

https://dspace.org/

Corporate entrepreneurship and innovation performance: the moderating role of endogenous risk management in the South African telecommunications sector

Zondo, Hlengiwe Londiwe

2021

https://hdl.handle.net/10539/32619

Downloaded from a DSpace repository. https://dspace.org/





Corporate entrepreneurship and innovation performance: the moderating role of endogenous risk management in the South African telecommunications sector.

"A research report submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Management in Entrepreneurship and New Venture Creation"

Authored by Hlengiwe Londiwe Zondo
Student Number ~ 1806827

Supervisor: Professor Boris Urban

Wits Business School
University of Witwatersrand

.

Abstract

Innovation and risk are indivisible. The mismanagement of risk can carry an enormous penalty. In recent history, the corporate community has observed a number of risk calamities that have resulted in substantial loss. Harmoniously, mounting evidence advocates for effective risk management as an archetypal characteristic of successful firms. At an academic level, literature discusses the importance of an organisational culture in enterprise risk management as a means of improving firm and innovation performance. However, there is scant empirical evidence to support this connection, an evident research gap within the South African context. At industry level, the South African telecommunications sector has experienced adverse consequences due to the mismanagement of risk that ascended from a lack of control-related structures, policies, systems, and knowledge management systems pertaining to innovation performance.

Within this ambit, there lies the need to gain insight on the role of endogenous risk management within the corporate entrepreneurship context and its effect on innovation performance in the aforementioned sector. Consequently, the purpose of this research is to investigate how organisational antecedents of corporate entrepreneurship may influence innovation performance while identifying the potential moderating effect of endogenous risk management on this relationship, within the telecommunications sector in South Africa.

This study follows a positivist paradigm, founded on a quantitative research approach utilising a cross-sectional viewpoint. Primary data, with a sample size of 187 participants, was collected by means of an online survey that was self-administered. Two stage probability sampling was adopted for this research. The sampling techniques used were stratified sampling, which was used to sample all the identified telecommunication firms in South Africa with primary focus on the significant market shareholders, and simple random sampling which was applied to employees within the telecommunication firms.

Data analysis comprised of correlational analysis, backward elimination method, multiple regression and moderation analysis. The antecedents of corporate entrepreneurship; management support, rewards/reinforcement and time availability were found to be significant predictors of

innovation performance at a 99 percent confidence level, whilst organisational boundaries were found to be an insignificant predictor of innovation performance. A significant but indirectly proportional relationship was found between work/discretion/autonomy and innovation performance within this study context.

It is noteworthy that the regression analysis revealed time availability, management support and rewards/reinforcement, as the most influential predictors of innovation performance, listed in descending order of strength. Firms with appropriate time availed, rewards/reinforcement and management support for employee entrepreneurial activity, are expected to yield prodigious results in innovation performance. Furthermore, the results indicated that endogenous risk management has a moderating effect on the relationship between corporate entrepreneurship and innovation performance. However, this was discovered to be statistically insignificant for each dimension of corporate entrepreneurship in relation to innovation performance. The findings were precisely the reverse of those found in developed economy context research.

The findings of this study have substantial implications for industry, academia and policy makers alike. This study succours telecommunication firms in the establishment and maintenance of internal corporate environments that are conducive to innovation. For longevity and competitive advantage purposes, it is within firms' best interest to invest in human capital as primary agents of knowledge creation, corporate entrepreneurship and innovation activities. Strategic policy formulation targeted at enhancing innovation outcomes and all the opportunities that come with it – could benefit the country at a micro, meso and macro level.

The originality of the study lies its nature within this particular emerging market context and the theoretical contribution made through a construct proposed for inclusion in the antecedents of corporate entrepreneurship framework.

Key words: innovation performance, corporate entrepreneurship, enterprise risk management, endogenous risk management, organisational intelligence, telecommunications, economic growth

Declaration

I, Hlengiwe Londiwe Zondo, declare that this research report is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Management in Entrepreneurship and New Venture Creation at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.



Hlengiwe Londiwe Zondo

Signed at Boksburg, Gauteng, South Africa

On the 20th day of April 2020.

Dedication

To my parents, for their unrelenting love and support over the years.

Acknowledgements

A number of people have been centrally or peripherally essential to the completion of this research. I extend my earnest gratitude to each of you for travelling this journey with me.

To my loving fortress of a husband, Dr. Njongenhle Nyoni, you are my unremitting inspiration to be the best version of myself. Your love and support are a luminous lighthouse in the midst of turbulent storms. You carry me to safety, always. *Ngiyakuthanda kakhulu Mthinsi om'hle.* To my mom and dad, Qiniso and Feziwe Zondo, the older I get, the more I understand what a gift it is to be loved so unconditionally. I love you more than words can say. Thank you for an imperfectly beautiful life and upbringing.

Jubs, thank you for allowing me to pick your brain on stats matters, your input was invaluable. Lynette Mhlongo, the dictionary should have your face next to the definition of the term friend. *Uyazi*. With this mere parenthesis in history, I hope to encourage my beloved siblings, nieces and nephews to always remain steadfast in their truth and ability to make manifest the glory of God that lies within each of them. May we never fear new beginnings or taking the unconventional path. *uNkulunkulu anibusise nonke ngamunye ngamunye*. Auntie Thobile, *uyisibusiso kithi.* To the rest of my family and friends, you enrich my life in so many wonderful ways. I hope to return the favour unreservedly.

Thank you to every respondent that took the time to complete the survey. Your input was paramount. To Dr Jabulile Msimango-Galawe (fondly known as Dr. J), Dr. McEdward Murimbika and Dr. Diran Soumonni, where do I start? With each word you broke down the walls of ineptness and revealed elusive mysteries. May your passion never cease. To the class of 2020, take pride in how far you have come and have faith in how far God's grace can take you.

Last, but by no means least, thank you to my supervisor Professor Boris Urban. Darren LaCroix once said, "to be the best, learn from the best". I have had the prodigious fortune of learning from the best and for that I am grateful.

ABSTRACT ..... **II**
DECLARATION ..... **IV**
DEDICATION ..... **V**
ACKNOWLEDGEMENTS ..... **VI**
LIST OF ACRONYMS ..... **X**
LIST OF FIGURES ..... **XI**
LIST OF TABLES ..... **XII**
LIST OF EQUATIONS ..... **XIV**
CHAPTER 1 : INTRODUCTION **1**
1.1 Background and Context of the Study 1
1.2 Purpose of the Study 2
1.3 Research Objectives/Questions 2
1.4 Problem Statement 3
1.4.1 Main Problem 3
1.4.2 Sub-Problems 5
1.5 Significance of the Study 5
1.6 Contribution of the Study 5
1.7 Delimitations of the Study 6
1.8 Assumptions of the Study 7
1.9 Definition of Key Terms 7
1.10 Structure of the Dissertation 8
1.11 Chapter Summary 9
CHAPTER 2 : LITERATURE REVIEW **11**
2.1 Introduction 11
2.2 Entrepreneurship in Emerging Markets 12
2.3 Entrepreneurship in South Africa 15
2.4 Telecommunications Industry 15
2.5 Innovation Performance 20
2.5.1 Definition and Concept 20
2.5.2 Types of Innovation 24
2.5.2.1 Product Innovation 24
2.5.2.2 Technological Innovation 26
2.5.2.3 Process Innovation 26
2.5.2.4 Market Innovation 27
2.5.2.5 Administrative Innovation 27
2.5.3 Determinants of Innovation Performance 28
2.6 Corporate Entrepreneurship 30
2.6.1 Definition and Concept 30
2.6.2 Antecedents of Corporate Entrepreneurship 40
2.6.2.1 Management Support 40
2.6.2.2 Work Discretion /Autonomy 42
2.6.2.3 Rewards/Reinforcement 44
2.6.2.4 Time Availability 47

2.6.2.5 Organisational Boundaries 49
2.7 Endogenous Risk Management 51
2.7.2 Definition and Concept 51
2.7.3 Endogenous Risk Management and CE-Inno_P Link 59
2.8 Conceptual Framework of Study 62
2.9 Chapter Summary 63

CHAPTER 3 : RESEARCH METHODOLOGY 67

3.1 Introduction 67
3.2 Philosophical Worldview 67
3.2.1 Research Paradigm 69
3.3 Research Design / Approach 71
3.4 Strategy of enquiry 72
3.5 Research Method 73
3.6 Rationale for Type of Research 74
3.7 Population and Sample 76
3.7.1 Population and Sampling Frame 76
3.7.2 Sample and Sampling Method 76
3.8 The Research Instrument 78
3.9 Procedure for Data Collection 80
3.9.1 Participants 80
3.9.2 Data Collection 80
3.9.3 Ethical Considerations 82
3.10 Data Analysis and Interpretation 82
3.10.1 Data Preparation and Cleaning 83
3.10.2 Data Coding and Reshaping 83
3.10.3 Descriptive Statistics 83
3.10.4 Correlational Analysis 84
3.10.5 Regression Analysis 85
3.11 Validity and Reliability of Research 87
3.11.1 External Validity 87
3.11.2 Internal Validity 87
3.11.3 Reliability 89
3.12 Limitations of the Study 89
3.13 Chapter Summary 90

CHAPTER 4 : PRESENTATION OF RESULTS 91

4.1 Introduction 91
4.1.1 Data Preparation and Cleaning 91
4.1.2 Data Coding and Reshaping 93
4.2 Sample Characteristics 94
4.2.1 Respondent Characteristics 94
4.2.2 Firm Characteristics 101
4.2.3 Combined Characteristics 105
4.2.4 Summary – Sample Characteristics 106
4.2.5 Descriptive Statistics Summary 107
4.3 Testing of Measurement Scales 109
4.3.1 Reliability of Measurement Scale Results 109
4.3.1.1 Corporate Entrepreneurship 110

4.3.1.2 Innovation Performance 110
4.3.1.3 Endogenous Risk Management 111
4.3.2 Principal Component Analysis 111
4.3.2.1 Dependent Variable - Innovation Performance 112
4.3.2.2 Independent Variable - Endo_RM & CE 112
4.4 Hypothesis Testing 118
4.4.1 Correlational Results 118
4.4.1.1 Correlation - Graphical 120
4.4.2 Multiple Regression Results 125
4.4.2.1 Model Diagnostics 125
4.4.2.2 Model Regression Results 132
4.4.2.3 Hypothesis One - Corporate Entrepreneurship and Innovation Performance 140
4.4.2.4 Hypothesis Two - Moderating Effect of Endo_RM on CE-Inno_P 143
4.5 Chapter Summary 156

CHAPTER 5 : DISCUSSION OF RESULTS 160

5.1 Introduction 160
5.2 Profile of Respondents 160
5.2.1 Age of Respondent 160
5.2.2 Gender of Respondents 162
5.2.3 Population Groups of Respondents 162
5.2.4 Position of Respondents Within the Firm 163
5.2.5 Level of Education of Respondents 164
5.3 Profile of Firm 165
5.3.1 Firm Age 165
5.3.2 Firm Size 165
5.3.3 Firm Location 166
5.4 Discussion of Results 167
5.5 Discussion of Research Question One 167
5.5.1 Hypothesis 1a Results 167
5.5.2 Hypothesis 1b Results 169
5.5.3 Hypothesis 1c Results 171
5.5.4 Hypothesis 1d Results 172
5.5.5 Hypothesis 1e Results 173
5.6 Discussion of Research Question Two 174
5.6.1 Hypothesis 2a Results 175
5.6.2 Hypothesis 2b Results 176
5.6.3 Hypothesis 2c Results 177
5.6.4 Hypothesis 2d Results 177
5.6.5 Hypothesis 2e Results 178
5.7 Chapter Summary 179

CHAPTER 6 : CONCLUSIONS, IMPLICATIONS, RECOMMENDATIONS 180

6.1 Introduction 180
6.2 Conclusions of the Study 180
6.3 Theoretical Contribution and Recommendation 181
6.4 Practical Contribution and Recommendation 185
6.4.1 Practical Implications and Recommendations for Employees 185
6.4.2 Practical Implications and Recommendations for Telecommunication Firms 185

6.4.3 Practical Implications and Recommendations for Policy Makers 188
6.4.4 Practical Implications and Recommendations for Industry Regulators 188
6.5 Study Limitations 189
6.6 Suggestions for Future Research 190
6.7 Conclusion 193
REFERENCE LIST 194
A. APPENDIX A: ADDITIONAL RESULTS 219
AA - Dependent Variables – CPA 219
AB - Independent Variables – CPA 222
AC - Descriptive Statistics 230
AD - Multiple Regression and Model Diagnostics 234
AE - Multiple Regression and Moderator Analysis 248
AF - Frequency Tables 258
APPENDIX B: CONSISTENCY MATRIX 278
APPENDIX C: ETHICAL CLEARANCE 280
APPENDIX D: RESEARCH INSTRUMENT 281

List of acronyms

Confirmatory Factor Analysis	CFA
Control Variable	CV
Corporate Entrepreneurial Activity	CEA
Corporate Entrepreneurship	CE
Dependent Variable	DV
Endogenous Risk Management	Endo_RM
Human Capital	HC
Independent Variable	IV
Information and Communications Technology	ICT
Innovation Performance	Inno_P
New Product Development	NPD
Principal Component Analysis	PCA
South Africa	SA
Statistical Package for the Social Sciences	SPSS

List of Figures

Figure 2.1: Wennekers and Thurik model for entrepreneurial activity to economic growth 13
Figure 2.2: Contribution of Entrepreneurship to National Economic Growth. 14
Figure 2.3: Economic and Social Impact of Telecommunications 16
Figure 2.4: Economic Impact of ICT 18
Figure 2.5: South Africa against comparative developing nations 19
Figure 2.6: Four Types of Innovation 25
Figure 2.7: Enterprise Risk Management Components 55
Figure 2.8: Continuous Enterprise Risk Management Process 56
Figure 2.9: Detailed Conceptual Model of Study 62
Figure 3.1: A Framework for Design 68
Figure 3.2: Graphic representation of moderation and mediation models 75
Figure 4.1: Missing Value Analysis – Prior Data Cleaning 92
Figure 4.2: Missing Value Analysis – Post Data Cleaning 93
Figure 4.3: Characteristics of respondents by age 95
Figure 4.4: Characteristics of respondents by gender 96
Figure 4.5: Cross-tabulation of gender and age of respondents 97
Figure 4.6: Characteristics of respondents by population group 98
Figure 4.7: Characteristics of respondents by position within firm 98
Figure 4.8: Characteristics of respondents by education level 99
Figure 4.9: Cross-tabulation of educational level and gender of respondents 100
Figure 4.10: Cross-tabulation of educational level and age of respondents 101
Figure 4.11: Characteristics of firm by size 102
Figure 4.12: Characteristics of firm by age 103
Figure 4.13: Characteristics of firm by location within South Africa 104
Figure 4.14: Cross-tabulation of education level of respondents and age of firm 105
Figure 4.15: Cross-tabulation of educational level of respondents and size of firm 105
Figure 4.16: Summary Table - sample characteristics 106
Figure 4.17: Descriptive mean statistics per variable 108
Figure 4.18: Summary Table – Loadings per Construct 116
Figure 4.19: Scatterplot - management support and innovation performance relation 121

Figure 4.20: Scatterplot - work discretion and innovation performance relation 122
Figure 4.21: Scatterplot - rewards & reinforcement and innovation performance relation 123
Figure 4.22: Scatterplot - time availability and innovation performance relation 124
Figure 4.23: Scatterplot - organisational boundaries and innovation performance relation 125
Figure 4.24: Linearity – Observed Predicted Value against Inno_P 127
Figure 4.25: Regression Standardized Residuals 128
Figure 4.26: Regression Studentized Residual 129
Figure 4.27: Residuals by Regressors for Inno_P 130
Figure 4.28: Normality Histogram - Model 3 131
Figure 4.29: Normality Q-Q Plot - Model 3 131
Figure 4.30: Moderating effect of Endo_RM on MS and Inno_P 145
Figure 4.31: Moderating effect of Endo_RM on WD and Inno_P 148
Figure 4.32: Moderating effect of Endo_RM on RR and Inno_P 150
Figure 4.33: Moderating effect of Endo_RM on TA and Inno_P 153
Figure 4.34: Moderating effect of Endo_RM on OB and Inno_P 155
Figure 4.35: Summary of regression results - the structural model 158
Figure 5.1: Population Pyramids of South Africa 161
Figure 5.2: Mid-year population estimates for South Africa by province, 2019 166
Figure 6.1: Proposed Construct Addition - Corporate Entrepreneurship Model 184
Figure A.1: Dependent Variable Scree Plot 220
Figure A.2: Independent Variables Scree Plot 226

List of Tables

Table 1.1: Definition of Key Terms 7
Table 2.1: Corporate Entrepreneurship Definitions 32
Table 2.2: Summary of Research Hypothesis 66
Table 3.1: Four Worldviews 69
Table 3.2: Qualitative, Quantitative, and Mixed Methods Approaches 71
Table 3.3: Strategies of inquiry 73
Table 3.4: Quantitative, Mixed, and Qualitative Methods 74
Table 3.5: Expected Survey Characteristics 78

Table 4.1: Highest mean item per scale 109
Table 4.2: Reliability Statistics – Corporate Entrepreneurship 110
Table 4.3: Reliability Statistics – Innovation Performance 111
Table 4.4: Reliability Statistics – Endogenous Risk Management 111
Table 4.5: Independent Variables Rotated Component Matrix[a] 114
Table 4.6: Statistical Correlation Analysis 119
Table 4.7: Correlation analysis - management support and innovation performance relation ... 120
Table 4.8: Correlation analysis - work discretion and innovation performance relation..... 121
Table 4.9: Correlation analysis - rewards/reinforcement and innovation performance relation 122
Table 4.10: Correlation analysis - time availability and innovation performance relation 123
Table 4.11: Correlation analysis - boundaries and innovation performance relation 124
Table 4.12: Model Summary 133
Table 4.13: Model ANOVA[a] 133
Table 4.14: Model Coefficients 134
Table 4.15: Moderation Effect Equations 137
Table 4.16: Various Model Summaries 139
Table 4.17: MS x Endo_RM Interaction Term Model Summary 144
Table 4.18: MS x Endo_RM Interaction Term ANOVA 145
Table 4.19: WD x Endo_RM Interaction Term Model Summary 147
Table 4.20: WD x Endo_RM Interaction Term ANOVA..... 147
Table 4.21: RR x Endo_RM Interaction Term Model Summary 149
Table 4.22: RR x Endo_RM Interaction Term ANOVA 150
Table 4.23: TA x Endo_RM Interaction Term Model Summary 152
Table 4.24: TA x Endo_RM Interaction Term ANOVA 152
Table 4.25: OB x Endo_RM Interaction Term Model Summary 154
Table 4.26: OB x Endo_RM Interaction Term ANOVA..... 155
Table 4.27: Summary of Findings 159
Table 5.1: Population estimates for South Africa by population group and sex 163
Table A.1: Dependent Variable KMO and Bartlett's Test 219
Table A.2: Dependent Variable Communalities 219
Table A.3: Dependent Variable Total Variance Explained 219

Table A.4: Dependent Variable Factor Matrix[a] 221
Table A.5: Rotated Factor Matrix[a] 221
Table A.6: Independent Variable KMO and Bartlett's Test 222
Table A.7: Independent Variables Communalities 222
Table A.8: Independent Variables Total Variance Explained 224
Table A.9: Independent Variables Component Matrix[a] 227
Table A.10: Independent Variables Factor Transformation Matrix 229
Table A.11: Descriptive statistics – per scale item 230
Table A.12: Descriptive statistics – per variable 232
Table A.13: Model 1 – Ordinary Least Squares 234
Table A.14: Model 1 – Diagnostics Ordinary Least Squares 236
Table A.15: Model 2 - Weighted Least Squares 239
Table A.16: Model 3 - Weighted Least Squares with Control Variables (Firm Age and Size) . 241
Table A.17: Model 4 - Weighted Least Squares with Firm Age 243
Table A.18: Model 5 - Weighted Least Squares with Firm Size 245
Table A.19: Endo_RM Moderates Management Support and Inno_P Relationship 248
Table A.20: Endo_RM Moderates Work Discretion/Autonomy and Inno_P Relationship 250
Table A.21: Endo_RM Moderates Rewards/Reinforcement and Inno_P Relationship 252
Table A.22: Endo_RM Moderates Time Availability and Inno_P Relationship 254
Table A.23: Endo_RM Moderates Organisational Boundaries and Inno_P Relationship 256

List of Equations

Equation 3.1: Sample Size Calculation 77
Equation 4.1: Multiple Regression Equation 135
Equation 4.2: Multiple Regression Equation - Moderation 137

Chapter 1 : Introduction

1.1 Background and Context of the Study

The mismanagement of risk can carry an enormous penalty. In recent history, the corporate community has observed a number of risk calamities that have resulted in substantial financial loss, diminished shareholder value, marred company reputations, dismissal of senior management and in some cases the destruction of the business. It is therefore axiomatic that well-governed companies have effective risk management (Barton, Shenkir, & Walker, 2002; Fama & Jensen, 1983; Jankensgård, 2019; Wright, 2016).

Harmoniously, mounting evidence advocates that effective risk management is an archetypal characteristic of successful firms. At a glance, the two phenomena - corporate entrepreneurship and risk control - might seem to be innately at odds. The objective of corporate entrepreneurship is to take the firm to new heights or a new direction, whilst risk management is meant to guide and frequently restrict actions. This risk can be puts into two categories namely endogenous and exogenous risk. Endogenous risk refers to risk from shocks that are produced and augmented *within* a system. On the other hand, exogenous risk refers to shocks from outside a system. Firms are exposed to both forms of risk. According to Danielsson and Shin (2002) the greatest damage is done by risk of the endogenous nature, as it exacerbates any exogenous pressures which are not within the firm's control (Mohamad, Ramayah, Puspowarsito, Natalisa, & Saerang, 2011). However, through strategic and agile policies and practices, a firm can adequately manage or address internal risk, which falls within the realm of its control (Nguyen, Larimo, & Wang, 2019). Thus, it would be beneficial to discover how endogenous risk management acts in association with the determinants of corporate entrepreneurial activity to encourage the innovation outcomes that enable long-term organisational success. This is the essence of this study, with its nucleus being the telecommunications industry in South Africa.

Centering on the South African telecommunications industry given its social and economic significance, the researcher investigated the effect on innovation performance of several commonly recognised antecedents of corporate entrepreneurship, as measured by the Corporate Entrepreneurship Assessment Instrument (CEAI) namely, management support, work

discretion/autonomy, rewards/reinforcements, time availability, and organisational boundaries. More importantly, the researcher examined the moderating effect of endogenous risk management on the relationship between the antecedents of corporate entrepreneurship and innovation performance (Goodale, Kuratko, Hornsby, & Covin, 2011).

