits and connects co-founders who have already gone through initial screening and vetting.

"I would say VCs and Venture builders like ANTLER and a couple of other incubators and accelerators which help you find a co-founder did not exist in 2015. Now, five to six years later they do exist, and you can have founder meetups and meet a potential co-founder." [SF3]

Concerning social networks, it was reported that most local innovators are at a disadvantage, as they ail from resource strained homes. One research participant commented:

"... most of our young people, their parents have no money to support them. They do not have resources." [GOV1]

5.3.2.4.10 Open Innovation

Research presents hackathons or innovation competitions as important avenues to encourage open innovation or co-creation of digital innovations, leveraging on the diverse competencies (technical and non-technical) of collaborating innovators (Toros et al., 2020). Some respondents noted that the rise of business incubators and accelerators such as iHub and Growth Africa in Kenya gave way to a series of technology competitions popularly known as hackathons or coding bootcamps as early as 2010. One research participant pointed out that University students and unemployed graduates were the main target audience for these events. Several respondents agreed that these competitions did create an enabling environment for the design and development of innovative digital solutions, some of which closed early-stage funding deals from both local and foreign investors. However, some respondents, particularly those who had taken part in such competitions, criticised the intent of the organisers and other attendees, deeming them as idea hungry vultures who could "steal" unpatented ideas from unsuspecting student innovators.

“Around that time, there were a lot of technology competitions. They were calling them boot camps, others were calling them hackathons. But basically, it was just a way of getting ideas from people who were in the university or fresh university graduates at that time. So, we realised that it was not the best idea to bring your top innovative idea to such competitions. Basically, you must do your research first.” [SF8]

5.4 Analysis of Findings on Research Question Two

5.4.1 Comparing the Success Factors between a Structured and an Unstructured Technology Innovation Environment

An overwhelming majority of research participants reported that the Structured Technology Innovation Environment (STIE) is undoubtedly an enabler of Digital Innovation Success (DIS) in any context. Even with the operational and relevance challenges reported by some research participants concerning STIE in Kenya, the impact of affiliation to one for a digital innovator was majorly positive as it promotes a higher chance at success. Figure 5-9 visualises sub-themes categorised under Structured Environment Support Services (SESS) as reported by the research participants. These sub-themes will form the basis of comparison between Structured Technology Innovation Environment (STIE) and Unstructured Technology Innovation Environment (UTEI), constructs that were defined under chapter three of this thesis. Select data excerpts to support each sub-theme are included.

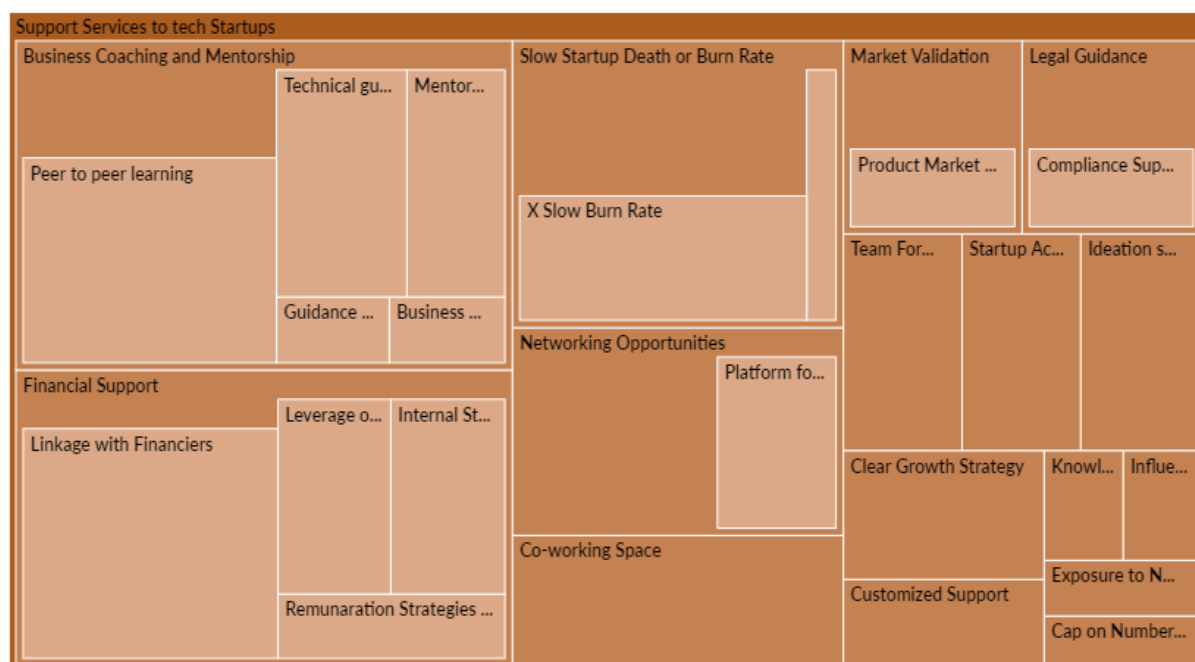


Figure 5-9: Structured Environment Support Services (SESS)

In the comparison between STIE and UTIE, we begin by highlighting key sub-themes that emerged as part of the SESS construct presented in Figure 5-9, using a sunburst hierarchy chart (Figure 5-10), which displays sub-themes with largest segments by volume of data coded under it.

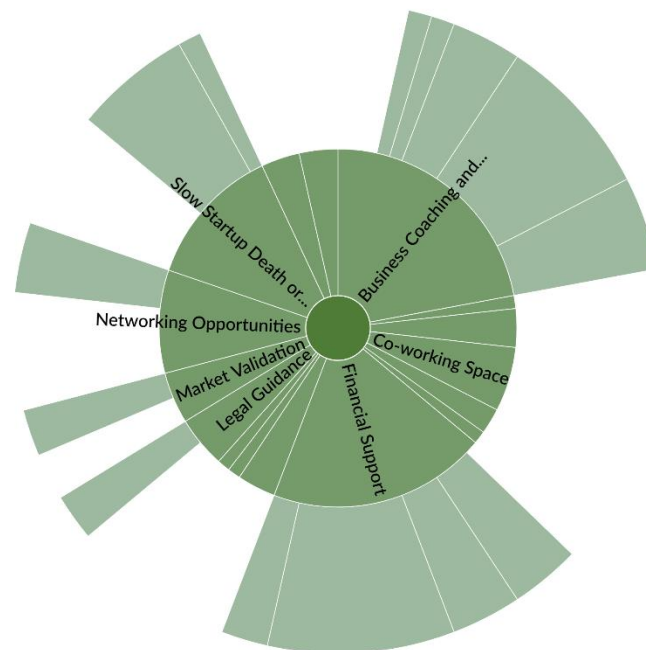


Figure 5-10: High-level Themes for SESS

5.4.1.1 Comparative Factor 1: Slower Startup Death or Burn Rate

Slow startup death or burn rate was reported by majority of the research participants as a benefit that technology startups under an STIE would gain compared to those operating in an UTIE. One research participant defined burn and death of as startup as follows:

“Death could mean you ran out of money before you hit product market fit, which means you must close. Raising funds in Kenya was not as easy back in 2015, 2017, 2018. So, around that time you could only burn very little, and the runway is extremely short because you were either funding by yourself or fundraising. The fundraising done locally was never sufficient to enable you to experiment enough to get the product market fit. So, you just close, and you work on something else.” [SF6]

The following Structured Environment Support Services (SESS) were reported as contributing factors towards a ‘slower startup death or burn rate’ for technology startups affiliated to an STIE: business coaching and mentorship, peer to peer learning through collaboration enabled via a buddying system where digital innovators/startup founders working on similar or related

ideas are grouped together in order to learn from each other, technical guidance on understanding the financial market and commercialisation, mentorship, guidance on the full business cycle and business model reengineering. Figure 5-10 visualises these factors through a tree map hierarchical chart.

A justification for the slow death and burn rate for tech startups under STIE was access to business strategies and other information on what to do or not do. STIE such as incubators and accelerators are seen as ‘knowledge centres’, which hold very valuable information that you might “...never find on Google if you search.” [SF6]. Access to this knowledge could potentially contribute to digital innovation success. Tech startups operating in an UTIE often miss out of useful information that could help them “...learn fast, succeed fast or fail fast” [HM5].

“Over the years, you have gathered experience on various startups and how they navigated certain problems. Documenting that alone is one of the things that some of these top accelerators do, which means when you get into Y Combinator, you have access to a knowledge bank that is spanning over 10 years of some of the best world startups, all the problems they faced how they navigated them. There is also a lot of resources on strategy, how to handle investors...like literally things you will never, ever find on Google if you search.” [SF6]

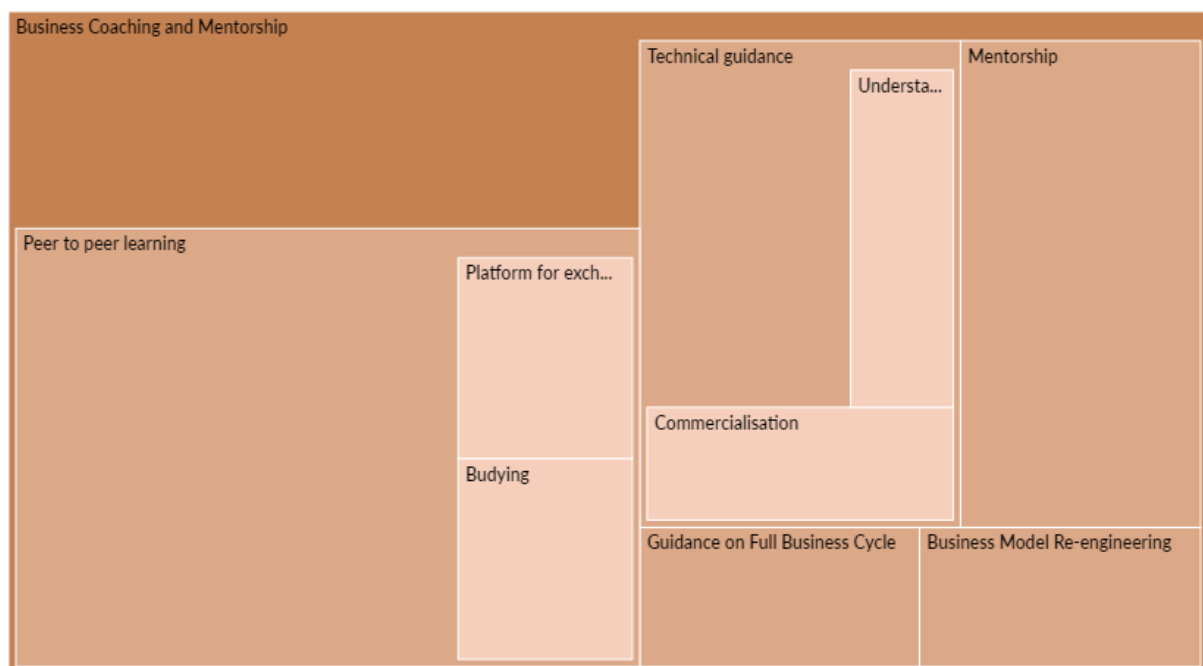


Figure 5-11: Tree Map - Structured Environment Support Services (SESS) towards Slow Startup Death or Burn Rate