1.2 Purpose of the Study

The purpose of this research is to illustrate how endogenous risk management influences the innovation performance of firms with entrepreneurship-facilitating organisational traits within telecommunications in South Africa, to address the scant empirical research within this context. This study seeks to ascertain the relation between corporate entrepreneurship and innovation performance while identifying the potential moderating effect of endogenous risk management on this relationship. This study seeks to provide understanding that could help telecommunication firms to effectively balance the facilitation and the control of innovation – through corporate entrepreneurship and risk management effect insights.

1.3 Research Objectives/Questions

With the intent to contribute to literature pertaining to intrapreneurship and the telecommunications industry within an emerging markets context - the aim of this research is to find out *how and/or to what extent*;

- The organisational antecedents of corporate entrepreneurship are positively related to innovation performance

- Endogenous risk management moderates the relationships between the organisational antecedents of corporate entrepreneurship and innovation performance.

Thus, addressing the following ***research questions***;

1. In relation to the organisational antecedents of corporate entrepreneurship, what are the significant (and most influential) predictors of innovation performance in telecommunication firms in South Africa?

2. How does endogenous risk management moderate the relationship between the organisational antecedents of corporate entrepreneurship and innovation performance in telecommunication firms in South Africa?

1.4 Problem Statement

1.4.1 Main Problem

The quest of innovative initiatives generally involves the assumption of risk and the possibility of results containing loss. At an academic level, risk has been scrutinised through research from an assortment of angles including; adverse circumstances (Weiss & Maher, 2009), supply chain disruption (Ellis, Henry, & Schockley, 2010), supply chain agility (Braunscheidel & Suresh, 2009), financial (Bromiley, McShane, Nair, & Rustambekov, 2015), risk control (Goodale et al., 2011) and risk management (Narasimhan & Talluri, 2009).

Literature discusses organisational culture's importance and enterprise risk management as a means of improving firm and/or innovation performance (Albors-Garrigos, Igartua-Lopez, & Peiró-Signes, 2018; Wanlapa & Krittapha, 2015). However, there is scant empirical evidence to substantiate this connection (da Silva Etges & Cortimiglia, 2017), an evident research gap within the African context including South Africa. Numerous studies (Bruton, Ahlstrom, & Obloj, 2008; de Villiers-Scheepers, 2012; Goodale et al., 2011; Hitt, Ireland, Sirmon, & Trahms, 2011; Ketchen, Ireland, & Snow, 2007) argue that much remains to be understood about how corporate entrepreneurship is enacted in emerging economies, with some specifically focusing on Africa (Zoogah, Peng, & Woldu, 2015) or South Africa (Ravjee & Mamabolo, 2019). Kuratko, Hornsby, and Hayton (2015) state that notwithstanding the recent expansion in corporate entrepreneurship

research (theoretical and empirical on CE and entrepreneurial behaviour), there still remains fundamental issues that warrant understanding.

This notion resonates with the South Africa context, where there is a critical lack of research on how firms can effectively balance the facilitation and control of (desired and undesired) innovation. Consequently, corporate entrepreneurial activity in relation to endogenous risk management and innovation performance within the South African context needs to be examined more attentively. According to Goodale et al. (2011), firms realise that a combination of formality and discretion is essential in offering both high effectiveness and high efficiency. Nevertheless, the implementation of control-related structures, policies, systems, and risk management philosophies in organisations is seen as a deterrent to the freedoms needed to successfully promote entrepreneurial behaviour in established firms.

At industry level, the South African telecommunications sector has experienced adverse consequences due to the mismanagement of risk that arose from a lack of control-related structures, policies, systems, and knowledge management systems pertaining employee innovation performance (the unit or building block for firm innovation performance). This is illuminated in the costly and ongoing litigation debacle with one of the leading telecommunication firms in South Africa that emanated from insubstantial risk control and management systems regarding employee innovation. This oversight may cost the aforementioned organisation up to R20 billion should the court rules in favour of the complainant.

Within this ambit, there lies a need to gain insight on the role of endogenous risk management in relation to corporate entrepreneurship and innovation performance as well as the organisational CE factors that give rise to greater Inno_P in the aforementioned sector. Consequently, this study focuses on providing these insights on the South African telecommunications industry in this regard.

1.4.2 Sub-Problems

- Sub-problem 1: The need to identify the dimensions of CE (management support, work discretion/autonomy, rewards and reinforcement, time availability, organisational boundaries) that drive innovation performance in South African telecommunication firms.
- Sub-problem 2: The importance of determining the effect of endogenous risk management on the relationship between corporate entrepreneurship and innovation performance of telecommunication firms in South Africa.

1.5 Significance of the Study

The telecommunications industry is essential for *economic growth* – an area of great need in the stagnant South African economy (GDP growth rate of below 1.9% for the past five years as per the World Bank (2018). This makes the telecommunications sector a key economic enabler with great potential to make substantial economic and social impact. To this end, insight that unlocks understanding on how to enhance this industry (i.e. greater innovation performance through improved understanding of the role of internal risk management and CE) holds potential to address some socio-economic issues plaguing South Africa as highlighted by Bilbao-Osorio, Dutta, and Lanvin (2014) in the Global IT Report. This report states that despite the South African ICT infrastructure being the most sophisticated within the African context, broadband is both limited and expensive leading to business usage that is moderate whilst both individual and government usage is low. Furthermore, this report narrates that government is not leveraging technology extensively to make social and economic impact. Thus, innovation and path creation through leveraging insights can assist SA in moving beyond the middle-income trap at a macro level, transform industry at meso-level and firms at the micro-level (Lee, 2013).

1.6 Contribution of the Study

Within the emerging economy/South African context, this study builds on existing theories, namely resource based view, agency, human capital, prospect, innovation and corporate entrepreneurship theories. Based on the insights from this study, telecommunication firms can

assess, facilitate, manage, and improve their corporate entrepreneurship (Ireland, Covin, & Kuratko, 2009) and risk management strategies (Hu & Wu, 2016) for innovation performance outcomes that enable long-term organisational success.

Furthermore, risk management has historically had an inclination towards operating in "silos". Different facets of risk management such as operational risk, financial risk, technology risk, environmental risk, legal and insurance risk have largely been researched and managed independently (Tummala, Xie, & Schoenherr, 2011). Inclusive and proactive identification of risk has been lethargic – hampering the creation of a culture of risk identification, analysis, mitigation and control. This study investigates the management of risk (endogenous) as an integrated concept across the entire telecommunications firm - in relation to the CE-Inno_P relationship (Barton et al., 2002; Covin & Slevin, 2009; Hornsby, Holt, & Kuratko, 2008; Hornsby, Kuratko, Shepherd, & Bott, 2009; Hu & Wu, 2016), adding to the enterprise risk management framework and the strategy of firms seeking to establish their entity's risk philosophy and culture (Mishra, Rolland, Satpathy, & Moore, 2019).

This study adds considerable value to corporate firms within the South African telecommunications industry as well as interest groups involved in telecommunications policymaking and regulation. It seeks to provide insight that may contribute towards tackling the aforesaid issues that plague SA – leading to more efficient systems that stem from applied insights and rewards that have potential to trickle down from a macro level to the microlevel; the digital inclusion of ordinary citizens or entrepreneurs, thus reducing barriers to entry into the business world.

1.7 Delimitations of the Study

- The study focuses on telecommunication firms in South Africa
- The respondents are employees at all levels in the abovementioned firms.
- This study researched firms that have been in existence for at least three years
- It focuses on sample characteristics, Endo_RM, CE and Inno_P elements within these firms

1.8 Assumptions of the Study

The underlying assumptions of this study are as follows;

- Telecommunication firm employees allocated time to complete the survey
- Given the nature of the telecommunications industry, respondents did not have difficulty understanding the questions. It is further assumed that respondents provided authentic answers.
- It is assumed that the participants had an adequate command of English, which is the most predominant language used in corporate South Africa
- Participants had an understanding of the nature and purpose of the study
- It is assumed that the questionnaire was completed by the intended persons

1.9 Definition of Key Terms

Table 1.1: Definition of Key Terms

Term	Definition
Endogenous Risk Management	Identification, analysis, mitigation and control of risk that may arise from within the firm (Danielsson & Shin, 2002)
Corporate Entrepreneurship	Corporate entrepreneurship encompasses two types of phenomena and the processes surrounding them: (1) the birth of new businesses within existing organisations, such as internal innovation or venturing; and (2) the transformation of organisations through renewal of the key ideas on which they are built, i.e. strategic renewal (Guth & Ginsberg, 1990)

Innovation Performance	This study looks at innovation performance as; "(1) new products or services developed, (2) number of new products or services brought to market, (3) speed with which new products or services are developed, (4) speed with which new products or services are brought to market, (5) ability to respond quickly to market or technological developments, (6) ability to pre-empt competitors in responding to market or technological developments, (7) incorporation of technological innovations into product/service offerings, and (8) incorporation of technological innovations into internal operations." (Goodale et al., 2011, p. 122)
Economic Growth	"A country's economic growth may be defined as a long-term rise in capacity to supply increasingly diverse economic goods to its population, this growing capacity based on advancing technology and the institutional and ideological adjustments that it demands. Advancing technology is the permissive source of economic growth" (Simon, 1973, p. 247)

1.10 Structure of the Dissertation

Chapter One serves as an introduction to the study, providing context within which the study is located and the background against which the study is carried out. It therefore comprises the purpose of the study, objective and research questions that channelled the study. Moreover, this chapter articulates the problem statement and details the significance and contribution of the study to the existing stock of knowledge. In addition, it presents and discusses the delimitations, assumptions and key terms found within the study. The chapter concludes with an outline on the structure of the dissertation.

Chapter Two presents and discusses literature reviewed. It introduces and expands on the concepts of entrepreneurship within the South African context, telecommunications, innovation performance, corporate entrepreneurship and endogenous risk management based on literature reviewed. The theory that underpins the variables under study is examined and relations are hypothesised accordingly. This chapter incorporates a detailed conceptual framework of the study and the hypothesised relations between the independent variables (Endo_RM and CE) and the dependent variable (Inno_P).

Chapter Three consists of the methodological approach adopted for this research. It describes and explains the research paradigm, design and philosophies, population and sampling methods that funnelled units of analysis of this study. The research instrument utilised to gather primary data is reflected upon. The data collection procedure, ethical considerations, data analysis and interpretations for the study are also presented and discussed in this chapter. Validity and reliability tests, as well as the limitations of the study, conclude the chapter.

Chapter Four presents the results of the empirical study and the tested hypotheses. It also provides results on descriptive statistics, testing of measurement scales, principal component analysis, model diagnostics, correlation and regression analysis of the variable under study.

Chapter Five offers a discussion on the findings of study, as presented in the previous chapter.

Chapter Six provides the conclusion and recommendations of the study. Theoretical and practical contributions alongside recommendations from the researcher are made. The chapter concludes with the exposition of identified study limitations and suggestions offered for future research.

1.11 Chapter Summary

This chapter commenced with an introduction that focussed on the background and context to the study. The purpose of the study, research questions and problem statement were presented respectively. The chapter presented the aim of the study which is to provide understanding that could help telecommunication firms to effectively balance the facilitation and the control

of innovation through understanding the impact of corporate entrepreneurship on the innovation performance of telecommunications firms in South Africa and the moderating role of endogenous risk management of this relationship. The value of the study was discussed through the potential contribution, significance and beneficiaries of the study. The telecommunications sector was highlighted as a key economic enabler with great potential to make substantial economic and social impact. Contribution to existing theory, frameworks, firm strategies and telecommunication industry ecosystem players was noted. The study scope and boundaries were underlined through delimitations and the assumptions of the study were highlighted. Key terms from the study were defined and the chapter concluded with an outline of the structure of the dissertation.

Chapter 2 : Literature Review

2.1 Introduction

One of the most potent challenges facing organisations today is finding an equilibrium between high performance or efficiency considerations on the one end of the spectrum and the promotion of innovation through a conducive internal climate, on the other end (O'Reilly & Tushman, 2004). Efficiency necessitates the exploitation of present competences and is frequently best served by distinct structures that specify, control or manage how various activities should be carried out. This is contrary to innovation which insist on flexibility as employees are best able to innovate when they depart from routine tasks – giving room for exploration of new opportunities. The two concepts (efficiency – through control and innovation – through flexibility) are not mutually exclusive theoretically but can undoubtedly collide in practice. This clash is mostly evident in business units that are devoted to research and development or innovation, while s maintaining a level of predictability as their output forms the input for organisational functions that are more repetitive. An example is new product development (NPD) which relies heavily on experimentation and the development of new ideas that must be approved and controlled by management to moderate risk, prevent the development of non-profitable products or the mismanagement of knowledge. Thus, through internal risk management, an organisation can control (desirable and undesirable) innovation whilst creating an internal environment that enables employee entrepreneurial activity, facilitating firm innovation (Oh, Ho, Pham, Huang, & Wang, 2018).

This study seeks to understand whether a firm's endogenous risk management can strengthen the relation between its entrepreneurial climate and innovation performance (allowing for both efficiency and flexibility - controlling and facilitating innovation performance). This sought insight pertains specifically to the South African telecommunications industry, one that falls within the emerging markets context.

2.2 Entrepreneurship in Emerging Markets

Emerging market firms (EMFs) have become noteworthy players in global business. Corporate entrepreneurship, through its pillars of innovation, venturing into new markets and strategic renewal, has served as a significant source of competitive advantage (Covin & Slevin, 1991b; Demirkan, Yang, & Jiang, 2019). In her article, on the antecedents of strategic corporate entrepreneurship, de Villiers-Scheepers (2012) highlights the growing significance and importance of emerging economies as economic forces globally and the meaningful role that entrepreneurship plays in this process. Africa is progressively becoming the economic powerhouse of the world as businesses increasingly look to the continent to access further growth. Hoffman (2018) points out the internet as the single most effective mechanism in human history for promoting global economic prosperity and lifting the world's population out of poverty. He also highlights that many of the next billion internet users will come from Africa. From an economic and academic (Zoogah et al., 2015) perspective, Africa has been dubbed both the *final* and *new* frontier, respectively. Mol, Stadler, and Ariño (2017) highlight that the principal cause for this optimism is the opportunity offered by Africa as an under explored context.

This optimism is not without its boundaries, as firms operating in emerging economies are said to be confronted with numerous challenges that include but are not limited to; macroeconomics constraints, unstable political terrain, infrastructural problems, limited availability of skilled labour and social issues. Notwithstanding all these challenges, entrepreneurial intentions in emerging markets are said to be higher than those observed in developed economies. Entrepreneurship is seem by numerous agents as a means of addressing major socio-economic issues, including unemployment and poverty (Bruton et al., 2008). According to Lumpkin and Dess (1996) entrepreneurial activity represents one of the major propellers of economic growth and explains the preponderance of the new business development and job creation.

The link between entrepreneurial activity and economic growth has been studied by various scholars. Wennekers and Thurik (1999) offer the following framework shown in Figure 2.1. The framework explores the impact of entrepreneurship on economic growth at three different levels of analysis, namely: the individual level, the firm level and the macro level. Herein, entrepreneurial

activity grows and changes the productive potential of the national economy by encouraging higher productivity and the progression of new niches and industries. Processes at the aggregate level are, in turn, linked to the individual layer (Carree & Thurik, 1998).

The entrepreneurial process occurs in the context of a set of conditions for entrepreneurship. It further depends on the emergence and presence of market opportunities and the capacity, motivation and skills of individuals to establish firms in pursuit of those opportunities. In this framework, we observe the link between firm performance and economic growth (Carree & Thurik, 1998; Khan, 2018).

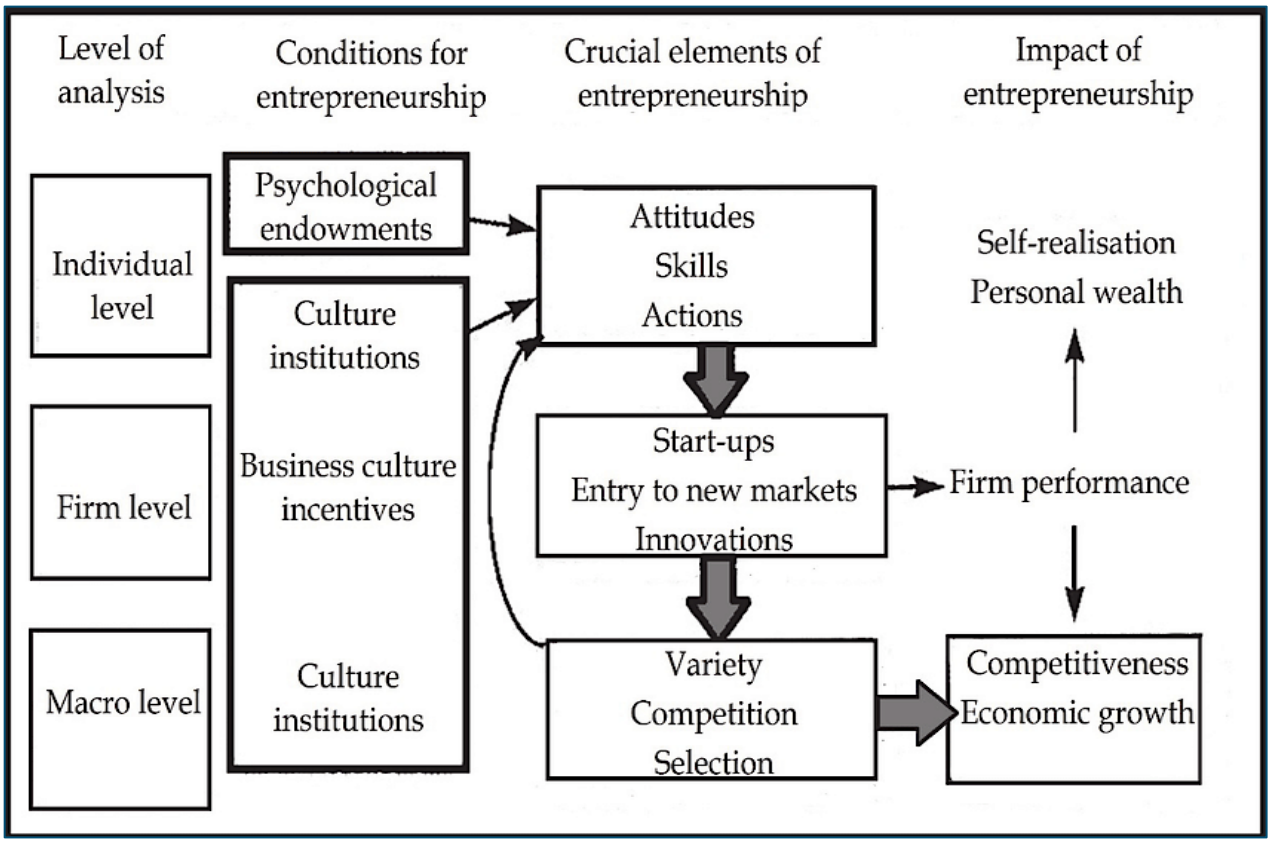


Figure 2.1: Wennekers and Thurik model for entrepreneurial activity to economic growth

Source: adapted from Wennekers and Thurik (1999, p. 52)

Another framework on the link between entrepreneurship and economic growth is the Global Entrepreneurship Monitor (GEM) model (Figure 2.2), which maintains that the performance of

large established firms is influenced by general business conditions (General National Framework Conditions), which are, in turn, dependant on the social, cultural and political contexts. These contexts are influential in creating unique business and entrepreneurial environments and should therefore be taken into account when analysing cross-national differences and national developments over time. Consequently, entrepreneurship within various emerging markets is said to be unique (especially when compared to developed economies) (Herrington, Kew, & Kew, 2010). This then necessitates a unique approach to strategies relating to corporate entrepreneurship, organisational climate and culture definition, risk management, knowledge and personnel management.

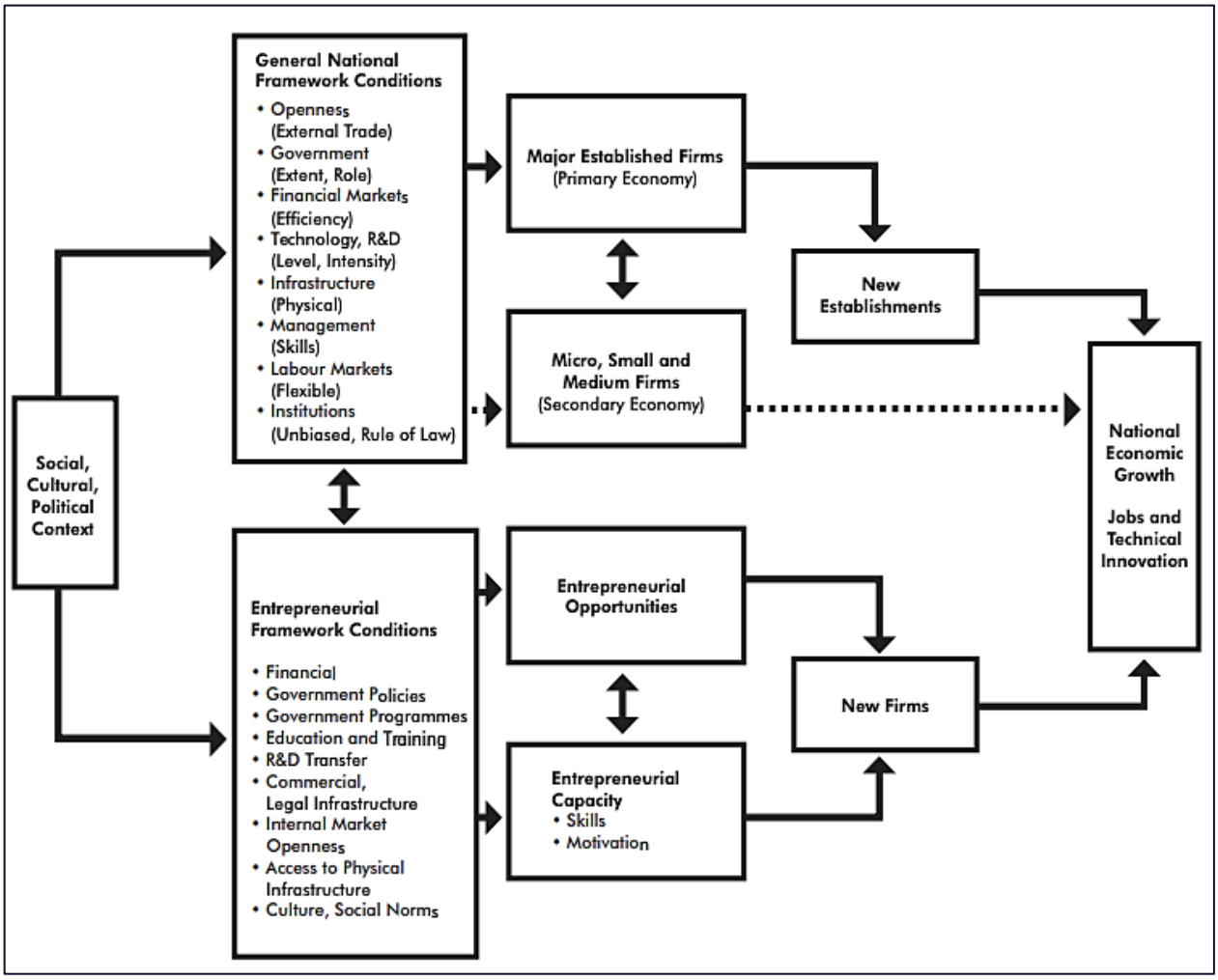


Figure 2.2: Contribution of Entrepreneurship to National Economic Growth.