The data excerpts below include select comments from research participants regarding ‘slow death or burn rate’ sub-theme:

“My experience with different cohorts we have done and experimented with is that; If you (innovator) are in the business where you need to talk to more people, you need to hear feedback and input and have an accountability partner? You also must understand the industry and do it in an environment where someone is exposing you to opportunities, to insights, you are learning from others who have been in your field. They help you to learn fast, succeed fast or fail fast.” [HM5]

“ICT based innovations thrive better under a support environment.” [AC2]

“That doesn't mean that if you are in an unstructured environment, you will not succeed. Though you take a bit longer for you to succeed because you are applying what you do not know. From experience, I have seen that innovations that come out of unstructured process take longer for them to break out and succeed compared to someone who is in a more structured environment.” [HM5]

“When you take these through a structured way, the death rate is very low, very low. Those who start serendipitously change. If you ask them what the original thought was, they will have gone through so many alterations or changes. They did not start with a value proposition properly. So, this is what I deal with daily from young people, they just send me a write up and say I am going to start this. Then I ask them, what is the problem you are solving? And then they say, no, no, no, I just thought this is something that is good! If they do not know the problem, then it will be very difficult to talk about the value proposition.” [GOV1]

One research participant was of the view that other external factors, such as market and regulatory challenges, may potentially play a positive or negative role towards the outcome ‘slow death or burn rate’, irrespective of the environment (STIE or ITIE) one is operating under. In other words, all startups, whether in an STIE or UTIE face market and regulatory challenges, which could increase or slow down their death or burn rate.

“But in all honesty, even though they are in some of these programs (offered by a STIE), at the end of the day, the market is the market. Regulation is regulation. Being in that environment, however, cushions them (STIE) in the sense that they have raised funding and can grow slowly, with a slow burn rate. Unlike other startups (in UTIE) who do not have that cushion around them. So, they might ‘close shop’ earlier than the other startups (under a STIE). So, it is more of an economic side of things, or rather comparative advantage.” [SF3]

5.4.1.2 Comparative Factor 2: More Networking Opportunities

Turning now to networking opportunity sub-theme, STIE in Kenya were reported as key enablers of collaboration between technology startup founders or digital innovators and linkage with other valuable networks towards creating an enabling environment for digital innovation success. Most STIEs run periodic high level networking events that their members can attend for free, and which provide them with a platform to meet targeted partners who are likely to have interest in their innovation ideas. Innovators or technology startup founders operating in a UTIE are disadvantaged in this sense. This, however, is not to imply that they are incapable of seeking networking opportunities, with potential to transform their startups, on their own.

Some research participants who alluded to this were of the view that digital innovators in an UTIE often have built reliable networks in the past, which they could easily leverage towards achieving a successful digital innovation outcome.

“An example is Y Combinator, the place where you can have a one-on-one call with big names like Brian Armstrong, the guy who founded Coinbase or guys who founded Airbnb, and they tell you how they navigated a certain problem.” [SF6]

“I would believe that most of them have some level of support network, whether mentors or devices that help them as well.” [HM1]

“The other advantage is you have a community of innovators. So, you can share ideas and network. When you are looking for co-founders for instance, it is easier to get a co-founder from an incubator/accelerator because there are many innovators you get to meet and interact with daily.” [SF1]

“We needed to see that push come in. I will be very honest with you. When we were in the incubation centre, there was a lot of exposure to bureaucrats who really believed in innovation at that point in time. So, when you look at the wider range of investors, they were very keen on how you were going to revolutionise retail. So, at that point, we realised this is something that we can go ahead with and push.” [SF2]

“And maybe what we have seen from some of the African startups that have gone to YC, is they have a network of global connections like lawyers and financial advisors around them and other co-founders, who give them the knowledge they need such as setting up a Delaware company or preparing for fundraising.” [HM4]

5.4.1.3 Comparative Factor 3: Market Validation Support

Market validation is a critical stage of development that startups, particularly technology startups, cannot evade, as they operate in an environment of uncertainty. Market validation helps reduce the risk of early death of a digital innovation. Market validation involves face-to-face or screen-to-screen interaction with the target audience or target market to ascertain that your digital solution addresses a real-life problem. This process requires financial and technical resources, which may not be accessible to some digital innovators, especially those from nascent unstructured innovation ecosystems. STIE is known to provide technical expertise and knowledge on effective market validation strategies for a given field/sector and within a given context. Operating in a UTIE environment requires that a digital innovator be willing and capable of committing time, effort, money, and other resources towards implementation of a

market validation strategy to increase their chances of success. Most research participants echoed these sentiments.

“We as tech innovation hubs, our job is typically working with startup founders, helping them to understand: Is there a market? Can you validate this market? How do you get your product market fit right? How do you build a business that you are going to monetise? How do you build the strategy for scaling?” [HM5]

5.4.1.4 Comparative Factor 4: Business Coaching and Mentorship Support

Mentorship and coaching have the potential to shorten a journey. In a digital innovation process, early access to business coaching and mentoring, services offered by most STIE organisations such as incubators and accelerators, have been shown to have a positive impact on Digital Innovation Success (DIS). These services are, however, not bounded within an STIE, but are accessible formally, or informally, to digital innovators operating under an ITIE, who can leverage their network, which may include access to experienced business coaches and mentors. The difference between the two environments might arise regarding how such coaching and mentoring is structured and delivered to an innovator. In UTIE, the interaction might be informal and unstructured and may be challenged in terms of space and time. An STIE environment on the other hand is seen to provide a structured and well measured approach to business coaching and mentoring, with well thought out outputs and outcome, which in turn could have more meaningful impact and tangible outcomes. This is evident in the feedback given by majority of research participants within the Kenya context.

“I have been in a local incubator, the C4D Lab at the University of Nairobi, when I was working on my first startup. There were partners who could assist you figure out the model” [SF6]

“He lucks in business, he has the skill, he is selling a service, he is selling a technological skill, which is his work, but he is not looking at the entire cycle of business. This individual am talking about, the guy is regarded as a freelancer out there. But when he comes to this environment (STIE), there is a more structured way of helping him to think business, to think of accessing capital, to think of a business model, to think of business partners, enable his access to technology and training.” [AC2]

Some research participants, however, believe that it is possible for digital innovators operating under an UTIE to have requisites technical and business knowledge needed to achieve a successful digital innovation outcome.

“It is worth looking at how many of them (innovators) come with a deep tech background or come from a business background. One may have worked at a tech business and gotten enough insights to then launch their own business.” [HM1]

5.4.1.5 Comparative Factor 5: Financial Support

Access to financial capital was the most prominent theme reported by most research participants as a critical enabler of Digital Innovation Success (DIS). STIE were presented as enablers of access to capital, through the following ways:

- 1) **Startup Fund:** STIE organisations such as business incubators and accelerators may have their own internal startup fund, which their members (technology startups operating under them) may be eligible to apply for if they meet a certain criterion. Some incubators and accelerators in Kenya have managed to put such a fund together, albeit with fund replenishment and management challenges. This is because most digital innovators in Kenya, as previously mentioned, hail from very poor backgrounds, and struggle to meet their basic needs and those of their families. The risk of funding such an innovator therefore because high as they are most likely to channel the funds elsewhere other than the startup. Antler, an incubator in Kenya, is reported to have a funding model where they pay a monthly stipend to startup members, to enable them focus on idea development and commercialisation. A further inquiry by the researcher revealed that a founder needs to take up a role within the incubator, which may involve day-to-day operations management. The impact of this on a digital innovation process would need to be studied further.

“I have also seen a lot of us tech innovation hubs starting to also operate as investors.”
[HM3]

“They go a step further where they provide seed funding to ideas that they feel have potential to scale...” [SF7]

“One of the core ingredients in that seed funding is a salary for the founders, because that is another thing I have realised is killing our entrepreneurship ecosystem. We have young guys with brilliant ideas who are required to work on those ideas for 24 months without a salary. For sure, we are human beings. We have basic needs and all that. So, if I am not able to pay my bills, there is no way I am going to concentrate on that idea until it pays me.” [SF7]

Digital innovators operating in a UTIE environment must do side hustles to make ends meet as they wait, to break even. This draws away the attention of the innovator from their digital innovation, leading to lost time and focus.

“Okay, a typical scenario would be you have your product, you are marketing your product but then for you to survive and pay your bills before you make a sale, you must do other projects. For example, you would get a gig to develop something for some

clients, which is totally not your product. So, that is lost time and lost focus. As much as I'm marketing my product, other things we do within the company are just to sustain ourselves. So that is the problem, because at the end of the day you do not entirely focus on your core innovation idea.” [SF8]

- 2) **Leveraging a STIE organisational name to secure funding:** Affiliation to a well-known STIE organisation with a strong reputation was reported as a strategy to attract funding.

“Remember also in a structured environment when you are talking to people mention that you are working with PANGEA (an accelerator), that they are backing you up, it comes out as a validation.” [HM5]

“First of all, you will use our name, therefore you are likely to get more funding.” [AC2]

“If you are in one of these incubators, accelerators, or VCs, you have an advantage. If you joined YC for example, your brand suddenly skyrockets, as fundraising becomes easier.” [SF3]

Getting accepted into such reputable incubators or accelerators was reported as a daunting task. This entrance hurdle further strengthens the reputation of the STIE as admission can be equated to getting a degree from an Ivy League or highly ranked university:

“And I think the more you apply to YC the higher the chances of you getting in. If you apply three or four times, I'm pretty sure you will get in because you have already shown serious consistency in what you are doing. So, naturally, most people apply once, they get rejected, they give up. For us, we applied twice and got in the second time. There are people I know who have applied four times and got in the fifth time.” [SF6]

- 3) **Direct linkage with financiers:** Some STIE organisations build reliable relationships with financiers, which their members could leverage. A lot of work goes into branding and positioning oneself as a credible incubator or accelerator that can handle startup funding from both local and international financiers. Financiers also value such relationships, as they facilitate identification of bankable digital innovation ideas early on, thereby minimising the risk of loss of money and may increase chances of Return on Investment (ROI).