Source: Herrington et al. (2010, p. 22)

2.3 Entrepreneurship in South Africa

South Africa faces numerous economic, political and social challenges such as high unemployment, low economic growth, structural inequality, spatial divides, power supply and energy insecurity. The most problematic hindrances to doing business in South Africa are an inadequately educated workforce, crime and theft, restrictive labour regulations, poor work ethic in national labour force, inefficient government bureaucracy, access to financing, corruption, and inadequate supply of infrastructure (Herrington et al., 2010; The World Bank, 2019).

Furthermore, South Africa remains a dual economy with one of the highest inequality rates in the world. This inequality is perpetuated by a legacy of exclusion and the nature of economic growth, which is not pro-poor and does not generate sufficient jobs (The World Bank, 2019). Despite the challenges of entrepreneurship in South Africa, it continues to hold a prominent position as a solution for the country's socio-economic challenges. In the hope of stimulating substantial job creation, economic development and addressing social issues, government has focussed on crafting policies that develop entrepreneurship in South Africa. Although these policies appear to be created with good intentions, they have at times been lost in implementation or created barriers to entry and unfavourable environments for entrepreneurship (Ayankoya, 2016; Klapper, Laeven, & Rajan, 2006).

2.4 Telecommunications Industry

Historically, the South African telecommunications sector has favoured the existence and prosperity of a select few large firms over competitiveness and contestation in the industry. To facilitate broad-based economic development, a monopoly (Telkom) held the sole license for a five-year period. This was mandated by the South African government in 1997 in order to extend telecommunications services in the country. Subsequent to this period, a few more firms entered the market, contending with monumental entry costs. Entrants were expected to compete with incumbents while the playing field was far from level due to high barriers to entry, infrastructural, as well as (slow and poor) policy and regulation challenges. This resulted in substantially meagre outcomes (Achterberg, 2010; ICASA, 2017; Naidoo, 2004). Despite new entrants (e.g. Rain), the

South African telecommunications industry is still vastly dominated by a handful of established firms (such as Telkom, Vodacom, MTN and Cell C) with one of the globe's steepest prices for data compared with other nations, including countries in which these South African companies operate in (Achterberg, 2010; ICASA, 2017; Naidoo, 2004).

Scant competition within the industry has reduced the incentive of telecommunication service providers to invest in infrastructure which has in turn resulted in limited impact on the economy (Hoffman, 2018). More so, the limited socio-economic impact (creation of employment, productivity and quality of life) of ICT can be attributed to feeble policy, industry development (competition) and investment and incentives to ICT adoption as shown in

Figure 2.3 (Katz, 2009). Within this ambit, the importance of competition has become more apparent with each new development in the sector (Hawthorne, Mondliwa, Paremoer, & Robb, 2016).

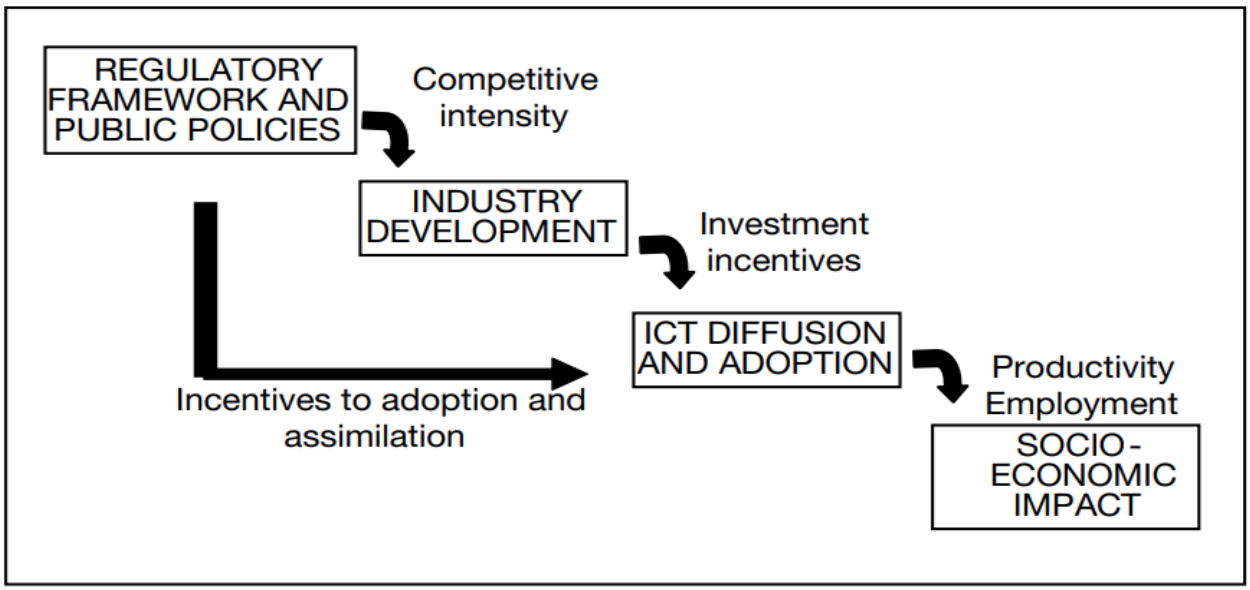


Figure 2.3: Economic and Social Impact of Telecommunications

Source: (Katz, 2009, p. 45)

The cumulative importance of telecommunications for the South African economy was perhaps best summarised by former Minister of Posts, Telecommunications and Broadcasting, Jay Naidoo, in 1997 (Naidoo, 2004, p. 7);

> *"Better telecommunications will enhance our ability to deliver improved quality of life, electronic health and learning services to previously disadvantaged areas. It opens up great opportunities to train and equip our people with skills necessary to improve our ability to innovate. Innovation is a key factor in determining our global competitiveness. In an increasingly information-driven world, our competitiveness will depend on our ability to access and exchange information globally."*

Telecommunications technology touches every aspect of our lives. It affects the way we do business, the way we govern ourselves, the way we communicate, and the way we build the collective human experiences we call culture. The industry today includes software-based applications with a communications emphasis and intermediate layers of software incorporated into end-to-end communication services. It also includes suppliers of telecommunications equipment and software products (Achterberg, 2010).

Technology is driving entrepreneurship and business models and economists cite the ICT sector as directly connected to economic growth. Most studies trying to connect economic growth and ICT have resolved that technology adoption and capacity have a significant bearing on economic growth. Precisely, ICT has been found to have a direct influence on the economy at the four levels listed in Figure 2.4 – Economic Impact of ICT (Katz, 2009).

Economic Impact of ICT

Areas of Impact	Benefits
Productivity	• Improvement ot total factor productivity, particularly in those industries that are ICT-intensive but also in those that are not
Creation/relocation of enterprises	• Relocation of enterprises based on the availability of high capacity telecommunications networks (as one of many infrastructure factors) and quality of life (driven by availability of networks in schools, hospitals, public administration etc.)
Employment	• Creation of employment as a result of relocation of companies searching for labour cost arbitrage • Creation of qualified self-employment resulting from the availability of communication networks • Creation of employment in manufacturing and installation of telecommunications equipment
Economic growth	• Increase in efficiency of industries with high transaction costs (retail distribution, finance etc.) • Consumer surplus generated by the availability of new telecommunications services, reduction of travel time and transportation etc.

Figure 2.4: Economic Impact of ICT

Source: (Katz, 2009, p. 43)

On the contrary, Niebel (2018) argues that while investment in ICT is a noteworthy driver of productivity growth, which in turn improves the standard of living in an economy, weak and ambiguous empirical evidence exists on its contribution to economic growth for emerging and developing countries. Niebel (2018) also notes that despite the optimism from The World Bank on ICT's great promise to reduce poverty, increase productivity and boost economic growth, there is significant lack of evidence in this regard, largely due to the lack of high quality micro and macro level data sets on ICT for emerging and developing countries.

From the data that is available, South Africa lags behind other developing and middle-income countries in respect to a number of characteristics including broadband availability and speeds. South Africa has significantly lower availability and slower speeds than Turkey, the Russian Federation, China and Brazil. The South African Telecommunications industry is regulated by the Independent Communications Authority of South Africa, an independent regulatory body established to regulate both the telecommunications and broadcasting sectors in the public interest. However, the public has repetitively expressed concern over the exorbitant pricing, among other issues regarding the industry's performance (ICASA, 2017; Naidoo, 2004).

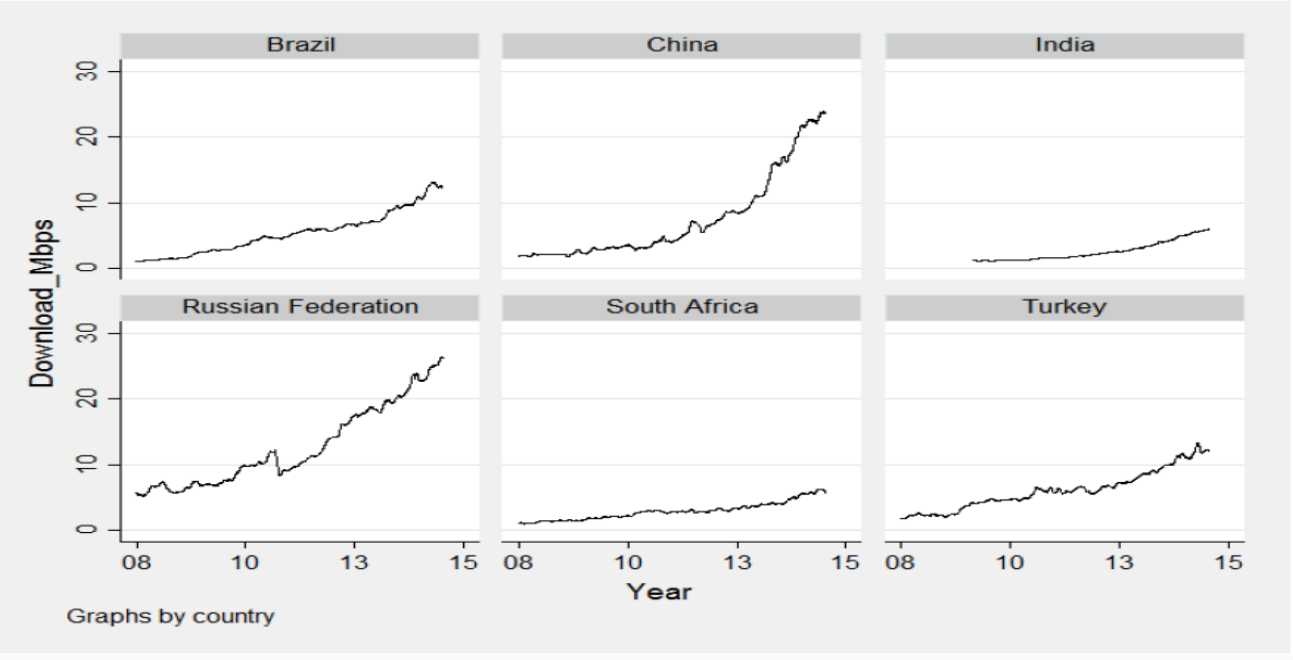


Figure 2.5: South Africa against comparative developing nations

Source: (Hawthorne et al., 2016, p. 15)

In depicting the telecommunications industry, a distinction needs to be made between network operation (e.g. Telkom) and service provision (e.g. Afrihost an internet service provider). Network operators provide the links and exchanges that enable communication to take place between one point and another. Service providers use network operations to communicate and provide various communication services to end-users. The four main sectors of the South African telecommunications industry are (Achterberg, 2010):

- local fixed network operation;
- local mobile network operation;
- long-distance network operation;
- service provision over combinations of the above networks

In precis, the telecommunications sector has been noted as one of the facilitators of economic growth and participation. As such, multiple agents in South Africa (academics, industry, government, civil society) ought to care about the competitive outcomes of this market. When

competition works in telecommunications, it can result in expanded services, lower prices, and the stimulation of innovation (Hawthorne et al., 2016).

2.5 Innovation Performance

2.5.1 Definition and Concept

Studies on innovation have developed from inconsequential research in social sciences to a worldwide, multidimensional phenomenon approached from several research viewpoints that drive the strategic dialogue on competition and productivity at local, regional, and national levels. Innovation is undeniably one of the most imperative strategic and operational levers available to firms for creating competitive advantage (da Silva Etges & Cortimiglia, 2017). It is cited as key to the competitive advantage and superior performance of a firm (Barney, Ketchen, Wright, Ketchen, & Wright, 2011). The intangible resources that are its focal point account for innovation performance variation among organisations (Galbreath & Galvin, 2006). Over the past few centuries, the competitive environment of firms has undergone major transformation due to globalisation. Organisations have amplified their pursuit for strategies that will provide sustainable competitive advantage. Such strategies generally require that firms continuously differentiate their products and processes, that is, they must constantly be innovative. Schumpeter (1942) argued that organisations should innovate in order to renew the value of their asset capability. Consequently, innovation in products, process, market, technology and administration is regarded as an essential prerequisite for the organisational survival and success (Madhoushi, Sadati, Delavari, Mehdivand, & Mihandost, 2011; Popadiuk & Choo, 2007).

Innovation has been commonly defined as the successful application of new ideas resulting from organisational processes in which different resources are combined (Dodgson, Gann, & Phillips, 2014). This combination of various resources is a multi-stage process that leads to improved or new products, services, or processes with which firms seek to differentiate themselves on the market (Baregheh, Rowley, & Sambrook, 2009; Rauter, Globocnikb, Perl-Vorbach, & Baumgartnerd, 2019). Ultimately, these resources yield returns and act as drivers for corporate innovation performance that increases chances of long-term firm survival.

Urabe (1988, p. 3) defines innovation as the "generation of a new idea and its implementation into a new product, process or service, leading to the dynamic growth of the national economy and the increase of employment as well as the creation of pure profit for the innovative business enterprise". Furthermore, Urabe (1988) highlights that innovation is certainly not a one-time phenomenon, but a sustained and cumulative process consisting of numerous organisational decision-making phases (these range from the idea generation to the implementations phase). New ideas may stem from a perceived customer need to new ways of producing existing goods. These perceptions or novel ways of doing things are derived from a collective process of gathering information alongside the entrepreneurial vision of those in power. Through apt implementation the novel concept is expounded and commercialised into a new marketable product or a process that either results in cost reduction for the firm and/or increased productivity. Based on this definition, the innovation performance of a firm would be gauged on how well it generates and implements new ideas into products, processes or services, whilst considering subsequent impact on the economy, job creation and profitability of the firm. Whilst the job creation and profitability of a firm would not be difficult to measure, the noble gesture of measuring the true impact to the economy seems rather implausible.

In their study on operations management and corporate entrepreneurship, Goodale et al. (2011, p. 122) take a systematic enumeration approach and define innovation performance as; **"**(1) new products or services developed, (2) number of new products or services brought to market, (3) speed with which new products or services are developed, (4) speed with which new products or services are brought to market, (5) ability to respond quickly to market or technological developments, (6) ability to pre-empt competitors in responding to market or technological developments, (7) incorporation of technological innovations into internal operations." This definition differs from Urabe's definition in that it does not explore the subsequent ripple effects of innovation but the characteristics and incorporation of innovation itself. This characterisation was utilised to evaluate firm innovation performance in this study, as it did not pose any measurement challenges and encompassed areas of interest; quantity, speed, ability to adapt and pre-empt market and technological changes, and lastly internal operations assimilation.

Andries and Czarnitzki (2011) contend that innovation is inherently about identification and utilisation of opportunities to create new products, services or work practices. Similar to the definition from Goodale et al. (2011), Andries and Czarnitzki (2011) accentuate the concepts of newness, speed and adaptability to market needs. They affirm that the rate at which firms develop new products, services and processes impacts the performance of a firm and its longevity. Through the introduction of new products, services and processes, organisations are able become more efficient, adapt to meet market demands and possibly establish new markets.

O'Reilly and Tushman (2004) are also of view that for long term sustainable growth, the majority of firms require the maintenance of diverse innovation efforts. Kuratko, Covin, and Hornsby (2014) assert that although corporate innovation is commonly pushed as a practical strategy for sustaining competitive advantage, it remains quite elusive for most companies. The following reasons are cited as challenges in this regard:

- understanding what type of innovation is being sought (impacting firm Inno_P);
- coordinating managerial roles (stemming from firm organisational culture and agency);
- effective use of operating controls (endogenous risk management); and
- proper training and development of employees (human capital theory).

When these are collectively acknowledged, understood and aptly addressed, they assist in creating an effective innovative ecosystem within an organisation (Kuratko, Covin, et al., 2014). The ability of a firm to do this well also largely depends on the resources and capabilities available to the firm (Drazin & Rao, 2017).

In the resource-based view (RBV) of the firm, resources and capabilities are regarded as the principal sources of sustainable competitive advantage. The firm's innovative capacity is proposed as one of the most important capabilities for developing this advantage. In line with the RBV, it is widely accepted that the ability to innovate depends on the firm's underlying resources and capabilities. A vital principle in the literature on new product development is that the new product introduction rate is a function of a firm's ability to manage, maintain and create knowledge (Drazin

& Rao, 2017; Scheepers, Hough, & Bloom, 2008). A significant portion of the knowledge that is needed for innovation, exists within individuals (Subramaniam & Youndt, 2005).

Individuals are the primary agents of knowledge creation and in the case of tacit knowledge, they are the principal storehouses of knowledge. In addition, individual knowledge and skills can sometimes be rare and complex, thus making them difficult to imitate. As a result, in alignment with the human capital theory, human capital is regarded as a critical resource in developing innovations and a sustainable competitive advantage for firms (Hitt et al., 2011). The human capital theory suggests that the knowledge, abilities, and skills gained through education, experience, and training enhance job engagement and in turn have a positive association with job performance, which then provides firms with competitive advantage. (Harris, Pattie, & McMahan, 2015). Although many scholars hold this fundamental narrative in high regard, the human capital theory has been ostracised by some scholars (Marginson, 2019) for its single theoretical lens.

The innovation performance of a firm rests on the innovation performance of its employees who are said to increase cognitive ability and attentiveness through greater investment education and experience, which in turn improves knowledge-based task performance (Harris et al., 2015). Although many other factors play a role in the idea generation process (Ward, 2004), individual knowledge is important for generating ideas, which in turn can become relevant when used in the innovation process (Bledow, Frese, Anderson, Erez, & Farr, 2009). Consequently, senior management in firms ought to encourage and create a conducive environment for the participation of employees in the innovation process, as opposed to relying solely on their own actions and ideas (Andries & Czarnitzki, 2011). Furthermore, the intelligence of an organisation can give it competitive advantage in innovation outcome and overall performance (Yolles, 2005).

One of the most important determinants of a country's competitiveness is its human talent – the skills, education and productivity of its workforce. Management sciences postulate that none of the factors of production, no matter how sophisticated, can replace the input of personnel (Olusadum & Anulika, 2018). In South Africa, the overall levels of education and training, social and cultural norms and the regulatory environment hold great significance and a potentially negative role in determining the level of innovation. The continued importance of education as an

identified limiting factor in South Africa is not consistent with findings in other developing or efficiency-driven economies where (as a limiting factor) education does not play as significant a role as it does in South Africa (Herrington et al., 2010).

2.5.2 Types of Innovation

2.5.2.1 Product Innovation

Product innovation is the introduction of a new product or significant improvement on an existing product (Polder, Leeuwen, Mohnen, & Raymond, 2010). The product must either be a new product or significantly improved with regards to its features, intended use, user-friendliness, components or material (ul Hassan, Shaukat, Nawaz, & Naz, 2013). The introduction of new products to the market is an important key driver of firm innovation performance (Ernst, 2002). Numerous empirical studies have revealed a positive relationship between product innovation activities and firm innovation performance (Prajogo, 2006). Product innovation activities, which stem from a firm's corporate entrepreneurship strategy, can produce superior financial success for a firm. New product development and product innovation is an important strategy for increasing the market share and performance of the business. When a new product is successful in the market, it may gain several advantages such as a premium price and a greater market share as seen with products such as Apple communication devices (Ceylan, 2013).

In the highly competitive business environment that exists today, firms strive to develop new products in order to meet customer needs (some of which are pre-empted). In this environment, firms use product innovation to compete in the market. The aim of product innovation is to attract new customers and maintain existing ones (ul Hassan et al., 2013). As depicted in Figure 2.6, Henderson and Clark (1990) propose four types of product innovation:

- Incremental innovation: strengthening the core components of the product whilst maintaining the existing connections between them
- Modular innovation: changing the fundamental technology of the component but not changing the way in which the system links together

- Architectural innovation: changing the design; whilst the components may not change significantly the way in which they link together does
- Radical innovation: extreme; it encompasses changing both the technology of the components and also the way in which they link together

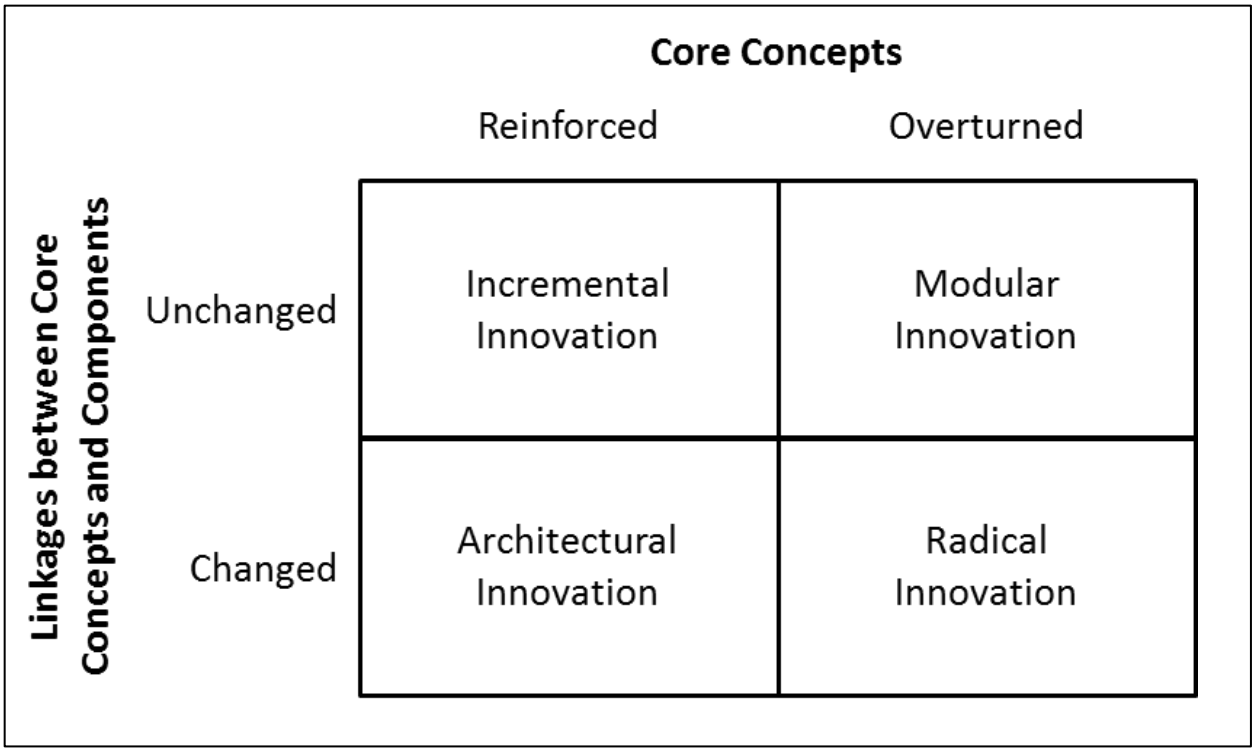


Figure 2.6: Four Types of Innovation

Source: Henderson and Clark (1990, p. 12)

Although new products open up new opportunities for companies, the substantial risk associated with these new products should not be neglected. Empirical studies thus point to high failure rates of new products, especially in consumer markets. It is therefore prudent for management to learn about factors which impact their product innovation activities, product innovation and subsequent firm innovation performance (Ernst, 2002).

2.5.2.2 Technological Innovation

Technological innovation is the knowledge of components, connections between components, methods, processes and techniques that go into a product or service. As depicted in Figure 2.6, there exists a significant overlap between product and technological innovation. The Frascati Manual (2004) presents a set of activities in technological innovation. These consider research and development (R&D) as the only activity that is carried out at different phases of the innovation process, acting not only as the original source of inventive ideas but also as a form of problem solving that can be called on at any point up to implementation (Popadiuk & Choo, 2007). This type of innovation is often cited as a foundation for competitive advantage, and major contributor to firm performance in innovation (or innovativeness). It is widely accepted that an organisation's capability to innovate is closely tied to its intellectual capital; its ability to utilise its individual knowledge resources. Several studies emphasise how new products and processes embody knowledge. There is a clear link between individual knowledge and innovation performance (Andries & Czarnitzki, 2011).

Innovation can include both improved technology and better methods of doing things. It may be manifested in new products, services or improved quality; new ways of production, packaging, marketing or distribution; new markets; new supply sources; new organisations or systems (Szeto, 2000; Tien, 1998).

2.5.2.3 Process Innovation

Process innovation, on the other hand, is concerned with introducing new elements into an organisation's operations such as input materials, task specifications, work and information flow mechanisms, and equipment used to produce a product or render a service (Ceylan, 2013; Popadiuk & Choo, 2007). Firms are said to make use of process innovation to bring efficiency to their organisations (Polder et al., 2010).

ul Hassan et al. (2013) propose that process innovation is improving the production and logistic methods of a firm significantly or bringing significant improvements in the supporting activities.

Furthermore, it can include bringing significant improvement in the equipment, technology and software of the production or delivery method. Firms innovate their processes in order to produce innovative products, decrease the production cost or potentially reduce cost of the product. They develop or adopt new process to compete with other firms – for efficiency and long-term survival.

However, the development or adoption of new process is not always easy for established firms, where processes, information flow and structure generally take on a bureaucratic approach. Henderson and Clark (1990) argue that, given the right internal climate, architectural and radical innovation can profoundly challenge existing organisational structure and processes. Incremental and modular process innovation are seen as less challenging to established structures since not much is changing. What is most arduous to achieve in a large firm, is radical process innovation, which establishes a new dominant design. When an organisational structure and information flow is rigid, it becomes very difficult for a firm to respond in appropriate ways. The structure becomes an obstacle to innovation performance.

2.5.2.4 Market Innovation

Market innovation refers to the new knowledge embodied in distribution channels, product, applications, as well as customer expectations, preferences, needs, and wants (Afuah, 1998). The main idea is the improvement of the components of the marketing-mix, that is, product, price, promotion and place. Market innovation includes activities such as market tests and adaptation of products for different markets (Popadiuk & Choo, 2007).

According to Goodale et al. (2011) market innovation refers to a firm's ability to respond swiftly to market or technological developments as well as its ability to anticipate competitor response as it reacts to the aforementioned developments in the market.

2.5.2.5 Administrative Innovation

Administrative innovation encompasses innovations that pertain to the organisational structure and administrative processes. In this case, it can be specifically related to strategies, structures,

systems, or people in the organisation. Certain strategies, structures, systems and hierarchies yield better innovation outcomes than others (Popadiuk & Choo, 2007).

Covin and Slevin (2002) highlight that the hardware segment of an organisation (its strategy, structure, systems, and procedures) is the contextual framework within which individuals within the firm take their behavioural cues. This matters greatly in relation to employee entrepreneurial activity and subsequent innovation performance.

2.5.3 Determinants of Innovation Performance

There are numerous factors that influence the innovation performance of a firm. These can be categorised into external and internal. The external factors largely fall outside of a firm's realm of control, while internal organisational factors reside within its area of influence (Hansen & Wernerfelt, 1989; Nguyen et al., 2019). Within the internal sphere, Kuratko, Covin, et al. (2014) note clarity of strategy from management in innovative activities, management coordination and support, effective use of operating controls; and proper training and development of employees as key determinates of innovation performance.

Goodale et al. (2011); Hornsby, Kuratko, and Montagno (1999); and Scheepers et al. (2008) emphasise corporate entrepreneurial strategy as a significant driver of firm innovation performance in the form of management support, work discretion/autonomy for employees, risk and rewards, time availability and organisational boundaries. Furthermore, based on the study by Goodale *et al* (2011), the researcher expected a moderating effect of risk management based on directive followed by this research study in its investigation of the moderating effect of risk management - risk control and process control on the relationship between corporate entrepreneurship an innovation performance in a developed economy context.

Innovation performance is also influenced by the degree and regularity of innovation activities that firms are involved in. Continuous innovation; in terms of products, processes, and administrative routines and structures, is needed to compete in mounting competitive environments. Executives

agree that innovation is the most important pathway for companies to accelerate their pace of change in the global environment (Kuratko, 2009; Nguyen et al., 2019).

The rise in complexity of products and services, shorter life cycles, and rapidly changing market demands require new or different capabilities and management practices to successfully develop innovations and sustain a company's competitive advantage. These capabilities enable an organisation to learn from and about its environment (Lawson & Samson, 2001). As such, the researcher saw it fit to add an increasingly important factor that Rauter et al. (2019) and Yolles (2005), among other scholars, have explored, namely; *organisational intelligence*.

According to Yolles (2005), the notion of organisational intelligence is best thought of as a metaphor, in particular because it draws on conceptualisations that are normally applied to the individual rather than the collective. It is concerned with the acquisition, processing and utilisation of information. It consists of the ability of firms to make sense of complex situations and act effectively, to interpret and act upon relevant events and signals in the environment. It embraces both knowledge management and organisational learning, as it is the application of knowledge management concepts to a business environment. It also includes the ability to develop, share and use knowledge relevant to its business purpose as well as the ability to reflect and learn from experience (Frappaolo, 2006; Glynn, 1996). Efficacious organisations invest and nurture this capability, from which they execute effective innovation processes, leading to innovations in new products, services and processes, and superior business performance results (Lawson & Samson, 2001).

Herein, organisational intelligence constitutes the intellectual capacity of an entire telecommunications firm. Intelligent firms are intentional in building firm-awareness on where their strengths and weaknesses lie as they respond to change and complexity (Glynn, 1996). This assists them in building sustainable firms through enhanced market, product and process innovation. Within telecommunications, the continental growth of MTN (the largest mobile operator in Africa) is an apt example of how organisational intelligence can enhance firm performance. This multinational enterprise, operating mobile telecommunications networks in Asia and Africa, has exhibited how the search for and integration of external knowledge, purposefully processing information to adapt in varying and complex contexts can garner

sustainability (Hoffman, 2018; Sutherland, 2015). Schwaninger (2001) suggests that the intelligent organisation is adaptable, effective, virtuous, and sustainable.

The important role of the search for and integration of external knowledge in a corporate's innovation success has been widely acknowledged (Gianiodis, Ellis, & Secchi, 2010; Giannopoulou, Yström, & Ollila, 2011; Huizingh, 2011; Stefan & Bengtsson, 2017). A large body of literature emphasises in recent years the utter importance of external knowledge search and efficient knowledge recombination in order to innovate (Chesbrough & Bogers, 2014; Martini, Neirotti, & Appio, 2017; Mina, Bascavusoglu-Moreau, & Hughes, 2014).

Various stakeholders within the entrepreneurial ecosystem have the potential to influence firm innovation performance. The point of influence at government level is through enlightening policy decisions that affect public investments and facilitate the growth and maintenance of the telecommunications industry. At the industry level, the focus is on effectiveness, competence and compliance across firms under that watchful eye of industry regulatory bodies (such as ICASA). At the firm level, innovation performance can be influenced by research and development; new product development; and the extent to which enablers of innovation are encouraged to thrive through a conducive organisational climate, stemming from its corporate entrepreneurship strategy (Birchall, Chanaron, Tovstiga, & Hillenbrand, 2011; Boone, Lokshin, Guenter, & Belderbos, 2019; ICASA, 2019a).

2.6 Corporate Entrepreneurship

2.6.1 Definition and Concept

Corporate entrepreneurship has evolved to become a key strategy that facilitate firms' innovation efforts in order to effectively overcome the competitive realities of business. The corporate entrepreneurship strategy represents a firm's coordinated efforts towards entrepreneurship. It remains on the knowledge frontier because its actual implementation is a persistent challenge for many organisations. This strategy is built on three internal elements: an entrepreneurial strategic

vision, a pro-entrepreneurship organisational architecture, and entrepreneurial processes and behaviours (Kreiser, Kuratko, Covin, Ireland, & Hornsby, 2019).

Entrepreneurially strategic organisations have moved beyond the traditional product and service innovations to pioneering innovation in processes, value chains, business models, and all functions of management (Boone et al., 2019; Govindarajan & Trimble, 2005). All enterprises are facing a new global reality requiring innovation, courage, risk-taking, and entrepreneurial leadership (Kuratko & Morris, 2013). Ireland et al. (2009) emphasised that to simultaneously develop and nurture competitive advantages, grounded in innovation, firms increasingly depend on CE. Firms that exhibit CE are typically viewed as dynamic, flexible entities prepared to take advantage of new business opportunities as they arise (Kuratko, Goldsby, & Hornsby, 2012). Despite the importance of entrepreneurship and innovation as a worthwhile strategy for positive results in today's corporations, apt implementation of corporate innovation remains a significant challenge for most companies (Kreiser et al., 2019; Kuratko, Hornsby, & Covin, 2014).

In recent history, the entrepreneurial abilities of firms have become a significant theme of discussion among both practitioners and academics. Notwithstanding the growing recognition of the importance of entrepreneurial activities within established organisations, ambiguities still plague attempts to define such activities. Moreover, language is a significant challenge when entrepreneurship is applied to a corporate setting. The term entrepreneurship does not seem to have any issues when describing entrepreneurial efforts of individuals operating outside the context of an existing organisation, but a number of terms (Table 2.1) are used for the entrepreneurial efforts within an existing organisation such as corporate entrepreneurship (Burgelman, 1983; Morris, Kuratko, & Covin, 2011; Zahra, 1993) corporate venturing (Biggadike, 1979; Block & MacMillan, 1993), intrapreneurship (Pinchot, 1985), internal corporate entrepreneurship (Jones & Butler, 1992), internal entrepreneurship (Schollhammer, 1982; Vesper, 1984), strategic renewal (Guth & Ginsberg, 1990) and venturing (Hornsby, Naffziger, Kuratko, & Montagno, 1993).

In Table 2.1, adapted from Sharma and Chrisman (1999), the researcher explores the multi-dimensional and somewhat cohesive nature of CE based on definitions from several authors. An analysis of this table shows how some authors use different terms to portray the same phenomenon.

Burgelman (1983) defines corporate entrepreneurship as the process whereby the firms engage in diversification through internal development. Such diversification requires new resource combinations to extend the firm's activities in areas unrelated, or marginally related, to its current domain of competence. Covin and Slevin (1991a) tread on a similar line of thought in that they define corporate entrepreneurship as involving the extension of a firm's domain of competence and corresponding opportunity set through internally generated new resource combination. Chung and Gibbons (1997) view corporate entrepreneurship as an organisational process for converting ideas into joint action through the management of uncertainties, which are synonymous with risk. It is observed that all three definitions describe internally controlled action taken by firms – whether it be diversification, extension of a firm's domain or conversion of ideas through joint action.

Biggadike (1979, p. 104), on the other hand, describes corporate venturing as "marketing a product or service that the parent company has not previously marketed and that requires the parent company to obtain new equipment or new people or new knowledge". Taking a different approach, Roberts and Berry (1985) define internal ventures as a firm's attempts to enter different markets or develop substantially different products from those of its existing base business by setting up a separate entity within the existing corporate body. Perhaps the most widely accepted definition of corporate entrepreneurship is the one proposed by Guth and Ginsberg (1990), which has been adopted in this study. Guth and Ginsberg (1990) state that corporate entrepreneurship embodies the birth of new businesses within existing businesses and the transformation or rebirth of organisations through a renewal of their vital ideas. This definition includes both Biggadike's and Burgelman's definitions of corporate venturing. It also presents the interchange of the idea of new organisations and new combinations that characterises the debate uncovered in the literature on entrepreneurship.

Table 2.1: Corporate Entrepreneurship Definitions

Author	Definition - Corporate Entrepreneurship
Burgelman (1983)	Corporate entrepreneurship refers to the process whereby the firms engage in diversification through internal development.

	Such diversification requires new resource combinations to extend the firm's activities in areas unrelated, or marginally related, to its current domain of competence and corresponding opportunity set.
Chung and Gibbons (1997)	Corporate entrepreneurship is an organisational process for transforming individual ideas into collective actions through the management of uncertainties.
Covin and Slevin (1991a)	Corporate entrepreneurship involves extending the firm's domain of competence and corresponding opportunity set through internally generated new resource combination.
Guth and Ginsberg (1990)	Corporate entrepreneurship encompasses two types of phenomena and the processes surrounding them: (1) the birth of new businesses within existing organisations, such as internal innovation or venturing; and (2) the transformation of organisations through renewal of the key ideas on which they are built, i.e. strategic renewal.
Jennings and Lumpkin (1989, p. 489)	"Corporate entrepreneurship is defined as the extent to which new products and/or new markets are developed. An organisation is entrepreneurial if it develops a higher than average number of new products and/or new markets."
Schendel (1990, p. 2)	"Corporate entrepreneurship involves the notion of birth of new businesses within on-going businesses, and…the transformation

	of stagnant, on-going businesses in need of revival or transformation."
Vesper (1984, p. 295)	"Corporate entrepreneurship involves employee initiative from below in the organisation to undertake something new. An innovation which is created by subordinates without being asked, expected, or perhaps even given permission by higher management to do so."
Zahra (1996, p. 1715)	"Corporate entrepreneurship — the sum of a company's innovation, renewal, and venturing efforts. Innovation involves creating and introducing products, production processes, and organisational systems. Renewal means revitalising the company's operations by changing the scope of its business, its competitive approaches or both. It also means building or acquiring new capabilities and then creatively leveraging them to add value for shareholders. Venturing means that the firm will enter new businesses by expanding operations in existing or new markets."
Author	**Definition - Corporate Venturing**
Biggadike (1979, p. 104)	"A business marketing a product or service that the parent company has not previously marketed and that requires the parent company to obtain new equipment or new people or new knowledge."
Block and MacMillan (1993, p. 14)	"A project is a corporate venture when it (a) involves an activity new to the organisation, (b) is initiated or conducted internally,

	(c) involves significantly higher risk of failure or large losses than the organisation's base business, (d) is characterised by greater uncertainty than the base business, (e) will be managed separately at some time during its life, (f) is undertaken for the purpose of increasing sales, profit, productivity, or quality."
Author	**Definition - Intrapreneurship**
Pinchot (1985)	Intrapreneurs are "dreamers who do." Those who take hands-on responsibility for creating innovation of any kind within an organisation. Whether they are creators or inventors, they are dreamers who always figure out how to turn an idea into a profitable reality.
Nielson, Peters, and Hisrich (1985, p. 181)	"Intrapreneurship is the development within a large organisation of internal markets and relatively small and independent units designed to create, internally test-market, and expand improved and/or innovative staff services, technologies or methods within the organisation. This is different from the large organisation entrepreneurship/ venture units whose purpose is to develop profitable positions in external markets."
Author	**Definition - Internal Corporate Venturing**
Roberts and Berry (1985, p. 6)	Internal ventures are a firm's attempts to enter different markets or develop substantially different products from those of its existing base business by setting up a separate entity within the existing corporate body.

Zajac, Golden, and Shortell (1991, p. 171)	Internal corporate venturing involves 'the creation of an internally-staffed venture unit that is semi-autonomous, with the sponsoring organisation maintaining ultimate authority'
Author	**Definition - Internal Corporate Entrepreneurship**
Schollhammer (1982, p. 211)	"Internal (or intra-corporate) entrepreneurship refers to all formalised entrepreneurial activities within existing business organisations. Formalised internal entrepreneurial activities are those which receive explicit organisational sanction and resource commitment for the purpose of innovative corporate endeavours - new product developments, product improvements, new methods or procedures."
Jones and Butler (1992)	Internal corporate entrepreneurship refers to entrepreneurial behaviour within one firm.
Author	**Definition - Strategic or Organizational Renewal**
Guth and Ginsberg (1990)	Strategic renewal involves the creation of new wealth through new combinations of resources.
Zahra (1996, p. 1715)	"Renewal means revitalising a company's business through innovation and changing its competitive profile. It means revitalising the company's operations by changing the scope of its business, its competitive approaches or both. It also means

	building or acquiring new capabilities and then creatively leveraging them to add value for shareholders."
Zahra (1993, p. 321)	"Renewal has numerous facets, including the redefinition of the business concept, reorganisation and the introduction of system-wide changes for innovation. Renewal is achieved through the redefinition of a firm's mission through the creative redeployment of resources, leading to new combinations of products and technologies."

Sharma and Chrisman (1999, p. 8) define firm-level entrepreneurship as the "process whereby an individual or a group of individuals, in association with an existing organisation, create a new organisation or instigate renewal or innovation within that organisation". Heavey and Simsek (2013, p. 838) affirm corporate entrepreneurship as "the process through which firms innovate, create new businesses, and transform themselves by changing the business domain or key strategic processes." Furthermore, they express that CE is pivotal to a firms' capacity to compete, adapt, and perform in increasingly competitive environments (Heavey & Simsek, 2013). Bartol and Martin (1998) state that corporate entrepreneurship is the practice of innovating and developing new products, processes or services within an organisation or through acquisition of innovation or innovative firms. What is noteworthy, in the Bartol and Martin (1998) definition, is the notion of action that is embodied in the term *practice*. Sharma and Chrisman (1999) and Heavey and Simsek (2013) give definitions that emphasise *process* and its connotation of steps taken over time.

Corporate entrepreneurship is a process that ought to be not seen as a single event, but rather as part of the organisational culture of an enterprise. Over the years, proposed models of the CE process have suggested important linkages between structure, strategic decision-making, environment, management processes, and entrepreneurial orientation (Covin & Slevin, 1991b; Ireland et al., 2009; Lumpkin & Dess, 1996; Tseng & Tseng, 2019). The level of entrepreneurship varies in intensity, depending on the culture, explorative or exploitative nature of firm activities. The ability of CE activities to improve an enterprise's innovation performance and create value in

the long run has drawn interest in the internal factors that facilitate entrepreneurial behaviour. Some of the internal factors discussed in the literature include organisational leadership; the culture and value system of an organisation; structure and processes; systems and the availability of resources (Covin & Slevin, 1991a; Hornsby, Kuratko, & Zahra, 2002). These organisational factors, both individually and in combination, are understood to be important facilitators of CE activities.

Hornsby et al. (2002) expanded on the work of other authors (Kuratko, Montagno, & Hornsby, 1990) and identified a set of organisational factors that are coherent throughout the literature. These factors are strategic leadership and support for CE; empowered, autonomous employees; the use of appropriate rewards for CE; the availability of resources, especially time; and a supportive organisational structure. Based on extensive research, Hornsby et al. (2002) developed and refined the Corporate Entrepreneurship Assessment Instrument (CEAI) to assess these five internal factors. This instrument, crafted to evaluate each of the five organisational antecedents of corporate entrepreneurship (management support, work discretion, rewards and reinforcement, time availability, organisational boundaries), was used by the researcher to help telecommunication firms assess, facilitate, manage and improve corporate entrepreneurship activities – as supported by Ireland, Kuratko, and Morris (2006) who state that the CEAI provides a sound basis to do this.

Additional research yielded further insights on the concept of CE. According to de Villiers-Scheepers (2012) corporate entrepreneurship refers to the development and pursuit of new business ideas and opportunities by established organisations. Generally, it is understood to be the process whereby established firms act in an innovative, risk-taking and proactive manner (Dess, Lumpkin, & McGee, 1999; Scheepers et al., 2008). This behaviour results in varying outcomes, which include but are not limited to a new product, service, process or business development. The latter may be new ventures that are created (Altman & Zacharakis, 2003) or the restructuring and strategic renewal of an existing enterprise (Guth & Ginsberg, 1990). CE is a multi-faceted phenomenon that includes corporate venturing, intrapreneurship and strategic renewal as components. Corporate venturing is the creation of new businesses within or outside an existing organisation, intrapreneurship focuses on the individual/employee who drives the entrepreneurial

process with an established firm. Strategic renewal involves strategy reformulation or reorganisation leading to new combinations of resources, often resulting in competitive advantage (Covin & Slevin, 1989; George, Bley, & Pellegrino, 2019; Guth & Ginsberg, 1990; Morris et al., 2011).

From the aforementioned, Bartol and Martin (1998), Sharma and Chrisman (1999) and Heavey and Simsek (2013) mention of the term new, new resource combinations (Burgelman, 1983; Covin & Slevin, 1991a), ideas (Chung & Gibbons, 1997), birth of new businesses, renewal, (Guth & Ginsberg, 1990; Schendel, 1990), new products and/or new markets(Jennings & Lumpkin, 1989), undertake something new (Vesper, 1984), innovation (Zahra, 1993), creating and introducing products, production processes, and organisational systems (Zahra, 1996). The researcher derives a cohesive notion of *newness* manifested through a product, process, market or resource combination. Transformation and revival of *the existing* also features quite prominently, leading to an overall perception of novelty, innovation and revitalisation as being the essence of CE. Furthermore, the "on-going" (Schendel, 1990) segment cements the earlier viewpoint of CE not being a single event, but rather as part of the organisational culture of an enterprise (Covin & Slevin, 1991a; Hornsby et al., 2002).