“If an accelerator has grown and it has a (positive) reputation, it is very easy for venture capitalists to be invited. And that means you (digital innovator within an STIE) have an opportunity to showcase your ideas to many venture capitalists in one city.” [SF2]

“The other one is increasing the investor database. The investor database here gives a startup some opportunity to assess and access some of the top investors either locally or internationally. This, however, takes a lot of brand building by the accelerator to ensure that they attract the best.” [SF6]

“But what I can say from what I see is the accelerators sometimes organise for venture capitalists to come and listen to their (digital innovator in an STIE) ideas and then they can fund.” [SF1]

Research participants who are also digital innovators under UTIE did acknowledge the impact that direct access to funding might have on their startup journey. Direct access to financiers for innovators under a UTIE was reported to be limited to friends and family, whose resource portfolio is limited and incomparable to VCs and other financiers.

“If we had gone through the route of joining an incubator, we would most likely have launched or gone to market earlier than 2020. So, the time that it took us to look for an investor, the many meetings that we had with different investors, that time could have been cut significantly lower compared to us joining an accelerator that could take us to the next level.” [SF5]

“The other thing is that a structured environment (STIE) introduces you (digital innovator) to investment opportunities. So, that means you will be on the minds of Investment companies out there. While in the other case (UTIE), your networks and friends can only give you access to limited funds compared to a community of people that might have access to a wide range of stakeholders and partners, and contacts that might be of use to a startup in a structured format.” [HM3]

5.4.1.6 Comparative Factor 6: Legal Guidance Support

Part of the perks of working in a STIE such as an incubator or an accelerator is early access to legal guidance, particularly on issues around patent and legal requirements for a sector in which an innovation would operate under. In Sub-Saharan Africa, access to legal services, especially for those in rural areas, remains a major challenge, as most lawyers are based in urban areas (World Bank, 2018). Moreover, most people in the Global South are unaware of their rights and avenues where they can seek justice when legally aggrieved (UN Office on Drugs and Crime, 2020). This makes such individuals more vulnerable to exploitation, especially on matters around patenting digital innovation ideas in case of technology startup innovation. The ratio of lawyers to the population remains low in the Global South compared to Global North

countries. A 2022 report by the World Justice Project on the Rule of Law Index gives shocking figures on the average ratio of lawyer to 10,000 population in low- and middle-income countries such as Kenya, which is 1:1 compared to 10:9 in the Global North (World Justice Project, 2022). Access to legal aid is also a challenge due to limited resources, which means that the little legal aid available, which is often offered by law Students from institutions of higher education that offer law courses such as Strathmore University, is not enough to meet the demand for legal services, as many people cannot afford private legal services in the Global South. The Access to Justice Initiative (2019) reports that only 10% of the population in Sub-Saharan Africa can afford legal services. Corruption issues reported in some countries in the Global South, may further exacerbates access challenges to legal services. Considering this background, it is evident that access to legal services for a digital innovator in Kenya could pose as a barrier to digital innovation success (BDIS), particularly for innovators operating within an UTIE. Outstanding views from research participants regarding access to legal guidance, a comparative factor between STIE and UTIE, were in favour of STIE as evidenced by the below data extracts:

“So, for instance, when it comes to issues to do with governance, issues to do with legislation within a company: those are things that being in a structured environment (STIE) might push you to get early on, while someone who is not in a structured environment (UTIE) may not see the need to immediately register the business or to do the due diligence.” [SF2]

“So, with an accelerator, or an incubator, you get direct access to mentors and legal advisors. So, people can help you set up your company. They can help you to do any due diligence that needs to be done, from business, to legal, to investments as well.” [SF5]

5.4.1.7 Comparative Factor 7: Access to Co-working Space

Kenya’s innovation ecosystem is concentrated mostly in urban areas. Like other urban areas in the world, the cost of renting an office space, especially a furnished space like a co-working space offered in an STIE, is expensive. As of 2022, popular property marketing sites in Kenya such as *jiji.co.ke* average a monthly office rental cost that ranges between USD 270 to USD 9,700 in Nairobi, Kenya. Innovators working in a UTIE, who cannot afford to rent in an office park, will often work from home, if they can afford a stable internet connection, to cut down on cost. Access to a co-working space for a digital innovator in Kenya is therefore an enabler of Digital Innovation Success (EDIS). This SESS is therefore an important comparative factor between STIE and UTIE.

“Some of the good things you get from an accelerator is number one: you have office space! That means you have a physical location. That's an advantage. You will have enabling facilities and infrastructure such as, the Internet, Boardroom, all those things.” [SF1]

“The other thing is most acceleration programs give you space where you can go and work from. For us, since we didn't have that, then we had to have money for us to rent out a place to set up shop. So, all those hurdles would have easily been eliminated had we joined an incubation program.” [SF5]

A few research participants had differing views regarding co-working space as a sustainable enabler of digital innovation success (EDIS). One research participant noted that some incubators in Kenya, especially those with resource challenges, can only manage to provide a co-working space, which may not be enough to spur innovation. An innovator in such a STIE may not differ much from one working from home under an UTIE.

“The rest of the incubators, what they do is offer you an office space only, which does very little to spur the growth of that whole innovation.” [SF7]

“But the reason why it stopped...like iHub depended a lot on external funding to be able to make that work (free access to office space), because people (digital innovators) who are coming there, it is either we pay to be there in which case the fee would be exorbitant or there is funding to make that happen.” [SF4]

“We couldn't stay in the Incubation Centre for long because remember, as people who hold stock, I think 3 months or four months in, we had outgrown the small desk we had at the incubation centre mostly because we needed space to store the products that we were selling online and we needed to be able to expand, That is how moving out of that space happened.” [SF2]

5.4.2 Connecting Cases, Degrees of Empowerment, Technology Innovation Environment to Secondary DIS Outcomes (Case Based)

This section explores the interplay of agency and structure factors in the four cases representing the two innovation environments, which is STIE and UTIE, towards the achievement of secondary DIS outcomes. The four key aspects of degrees of empowerment according to the Choice Framework (Figure 3-3) include: existence, sense, use and achievement of choice (Klein, 2013). The expected secondary DIS outcomes are categorised as illustrated in the conceptual framework (Figure 3-4).

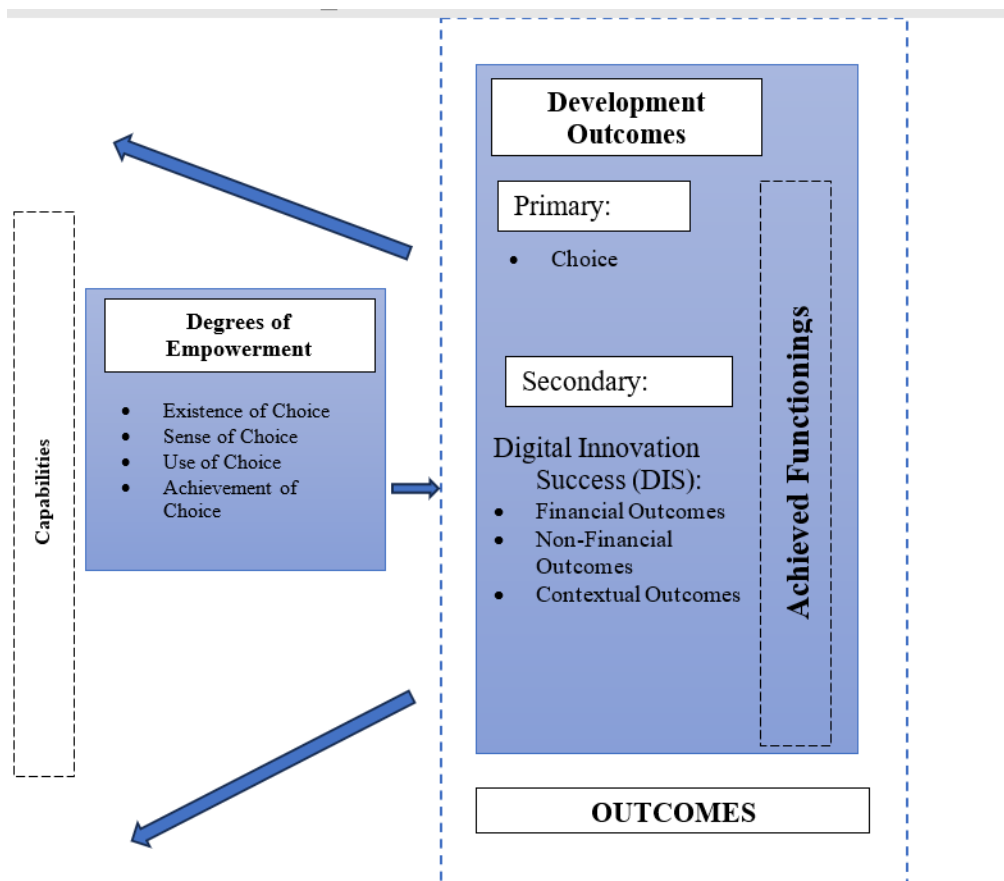


Figure 5-12: Degrees of Empowerment and DIS Outcomes (Extracted from Conceptual Framework in Chapter 3 of this Thesis)

Reference is also made to Table 4-3 presented under research strategy sub-section in chapter four, that profiles the cases as illustrated in Figure 5-13.

Case	Industry	Innovation Environment (Structured/ Unstructured)	Status (Successful/ Unsuccessful)	Source
Case A	Retail	Structured	Successful	Business Incubator
Case B	eHealth	Unstructured	Successful	Online Information Search
Case C	AgriTech and FoodTech	Structured	Unsuccessful	Business Incubator/ Technology Hub
Case D	Fintech	Unstructured	Unsuccessful	Online Information Search

Figure 5-13: Profile of Cases (Extracted from Chapter 4 of this Thesis)

5.4.2.1 Connecting Case-A under an STIE to Secondary DIS Outcomes

One successful Case that had operated under an STIE was selected based on the selection criteria discussed in chapter four of this thesis. Table 5-8 explores the interplay of agency and structure resources in the Case representing STIE, towards the achievement of secondary DIS outcomes. The resources contribute to digital innovator capability to sense, use and achieve existing secondary DIS outcomes. The Digital Innovation Success (DIS) Outcomes are illustrated in the conceptual framework in chapter three, which is a refinement of the CF.