Corporate entrepreneurship plays a key role in firms' performance. A prominent view in entrepreneurship research asserts that organisational factors influence innovation through various entrepreneurial activities (Hornsby et al., 2009; Ireland et al., 2006; Morris, Kuratko, & Covin, 2008). In addition, previous research on corporate entrepreneurial activity (Antoncic & Hisrich, 2001; Burgelman, 1983; Covin & Slevin, 1991a; Goodale et al., 2011; Guth & Ginsberg, 1990; Hornsby et al., 2009; Thornhill & Amit, 2001; Vesper, 1984) has recognised the vital role internal organisational antecedents play in stimulating and upholding innovation performance. Thus, the researcher hypotheses that;

H1. The organisational antecedents of corporate entrepreneurship are positively related to innovation performance.

2.6.2 Antecedents of Corporate Entrepreneurship

2.6.2.1 Management Support

The first antecedent that cultivates corporate entrepreneurship in a firm is strategic leadership and support from management for CE activities. According to Ireland et al. (2006) management support is the willingness of top-level managers to facilitate and promote entrepreneurial behaviour among employees. It is the encouragement and keenness of managers to enable CE activities within an organisation. It includes the championing of innovative ideas whilst providing the resources needed to encourage entrepreneurial behaviour (Hornsby et al., 1993).

Management influence is central in the creation of an organisational culture of innovation, where employees understand that it is expected of them to participate wholly in the innovation process. This support from management can manifest in various practises and customs that include, but are not limited to, espousing innovative ideas, acknowledging and appreciating the employees that articulate these ideas, making the adequate preparation and offering of required resources (financial, nonfinancial, tangible, intangible) or the necessary expertise as well as institutionalising the entrepreneurial activity within the firm's system and processes. A holistic approach and commitment to cultivate a supportive organisational climate is imperative for an organisation to become 'entrepreneurial', yielding greater innovation outcomes that may in turn lead to improved long-term financial performance (Hornsby et al., 2002; Scheepers et al., 2008). Directly, management support leads to non-financial benefits, such as increased morale of employees, collaboration and a creative working environment (Hayton, 2005).

Morris et al. (2008) argue that achieving entrepreneurial actions is no easy feat and that it requires considerable time and investment, and there must be repeated reinforcement. Furthermore, Morris et al. (2008) highlight that the nature of large firms tends to oppose entrepreneurial behaviour with numerous constraints. They propose that for sustainability purposes the entrepreneurial spirit be integrated into the mission, goals, strategies, structure, processes, and values of an organisation. Entrepreneurial leadership, innovation, speed and flexibility are cited as cornerstones to achieving

entrepreneurial actions. An opportunity-driven mindset among managers, where actions are not constrained by resources currently controlled, is added as a key imperative.

Entrepreneurial opportunities exist mainly because different agents have different beliefs about the relative value of resources when they are converted from inputs into outputs (Schumpeter, 1934; Shane & Venkataraman, 2000). Although heterogeneity is a common trait among both resource-based and entrepreneurship theory, resource based logic focusses on the heterogeneity of resources while entrepreneurship theory focuses on the heterogeneity in beliefs about the value of resources. However, when it is noted that beliefs about the value of resources are themselves resources, perceived clashes between the two theories are resolved. These theories both use the same unit of analysis - the resource (Alvarez & Busenitz, 2001).

Regarding the aforementioned resources, de Villiers-Scheepers (2012) states that firm-level entrepreneurship in established firms draws from a greater resource base than start-ups, but established firms' entrepreneurial capacity for innovativeness, risk-taking and proactiveness is often constrained by structures, systems and processes instituted during the formalisation and growth of the firm to achieve efficiency and effectiveness, therefore large firms need to intentionally cultivate their entrepreneurial capabilities (Kyrgidou & Hughes M., 2010) through corporate entrepreneurship.

It is also worth noting that firm-specific resources can at times be attributed to cognitive differences between managers in firms (Alvarez & Busenitz, 2001). In line with the human capital theory and RBT, managers that yield greater innovative outcomes are those that are consistently better informed about the future value of their strategies over and above peers or other firms in the same market. (Barney et al., 2011; Hitt, Xu, & Carnes, 2016; Subramaniam & Youndt, 2005). The human capital theory implies that the greater the investment made by management in the development of human capital the greater the innovative outcomes for organisations (Harris et al., 2015; Hayton, 2005; Tugce Hanci-Donmez & Karacay, 2019).

As management invest in, support, facilitate, and promote entrepreneurial behaviour among employees, they are encouraged to solve problems in innovative ways, seek opportunities in a

proactive manner and embark on moderately risky undertakings. Kuratko, Hornsby, et al. (2014) state that top management support has been found to have a direct positive relationship with an organisation's innovative outcomes. Thus, the following hypothesis is postulated:

- H_{1a}. Management support is positively related to innovation performance.

2.6.2.2 Work Discretion /Autonomy

The second organisational antecedent nurturing CE activities is the extent to which employees are empowered to function autonomously in their jobs, namely; work discretion/autonomy. It can be defined as the amount of freedom provided to an employee in planning, organising, and executing their work which usually takes into account the methods as well as the timing of their work schedule. Hackman and Oldham (1975) define autonomy as "the degree to which the job provides substantial freedom, independence, and discretion to the individual in scheduling the work and in determining the procedures to be used in carrying it out". Harmoniously, Ireland et al. (2006) state that work discretion/autonomy is managements' commitment to tolerate failure, provide decision-making latitude and freedom from excessive oversight and to delegate authority and responsibility to middle-and lower-level managers. Managers should encourage risk taking by setting an example and by tolerating failure. In a study of the effects on innovation of the organisational downsizing of the work environment, Amabile and Conti (1999) reported that acceptance of risk taking is the most crucial factor in promoting innovation.

Autonomy (through the delegation of partial authority and decision making latitude) implies trust in employee competence. Autonomy concerns "the experience of acting with a sense of choice, volition and self-determination" and competence is about "the belief that one has the ability to influence important outcomes" (Shi, Connelly, & Hoskisson, 2017). Autonomy empowers employees to decide on the work methods they see as most effective and efficient for performing their own work. Entrepreneurial work environment, allow employees to make decisions about their work process and are rarely condemned for failures during the innovation process (Tian & Wang, 2014). This then gives employees permission to pursue entrepreneurial activities and take

calculated risks without fear of negative consequences. Risk is an expected part of the innovation process (Hornsby et al., 2002; Hornsby et al., 1993; Scheepers et al., 2008).

Stopford and Baden-Fuller (1994); Hornsby et al. (2002) indicated that employees should not be criticised for errors made while being involved in entrepreneurial activities. The capability of firms to tolerate failure and provide decision making authority to employees without excessive oversight constitute entrepreneurial oriented work discretion (Ireland & Webb, 2007). This encourages employees to take risks while exercising entrepreneurial intentions (Hornsby et al., 2002). Pearce, Kramer, and Robbins (1997) among others recognised the importance of middle managers in enhancing and cultivating self-guided behaviour.

Rutherford and Holt (2007) highlighted that igniting innovation in an organisation needs top management to provide an adequate level of freedom and decision-making latitude to the employees to embark in entrepreneurial activities. Further evidence suggests that changing the work climate to support autonomy positively changes the extent to which employees internalise work rules, standards, and procedures whilst simultaneously encouraging employees to act creatively, volitionally, and proactively (Stone, Deci, & Ryan, 2009).

A study carried out by Orth and Volmer (2017) affirmed that innovative behaviour exists when there is a presence of work autonomy. A favourable organisational environment that encourages work discretion is an important element in cultivating entrepreneurial orientation among employees. This entrepreneurial mind-set can grow when employees are empowered, encouraged to actively participate, and share in creativity and responsibility (Ngo & Lau, 2004). These attributes improve employees' consciousness on entrepreneurial activities and their involvement and commitment to them to the benefit of the firm. This was also confirmed by Kumar and Appu (2016) who reiterated that three dimensions of work autonomy (work method autonomy, work schedule autonomy, and work criteria autonomy) generate workplace creativity, understanding that the essence of entrepreneurship is creation and newness and that newness is an outcome of innovation (Baskaran, 2017; Shane & Venkataraman, 2000).

For corporate entrepreneurship to thrive in a firm, employees must perceive that the climate is one where they can engage in innovative activities freely (Rutherford & Holt, 2007). Past literature provides evidence that employees with greater work discretion tend to be better motivated and as a result, generate greater well-being. This is because discretion towards their work provides them the freedom to make necessary decisions in regards to their own work, hence making them more effective (Baskaran, 2017; Yaşlıoğlu, Temelli, & Aydinlik, 2017). Lumpkin and Dess (1996) argue that employees must be given freedom to exercise their creativity and that firms champion promising ideas.

Conversely, in spite of various claims that work discretion creates entrepreneurial orientation among employees, Alpkan, Yilmaz, and Kaya (2007) found that risk tolerance was positively associated with innovation performance, while work discretion was negatively associated.

Kuratko, Hornsby, et al. (2014) and Baskaran (2017) highlighted that employees should be given an opportunity to exercise their work discretion in performing their duties while equally encouraging them to actively engage in experimentation in their day-to-day activities. This leads to improvement in innovation outcomes and business performance. Based on preponderance of this finding in the aforementioned studies, the following hypothesis is postulated:

- H_{1b}. Work discretion/autonomy is positively related to innovation performance.

2.6.2.3 Rewards/Reinforcement

The third organisational antecedent that enhances entrepreneurial behaviour is the appropriate use of rewards and reinforcement for corporate entrepreneurship activities or outcomes. This dimension is primarily concerned with channeling desired behaviour with (intrinsic or extrinsic) motivation; stemming from either financial or non-financial rewards. It is concerned with the development of appropriate organisational cultures, underpinning core values and increasing the motivation and commitment of employees (Gogia & Soni, 2017). Rewards and reinforcement foster the motivation of employees to engage in innovative, proactive and moderate risk-taking behaviour (Fry, 1987; Goosen, DeConing, & Smit, 2002; Shi et al., 2017).

Various scholars highlight that an effective reward system that stimulates entrepreneurial activity ought to be in alignment with established goals, it should offer timeous feedback, clearly defined responsibilities and provide performance-based incentives. A salubrious rewards system requires a systematic process of formulation and implementation of strategies and policies, programmes that aim to reward people properly, fairly and equitably and consistently with their value to the organisation (Gogia & Soni, 2017; Ireland et al., 2006). Through an apt rewards system, managers can develop the proclivity to accommodate risky and uncertain innovation endeavours by employees. This kind of system also increases the willingness of employees to take risks in the intrapreneurial activities (Yaşlıoğlu et al., 2017). Innovative firms are characterised by offering rewards based on performance, providing challenges, raising responsibilities and endorsing the ideas of employees throughout the organisation (Kuratko & Hodgetts, 2004; Scheepers et al., 2008).

In this regard (rewards and reinforcement), numerous researchers cite the prospect theory for its predictions on how compensation structures influence employee behaviour. The primary proposal of prospect theory is that individuals view outcomes from decisions under uncertainty as gains or losses relative to a certain position. The second proposal offered by the prospect theory is that "losses loom larger than gains. The aggravation that one experiences in losing a sum of money appear to be greater than the pleasure associated with gaining the same amount" (Kahneman & Tversky, 1979). Although prospect theory is not often utilised for the theory of entrepreneurship, it is of particular relevance as it offers an empirically based framework to analyse how employees make decisions (Parker, 2009; Shi et al., 2017; Wennberg, Wiklund, DeTienne, & Cardon, 2010).

The prospect theory observes two phases in the choice process; framing and valuation. In the framing phase, the individual making a decision builds a representation of the undertakings, contingencies, and outcomes that are pertinent to the decision. In the valuation phase, the decision maker weighs up the value of each prospect and chooses accordingly. In the same line of thinking, employees within a telecommunications firm experience two phases in their choice process; framing and valuation. Firstly, they construct the various possibilities and outcomes of actions and subsequently gauge the value of each prospect. Secondly, they make a choice on the best course of action to take based on what will result in the best prospect. Should engaging in innovation

activities hold potentially more favourable than threatening prospects, employees will be more likely to engage in these kinds of entrepreneurial activities.

Similarly, the reinforcement theory, associated with Burrhus Frederic Skinner, considered free will as an illusion and human behaviour as a function of consequences. This theory, which focuses on the consequences of human behaviour as a motivating factor, identifies positive reinforcements as promoters of desired behaviour through praise, appreciation, a good grade, trophy, money, promotion, or any other reward. It distinguished positive reinforcements from negative reinforcement and punishment, where the former gives a person only what they need in exchange for desired behaviour, and the latter tries to stop the undesired behaviour by inflicting unwanted consequences (Olusadum & Anulika, 2018). However, Gordon (2007) argued that, while such contingencies may be valuable for the prediction and control of behaviour, they fall short as an explanation of behaviour that seeks to account for its continuity and its representation at the personal level, and that is constrained by the credible consequences of the action. Furthermore, he maintains that only intentionality can offer the theoretical structures needed to accomplish an adequate explanation of behaviour. Intentionality is complemented by a formal and systematic understanding of the role of the environmental determinants of behaviour. These internal environmental determinants would be cultivated by firms to obtain the desired innovation outcomes (Ravjee & Mamabolo, 2019).

According to Urban and Verachia (2019) a firm's organisational culture is cemented through the commanding influence of rewards, as they align individual goals with that of the organisation. As previously mentioned, Pearce et al. (1997) among others recognised the importance of middle managers and the role they play in either promoting or inhibiting corporate entrepreneurial activity (Hornsby et al., 2009; Urban & Verachia, 2019).

To further enrich this study, Locke's goal-setting theory, offers an integrative model of motivation that sees goals as key determinants of behaviour. Possibly one of the most widely applied theories, the goal-setting theory stresses the importance of goal specificity, difficulty, and acceptance. It furnishes guidelines for how these can be incorporated into firm incentive programs. Lock advises that for effective goal setting, firms need to set challenging but attainable, specific and measurable

goals. In order to obtain commitment from employees and adequate effort toward reaching them, strategies need to use extrinsic rewards (such as bonuses), and encouraging intrinsic motivation through providing feedback about goal attainment. Other rewards and reinforcement support that can be provided by managers are; encouragement, materials and resources, as well as moral support (Locke & Latham, 1991; Locke & Latham, 2019).

Kuratko, Hornsby, et al. (2014) state that firms encourage entrepreneurial activity based on rewards/reinforcements systems. Reward systems that promote risk taking and innovation result in more entrepreneurial behaviour from employees, based on the prospect of rewards. Many studies have acknowledged reward and resource availability as fundamental determinants of entrepreneurial behaviour that lead to greater firm innovation performance (Kuratko, Hornsby, et al., 2014). Thus, it is hypothesised that;

- H_{1c}. Rewards/reinforcements are positively related to innovation performance.

2.6.2.4 Time Availability

The fourth organisational antecedent that cultivates corporate entrepreneurship is the availability of resources, such as time. To contemplate participating in entrepreneurial endeavours, employees need to perceive resources as accessible for these activities (Covin & Slevin, 1991a; Scheepers et al., 2008). For new and innovative ideas to blossom, employees ought to be provided with time to develop their ideas. Consequently, in the evaluation of workloads, firms need to ensure that employees (as individuals or groups) are afforded the time needed to pursue innovations and that their jobs are structured in a way that supports efforts to achieve both short-and long-term organisational goals, including but not limited to innovation performance (Ireland et al., 2006; Kreiser et al., 2019; Kuratko, Ireland, Covin, & Hornsby, 2005; Piyachat, 2017). Entrepreneurial work environments allow employees to pursue creative, entrepreneurial experiments in a segment of their work time (Morris et al., 2011).

Chienwattanasook, Wattanapongphasuk, Prianto, and Jermsittiparsert (2019), state that the time availability factor includes concern about employees' routine duties. This factor has been

researched alongside numerous organisational components, including innovation. Mowlaei (2017) highlight that the significance of time availability rests heavily on learning and securing new information, which is vital for enhanced innovation performance. Furthermore, while clarifying the significance of time availability, (Chima & Kasim, 2018) propose that in the absence of time set aside for such activities, employees may feel that they are compromising their individual duties for which they are contracted. As a result, when seeking to enhance innovation performance, thorough investigation is from firms required on how they can inspire employees while lightening their work pressure.

Morris et al. (2008) also agree that time is an important factor for firms to consider when vitalising corporate entrepreneurial behaviour, as its lack of availability can pose a major obstacle. Freeing up employees' time by allowing them to try new things is essential in promoting corporate entrepreneurship behaviour. This provision of time for innovative activities is said to translate to greater innovation performance for firms (Jingnan & Yunus, 2018). Corporate entrepreneurship activities often unfold over time, across organisational level. In each step, participants share their ideas, add refinements, introduce concepts, test their assumptions, and so forth. These activities extend what employees know and even create new knowledge. In creating this knowledge, employees also convert this knowledge to idea sets that serve as the basis for introducing novelty and variety into the inventory of their companies. CE activities also contribute to the development of diverse organisation capabilities that enable firms to compete, conceive new strategies, remake themselves, and undertake transformational activities that redefine their industries (Zahra, 2015).

Another way in which employees benefit from time that is availed is reduction in stress and cognitive pressure that then allows employees to thrive. Suvonova, Lee, and Park (2019) highlight that the psychological stress of employees can be reduced, and a cognitive process of reflective thinking facilitated when employees are provided with blocks of free time. These psychological resources have cognitive, emotional, motivational and decisional components (Bandura & Locke, 2003) which help employees successfully develop and implement work-related innovative ideas (Abbas & Raja, 2015).

Research suggests time availability is an important resource for generating entrepreneurial initiatives. Urban and Verachia (2019) and Covin and Slevin (1989) emphasise that time availability, among other resources, is vital for improving entrepreneurial outcomes. Osasuyi and Mwakipsile (2017) expressed the view that time can be utilised to assist the organisations to encourage entrepreneurial exercises. Corporate entrepreneurship activities have been found to have positive associations with future company performance (Zahra, Randerson, & Fayolle, 2013). The availability of unstructured or free time can enable corporate innovators to consider opportunities for innovation that may be precluded by their required work schedules, enhancing firm innovation performance (Kuratko, Hornsby, et al., 2014). The following hypothesis can thus be postulated with regard to time availability:

- H_{1d}. Time availability is positively related to innovation performance.

2.6.2.5 Organisational Boundaries

The final organisational factor that facilitates corporate entrepreneurship is the existence of a supportive organisational structure and fluid boundaries (Lumpkin & Dess, 1996; Morris et al., 2011). An entrepreneurial environment has organisational boundaries that are not excessively restrictive (Yaşlıoğlu et al., 2017). Kyrgidou and Hughes M. (2010) note that organisational boundaries refer to the extent to which employees perceive organisational boundaries to be flexible, which is useful in promoting entrepreneurial activity, as they enhance the flow of information (knowledge dissemination) between the external environment and the organisation, as well as between departments/divisions within the organisation. Innovative outcomes emerge most predictably when innovation is treated as a structured and purposeful process.

In an internal organisational environment, knowledge dissemination practices include processes that dispense explicit and tacit knowledge across the organisation, through formal and informal channels, in order to facilitate the application of knowledge. Informal channels are beneficial in exchanging ideas, but formal ones are said to have the advantage of being more systematic (Zahra & George, 2002). Explicit knowledge is easier to codify and disseminate, whereas disseminating tacit knowledge is said to be difficult and requires interaction among employees. This interaction

among employees is either encouraged or hindered by organisational boundaries (Alegre, Sengupta, & Lapiedra, 2013). Urban and Verachia (2019) highlight that there is an ease of information transfer that exists within flexible organisations that benefits these firms.

Ireland et al. (2006) propose that organisational boundaries are specific explanations of outcomes expected from organisational work and development of mechanisms for evaluating, selecting and using innovations. A supportive organisational structure provides the administrative means by which ideas are appraised, selected and executed (Goosen et al., 2002). However, a bureaucratic organisational structure leads to perceived boundaries, creating obstacles to CE activities. Large firms have a proclivity to be more bureaucratic, risk averseness with lengthier decision making processes which may hinder these activities (Adeyeye, Egbetokun, Opele, Oluwatope, & Sanni, 2018; De Vries & Duque, 2018). In the latter organisations, employees tend to focus on their divisions' challenges and are hindered from seeing the bigger picture. Employees ought to be encouraged to approach organisational issues from both a fragmented and holistic perspective of the organisation.

In addition, entrepreneurially oriented organisations avoid having standard operating procedures across the board and are intentional in reducing dependence on narrow job descriptions as well as rigid performance standards (Hornsby et al., 2002; Scheepers et al., 2008). Maroofi, Ardalan, and Tabarzadi (2017) also argue that organisations ought to not have standard working systems for jobs. They further state that dependency on stringent work descriptions, reliance on employment descriptions and inflexible performance principles should be minimised. In this regard, it is perceived that the setting of the applications of organisational boundaries matters greatly.

Kuratko, Hornsby, et al. (2014) emphasise that it is organisational boundaries that are sufficiently flexible that motivate, coordinate, and empower entrepreneurial behaviour. These kind of boundaries facilitate the potent utilisation of assets, enabling innovation. When employees perceive organisational boundaries to be flexible, they perform better and generate new ideas. The manner in which organisations scrutinise, filter and execute ideas is guided by organisational boundaries. Kuratko et al. (2014) expressed that organisational boundaries can guarantee the worthwhile utilisation of the assets which enables innovation. Flexible organisational boundaries

have positive influence on employee performance. They are said to increase the satisfaction level of employees which increases the performance (Malarvizhi, Nahar, & Manzoor, 2018; Maurice, 2013).

Morris and Kuratko (2002) consider the system, structure, principles and methods as an obstacle for intrapreneurial activities. It is believed that many written rules and methods constitute an inflexible organisational structure which would prevent the emergence of intrapreneurial activities. de Villiers-Scheepers (2012) note that firm-level entrepreneurship in established firms draws from a greater resource base than start-ups, but established firms' entrepreneurial capacity for innovativeness, risk-taking and proactiveness is often constrained by structures, systems and processes instituted during the formalisation and growth of the firm to achieve efficiency and effectiveness, therefore they need to focus on cultivating their entrepreneurial competencies through flexible organisational boundaries.

Consistent with this point, organisation theorists (Kuratko, Hornsby, et al., 2014; Kyrgidou & Hughes M., 2010) have long recognised that productive outcomes are most readily accomplished in organisational systems when uncertainty is kept at manageable levels. This can be achieved through setting boundaries that induce, direct, and encourage coordinated innovative behaviour across the organisation. In short, organisational boundaries can ensure the productive use of innovation- enabling resources, yielding greater firm innovation performance (Kuratko, Hornsby, et al., 2014). The following hypothesis can thus be postulated:

- H_{1e}. Organisational boundaries are positively related to innovation performance.

2.7 Endogenous Risk Management

2.7.2 Definition and Concept

Risk management is an important activity for organisations that are striving to provide value for their stakeholders in the face of real-world uncertainties. Understanding how an organisation can use its formal risk management systems to support innovation has emerged as an important

research question (Bisbe & Otley, 2004; Shields, 1997). Efficient risk management can potentially present value-creating opportunities that may not have been identified otherwise and/or curb undesired outcomes, including but not limited to innovation. Over the years, organisations have been attempting to identify and manage the risks inherent in their operations (Mishra et al., 2019).

Firms bear considerable cost due to deficient risk management systems. At times the risk comes at so high a cost that the firm cannot recover. Risk management failures at major corporations have captured the headlines for decades, and the telecommunications sector is no exception with a multi-billion-rand dispute currently at play at one of the major telecom firms in South Africa. This dispute between a former employee and the firm is one that could have been prevented through unambiguous and apt endogenous risk management systems. It is herein that the importance of Endo_RM cannot be emphasised enough, as affirmed by literature on effective risk governance as an imperative part of the firms' success (Barton et al., 2002; Danielsson & Shin, 2002; Goodale et al., 2011). This is confirmed by Bowers and Khorakian (2014) who state that while innovation holds resemblances to other forms of projects, it embodies a high failure rate. They argue that explicit risk management assists in generating greater innovation performance. However, they also emphasise that excessive or inappropriate risk management may stifle the creativity that is core to innovation.

On the other hand, Jensen (1993) contends that the chief cause of failure is 'internal control systems." Jensen's argument infers that internal control systems are made to control managerial behaviour particularly that of divisional managers, having a perilous effect on firm innovation. Furthermore, Jensen (1993) provides evidence supporting the notion that internal control systems have not created effective research and development and capital expenditure allocations.

Once considered to be detrimental to innovative efforts, there is however rising consensus that formal controls, when activated in an enabling, facilitative and interactive environment and/or fashion, increase the capacity of an organisation to derive benefits from enhanced innovation. Fully interactive control systems provide a lever to fine-tune and alter strategy as competitive markets change (Bedford, 2015; Bisbe & Malaguen˜o 2012). Firms derive greater firm performance by adopting a systematic and consistent approach (or process) to managing the internal risks

threatening an organisation. As a result, endogenous risk management is presumed to lower a firm's overall risk of failure and thus increase the performance and, in turn, the value of the organisation (Gordon, Loeb, & Tseng, 2009)

In their report on enterprise risk management, Everson, Chesley, and Martens (2016) proposed a framework of enterprise risk management that highlights the need for organisations to improve their approach to managing risk by recognising the growing importance of the connection between strategy and enterprise performance. This framework proposes a set of principles organised in five related components of enterprise risk management;

1. Risk governance and culture: form the foundation for all other components of enterprise risk management. Risk governance sets the firm's tone, reinforcing the importance of enterprise risk management. Culture, which pertains to ethical values, desired behaviours, and understanding of risk in the entity, is reflected in an organisation's decision-making. Culture is developed and shaped by employees at all levels of an entity. They bring the enterprise risk management to life through practices. Each employee has a point of reference, which influences how they identify, assess, and respond to risk. Risk governance and culture define organisational behaviours, demonstrate commitment to integrity and ethics, enforce accountability, attract, develop and retain talented/innovative employees. Organisational culture, structure, systems, policies, and procedures all serve as a risk management function within an organisation (Scott, 1998).

2. Risk, strategy and objective setting: enterprise risk management is integrated into the firm's strategic plan through the setting of strategies and business objectives. With an understanding of business context, the organisation can gain insight into internal and external factors and their impact to risk. An organisation establishes its risk appetite alongside its strategy-setting. The business objectives allow strategy to be put into practice and shape the entity's day-to-day operations and priorities. This element considers risk and business context, defines risk appetite, evaluates alternative strategies and defines acceptable variation in performance.

3. Risk and execution: an organisation identifies and assesses risks that may affect an entity's ability to achieve its strategy and business objectives. It prioritises risks according to their severity and considering the entity's risk appetite. The organisation then selects risk responses and monitors performance for change. In this way, it develops a portfolio of the risk the entity has assumed in the pursuit of its strategy and business objectives.

4. Risk information, communication and reporting: communication is the continual, iterative process of obtaining information and sharing it throughout the entity. Managers use relevant and quality information from both internal and external sources to develop and support enterprise risk management. The organisation leverages information systems to capture, process, and manage data and information. By using information that applies to all components, the organisation reports on risk, culture, and performance.

5. Monitoring enterprise risk management performance: by monitoring enterprise risk management performance, an organisation can consider how well the enterprise risk management components are functioning over time and in light of substantial changes.

Figure 2.7 illustrates these components and their relationship with the entity's identity, and how they affect an organisation's performance. In this framework, corporate entrepreneurship would form part of the strategy segment of this structure. And enterprise risk management would be the function that ensures that day to day decision making and behaviour aligns to the firm's CE strategy in the hope for the desired innovation outcome or enhanced performance.



Figure 2.7: Enterprise Risk Management Components

Source: Everson et al. (2016, p. 21)

According to Hu and Wu (2016) the risk management process consists of four components: risk identification, risk analysis, risk evaluation and risk treatment. Similarly, the risk management process depicted in Figure 2.8, shows the various aspects of the enterprise risk management process. The Endo_RM process involves the establishment of context, risk assessment and subsequent treatment. It is worth noting that Endo_RM is not static but a is continuous process and flow of information reflected in communication, monitoring and evaluation. The blue lines represent the continual communication and the iterative process of providing, sharing, and obtaining information, which flows throughout the entity. Through management control, which is the formal, information-based routines and procedures managers use to maintain or alter patterns

in organisational activities, firms can build an entrepreneurial environment that enables desired innovation outcomes through apt information flow and decision making (Simons, 1995).

Knowledge is embedded in multiple entities within the firm, such as individual employees, organisational culture, routines, policies, systems, and documents (Alegre et al., 2013). For continuous innovation to thrive, a well-planned system of knowledge management that enables the firm to excel in technological, market and administrative knowledge creation is required (Popadiuka & Choo, 2006). Innovation-oriented firms need to strongly assess, treat, monitor and evaluate future events in order to mitigate risks that threaten their sustainability (Birchall et al., 2011).

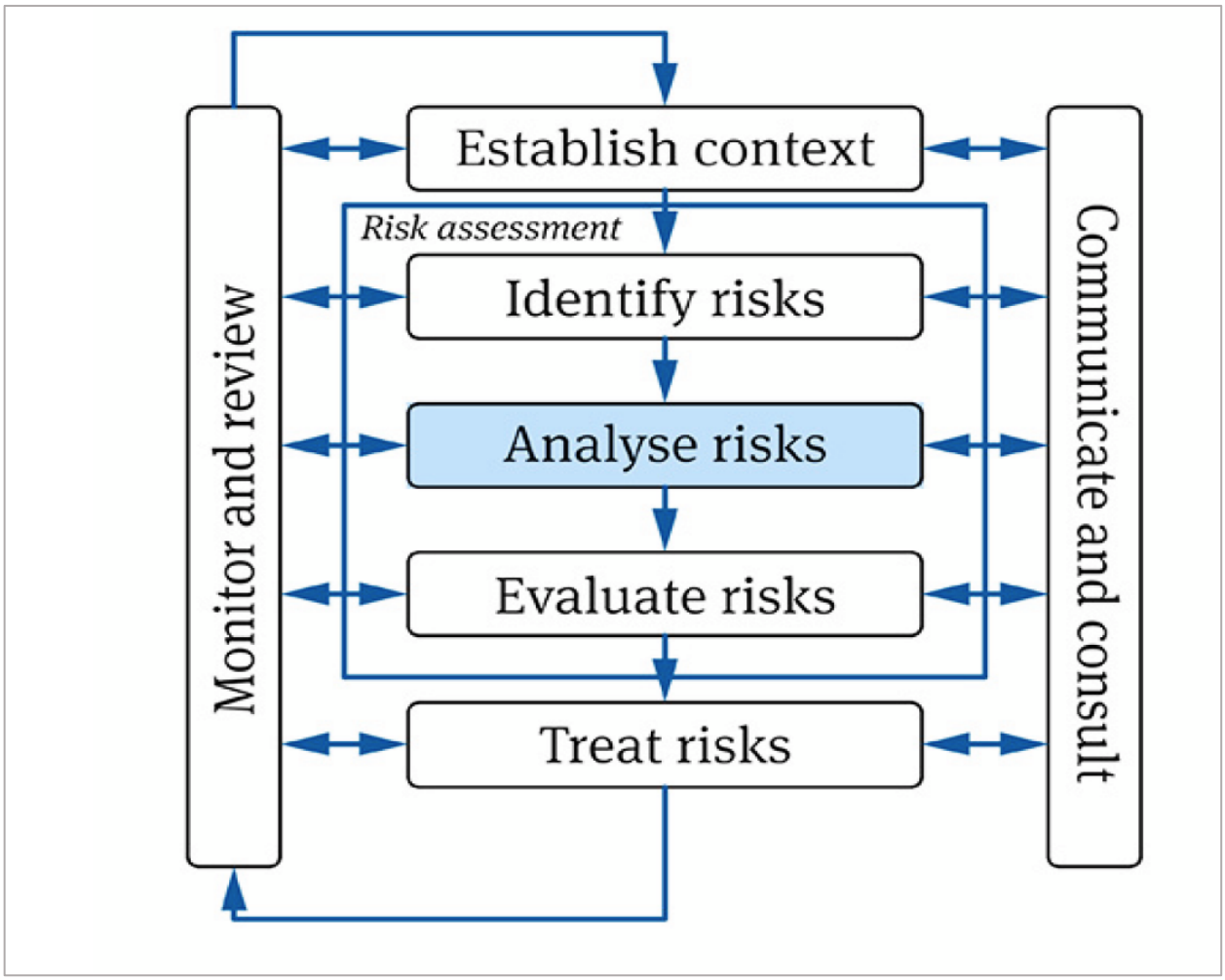


Figure 2.8: Continuous Enterprise Risk Management Process

Source: Mishra et al. (2019, p. 167)

Based on previous studies (Bisbe & Otley, 2004; Goodale et al., 2011; Simons, 1995) the researcher expects a positive moderating effect of endogenous risk management on the relationship between corporate entrepreneurship and innovation performance.

Simons (1990); (1991); (2000) presented a series of cases that contribute to a theory of how senior managers can use controls to develop and implement corporate strategy. Simons' (1995) levers of control framework indicates that an interactive use of management control systems contributes to fostering successful product innovation. He introduced key constructs that are controlled by a different system, or lever, the use of which has different implications for firms. These levers are;

- Belief systems are used to inspire and direct the search for new opportunities.
- Boundary systems are used to set limits on opportunity-seeking behaviour.
- Diagnostic control systems motivate, monitor and reward achievement of specified goals.
- Interactive control systems stimulate search and learning, allowing new strategies to emerge as participants throughout the organisation respond to perceived opportunities and threats. These systems focus attention on strategic uncertainties and enable strategic renewal.

Bisbe and Otley (2004) investigated the moderating effect of interactive use of management control systems on the relationship between product innovation and performance. They found that the relationship between product innovation and performance is moderated by the extent to which management control systems are used interactively. They also highlighted innovation as an important way that organisations can effectively adapt to changes in markets, technology and competition as well as effectively take pre-emptive action to influence the environment.

Goodale et al. (2011) propose from an agency theory perspective, that risk management mechanisms are the means through which firms can skilfully balance the interests of employers (principals) and employees (agents) in the successful pursuit of innovation through corporate entrepreneurship. Additionally, agency theory is a useful theoretical lens through which many of the functional as well as dysfunctional dynamics of corporate entrepreneurship might be understood. They also highlight that agency complications can surface when there is a conflict in

goals between the employers and the employees (Jensen & Meckling, 1976), where the employees work for the employers but do not bear the repercussions or cost of the work outcome (Fama & Jensen, 1983).

The effect of risk control on this cost of agency problem is crucial in shedding light on how entrepreneurial activity and its innovation performance outcomes are likely affected by endogenous risk management. Particularly, innovation-oriented risk management from senior management may rescind the positive relationship between entrepreneurial activity and its performance outcomes. Goodale et al. (2011) state that this is largely due to limitation in action taking latitude available to employees at lower level of the organisation, when the organisational structure is centralised. As per the agency theory, a centralised organisational structure encourages behaviour-based compensation, monitoring, and policy-directed behaviour among firm employees (Goodale, Kuratko, & Hornsby, 2008) According to Morris, Allen, Schindehutte, and Avila (2006), restrictions that limit the scope of entrepreneurial opportunities that employees can identify and pursue could limit a firm's capacity to reach its desired innovation outcomes. This would be due to great opportunities being missed as they are filtered out by organisational architecture elements that limit individual discretion.

On the other hand, decentralised endogenous risk management mechanisms that are selected and driven at the operational level instead of being sent via a top down approach, are said to offer reduced risk premiums of outcome-based incentives by establishing clear organisational routines/boundaries for behaviour, specifying work tasks, and suitably governing incentives that are more likely to promote the long-term innovation interests of the organisation. The decentralised control system eradicates the cost of agency problem, by placing responsibility on the level of the individual, employee or decision maker. The benefit of this version of endogenous risk management is that the most knowledgeable workers, who know where the opportunities are worth pursuing, will be on the forefront of innovation (Burgelman & Grove, 1996). Consequently, innovation-centred controls designed and administered by agents of innovation awards greater discretionary power to these potential corporate entrepreneurs. Furthermore, when innovation activities are prioritised by the firm, the existence of an expanded entrepreneurial opportunity set will increase the likelihood that the employees will collectively allocate their time and efforts to

entrepreneurial opportunities of greatest perceived value. This would be facilitated by the presence of controls set at the operational level. This would have the effect of strengthening the relationship between entrepreneurial behaviours and their innovation performance outcomes.

Based on the evidence of the aforementioned prior research the researcher anticipates a moderator effect from endogenous risk management and postulates the following;

- H2. Endogenous risk management moderates the relationships between the organisational antecedents of corporate entrepreneurship and innovation performance

2.7.3 Endogenous Risk Management and CE-Inno_P Link

The assumption of risk, herein defined as exposure to the prospect of outcomes involving loss, is said to be married to innovation (Knight, 1921). Generally, organisations attempt to manage or minimise risk through the pursuit of tried-and-tested products and services, or through chasing risk-moderate return projects or delaying responses where possible to circumvent the cost that often comes with novelty (Miller & Friesen, 1982).

Endogenous risk management has predictable influences on the relationships between the organisational antecedents to corporate entrepreneurship and innovation performance. Specifically, management support is said to have a more positive influence on innovation performance when endogenous risk management is low (vs. high) due to the implicit endorsement by the presence of management support that may suggest that any innovative initiatives being pursued have been thoroughly vetted (Zwikael & Sadeh, 2007). When this is the case, the weight of additional constraints on the process or emphasis of innovative efforts through an endogenous risk management lens may only serve to obstruct their success (Goodale et al., 2011). Thus, the following hypothesis is postulated;

- $H_{2a.}$ The relationship between management support and innovation performance is more positive under low than high levels of endogenous risk management.

Behavioural agency theory, which sheds light on agent behaviour, with particular emphasis on internal governance, states that external governance mechanisms such as ongoing external monitoring and control from managers reduces employees' intrinsic motivation, which may in turn be counterproductive to the desired firm innovation outcomes. Cognitive evaluation theory asserts that external monitoring and controls impinge an individual's motivation to behave in ways the controls are designed to ensure (Shi et al., 2017).

By contrast, Goodale et al. (2011), assert that endogenous risk control may facilitate the positive effect of work discretion/autonomy on innovation performance because innovative behaviours and initiatives that arise autonomously, by definition, have not been inspected by senior management organisational authorities and are, therefore, less likely to be aligned with the firm's strategic interests (Lewis, 2003). As such, lower innovation performance may result when work discretion/autonomy is not tied to the presence of endogenous risk management Thus, the following hypothesis is postulated;

- $H_{2b.}$ The relationship between work discretion/autonomy and innovation performance is more positive under high than low levels of endogenous risk management.

The existence of rewards/reinforcements for innovative activities may best enhance innovation performance when risk controls are emphasised. In particular, innovative behaviours and initiatives that are both rewarded and have been subjected to careful risk evaluation will likely gain momentum within the organisation (Balkin & Logan, 1988; Kanter, 1994). The rewards are said to prompt and sustain innovative behaviours and initiatives that have been determinedly judged to have an acceptable risk-return probability, a combination which ought to result in high innovation performance outcomes (Goodale et al., 2011). Thus, the following hypothesis is postulated;

- $H_{2c.}$ The relationship between rewards/reinforcements and innovation performance is more positive under high than low levels of endogenous risk management.

The moderating effect of endogenous risk management on the time availability innovation performance relationship is likely to be more positively related to innovation performance when

endogenous risk management is low. Said differently, time availability may be less positively related to innovation performance when endogenous risk management is high. In accordance with hypothesis 1d, if time constraints limit the energy and efforts employees can devote to innovative behaviours and initiatives, the general quantity and quality of innovative outcomes may be poor (Ireland et al., 2006; Schuler, 2006). In such situations, the presence of high endogenous risk management may ensure that the innovative behaviours and initiatives pursued contribute to the organisation's overall prosperity. Briefly, endogenous risk management may weaken the negative effect that time availability's absence likely has on innovation performance (Goodale et al., 2011). Thus, the following hypothesis is postulated;

- $H_{2d.}$ The relationship between time availability and innovation performance is more positive under low than high levels of endogenous risk management.

Organisational boundaries may positively influence innovation performance when endogenous risk management is high. This relationship is implied by the possibility that the existence of organisational boundaries may implicitly sanction innovative behaviours and initiatives, thus pardoning those behaviours and initiatives from critical evaluation. Due to the fact that organisational boundaries outline what is permissible in terms of behaviours, job expectations, standards to be met, processes and procedures, innovative behaviours and initiatives that arise from such conditions may be seen not as deviations from what is acceptable but part of what is expected (Das & Joshi, 2007).The presence of endogenous risk management when organisational boundaries are high may ensure that innovative behaviours and initiatives are consistent with the organisations' best interests and likely to result in desirable innovation performance outcomes (Goodale et al., 2011). Thus, the following hypothesis is postulated;

- $H_{2e.}$ The relationship between organisational boundaries and innovation performance is more positive under high than low levels of endogenous risk management.

Innovation requires a climate in which "calculated risks" are taken (Chakrabarti & Souder, 1987). Firms should take careful and controlled risks with the objective of improving firm innovation performance.

2.8 Conceptual Framework of Study

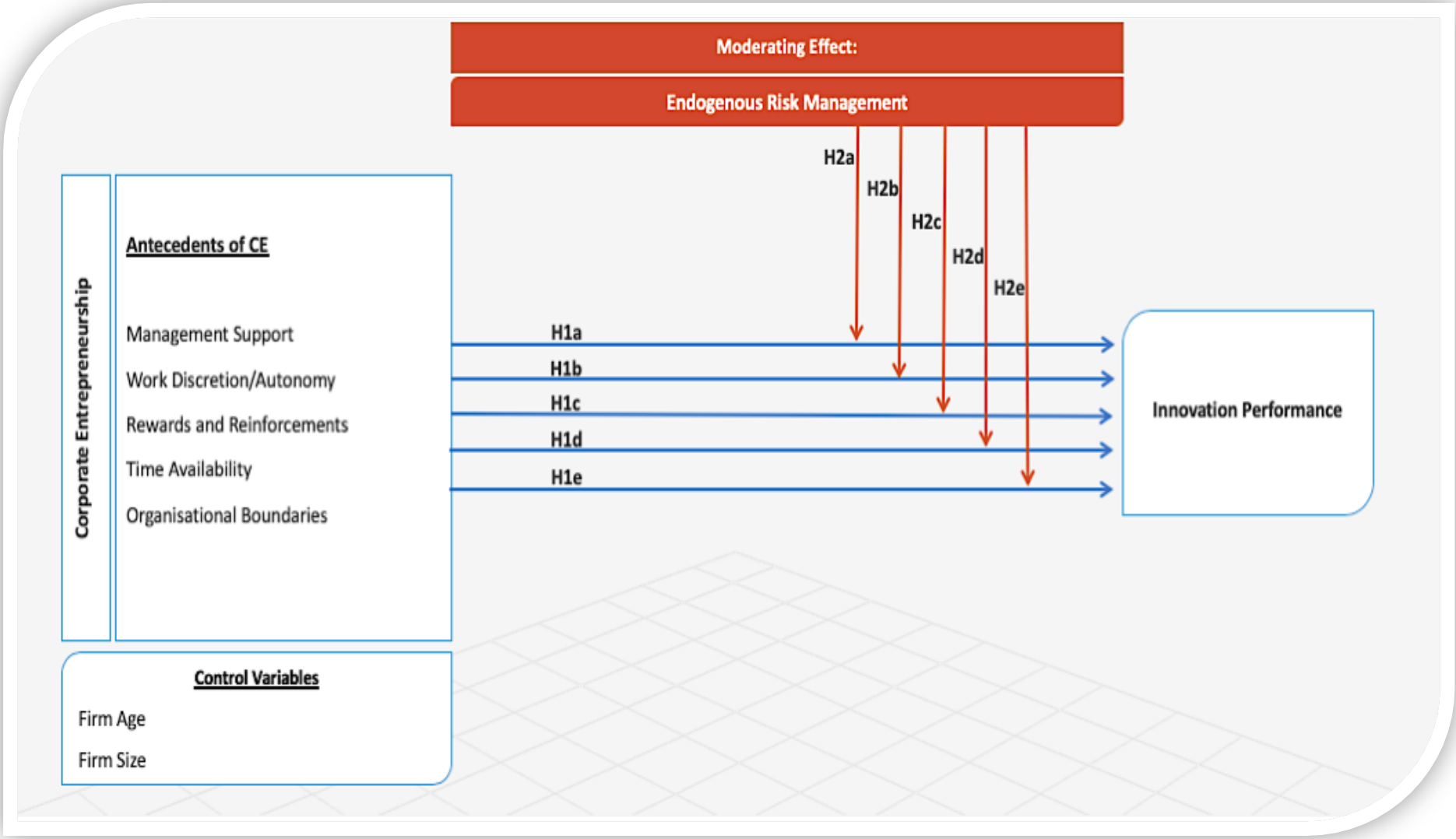


Figure 2.9: Detailed Conceptual Model of Study

2.9 Chapter Summary

This chapter commenced with an introduction on literature pertaining to entrepreneurship in emerging markets, followed by specific focus on the South African context and its telecommunications sector. It then went on to cover works on innovation performance, corporate entrepreneurship and endogenous risk management. Definitions were provided on each construct and, although not exhaustive, existing body of knowledge was critically reviewed to further elaborate on the views held by different scholars on the pertinent concepts. The chapter concluded with a detailed conceptual framework of the study.