Table 5-8: Factors Influencing Choice of a STIE in Kenya

Case	Agency and Structure Resources	Evidence/Data Excerpt	DIS Secondary Outcomes
Case A	Institutions and Organisations; Material Resources (MR); Social Resources (SR); Space	<i>In its nascent stages, the founders decided to join a local business incubator, which they say helped them refine their business idea and model of Case A, which they deem pivotal towards digital innovation success. [Case A Description in Chapter 4]</i>	Financial Outcomes: <i>Revenue/Paying Customers; Break-even.</i>
	Financial Resources (FR)	<i>As the company began to grow within the first year of operation, the need for a big storage space necessitated their move from their cubicle in the incubator to a physical shop. [Case A Description]</i>	Non-Financial Outcomes: <i>Product Market Fit, Viable Business Model, Foreign market reach, Team growth</i>
	Proximity to an Incubator (Geographical Resources (GR))	<i>"I went to Strathmore University... we heard about the incubation center in Strathmore University, and we went to try our luck." [SF2]</i>	Contextual Outcomes: <i>Addressing an emerging opportunity, Transformation of the innovator, Growth of an Innovation Ecosystem</i>
	Education (ER); SR	<i>"I went to Strathmore University" [SF2]</i>	
	Time	<i>Immediately after graduating, Founders had time to work on Case A only full-time.</i>	
	Health (He)	<i>Founders are young (between age 22 and 24) and healthy</i>	
	Technologies and Innovation; Information	<i>They developed their first website to facilitate the retail process more efficiently; "We had Mangeta (ecommerce software now Adobe Commerce). We had Wix (website development platform) and other platforms that we were using"; "We went with Shopify eventually because Shopify basically allocated to us the bandwidth we required at that point in time and when the higher peak periods came they were able</i>	

Case	Agency and Structure Resources	Evidence/Data Excerpt	DIS Secondary Outcomes
		<i>to expand without hurting us as a business”; “The skill set (business operations) that I learnt, most of it came from Google.” [SF2]</i>	

5.4.2.2 Connecting Case-B under an UTIE to Secondary DIS Outcomes

One successful Case that had operated under a UTIE was selected based on the selection criteria discussed in chapter four of this thesis. Table 5-9 explores the interplay of agency and structure resources in the Case representing UTIE, towards the achievement of secondary DIS outcomes. The resources contribute to digital innovator capability to sense, use and achieve existing secondary DIS outcomes. The Digital Innovation Success (DIS) Outcomes are illustrated in the conceptual framework (Figure. 3-3) in chapter three, which is a refinement of the CF (Figure. 3-2).

Table 5-9: Factors Influencing Choice of an UTIE in Kenya

Case	Agency and Structure Resources	Data Excerpt	DIS Secondary Outcomes
Case B	Financial Resources (FR)	<i>Further, the founders acknowledge that the two rounds of funding, pre-seed, and seed, which they got early on accelerated the growth of Case B and allowed the founders to quit their formal employment to work on Case B full-time. [Case B Description in Chapter Four]</i>	Financial Outcomes: Revenue/Paying Customers; Break-even; Funding Acquisition (Pre-seed and Seed)
		<i>The early-on funding also contributed to the founders' decision to not join a business incubator, an accelerator, or a technology hub. [Case B Description]</i>	Non-Financial Outcomes: Product Market Fit, Viable Business Model, Partnership with Industry Leader(s)/Key Players, Team growth
	Technologies and Innovation	<i>"One, we have a mobile application they (users) can download from the Google Play Store. We also have a website, and a phone number they can reach out to us with via call, SMS, or WhatsApp. We also have email. So, through the different ICTs, we have managed in the two years we have been in operation to service slightly over 25,000 patients through all the different mediums mentioned at the same time." [SF5]</i>	Contextual Outcomes: Addressing an emerging opportunity, Transformation of the innovator, Growth of an Innovation Ecosystem
	ER- Ability to Market and Test their Product	<i>The founders sensitised people about the innovation and services offered through their innovation, which is Case B. They had potential clients try their service, and level of care.</i> <i>The founders' decision to partner with the medical laboratory, which is a globally renowned healthcare service provider, was mainly to legitimise Case B's business model. [Case B Description]</i>	
	Psychological Resources (PnS); SR - Access to	<i>"So, I met my other co-founder Jason through a mutual friend. And through that mutual friend, he would introduce his idea of Case B" [SF5]</i>	

Case	Agency and Structure Resources	Data Excerpt	DIS Secondary Outcomes
	Networking Opportunities; Information; Institutions and Organisations	<i>"So, initially, this involved going to different tech startup summits that are in town (Nairobi), meeting with different startups as well in Nairobi, getting advice on who the investors are, scheduling meetings with those investors and trying to pitch to them the idea." [SF5]</i> <i>Fortunately, the investor who invested in Case B, had also invested in other startups. One of those startups was a medical laboratory already operating in Kenya. The founders were able to connect easily since they had the same investor. Having the same investor also eased the revenue share discussion. [Case B Description]</i>	
	Psychological Resources (PnS) - Capability to Seek Partnerships	<i>Fortunately, the investor who invested in Case B, had also invested in other startups. One of those startups was a medical laboratory already operating in Kenya. Case B took this opportunity to partner with a medical laboratory that was conducting tests for COVID-19. [Case B Description]</i> <i>Other than the medical lab, the startup also managed to partner with tourism companies, which enabled them to expand their service to patients in remote areas, particularly patients on Safari. [Case B Description]</i>	
	Time: ER - Founders had Business and Technical Knowledge, and Work Experience	<i>Being a health technology startup, Case B had at least one founder handling the technology side of the business and another the health side, and overall business administration. [Case B Description]</i> <i>"Being a health tech startup, we had at least one person in the technology side of the business, another person on the health side, and one managing the overall business" [SF5]</i> <i>The founders had quit their jobs to run Case B full-time. [Case B Description]</i>	
	SR- Right Talent Mix	<i>According to the founders, finding the right talent mix of people for all the different pillars of their company made sure that Case B was running smoothly, and no one department could pull the entire company down. Case B had a multicultural and multidisciplinary team. [Case B Description]</i>	
	Time and Space	<i>In addition, they noted that the decision to work full-time on Case B also accelerated product development and go-to-market. [Case B Description]</i>	

Case	Agency and Structure Resources	Data Excerpt	DIS Secondary Outcomes
		<i>"Most acceleration programs give you space where you can go and work from. For us, since we didn't have that, then we had to have money for us to rent out a place to set up shop." [SF5]</i>	
	Information - Understanding and Awareness of Policy and Regulations	<i>Concerning government policy and regulations, Case B operates within the rules and regulations provided by the Ministry of Health, which they have managed to navigate successfully, albeit with challenges. [Case B Description]</i> <i>Luckily, the government released some regulations for re-opening of businesses and offices, which required all employees to be tested for COVID-19 before going back to work. [Case B Description]</i>	

5.4.2.3 Connecting Case-C and D to a Failed Outcome

This analysis focuses on the agency and structure elements of the Choice Framework that contributed to the outcome in Case C (representing a digital innovation that failed to achieve success under STIE) and Case D (represents a failed innovation under an UTIE).

Case	Agency and Structure Elements	Data Excerpt	Outcomes
Case C	Financial Resources (FR)	<i>Case C was able to attract funding from three major investors totalling USD 235,000 combined. [Case C Description]</i>	Zombie status (the startup is not actively in operation and can no longer generate significant revenue)
	Technologies and Innovation	<i>Case C was a digital innovation in AgriTech (technology enabled agribusiness) and FoodTech (technology enabled food business). [Case C Description]</i>	
	Time and Space	<i>Case C operated in and with the support of local technology hubs and co-working spaces. [Case C Description]</i>	

Case	Agency and Structure Elements	Data Excerpt	Outcomes
	Psychological Resources; SR- Right Talent Mix; Managing Resource Dependence (MRD)	<i>After 3 years of operation, Case C co-founder challenges led to exit of two co-founders, leaving one co-founder to manage all the operations of Case C. The exit of the two co-founders had a big impact on the operations of the company which contributed to high customer churn rate, loss of income among other operational challenges. [Case C Description]</i>	
Case D	Inaccessible Financial Resources (FR)	<i>"Okay, financing is a very difficult thing to come across in Kenya" [SF8]</i>	Closed/cease operation
	Technologies and Innovation	<i>"...startup P (real name hidden) ...which was a way for Mobile Money App X [real name hidden] users in Kenya to access their Mobile Money App X statements. At that time, Mobile Money App X did not have a way for people to get statements. There was no communication from Mobile Money App X, either by e-mail or other means for clients to get their statements" [SF8]</i> <i>"...and that time Company X API's (Application Programming Interface) had not been developed" [SF8]</i>	
	Managing Resource Dependence (MRD); Psychological Resources	<i>Just before going to market, the founders decided to seek partnership with a leading Telco in East Africa, a move which would have catapulted Case D to a successful digital innovation. After several discussions and months of waiting for feedback, the founders had to let go of their innovation, as the potential partner decided to take up the idea and build a similar application in-house. [Case D Description]</i>	

Case	Agency and Structure Elements	Data Excerpt	Outcomes
		<i>"Around that time, there were a lot of technology competitions. They were calling them boot camps, others were calling them hackathons. But it was just a way of getting ideas from people who were in the university or fresh university graduates at that time. So, we realised that it was not the best idea to bring your top innovative idea to such competitions. You must do your research first." [SF8]</i> <i>The founders note their delay in patenting their idea as a key contributing factor to the turn of events. [Case D Description]</i>	

Case A founder attributed their success to passion and commitment of digital and strategic innovation, financial management skills and their ability to re-invent and innovate consistently.

The founders credit the success to their commitment to digital and strategic innovation of Case A. [Case A Description in Chapter Four]

Case B attributed their success to the right talent mix and ability to pitch and acquire funding early on at pre-seed and seed levels, which enabled them to quit their 9 to 5 jobs and focus on Case B full-time. One of Case B Founders acknowledged that the journey to success may have been shorter had they operated in an STIE:

“If we had gone through the route of incubator, we would most likely have launched or gone to market earlier than 2020. So, the time that it took us to look for an investor, the many meetings that we had with different investors, that time could have been cut significantly lower compared to us joining an accelerator. They could take us to the next level.” [SF5]

Case C ticked off on access to pivotal agency and structure resources but failed to achieve success. Case C failed outcome was primarily attributed to founder challenges. Case D failed outcome was attributed to technological dependencies on a third-party platform to provide the core innovative product and service. These cases illustrate the value of managing internal and external resource dependencies (MRD, a construct included in the conceptual framework). To achieve success, the resource dependency theory (RDT) opines that startups must manage their dependencies on internal and external resources such as funding, talent, and partnerships. RDT emphasises building relationships with key stakeholders as an enabler of success. Such relationships provide opportunities for access to necessary resources and support to navigate obstacles in the startup journey.

5.5 Proposition Testing

In conclusion, the findings chapter revealed the following contextual factors, which confirmed *Proposition one: There will be different enablers and barriers to digital innovation success in the Global South when compared to those in the Global North* as true. The most prominent contextual factors that emerged were categorised under the themes: ‘Entrepreneurship Support Organisations and Innovation Intermediaries’, ‘Innovation ecosystem’, and ‘Wrong focus on innovation’. Results on *Proposition two: Digital innovators working in an unstructured technology innovation environment (UTIE) will face more barriers (Barriers to Digital Innovation Success (BDIS)) and have different enablers (Enablers of Digital Innovation Success (EDIS)) compared with innovators in a structured technology innovation environment*

(STIE) revealed that the structured technology innovation environment, in and by itself, is an enabler of digital innovation success. The structured environment provides some moderating effect on some barriers and enhances some enablers of digital innovation success, which gives digital innovators a better chance at success compared to an unstructured technology innovation environment. This implies that digital innovators working in an unstructured environment (UTIE) face more barriers compared to those in a structured environment (STIE). The results also showed that each environment has its own unique enablers, which justifies cases of success in each environment.