It was noted that there exists an optimism for entrepreneurship in emerging markets, with Africa being dubbed both the *final* and *new* frontier, based on opportunities offered by the continent as an under explored context. Despite the challenges of entrepreneurship in South Africa, entrepreneurship continues to hold a prominent position as a solution for the country's socio-economic problems. Although the telecommunications sector was acknowledged as one of the facilitators of economic growth and participation, some scholars accentuated the weak and ambiguous empirical evidence that exists on its contribution to economic growth for emerging and developing countries. There is limited competition within this sector in South Africa, which may hamper competitive intensity and innovation outcomes.

The ability to continually innovate, to engage in an ongoing process of entrepreneurial action, has become the source of competitive advantage. Literature reviewed on innovation performance covered numerous views on the concept and its measurement. The proposition by Goodale et al. (2011), used in this study, states that innovation performance entails new products or services developed and brought to the market, the speed with which these are developed and brought to the market, the ability to respond quickly and pre-empt market or technological developments, as well as the incorporation of technological innovations into internal operations. Innovation was highlighted as an undeniable strategic and operational lever available to firms in creating competitive advantage. The researcher also explored the various types of innovation available to telecommunication firms namely product, process, technological, market and administrative innovation.

Corporate entrepreneurship was noted as a process that can facilitate firms' efforts to constantly innovate and effectively cope with the aforementioned competitive realities that companies encounter. This chapter also covered the five organisational antecedents of corporate entrepreneurship namely management support, work discretion/autonomy, rewards/reinforcement, time availability and organisational boundaries. Management support can be provided by motivating, guiding and mentoring employees in their development of new ideas as well providing the necessary resources. The autonomy/work discretion highlighted the need for employers to give employees decision making latitude whilst refraining from excessive oversight. The importance of appropriate reward systems were presented through the rewards /reinforcement dimension, as these increase the willingness of employees to take risks in their intrapreneurial activities. Employees are said to show superior performance when they feel empowered and appreciated by managers. Through time availability, firms can reduce workload and allow more time for employees to work on entrepreneurial activities, thus enhancing innovation outcomes. The final dimension, which is organisational boundaries, revealed the necessity for firms to set boundaries that are not overly restrictive but rather sufficiently flexible to encourage employees to work with one another inside and outside of their departments to develop innovation projects.

A developing domain of research has divulged how risk management systems hold an essential role in innovation facilitation and performance. There is growing consensus that formal controls, when activated in an enabling, facilitative and interactive fashion, increase the capacity of an organisation to improve and derive benefits from innovation (Bedford, 2015; Bisbe & Otley, 2004; Jørgensen & Messner, 2009). However, some scholars contend that the principal cause of failure can be attributed to internal control systems, as they stifle firm innovation. Based on studies done in developed economies, innovation is said to thrive at various levels of endogenous risk management. Within an emerging market context, the researcher sought to discover at what levels the relationship between CE dimensions and Inno_P was more positive – high or low levels of endogenous risk management.

In the midst of growing global competitive business environments, successful organisations bank on the fundamental notion that innovation drives success. Consequently, it is imperative to understand, within the developing nation context, what drives innovation performance and what

strengthens the CE-Inno_P relationship. This study sought do that by examining the antecedents of corporate entrepreneurship to ascertain which dimension have the greatest predictive power of innovation performance within the telecommunications sector in South Africa. Furthermore, it set out to discover the moderation effect of endogenous risk management on the CE-Endo_RM relation, with the aim of contributing theoretically and practically to the existing literature both in management and the sector in question.

The hypotheses of this study are summarised in Table 2.2 below.

Table 2.2: Summary of Research Hypothesis

Research Question	Hypothesis	Expectation
Research Question One In relation to the organisational antecedents of corporate entrepreneurship, what are the significant (and most influential) predictors of innovation performance in telecommunication firms in South Africa?	H_{1a}. Management support is positively related to innovation performance	+
	H_{1b}. Work discretion/autonomy is positively related to innovation performance.	+
	H_{1c}. Rewards/reinforcements are positively related to innovation performance.	+
	H_{1d}. Time availability is positively related to innovation performance.	+
	H_{1e}. Organisational boundaries are positively related to innovation performance.	+
Research Question Two How does endogenous risk management moderate the relationship between the organisational antecedents of corporate entrepreneurship and innovation performance in telecommunication firms in South Africa?	$H_{2a.}$ The relationship between management support and innovation performance is more positive under low than high levels of endogenous risk management.	More + L > H
	H_{2b}. The relationship between work discretion/autonomy and innovation performance is more positive under high than low levels of endogenous risk management.	More + H > L
	H_{2c}. The relationship between rewards/reinforcements and innovation performance is more positive under high than low levels of endogenous risk management.	More + H > L
	H_{2d}. The relationship between time availability and innovation performance is more positive under low than high levels of endogenous risk management.	More + L > H
	$H_{2e.}$ The relationship between organisational boundaries and innovation performance is more positive under high than low levels of endogenous risk management.	More + H > L

Chapter 3 : Research Methodology

3.1 Introduction

In this section the researcher describes the approach used to discover knowledge related to variables under study. It consists of the research methodology undertaken for this research, including the research paradigm, research design, population and sampling methods. The research instrument utilised to gather primary data is reflected upon. The data collection procedure, ethical considerations, data analysis and interpretations for the study are discussed. Validity and reliability tests, as well as the limitations of the study conclude the chapter.

3.2 Philosophical Worldview

Creswell (2014) states that the philosophical worldview is the general orientation regarding the world, relative to the nature of the research being conducted. These views are influenced by the discipline in which the research is being undertaken. Synonyms for this component include epistemologies and ontologies or research approaches (Figure 3.1.).

Even though philosophical concepts linger covertly in research, they possess significant effect in the practice of research and as such necessitate identification (Slife & Williams 1995). Creswell (2014) suggests researchers divulge the larger philosophical ideas they espouse. He advises researchers to think through the philosophical worldview assumptions that they bring to the study, the strategy of inquiry that is related to this worldview and the specific methods or procedures of research that translate the approach into practice.

The worldviews, strategies, and methods all play a part in the research design. These tend to be quantitative, qualitative, or mixed as detailed in Table 3.2. The table shows differences in these approaches and was useful in assisting the researcher to select an appropriate approach for this study. In addition to the link between the approaches, philosophical worldviews, strategies and methods, other factors considered were the research problem, the personal experiences of the researcher, and the audience for whom the report is written.

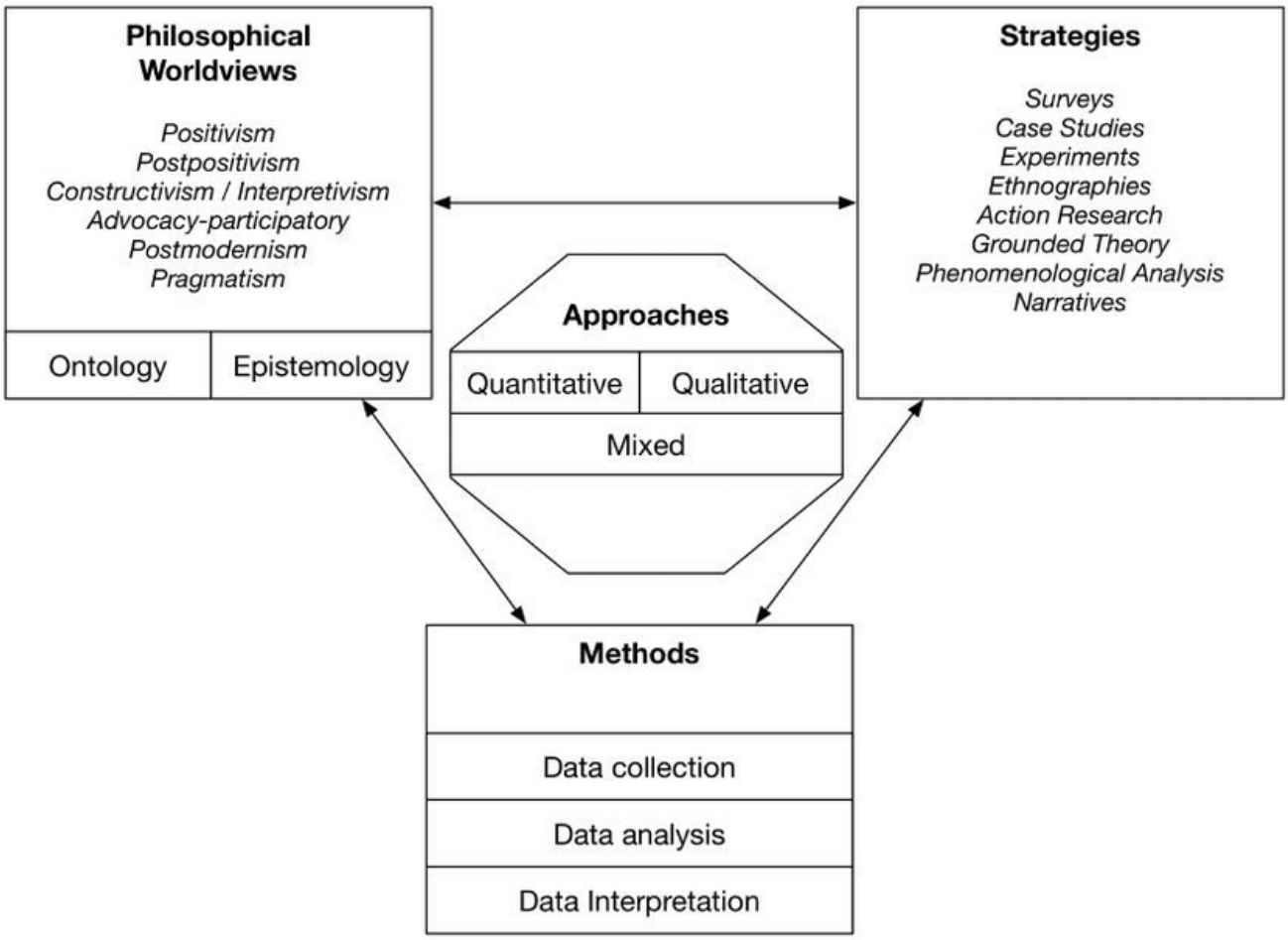


Figure 3.1: A Framework for Design

The Interconnection of Worldviews, Strategies of Inquiry, and Research Methods - Adapted from Creswell (2014, p.5)

This study takes an objectivist epistemological position, specifically, a distant non-interactive posture was adopted by the researcher (Ritzer & Guba, 1991). It identifies variables of endogenous risk management, corporate entrepreneurship, innovation performance, and analyses and tests the relationships between them to authenticate, prove or disprove objective knowledge of how these variables relate (ontology and epistemology) - Figure 3.1.

Creswell (2014) proposes four different worldviews namely Post-positivism, Constructivism, Advocacy/Participatory and Pragmatism, as shown in Figure 3.1 and detailed in Table 3.1.

Table 3.1: Four Worldviews

Postpositivist	Constructivism
• Determination • Reductionism • Empirical observation and measurement • Theory verification	• Understanding • Multiple participant meanings • Social and historical construction • Theory generation
Advocacy/Participatory	**Pragmatism**
• Political • Empowerment issue-oriented • Collaborative • Change-oriented	• Consequences of actions • Problem-centred • Pluralistic • Real-world practice oriented

Source: (Creswell, 2014)

3.2.1 Research Paradigm

The paradigmatic position of this study is positivism. This position, dubbed post-positivism due to the fact that it represents the thinking after positivism, challenges the historical notion of the absolute truth of knowledge(Phillips & Burbules, 2000) and recognises that we cannot be *positive* about our claims of knowledge when studying the behaviour and actions of humans. Postpositivists hold a deterministic philosophy in which causes probably determine effects or outcomes. As a consequence, the problems studied by postpositivists echo the necessity to identify and evaluate the causes that influence outcomes.

Ritzer and Guba (1991) assert that the positivist paradigm takes a deductive approach to research and utilises quantitative methods to test theory and hypotheses. The nature of this research paradigm models the world in such a way that certain factors can be anticipated or controlled with the objective of uncovering truth or producing causal laws. The principal resolve of quantitative research is to ascertain affiliations between variables informed by theory (Kirkwood & Campbell-Hunt, 2007).

The above assertions are supported by Phillips and Burbules (2000), who provide key assumptions of this position, stating that;

1. Knowledge is speculative and antifoundational - absolute truth can never be found. As a result, evidence established in research must always be seen as limited and fallible.
2. Research is a procedure in which claims are made and subsequently refined. In this process, some are abandoned for more strongly merited claims. This is the case with this study that commences with testing theory pertaining to the variables under study.
3. Evidence, rational consideration and data mould knowledge. Herein, the researcher collected data on instruments based on measures completed by the participants within the telecommunication sector.
4. Research strives to expand pertinent veritable statements that provide understanding on a concern or insight on causal relationships of interest. In this study, the researcher attempted to advance insight on the relationship among variables under study and posed this in the form of questions or hypotheses.
5. Objectivity is a fundamental facet of competent inquiry; researchers must examine methods and conclusions for bias. For this reason, standard of validity and reliability formed an important part of this quantitative research.

The principal investigator found that this position is reductionistic in the sense that it reduces ideas into a small, discrete set of ideas to test, such as the variables that comprise of hypotheses (Figure 2.9: Detailed Conceptual Model of Study) and research questions (section 1.3 Research Objectives/Questions). The knowledge that develops through a postpositivist lens is grounded on prudent observation and measurement of the objective reality that exists in the world. Hence, developing numeric measures of observations becomes paramount (see AF - Frequency Tables). Furthermore, there are laws or theories that govern the world, and these are tested, verified and refined to provide greater insight and understanding of the world (herein referring to insights on the variables under study within the SA telecommunications sector). Based on the aforementioned systematic and scientific method, the researcher began the study with analysis of existing theories (in chapter 2), followed by the data collection and presentation thereof (chapter 4), that either supported or refuted the theory (as discussed in chapter 5).

This research took on the pattern of previous studies on risk management as it relates to innovation or the entrepreneurial climate within a firm (Ali, Warren, & Mathiassen, 2017; Barton et al., 2002; da Silva Etges & Cortimiglia, 2017; Goodale et al., 2011; Gordon et al., 2009; Kimbrough & Componation, 2015).

3.3 Research Design / Approach

Research design involves the intersection of philosophy, strategies of inquiry, and specific methods as indicated in Figure 3.1 (Creswell, 2014). The various approaches are characterised in Table 3.2. This study was founded on the quantitative research approach utilising a cross-sectional viewpoint reflecting a snapshot of a singular time period (Blumberg, Cooper, & Schindler, 2014; Cameron & Trivedi, 2005; Cooper & Schindler, 2008).

Table 3.2: Qualitative, Quantitative, and Mixed Methods Approaches

Typically	Qualitative Approach	Quantitative Approach	Mixed Methods Approach
Use these philosophical assumptions	Constructivist/ advocacy/ participatory knowledge claims	Post-positivist knowledge claims	Pragmatic knowledge claims
Employ these strategies of inquiry	Phenomenology, grounded theory, ethnography, case study, and narrative	Surveys and experiments	Sequential, concurrent, and transformative
Employ these methods	Open-ended questions, emerging approaches, text or image data	Closed-ended questions, predetermined approaches, numeric data	Both open- and closed-ended questions, both emerging and predetermined approaches, and both quantitative and qualitative data and analysis
Use these practices of research as the researcher	Positions him- or herself	Tests or verifies theories or explanations	Collects both quantitative and qualitative data

	Collects participant meanings Focuses on a single concept or phenomenon Brings personal values into the study Studies the context or setting of participants Validates the accuracy of findings Makes interpretations of the data Creates an agenda for change or reform Collaborates with the participants	Identifies variables to study Relates variables in questions or hypotheses Uses standards of validity and reliability Observes and measures information numerically Uses unbiased approaches Employs statistical procedures	Develops a rationale for mixing • Integrates the data at different stages of inquiry Presents visual pictures of the procedures in the study Employs the practices of both qualitative and quantitative research

Source: (Creswell, 2014)

3.4 Strategy of enquiry

Primary data collected by a survey was used to find and test relationships between dimensions of corporate entrepreneurship, innovation performance and endogenous risk management of telecommunication business ventures in South Africa using a structured online research instrument adapted from previous studies by Goodale et al. (2011); Mishra et al. (2019); Hu and Wu (2016); Kimbrough and Componation (2015); Everson et al. (2016). The researcher did not only select a research approach to conduct the study but also decided on the type of quantitative method or model that provided specific direction for procedures in the research design. An overview of these strategies are shown in Table 3.3 (Creswell, 2014). The researcher made use of non-experimental designs, in the form of surveys.

Table 3.3: Strategies of inquiry

Quantitative	Qualitative	Mixed Methods
• Experimental designs • Non-experimental designs - surveys	• Narrative research • Phenomenology • Ethnographies • Grounded theory studies • Case study	• Sequential • Concurrent • Transformative

Source: (Creswell, 2014)

3.5 Research Method

The third key element in the research design framework (Figure 3.1: A Framework for Design) is the specific research methods that comprise of the forms of data collection, analysis, and interpretation by the researcher in the study. As shown in Table 3.4, it is useful to consider the full range of possibilities of data collection and to organise these methods by their degree of predetermined nature, their use of closed-ended versus open-ended questioning, and their focus on numeric versus nonnumeric data analysis. This study made use of pre-determined close-ended questions and numerical analysis of information gathered on scales of instruments and analysed on SPSS (descriptive statistics, correlation and regression) and SAS Studio University Edition (weighted least squares model 3 analysis). The researcher subsequently made interpretations of the statistical results and interpreted patterns that emerged from the data.

Table 3.4: Quantitative, Mixed, and Qualitative Methods

Quantitative Methods	Methods Mixed Methods	Qualitative Methods
Pre-determined	Both pre-determined and emerging methods	Emerging methods
Instrument based questions	Both open- and closed-ended questions	Open-ended questions
Performance data, attitude data, observational data and census data	Multiple forms of data drawing on all possibilities	Interview data, observation data, document data, and audio-visual data
Statistical analysis	Statistical and text analysis	Text and image analysis
Statistical interpretation	Across databases interpretation	Themes, patterns interpretation

Source: (Creswell, 2014)

3.6 Rationale for Type of Research

This research design was chosen based on literature reviewed and previous studies (Goodale et al., 2011; Ravjee & Mamabolo, 2019) which adequately captured the relationships between the variables under study. In addition, the researcher perused through the various approaches, methods and strategies of enquiry to select those that suited the objective of the study best given the time frame available to perform the study. Given more time, the researcher would have preferred to do a mixed study including both a quantitative and qualitative approach to capture the nuances that may be missed by one approach. However, given the finite resources of the researcher, there simply were not sufficient resources available to diligently cover both.

Based on literature reviewed, the researcher chose to study moderating effect over mediation (Goodale et al., 2011). There was little evidence to suggest that Endo_RM plays a mediating role (when the variable transmits the effect of the antecedent on the outcome, either in part or whole) between CE and Inno_P. Whilst there was a sturdy theoretical foundation on risk management

playing a moderator role (a moderator variable influences the nature (e.g., magnitude and/or direction) of the effect of an antecedent on an outcome). Moderation is illustrated graphically in Figure 3.2, which shows that the moderator variable Z (Endo_RM) influences the path relating X (CE) to Y (Inno_P). The moderating effect in this study is continuous (as opposed to categorical like industry type), it therefore relies on moderated multiple regression, which consists of creating a regression model that predicts the outcome based on a predictor X (CE), a second predictor Z (Endo_RM) hypothesised to be a moderator (Aguinis, Edwards, & Bradley, 2017). Consequently, moderation was selected to assess if Endo_RM influences the strength or direction of the relationship between an independent (CE) and dependent variable (Inno_P) (Baron & Kenny, 1986).

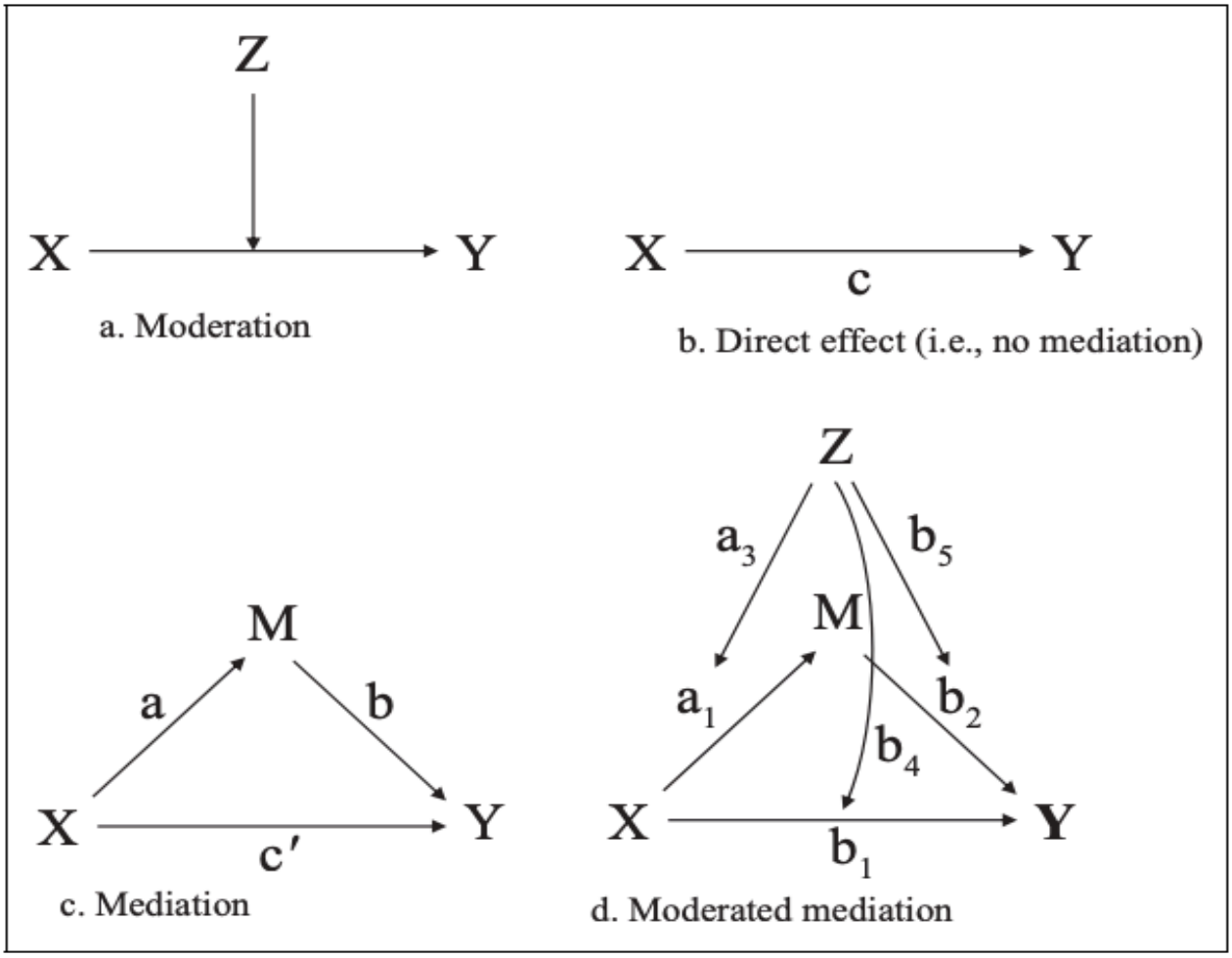


Figure 3.2: Graphic representation of moderation and mediation models.