In chapter three, the propositions shown in table 5-10 were defined. The findings revealed both propositions to be supported by the empirical evidence in this study.

Table 5-10: Proposition Testing Results

Proposition	Result
P1: There will be different enablers and barriers to digital innovation success in the Global South when compared to those in the Global North.	Supported
P2: Digital innovators working in an unstructured technology innovation environment (UTIE) will face more barriers (Barriers to Digital Innovation Success (BDIS)) and have different enablers (Enablers of Digital Innovation Success (EDIS)) compared with innovators in a structured technology innovation environment (STIE).	Supported

5.6 Chapter Summary

This chapter set out to present the findings of in-depth semi-structured interviews conducted in Kenya. 21 research participants, including informants from 4 cases (local digital startups) were interviewed. The results in this chapter reveal multi-level hierarchy of themes, which illuminate 60 factors (DISF) that hinder or enable digital innovation success in Kenya. These 60 DISF were subsumed under 14 major grouping or themes, 10 of which had been previously identified via systematic literature review and 4 that emerged from data during analysis. 2 out of the 4 context-based themes were recorded as part of the top 3 most relevant themes (Table 5-3). A second round of deeper analysis of research participant transcripts generated four levels of sub-themes subsumed under the 60 factors, after several iterations of merging, rearranging, and removing themes. Under level 2, 58 sub-themes were included, which in turn subsumed 79 sub-themes (level 3). The 79 subsumed 63 other sub-themes (level 4), which finally subsumed 11 others classified as level 5 sub-themes.

Briefly, the chapter begins with an overview of Kenya's digital innovation ecosystem, with the aim of identifying and understanding its unique characteristics. Thereafter, an exploration of

what digital innovation success means within the Kenyan context is presented, backed up by evidence from research participants. A detailed analysis of multi-level hierarchy of themes and sub-themes reported by research participants, and which could pose as either an enabler or barrier to digital innovation success, is presented in a chronological order.

Capital was the most prominent theme reported by research participants. Challenges of access to capital, particularly at the early stage, were reported as a major barrier. In addition, a lack of understanding of the digital startup business model, nature of digital startups as high risk non-investable ventures was among the reasons for the low investment. Other themes mentioned by most researchers include Entrepreneurship Support Organisations such as business incubators, accelerators and technology hubs, and Government, which were reported to play a very important role towards creating enabling innovation environment for local digital innovations to thrive. Leadership and open innovation were the least mentioned themes. A summary of research participants' views on them was included using the most relevant data extracts.

6 DISCUSSIONS

6.1 Introduction

This study started with a systematic literature review. The review revealed the following research gaps:

- a. A theoretical and empirical gap on contextual enablers of and barriers to Digital Innovation Success in the Global South, to expand knowledge of digital innovation success beyond what happens in the Global North.
- b. At the time when this research was initiated, there were not enough studies on differential factors that enable or hinder digital innovation success in structured (incubated) versus an unstructured (non-incubated) digital innovation environment in the Global South, which could have “different innovation intensities” (Vega & Chiasson, 2019, p. 249), processes and outcomes. This confirms a practical and empirical research gap.

To address the above research gaps, this study’s primary research questions were:

- a. What are the enablers of and barriers to digital innovation success for digital startups in Kenya?
- b. How do the identified enablers and barriers compare for digital startups operating in a structured versus unstructured innovation environment in Kenya?

Further, the following propositions were defined as a guide for this exploratory, qualitative study:

- a. Proposition (P1): There will be different enablers and barriers to digital innovation success in the Global South when compared to those in the global north.
- b. Proposition (P2): Digital innovators working in an unstructured technology innovation environment (UTIE) will face more barriers (Barriers to Digital Innovation Success (BDIS)) and have different enablers (Enablers of Digital Innovation Success (EDIS)) compared with innovators in a structured technology innovation environment (STIE).

First, the analysis identified the following as the most significant context-specific Digital Innovation Success Factors (DISF): ESOs and Innovation Intermediaries, Innovation Ecosystem, Natural Disasters, Wrong Focus of Innovation Ideas, and the following minor themes: ‘Impact Driven Innovation’, ‘Market not Ready’, ‘Trend Setters’ and ‘Value of Piloting’. These findings support proposition 1. Second, the data showed that the benefits of working in a Structured Technology Innovation Environment (STIE) enable Digital Innovation Success (DIS) irrespective of context. The data supported that STIE does give digital

innovators a better chance at success compared to an unstructured technology innovation environment (UTIE). This implies that digital innovators working in a UTIE face more barriers compared to those in a STIE. The data also showed that each environment has its own unique enablers, which justifies cases of success in each environment and the different innovation intensities (Vega & Chiasson, 2019). This finding supports the second proposition. Finally, a key outcome of this research is a novel conceptual model that extends the existing Choice Framework. This model advances knowledge within Information Systems Research by offering a fresh perspective on the Digital Innovation Success phenomenon. With this backdrop, this chapter locates the key study findings in a broader context, to show how the findings confirm, fit in, or differ from literature, theory, and practice. The chapter structure is as shown in Figure 6-1.

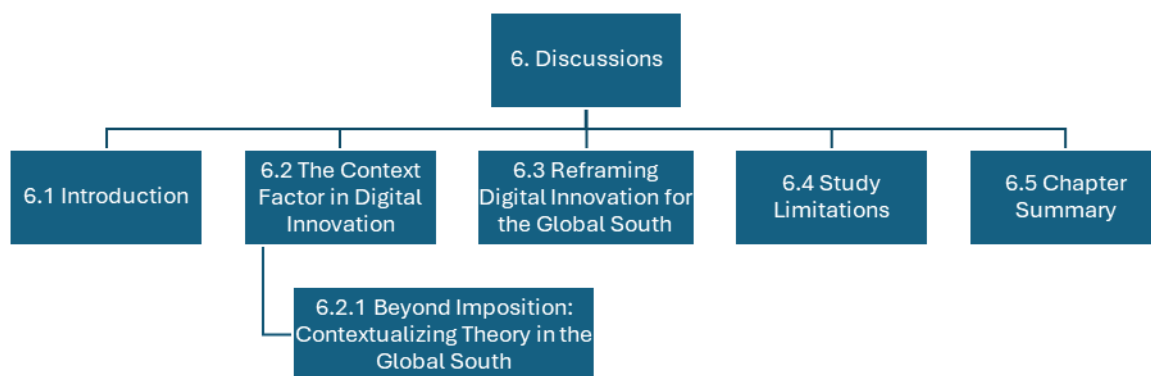


Figure 6-1: Structure of Chapter 6

6.2 The Context Factor in Digital Innovation

This study sought to investigate the importance and influence of context in understanding the enablers and barriers of Digital Innovation Success (DIS) in the Global South. At the bare minimum, Díaz-Santamaría and Bulchand-Gidumal (2021) note that an empirical context can influence the definition of DIS. This is because current research on definition of DIS lacks a “common denominator” on what is “understood as success” (p. 1). This section discusses the

context factor further to illuminate more on the need for its consideration in IS research, particularly for studies on digital innovation.

6.2.1 Beyond Imposition: Contextualizing Theory in the Global South

The urgent need for decolonisation of knowledge on digital innovation became more evident in the findings of this study's systematic literature review and results of the empirical data analysis. The literature confirmed that the success of digital innovations in the Global South continues to be explained based on the Silicon Valley narrative and foreign theories that could pose contextual fit challenges and ignore the importance of the "epistemologies of the south" (Jimenez & Roberts, 2019, p.5). The one-size fits all agenda often propagated by the Global North (Kothari et al., 2019) appears to have seeped through into Innovation research. The empirical data confirmed that the Global South thinks differently.

Silencing knowledge from the Global South therefore can: i) hinder both local and global progress due to exclusion of centuries of knowledge (a case in point is the concept of 'ubuntu' in South Africa) emanating from rich experiences and unique environments on global matters (Kothari et al., 2019); ii) undermine local agency (Kothari et al., 2019) which is evidenced by over-reliance on foreign solutions to solve local problems as alluded to by several research participants in this study and; iii) may perpetuate inequality through dominant narratives in academia that overlook the Global South perspective (Mignolo, 2003). This is evidenced in the results of the systematic literature review presented in Chapter 2, whose findings were dominated by research from the Global North.

Consistent with the literature, this research found the christening of Kenya as the "Silicon Savannah" to give an erroneous understanding of the complex nature of the innovation ecosystem in the country (de Beer, Millar, Mwangi, and Rutenberg, 2017). The notion implies a one-size fits all, as "if the perception of the American Silicon Valley had been taken wholesale and simply plastered onto an African scenario" (Ndemo and Weiss, 2016, p.18). Further, this study findings revealed unique factors that enable or hinder DIS in Kenya, through the lens of a conceptual model (Figure 3-4), which was a contextualized interpretation of the Choice Framework (Kleine, 2013). These results further support the value of contextualization of research on DIS.

6.3 Reframing Digital Innovation for the Global South

At the beginning of this study, a systematic literature review was conducted. The review sought to unearth enablers of and barriers to digital innovation success. The review revealed that previous studies evaluating DIS were more focused on experiences of the Global North, creating a limited perspective on what happens in the Global South. As emphasised in section 6.2, this research gap confirmed the need for contextualization of research on enablers of and barriers to digital innovation success to expand knowledge of digital innovation success beyond what happens in the Global North. This study focused on bringing some clarity on what happens in the Global South, which can contribute towards development of frameworks that foster successful digital innovations, in line with the realities of the South. The following subsection highlights contextual factors that emerged from data as unique enablers of or barriers to digital innovation success in Kenya. The factors were discussed in greater detail in the Findings chapter. This section will focus on the two most relevant factors as per data results (see Table 5-3). Consideration and further investigation of these factors can move the conversation beyond a one-size-fits-all approach to digital innovation. Most importantly, the findings can inform policy formulation around creating enabling innovation ecosystems for the Global South, as well as purposeful structural changes on how incubators/structured innovation environments (STIEs) and innovation intermediaries can work together to create better innovation ecosystems that can benefit innovators in both STIE and UTIE.

Key Contextual Enablers and Barriers to Digital Innovation Success from Study Findings

1. Entrepreneurship Support Organisations (ESOs) and Innovation Intermediaries

The present study revealed a network of actors in Kenya's innovation ecosystem comprising of business incubators, accelerators, technology hubs, co-working spaces, financial entities such as VCs and angel investors, and ICT and innovation research centres. These ESOs' primary focus is to provide support to entrepreneurs or innovators in the ecosystem. The role of innovation intermediaries such as government and academia in Kenya's ecosystem was also evaluated. ESOs and Innovation Intermediaries was the second most relevant theme in this study as shown in Table 5-3. The theme had an equal share of factors that enable and hinder DIS. A prevalent barrier mentioned by respondents under unstructured innovation environment (UTIE) is their belief that ESOs also want a stake in their ventures. This finding reflects that of Bergman and McMullen (2022), who found a gap in research where ESOs are depicted

as “helpers” who have no other interests other than offer support to entrepreneurs. Bergman and McMullen (2022) view this unidirectional relationship as erroneous and recommend a bi-directional approach in assessing the relationship between ESOs and entrepreneurs. A possible explanation for this is “helping scenarios are rarely straightforward, as both the ‘helper’ and the ‘recipient’ have interests” (Bergman & McMullen, 2022, p.4).

2. Innovation Ecosystem

Kenya, a middle-income economy, has put commendable efforts in strengthening its nascent innovation ecosystem, through initiatives geared towards upgrading its Science, Technology, and Innovation (STI) albeit with challenges. Initial innovation activities in Kenya are reported to have begun as early as in 1947, with the setup of the Central Laboratory by the colonial government. The current innovation ecosystem is said to be biased towards FinTech solutions. This is attributed to Mobile network penetration, which was reported to have led to the proliferation of digital innovations in Kenya, most of which were FinTech solutions. Kenya is also reported to have the largest concentration of hubs within the African continent (Lewis, Schneegans and Straza, 2021).

Further, the ecosystem was reported to have many problems to solve, which was largely mentioned by respondents as an opportunity for more innovation. Even with a tech-savvy population of young people, the caliber of entrepreneurs in Kenya was reported as incomparable to those of the Global North. The term ‘necessity entrepreneurs’ was largely referenced to by most respondents when describing the caliber of entrepreneurs/innovators in Kenya. A possible explanation for this, as reported by respondents, is that digital innovators in Kenya face social financial challenges as most ail from underprivileged backgrounds. This may hinder full-time commitment to building successful digital innovations. Because of this, it was surprising to learn that a considerable number of respondents view venture building in Kenya as a thing for the privileged people. In the Global North, STIEs are reported to offer some funding to cater for living expenses of member startups. Y Combinator, for instance, invests a one-time seed funding to cover both living expenses and business costs (Shontell, 2014). Antler, an early-stage investor headquartered in Singapore (Antler, 2024) with an office (more of an incubator) in Kenya, is reported to have successfully implemented the stipend model in the country.

Moreover, the innovators and the ecosystem at large were said to be relatively internationally minded, which was seen as both an opportunity and a challenge. As a challenge, a culture of importation of digital innovations from the Global North as opposed to local production was said to be developing in the country. Several of the imported solutions, however, were reported by respondents to fail within their first 3 years of operation due to market fit challenges.

Moving to the funding landscape of the ecosystem, limited diaspora investment and angel investment were also reported. The need for foreign co-founders to access capital was also reported. This could be attributed to Kenya's startup economy not being mainstream, which was also mentioned as an ecosystem challenge. Also, local startups were reported to have a low funding absorption capacity, which further could also discourage foreign investment.

On the demand side of digital innovation, slow uptake or adoption of local innovation outputs was reported. Low purchasing power on the demand side was also reported. The ecosystem also suffers from brain drain of its Unicorns, which were reported to be headquartered outside Africa, particularly Delaware, where the business environment and legal and regulatory framework is seen to favour technology startups compared to Kenya's ecosystem. Respondents also reported under-regulation and a lack of supporting legislation for technology startups and digital innovation. A possible explanation for this is the Startup Bill of 2021, which was said to be disconnected and misaligned with the nature of technology startup business operation and digital innovation management in general. Some respondents, however, view under-regulation as an opportunity for innovators.

Other challenges plaguing the ecosystem as reported by respondents include lower priority for Research and Innovation, ESOs working in silos contributing to a disorganised ecosystem, and stiff competition with global brands. Despite these challenges, Kenya was reported to be a leading innovation hub compared to its African neighbours but lagging globally. These findings further confirm the need for contextualized research on digital innovation success.

In addition, this study expanded on Vega & Chiasson (2019) concept of “different innovation intensities” (p.249) as a core differentiator between STIE and UTIE. The concept implies a difference in the pace, focus and nature of innovation in the two environments, but does not go into specific detail, particularly identifying additional factors that influence success in STIE

and UTIE thereby contributing to the ‘difference’ in innovation intensity. This research identified the following factors bundled under the construct Structured Environment Support Services (SESS), that influence success in STIE and can be used to explain the innovation intensity in STIE versus UTIE:

1. Slower startup death and burn rate, a factor attributed to digital startups under a STIE, is seen to encourage innovation activities within STIEs. There are very few studies on ‘startup death rate’. Most research is from the Global North, with a focus on ‘startup failure’ and ‘startup mortality’ where they reveal factors that could influence startup survival (Cotterill, 2013). The burn rate on the other hand is a financial metric that reflects how fast a startup spends its cash reserve. Blank and Dorf (2020, p. 439) defines it as the amount of cash a startup spends in a month or the pace at which it is bound to run out of cash.
2. STIE can facilitate connections that enable more marketing opportunities for digital innovators. This can be achieved through “access to business contacts” (Sillitoe & Chakrabarti, 2010, p. 157) or via networking or show-and-tell events organised by an STIE, where entities that are most likely to have interest in their members' innovation ideas are invited. Research reports incubation social capital as an important benefit of available to incubatees (Sillitoe & Chakrabarti, 2010), which provide opportunities for mentorship, collaboration with fellow innovators, linkage with investors and potential customers.
3. Market validation support could come either in the form of financial or technical (or both) support from an STIE towards faster validation and pivoting, thereby saving time and minimising wastage of resources. Grimaldi and Grandi (2005) note that the focus of most private incubators in the Global North is to shorten the “time-to-market and speed up liquidity events” (p. 114) for their incubates. In the UTIE, the market validation process can be longer and resource intensive.
4. Financial support: It is common to find STIEs with an internal startup fund accessible to their members (Sillitoe & Chakrabarti, 2010). This study also revealed that affiliation to a reputable STIE may afford a digital innovator easy access to venture funding. The empirical findings also showed that STIEs can afford an innovator direct linkage with financiers. This impacts positively on the innovation intensity of STIE.
5. Other STIE programs and services: Other STIE programs and services such as training coaching, mentorship, co-working space, market validation support, legal guidance and

more were empirically validated as concrete enablers of digital innovation success in the Global South. These attract more innovators to join an STIE (Blank and Dorf, 2020), which in turn contributes to increased innovation intensities in the structured environment. The infrastructure in STIE was also reported as an enabler of success, which could also contribute positively towards increased innovation intensity of STIE. The study also confirms that mentorship and coaching impacts positively on the innovation intensity of STIE, as it contributes largely towards a 'slower startup death or burn rate' for technology startups affiliated to an STIE. The study also revealed ease of access to business strategies (Blank and Dorf, 2020) as a key enabler. This was attributed to the view of STIE as knowledge centres that hold very valuable information concerning all matters startups and venture building. This impacts positively on the innovation intensity of STIE.

6.4 Study Limitations

The following study limitations are acknowledged:

- Theories used as a lens in the study – There are undoubtedly other suitable theoretical frameworks or models that can be used as a lens to study Digital Innovation Success. However, the Choice Framework, combined with some aspects of the Resource Dependency Theory, was found to be particularly productive in allowing the researcher to unpack and understand the Digital Innovation Success phenomenon within a Global South context.
- Cross-sectional timeline – The data collected during a defined short duration of time, as per the timeline indicated in ethical approval of not more than 12 months, may limit the evaluation of potential changes that may have significant influence on study results. The data collected in this study, however, was adequate as it generated several themes that allowed the researcher to sufficiently address the two research questions.

6.5 Chapter Summary

This chapter examines how research corroborates key study findings and establishes how the study contributes or complements existing knowledge on digital innovation success, with a focus on the Global South context. The study concludes by identifying potential study limitations, which could inform future research.

7 CONCLUSIONS, RESEARCH CONTRIBUTIONS AND RECOMMENDATIONS FOR FUTURE STUDIES

7.1 Introduction

This section presents study summary, the theoretical and practical contributions and concludes with recommendations for future researchers. Figure 7-1 shows the chapter structure.

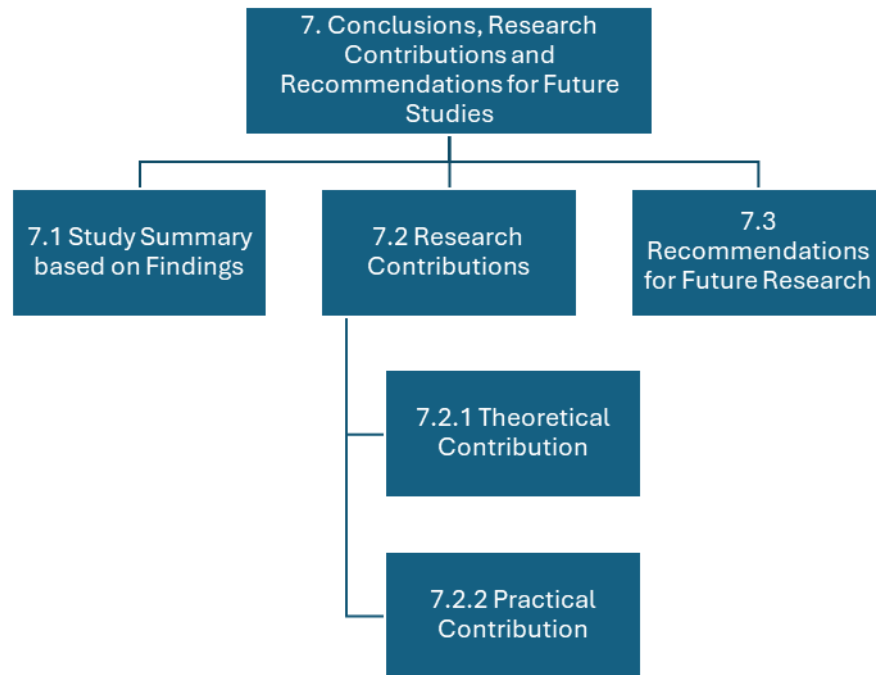


Figure 7-1: Structure of Chapter 7

7.2 Study Summary based on Findings

The study set out to explore potential enablers of and barriers to digital innovation success in the Global South. The following research questions guided the inquiry: i.) What are the enablers of and barriers to digital innovation success for digital startups in Kenya? ii) How do the identified enablers and barriers compare for digital startups operating in a structured versus unstructured innovation environment in Kenya? The exploratory, qualitative study followed took a post-positivist approach. The study adopted a multiple case study research strategy, where 4 cases (digital innovations) representing structured and unstructured technology innovation were evaluated. The study approached digital innovation success (DIS) as a socially constructed phenomenon which could be studied through an exploration of stakeholder views, opinions, and experiences, while allowing for researcher reflexivity. Data triangulation strategies, using various data collection methodologies (Patton, 1999), provided for research rigor by alleviating concerns on verifiability and replicability of study outcomes (Shank, 2002)

that could emerge on complete reliance on subject accounts as undisputable truth. In post-positivist research, multiple research methods provide for method triangulation (Denzin & Lincoln, 2011) which contributes to reliability and validity of research outcomes. The study employed semi-structured interviews and multiple case studies to collect in-depth insights on digital innovation success phenomena in Kenya. During data transcription, the researcher sought the services of an experienced transcription typist, which further eliminated the risk of researcher subjective accounts of the interview recordings and provided for investigator triangulation (Flick, 2022). Method and data triangulation in post-positivist research helps reduce risk of researcher and research participant biasness, which contributes to reliability of data and replicability of findings (Fossey, Harvey, McDermott, & Davidson, 2002; Shank, 2002). Through the lens of a conceptual framework, a refinement of Dorothea Kleine's Choice Framework that included a construct from the Resource Dependency Theory (RDT), data was analysed for themes following Braun and Clarke (2006) thematic analysis approach. The NVivo qualitative data analysis software was used to conduct thematic analysis.

Capital was the most prominent theme reported by research participants. Challenges of access to capital, particularly at the early stage, were reported as a major barrier to DIS in Kenya. In addition, a lack of understanding of the digital startup business model, and the nature of digital startups as high risk non-investable ventures were among the reasons for the low investment. The study revealed several key contextual factors influencing DIS in Kenya. These factors are categorised under the following major themes: ESOs and Innovation Intermediaries, Innovation Ecosystem, Natural Disasters, Misaligned Innovation Focus. Additional themes like the importance of Impact-Driven Innovation, Market Readiness, the influence of trendsetters in shaping innovation direction, and value of piloting innovation ideas also emerged from data. This thesis has provided a deeper insight into contextual factors that enable or hinder DIS in Kenya, a Global South country. Before this study, research on innovative ecosystems in the Global South was largely done through the Silicon Valley lens, and other models in the Global North. This is evident in the christening of Kenya as the 'Silicon Savannah', a title that continues to be used extensively in academic and practitioner research.

Further, the study compared structured and unstructured innovation environments (STIE and UTIE, respectively). Interestingly, it found that a structured environment directly contributes to successful digital innovation. It also acts as a buffer, reducing some barriers and strengthening some enablers. This gives digital innovators and entrepreneurs in structured environments a clear advantage over those in unstructured ones who face more obstacles.

However, the research also highlights that each environment has its own unique strengths that can lead to success.

In conclusion, beyond the empirical findings, this study presents a hopefully useful and, in the space of innovation, new conceptual model (Figure 3-4). By applying and refining Dorothea Kleine's Choice Framework (Kleine, 2013) in the domain of innovation, the model advances knowledge in Information Systems Research. It provides a new lens for understanding of Digital Innovation Success phenomena.

7.3 Research Contributions

7.3.1 Theoretical Contribution

First, this study contributes to the development of knowledge on Digital Innovation Success in the Global South. In particular, the study provides a theoretical explanation of contextual enablers of and barriers to digital innovation success in Kenya, a Global South country, and how they compare in structured versus unstructured technology innovation environment, through the lens of a conceptual model, which is a refinement of Kleine's Choice Framework. The focus on context contributes to development of knowledge based on the understanding and experiences of the South, rather than solely relying on western theories developed for and in the Global North. Second, the study provides a theoretical demonstration of how Kleine's Choice Framework can be used as a lens for Information Systems research and for building a conceptual model in the space of innovation and micro-sized startups (instead of individuals). The development of a conceptual model can be a guide on how researchers may expand on an existing framework to fit their research agenda and context.

7.3.2 Practical Contribution

The findings of this study have several important implications for future practice. First, digital innovators can use the study outcome to assess and select an innovation environment (STIE or UTIE) that best aligns with their strengths and weaknesses and complements their startup needs. Factors to consider would include their need for access to resources, training, mentorship, and risk tolerance. Second, government and policy makers can better tailor their support for different environments and the local innovation ecosystem in general, through policies that cater to the diverse needs of innovators in both STIE and UTIE, and other innovation stakeholders in their countries. Further, the study sheds more light on the difference between startups and MSMEs and recommends the need for targeted policies that align with

the nature of digital startups, which government and policy makers can include as a key policy priority. Third, investors can leverage the study findings to invest strategically in digital innovation ventures in the Global South. For instance, the study revealed a low funding absorption capacity of local startups and recommended the need to partner with ESOs and innovation intermediaries to disburse funding. This allows for targeted investment in the most promising digital ventures in the Global South based on their absorption capacity. The study also reported low local and diaspora investment, and recommended de-risking mechanisms that can encourage investors to support digital ventures. Fourth, academia and researchers can gain insights on complex digital innovation research agendas to guide more empirical work on challenges and opportunities that digital innovators face in STIE and UTIE within the Global South. Further, as a collaboration catalyst, researchers can explore models and best practices that encourage collaboration among innovation stakeholders or ESOs and innovation intermediaries, who were reported to operate in silos in Kenya.

7.4 Recommendations for Future Research

The purpose of exploratory research is to set the scene for more conclusive research on a phenomenon of interest (Saunders, 2012). This being an explorative study that takes on a cross-sectional time frame, it is likely that more insights could be derived from a longitudinal ethnographic study, where researchers immerse themselves in the empirical context to experience and observe a digital innovator's journey or a digital innovation process emanating from a digital startup, within a given context and innovation environment. In addition, to comprehensively compare one innovation context to another, it might be of value for a researcher to conduct empirical research on both contexts if resources (time and financial) allow.

Three research agendas emerged from this study, which can be explored further by academia and researchers in future. One, research that expounds more on the Hybrid Technology Innovation Environment (HTEI) might provide useful practical implications, especially for digital innovators, investors, ESOs, government and policy makers. Two, an empirical study that examines and compares two innovation ecosystems, such as Kenya's innovation ecosystem and the Silicon Valley, or perhaps two African innovation ecosystems (e.g. Kenya's and South Africa's "Silicon Cape") might provide a more conclusive outcome on the unique differences between innovation ecosystems to inform collaborative innovation activities. Three, academic research has been faulted for being disjointed and overly descriptive on the

impact ESOs have on an entrepreneurial process (Bergman & McMullen, 2022). In future investigations, this study agrees with Bergman and McMullen (2022) recommendation for a longitudinal study on the interaction between startups and ESOs, to bring more clarity on how ESOs support the entrepreneurial process. In particular, a different perspective on the ESO and innovator relationship needs to be investigated in detail, as previous studies have alluded to a unidirectional relationship as opposed to a bidirectional relationship where both parties, the “helper” and the “recipient” have interests (Bergman & McMullen, 2022, p.4).

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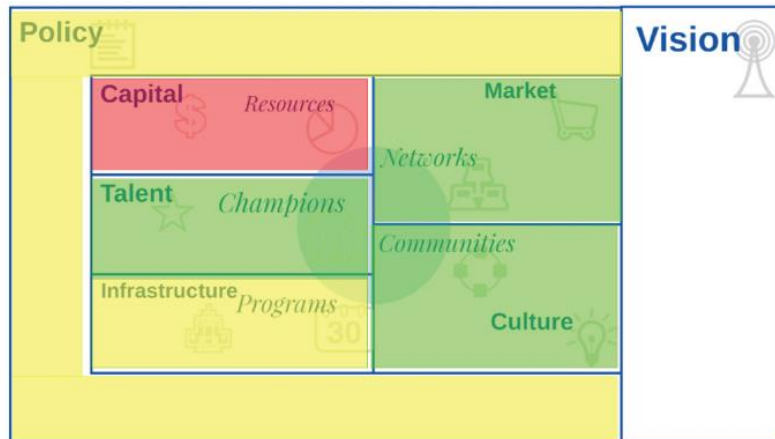
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9 APPENDICES

9.1 Appendix A: ITU Ecosystem Canvas Heat Map (International Telecommunication Union, 2017)



9.2 Appendix B: Government Directive: Enabling Environment for Kenyan Startups



REPUBLIC OF KENYA
THE NATIONAL TREASURY

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Finance – Nairobi
FAX No. 310833
Telephone: 2252299

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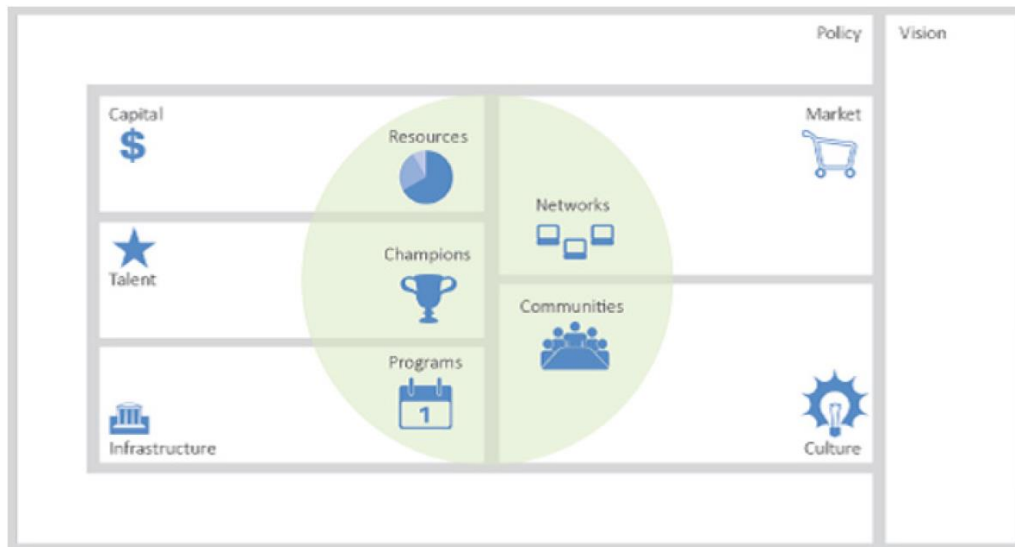
25th September, 2013

TREASURY CIRCULAR NO 14/2013

All Accounting Officers
All Chief Executive Officers, State Corporations
All County Governors
All Vice Chancellors, Public Universities
All Managers Co-operative Societies
All Principals, Public Colleges/Schools
All CDF Account Managers

RE: PRESIDENTIAL DIRECTIVE:- 30 PERCENT OF ALL GOVERNMENT
PROCUREMENT BE ALLOCATED TO THE YOUTH, WOMEN AND
PERSONS WITH DISABILITIES

9.3 Appendix C: ITU Ecosystem Canvas Tool (International Telecommunication Union 2017)



9.4 Appendix D: Codebook

Major (grouping) themes	Description	Sub-themes (factors)
Business model	Digital innovations can be embodied in or enabled by technology (Fichman, Santos, and Zheng, 2014)	Innovative business models, business model design, business model management
Capital	Includes financial and non-financial capital. Financial capital is a key enabler of digital startup success (Ester, 2017). Some financing options may bar innovation success, especially where a funding source imposes unfavourable contractual obligations. Non-financial capital can include intellectual and technical capacity in terms of physical tools and human capital.	Financial capital, Venture Capital (VC) investment, Angel Investor, startup capital, intellectual capital, human capital, social capital, psychological capital, talents, capabilities
Culture	The entrepreneurial, research and innovation culture of context under study and its impact on digital innovation success.	Startup culture, entrepreneurship culture
Digital Technology	Technological tools and platforms that drive the design and development of digital innovations.	Technology, ICT, mobile penetration, internet, open-source tools and platforms, unrestricted access to information
Education and Training	Education, formal and informal, has been addressed by a myriad of studies as an important enabler where accessible or a barrier where	Universities, technical skills, innovation and entrepreneurship curriculum, talents, competencies

Major (grouping) themes	Description	Sub-themes (factors)
	access is limited (Nielsen et al., 2016) Initiatives such as incorporation of innovation and entrepreneurship curriculum (van Den Berg, C. L., 2018) in institutions of higher learning may increase competency in running digital innovations successfully. Research centres on the other hand can release empirical research, information and technology, which digital startups can leverage on.	
Government	As a key stakeholder in the innovation ecosystem, assess what the government has done, is doing and will do towards creating an enabling digital innovation ecosystem.	Policy, ease of doing business, laws and regulations, government funding
Incubators and Accelerators	Technology hubs, digital innovation hubs (Sörvik, 2018), business incubators and accelerators are seen to provide an enabling environment that steer digital innovations to success.	Technology hubs, research, and innovation labs, living labs, business incubation, makerspaces, hackerspaces, accelerators
Leadership	Type of leadership style used by digital innovators/founder may affect innovation success.	Leadership styles, transactional leadership, laissez-faire leadership and transformational leadership

Major (grouping) themes	Description	Sub-themes (factors)
Networks	Formal and informal networks which a digital innovator can leverage to steer their innovation towards success.	Resilient networks, business advice, linkages, informal networks (friends and family)
Open Innovation	Opportunities for collaborative building of an innovation and its implication on outcome.	Collaboration, co-design, co-creation, co-production

9.5 Appendix E: Research Participant Consent Form

Dear Participant,

RE: Invitation and request for consent to take part in PhD research

I wish to invite you to participate in a PhD study on “*Enablers of and Barriers to Digital Innovation Success: A Comparative Study of Structured versus Unstructured Technology Innovation Environments in Kenya.*” The study aims to explore context specific enablers of and barriers to digital innovation success in Kenya, while comparing these factors within incubated (structured) versus non-incubated (unstructured) innovation environments.

Your participation in this research is voluntary. All information will be treated in a confidential manner and used exclusively for the purpose of this PhD study. No individual names will be recorded or published. You will not be requested to supply any identifiable information, ensuring anonymity of your responses. You can choose to withdraw from the research at any time for whatever reason, in accordance with ethical research requirements.

The interview will take approximately 45 minutes and will be conducted either online via a video conferencing tool accessible to you, or physically at a location convenient and accessible to you and the researcher. The researcher will ensure that all COVID-19 regulations in Kenya are adhered to when conducting the interviews. If you are willing to participate in this study, kindly sign (insert a digital signature) on the attached form and send it to me via email at your earliest convenience. Alternatively, you can confirm your interest to participate via a Google form available on this link: <https://bit.ly/PHDConsentForm>.

Should you have any questions regarding this research, please do not hesitate to reach me via email at MsLmutegi@gmail.com.

I look forward to your favorable response. Thank you.

Sincerely,

Lorna Mutegi

PhD Student

Department of Information Systems

University of Cape Town

Email: MsLmutegi@gmail.com

Professor Jean-Paul Van Belle,

Academic Supervisor,

Department of Information Systems

University of Cape Town

Email: jean-paul.vanbelle@uct.ac.za

9.6 Appendix F: Interview Guide

Interview Guide for Subject Matter Experts from Government, Industry and Academia (Incubation Manager/Start-up Mentors/Academic Experts/Government Representatives/Industry Experts)

Purpose:

To collect “background information” from key informants or subject matter experts who are part of, influence or are influenced by the Digital Innovation Ecosystem in Kenya

Target Research Participants:

Academics with expertise in either (or all) Information and Communication Technology, Entrepreneurship and Strategic Business Management

Industry experts with at least 5 years’ experience in entrepreneurship, management of business incubators/accelerators, mentorship, and training of start-ups both in a structured(incubated) and unstructured(non-incubated) innovation environment.

Subject matter experts from Government working for, with or in Government-led digital innovation initiatives, Government Institutions, agencies that deal with youth enterprise fund, innovation, and entrepreneurship related programs.

Section 1

1. Tell me about your role in the digital innovation ecosystem in Kenya? How long have you been in this space?
2. Who is a digital innovator in Kenya? Paint us a picture or describe the profile of a digital innovator or digital start-up in Kenya.
3. Describe the digital innovation ecosystem in Kenya? What is it characterized by?
4. How does the digital innovation ecosystem in Kenya compare to that in the Global North? What are its unique traits compared to the Global North?
5. How does the digital innovation ecosystem in Kenya compare to that in Silicon Valley? What are its unique traits compared to Silicon Valley?
6. How does the digital innovation ecosystem in Kenya compare to other ‘ideal models’ of innovation ecosystems in Africa (e.g., Cape Town/Silicon Cape, Nigeria etc.)? What are its unique traits compared to these other ecosystems in Africa?
7. What role does industry/business incubators/academia/government play in the digital innovation ecosystem in Kenya?
8. Which other key players in the digital innovation ecosystem support digital start-ups?

Section 2

9. In your perspective, what does digital innovation success mean or what do you consider as key measures of success for a digital innovation/start-up in Kenya?

Section 3

10. What are the enablers of and barriers to digital innovation success in Kenya?
11. How do the enablers of and barriers to digital innovation success compare in a structured versus unstructured innovation environment?
12. What can be done to enhance or moderate the enablers and barriers towards digital innovation success in Kenya?
13. What would be the contribution of digital innovators towards the success of their innovations or start-ups?

9.7 Appendix G: Ethical Approval from UCT



Faculty of Commerce
Private Bag X3, Rondebosch, 7701
2.26 Leslie Commerce Building, Upper Campus
Tel: +27 (0) 21 650 4375/ 5748 Fax: +27 (0) 21 650 4389
E-mail: jacques.rousseau@uct.ac.za
Internet: www.uct.ac.za
 @Commerce UCT  UCT Commerce Faculty Office

Loma Mutegi

11 09 2021

Department of Information Systems

University of Cape Town

REF: REC 2021/09/009

Enablers of and Barriers to Digital Innovation Success: A Comparative Study of Structured versus Unstructured Technology Innovation Environments in Kenya

We are pleased to inform you that your ethics application has been approved. Unless otherwise specified this ethical clearance is valid until 31-Dec-2022 .

Your clearance may be renewed upon application.

Please be aware that you need to notify the Ethics Committee immediately should any aspect of your study regarding the engagement with participants as approved in this application, change. This may include aspects such as changes to the research design, questionnaires, or choice of participants.

The ongoing ethical conduct throughout the duration of the study remains the responsibility of the principal investigator.

We wish you well for your research.

Signed by candidate

2021.09.11
15:51:52 +02'00'

Jacques Rousseau
Commerce Research Ethics Chair
University of Cape Town
Commerce Faculty Office
Room 2.26 | Leslie Commerce Building

Office Telephone: +27 (0)21 650 2695 / 4375
Office Fax: +27 (0)21 650 4369
E-mail: jacques.rousseau@uct.ac.za
Website: <http://www.commerce.uct.ac.za/com/Ethics-in-Research>

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9.8 Appendix H: Ethical Approval from Daystar University, Kenya

VERDICT – APPROVAL WITH COMMENTS

Daystar University Ethics Review Board

Our Ref: **DU-ERB/15/11/2021/000605**

Date: 15th November 2021

To: Lorna Mwendu Mutegi

Dear Lorna,

**RE: ENABLERS OF AND BARRIERS TO DIGITAL INNOVATION
SUCCESS: A COMPARATIVE STUDY OF STRUCTURED VERSUS
UNSTRUCTURED TECHNOLOGY INNOVATION ENVIRONMENTS IN KENYA**

Reference is made to your ERB application reference no. 211021-01 dated 21st October 2021 in which you requested for ethical approval of your proposal by Daystar University Ethics Review Board.

We are pleased to inform you that ethical review has been done and the **verdict is to revise as per the attached comments and then proceed to the next stage**. As guidance, ensure that the attached comments are addressed. Please be advised that it is an offence to proceed to collect data without addressing the concerns of Ethics Review board. Your application approval number is **DU-ERB-000605**. The approval period for the research is between **15th November 2021 to 14th November 2022** after which the ethical approval lapses. Should you wish to continue with the research after the lapse you will be required to apply for an extension from DU-ERB at half the review charges.

This approval is subject to compliance with the following requirements.

- i. Only approved documents including (informed consents, study instruments, MTA) will be used.
- ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by Daystar University Ethics Review Board.
- iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to Daystar University Ethics Review Board within 72 hours of notification.
- iv. Any changes anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to Daystar University Ethics Review Board within 72 hours.
- v. Clearance for export of biological specimens must be obtained from relevant institutions.
- vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
- vii. Submission of a signed one page executive summary report and a closure report within 90 days upon completion of the study to Daystar University Ethics Review Board via email [duerb@daystar.ac.ke].

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI)

<https://research-portal.nacosti.go.ke> and other clearances needed.

Yours sincerely,

Signed by candidate

Sr. Prof. A. U. Londo PhD
Chair, Daystar University Ethics Review Board

Encl. Review Report



...until the day dawn and the
daystar
arise in your hearts"
2 Peter 1:19 KJV

9.9 Appendix I: Research Permit

 REPUBLIC OF KENYA National Commission for Science, Technology and Innovation	 NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
Ref No: 638712	Date of Issue: 16/January/2022
RESEARCH LICENSE	
	
This is to Certify that Ms. Iorna Mtengi of University of Cape Town, has been licensed to conduct research in Kiamba, Kiambu, Machakos, Nairobi on the topic: Enablers of and Barriers to Digital Innovation Success: A Comparative Study of Structured versus Unstructured Technology Innovation Environments in Kenya for the period ending : 16/January/2023.	
Applicant Identification Number 638712	License No: NACOSTI/P/22/15142
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