Source: (Aguinis et al., 2017, p. 3)

3.7 Population and Sample

3.7.1 Population and Sampling Frame

The population of this study consists of firms within the South African telecommunications industry. Blumberg et al. (2014) define a sampling frame as a comprehensive list of all individuals or units in a population from which a sample would be drawn. The sampling frame for this study is South African telecommunication firms (telecoms and internet service providers) employees. The sampling frame was derived from the Independent Communications Authority of South Africa, the official regulator of the South African communications, broadcasting and postal services. This telecommunications database provided information on all the licence holders within this industry. In the telecommunications industry, over 90% of the market is accounted for by Vodacom, MTN, Telkom, Cell C, Neotel, Rain,Dimension Data, EOH, Datacentrix, Bytes, Gijima, Afrihost, T-Systems and Business Connexion BCX (ICASA, 2019a, 2019b). The abovementioned firms and minor market players formed the target population and sampling frame for this study.

3.7.2 Sample and Sampling Method

Sampling necessitates selecting representative elements of a population from which empirical analysis can be conducted and inferences made about the whole population (Blumberg et al., 2014). A sample is a set of entities drawn from a population with the aim of estimating characteristic of the population. The sample size is a smaller set of the larger population (Siegel 2003). It is a fraction or portion of a population selected such that the selected portion represents the population adequately. An appropriate sample size is the least number of participants required to identify a statistically significant result (Field, 2017).

The researcher did not identify any reigning theory or generally accepted method on how to determine the optimal sample size, however there were numerous views in literature cited as rules of thumb (Field, 2017; Green, 1991; Tabachnick & Fidell, 2019). For a truly parsimonious model analysis, the researcher found it a necessary prerequisite to adequately plan and interrogate research on the various approaches. Nunnally (1978) recommended that the researcher should have

at least ten participants per predictor variable under study. Kass and Tinsley (1979) recommended between five and ten, while Field (2017) proposed ten to fifteen. This translates to 60, 30-60, and 60-90 participants required for this study respectively, if one is to adopt the afore-stated recommendations. This recommendation goes up to 300 participants, beyond which, test parameters are said to be stable regardless of participant to variable ratio (Field, 2017; Tabachnick & Fidell, 2019) According to Hair, Anderson, Babin, and Black (2010), for an adequate sample size, that can be used in any regression analysis, this ratio ought to be 20 is to 1. In accordance with these rules of thumb, this study would require 120 respondents for an analysis that has potential to produce statistically and/or clinically significant results.

Green (1991) on the other hand offered an equation for the calculation of a statistically significant sample size. It reads as follows:

Equation 3.1: Sample Size Calculation

$N \geq 50 + 8p$; where p is the number of predictors.

For statistically significant results, a sample of $N \geq 50 + 8\ (6) = 98$ participants is sufficient as stated by Green (1991). Consequently, the final sample of 187 exceeds the required minimum stipulated by the *rules of thumb* from Nunnally (1978), Kass and Tinsley (1979), Green (1991), Hair et al. (2010) and Field (2017) thus making it a good sample size.

A two-stage probability sampling method was adopted for this research, based on the fact that telecommunication firms in South Africa are not vast in terms of numbers. The sampling technique included stratified sampling of identified South African firms listed in the telecommunications database (ICASA, 2019a, 2019b), which lists existing license holders, with primary focus on the significant market shareholders mentioned above – and simple random sampling within the firms.

The total employment in the South African telecommunication sector is 37,063 in 2018 (ICASA, 2019b). In pursuit of statistical significance, based on prior research (Goodale et al., 2011) and the recommendation above, the researcher ensured that the final sample size was adequate for further

data analysis (Blumberg, Cooper, & Schindler, 2014). Table 3.5 below summarises the expected survey characteristics.

Table 3.5: Expected Survey Characteristics

Variable	Description
Target population	Telecommunication firms in South Africa
Population size	37 063 (ICASA, 2019b)
Geographical survey	South Africa
Target sample size	300
Final sample size	187
Respondents	Employees at all levels of the firm

3.8 The Research Instrument

The data collection instrument is a device used to collect data in an objective and systematic manner. According to Blumberg *et al* (2014) the use of a questionnaire is beneficial as it is stable, consistent, and uniform. Primary data was gathered by means of a structured online research questionnaire. According to (Blumberg et al., 2014), collecting data through a survey has the following advantages:

- Ease of administration
- Relatively lower costs
- No geographical limitation – so wider reach

The questionnaire was divided into four sections (see Appendix D: Research Instrument) designed to gather data on demographic information including the control variables (firm size and age - which may have an impact of the variables under study based on previous studies done (e.g. Goodale *et al*., (2011), the antecedents of CE, innovation performance and endogenous risk management.

The CE and innovation performance scales were adapted from prior research by Goodale et al. (2011) and Donald F. Kuratko *et al*., (2014). The study empirically assessed the corporate entrepreneurial climate in telecommunication firms in SA utilising the corporate entrepreneurship assessment instrument (CEAI), originally developed by Kuratko *et al*. (1990) and expanded by Hornsby *et al*.. (1999). The endogenous risk management scale was compiled from a number of studies on risk management; primarily Goodale et al. (2011); Mishra et al. (2019) and supplemented with studies by Hu and Wu (2016); Kimbrough and Componation (2015) and Everson et al. (2016). The scale items were adapted to warrant reliability of the research instrument.

In order to develop a questionnaire of sound quality, the researcher collected and analysed applicable literature. Credible sources such as articles from google scholar, the University of the Witwatersrand Library and pertinent academic databases were used to do this. The scales were founded on addressing this study's research questions and objectives. In the first part of the study CE is the independent variable with Inno_P as the dependent variable. In the second part of the study, the CE-Inno_P relationship is the dependent variable while endogenous risk management is the independent moderating variable.

The construct items were depicted on a seven-point Likert scale with seven choices (Inno_P; 1 - extremely poorly, 2 - poorly, 3 - slightly poorly, 4 - neither poorly nor well, 5 - slightly well, 6 – well and 7 - extremely well. CE and Endo_RM scales were rated as follows; 1 - strongly disagree, 2 - disagree, 3 - slightly disagree, 4 - neither agree nor disagree, 5 - slightly agree, 6 - agree and 7 - strongly agree. This Likert scale was chosen as psychometric literature suggests that having more scale points provides enhanced quality in data collected with diminishing returns after approximately 11 points. The 7 Likert scale offers a good balance between having enough points of discrimination without having to maintain too many response options (Nunnally & Bernstein, 2010). The questionnaire was self-administered.

Appendix D: Research Instrument provides details on each construct and items as per Figure 2.9: Detailed Conceptual Model of Study (on page 63).

3.9 Procedure for Data Collection

3.9.1 Participants

Firms and employees falling within the sample strata were identified through the telecommunications database (ICASA, 2019a, 2019b). Primary data was gathered from employees of telecommunication firms in South Africa through a structured online research questionnaire.

3.9.2 Data Collection

Data collection is the process of assembling and measuring information on variables of interest (CE, Endo_RM, Inno_P and control variables) in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes. The researcher found that data collection methods vary by discipline, however, the emphasis on ensuring accurate and honest collection remains the same. The goal for all data collection is to capture quality evidence that translates to rich data analysis and allows the building of substantial and credible answers to questions that have been posed. Consequently, the researcher's priority was accurate data collection as an essential part of maintaining the integrity of research (Kabir, 2016).

Correspondence was issued through email and social media. Email correspondence was dispatched to telecommunication firms in South Africa. This communication contained an introduction on the purpose of the correspondence, a brief profile on the researcher and la ink to the questionnaire. The survey was distributed to respondents via a link from the Qualtrics (online survey platform) through both email and social media platforms, including LinkedIn, Facebook, Instagram, Twitter – specifically to telecoms. Reminders were sent at an interval of 3 days for social media platforms and once a week for email correspondence. The data collection phase was preceded by a pilot phase, during which 35 respondents were requested to complete the questionnaire, allowing refinement of the instrument. The data collection process is illustrated in Figure 3.1 below.

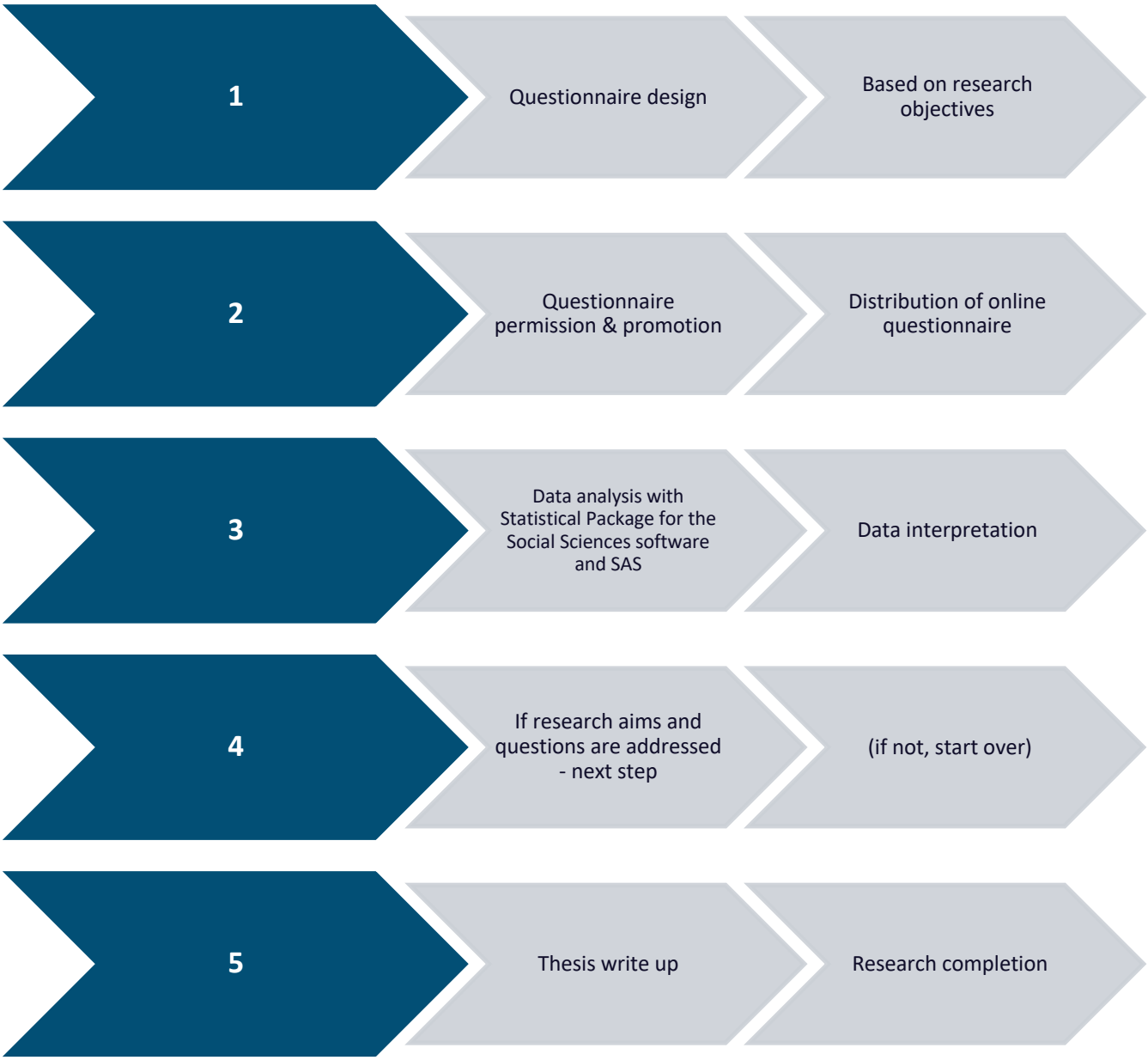


Figure 3.1: Data Collection Process Diagram

3.9.3 Ethical Considerations

The main ethical considerations of this study are consent and impact. Respondents were reassured that participation in this study was completely voluntary and that responses would remain highly confidential. No identifiable information (e.g. the name of company or the respondent) was requested ensuring privacy of all respondents (see Appendix D: Research Instrument – cover letter and consent question). How participation affects the respondents was also included in the aforementioned Appendix. The researcher will store the data collected for 5 years period at the University of Witwatersrand, after which it will be destroyed. Furthermore, the researcher also obtained permission with all the relevant gatekeepers:

- Telecommunications firms, where data was collected, were contacted for permission
- An ethical clearance application and the research instruments were presented to the Ethical Clearance Committee of the School of Management at Wits Business School. The study was approved and an ethical clearance certificate with the pertinent ethics protocol number was issued (see Appendix C: Ethical Clearance).
- Anonymity of participants was ensured, and individual/firm identities remained unknown during and post the write-up of the results. They will remain anonymous in any publications emerging from this research.
- Only data from participants that indicated consent were used
- Discrimination was avoided through random sampling within the firms – the researcher also evaded discrimination by gender, ethnicity, or other factors not related to the respondent's scientific competence and integrity

3.10 Data Analysis and Interpretation

The empirical analysis was based on descriptive statistical analysis, exploratory factor analysis, and multiple linear regression analysis.

3.10.1 Data Preparation and Cleaning

Succeeding data collection, a "*Statistical Package for the Social Sciences*" (SPSS) file was downloaded from Qualtrics (online data collection platform). To abate the risk of invalid conclusions, data cleaning was conducted. This entailed screening the data and addressing problems such as missing or invalid data to ensure the data is of good quality prior to conducting analysis. Subsequent to this, the researcher subjected the data to statistical and empirical analysis.

3.10.2 Data Coding and Reshaping

Text data was converted to numbers for purposes of analysis on the SPSS software that was used for this study (Field, 2017). On this software, the research instrument questions were coded into acronyms according to the research construct that they fell under. Corporate entrepreneurship was coded as CE, endogenous risk management as Endo_RM and innovation performance as Inno_P.

For advanced insight (including graphical visualisation) on the moderating effect, endogenous risk management (Endo_RM) was coded as follows,

- strongly disagree, disagree = low levels of endogenous risk management
- somewhat disagree, neither agree nor disagree, somewhat agree = medium levels of endogenous risk management
- agree and strongly agree = high levels of endogenous risk management

In the design of the survey instrument, reverse questions were included. The purpose of these was to ensure that the respondents applied themselves in completing the instrument – checking respondent attitude/measurement and reducing agreement bias (Hopper, 2017).

3.10.3 Descriptive Statistics

The empirical analysis commenced with descriptive statistics that described the sample characteristics. It measured centrality (mean and standard deviation), spread and distribution of

variables to be computed on each of the dependent and independent variables (Kumar, 2018). The results are presented in Tables and Figures in Chapter 4 and the respective appendices (Field, 2017).

3.10.4 Correlational Analysis

Correlation analysis was conducted in this study in order to determine if there is a correlation between CE, Endo_RM x CE, and Inno_P. The association between these variables was analysed using correlation analysis prior to estimating the regression model. This was done to establish if there is a linear relationship between the variables under investigation. The two main tests done were the Pearson correlation, which tests the relationships between continuous variables, and the Spearman correlation, which tests the relationship between ordinal variables (Field, 2017). These correlation tests were done to ascertain the relationships (direction and strength) between the independent and dependent variables.

The researcher conducted correlation analysis through two methods; the aforementioned statistical analysis and graphical assessment. The former method produced correlation coefficients which were analysed for direction and strength of the relationship. Using the Pearson's correlation coefficient (r) which ranges from -1 to 1, the researcher identified the direction and strength of the relationships. A positive correlation indicates that the variables are directly proportional, whilst a negative coefficient indicates an indirectly proportional relationship. Furthermore, SPSS generated a 2-tailed (evaluates the relationship in both directions) significance value. The closer the numerical value is to value one, the stronger the correlation whilst 0 indicates that there is no correlation (Field, 2017).

The latter method of the correlation involved plotting the variables on a scatterplot and evaluating these for any patterns exhibited from the distribution of the data. Where correlations were evident, the direction and the strength of the relationship were determined. This was done through analysing the correlation coefficient (r) and coefficient of determination (r^2) where:

- the slope of the regression line depends on the correlation between the two variables;

- the stronger the correlation between the two variables, the higher the slope;
- the coefficient of determination portrays the percentage of the dependent variable that is explained by/attributed to the explanatory variable (how good the IV is at predicting the DV); and
- this percentage was obtained by squaring the correlation coefficient. The results represent the coefficient of determination which is denoted by r^2.

The results from both the statistical and graphical correlation analysis can be found in Chapter 4.

3.10.5 Regression Analysis

Regression analysis is an authoritative statistical method that permits the researcher to investigate the relationship between two or more variables of interest. There are various kinds of regression analysis. In essence, they all study the influence of one or more independent variables on a dependent variable. Regression analysis was a helpful statistical method that the researcher leveraged to determine the extent to which particular independent variables (Endo_RM, MS, WD, RR and OB) influenced the dependent variables (Inno_P/CE-Inno_P relation in this study) (Field, 2017). The researcher made use of multiple regression analysis to determine the overall fit (variance explained) of the model and the relative contribution of each independent variable as a predictor of innovation performance; providing insight on how much of the variation in innovation performance can be explained by dimensions of CE and Endo_RM and the "relative contribution" of each independent variable in explaining the variance (Kumar, 2018).

Within the regression analysis, the researcher accounted for control variables. Firm size has long been emphasised as an important factor affecting performance. Thus, firm size was adopted as a control variable. Within this study, firm size refers to the number of employees in a firm measured by a four-point scale; Micro - 1 to 10 employees, Small - 11 to 50 employees, Medium - 51 to 250 employees, Large - 251 or more employees. Firm age was used as the second control variable. This four-point scale included less than 3 ½ years, 3 ½ to 10 years, 11 to 20 years, 21 years or more. There are significant differences in performance between new ventures and those that have

been existence for extended periods of time (older than 3.5 years)(de Wet, 2019). Consequently, this was accounted for in the analysis (Field, 2017).

The following multiple regression assumptions were acknowledged in the study (Field, 2017; Norusis, 1998):

1. The relationship between the independent variables and the dependent variable is linear. The researcher assessed this by producing scatterplots of the relationship between each of the independent variables and the dependent variable as seen in Chapter 4.
2. There is no multicollinearity the data. This was done to test if the predictor variables are not too highly correlated with one another. To test this assumption, the researcher selected "Collinearity diagnostics" when doing regression statistics on SPSS.
3. Independent Errors: for any pair of observations, the values of the residuals ought to be independent/uncorrelated. The researcher tested this by selecting the Durbin-Watson statistic under residual when doing regression statics on SPSS. The Durbin-Watson statistic ought to be close to two).
4. Homoscedasticity (the variance of the residuals is constant) is the assumption that the variation in the residuals is similar at each point across the model. The distribution residuals should be fairly constant at each point of the predictor variables (or across the linear model). The researcher produced a special scatterplot on SAS University Edition to assess the standardised values the model would predict, against the standardised residuals obtained.
5. Normality - The residuals should be normally distributed. There should be no significant outliers.

Model diagnostics were performed to identify any violation of the above assumptions. To conclude the regression analysis step, the researcher analysed the regression output to assess the predictive power and significance of the IVs in relation to the DV (Inno_P). Furthermore, for graphical presentation of the moderating effect of Endo_RM, the researcher operated a process procedure on SPSS Version 3.4 written by Andrew F. Hayes, Ph.D. The steps taken by the researcher in testing moderation are as follows.

In order to confirm the moderation effect on the relationship between Endo_RM and CE-Inno_P, the researcher included an interaction effect in the model to see if indeed such an interaction is significant and helps explain the variation in the response variable better than before. In more explicit terms the following steps were followed:

1. The researcher standardised all variables on SPSS using the Andrew F. Hayes, Ph.D. programme to address multicollinearity issues;
2. The researcher dummy coded categorical variables and created product terms automatically under the Andrew Haynes programme; and
3. A regression model was tested for fitness in predicting the outcome variable from the predictor variables.

3.11 Validity and Reliability of Research

3.11.1 External Validity

In order to measure the extent to which a researcher is measuring what they intent to – a validity test is done. The various kinds of validity tests available are external, internal, construct, content and criterion validity. This study measured external and internal validity. External validity provides insight on the causal relationship between constructs and how the relationship can be generalised across settings, persons and times. This study estimated the relations between CE and Inno_P as well as Endo_RM and the CE-Inno_P relationship. The results were used to make inferences on the population of telecommunication firms in South Africa (Blumberg et al., 2014).

3.11.2 Internal Validity

Internal validity examines whether or not a causal relationship exists between constructs and whether or not there are confounding factors in the study. Internal validity is determined by a number of factors that include history, maturation, selection, instrumentation, statistical regression and experimental mortality (Blumberg et al., 2014); (Cooper et al., 2008). This was tested using

SPSS software. To improve the internal validity of the research instrument, the following steps were taken:

- Research instrument comprised of elements from previous research;
- A pilot survey was conducted to assess validity and reliability; and
- Precise questions were asked to avoid confusion.

To investigate construct validity, Principal Component Analysis (PCA) was used to uncover the underlying structure of relativity. PCA is a procedure for identifying a smaller number of uncorrelated variables called principal components from a large set of data. Developed by Karl Pearson in 1901, the main goal of PCA is to explain the maximum amount of variance with the least number of principal components. The principal component method was employed by the researcher to find the principal components (Sunindijo & Zou, 2013). The PCA results presented in Chapter 4 are based on the Harris Kaiser varimax rotation method. The identified principal components were used to generate independent variables to put through multiple regression analysis (Field, 2017; Kumar, 2018). One of the advantages of using PCA is that it addresses potential multicollinearity issues that are generally associated with moderation studies. Most regression models that utilise more than one independent variable are affected, to a greater or lesser extent, by multi-collinearity. Multi-collinearity is a situation in which the independent variables are themselves highly correlated with one another. Furthermore, the method reduces overfitting of the model and greatly improves visualisation. It is used to remove the least beneficial features without losing significant predictive power. Based on this, some of the factors were discarded after extraction. Factor retention methods used were based on the following criteria (Field, 2017):

- Kaiser's criterion - where all the factors with eigenvalues greater than one were retained;
- Scree plot - manual testing used in conjunction with the previous method to excessive retainment; and
- Proportion of variance - loadings with less than 0.4 and a quantity of three loadings were excluded.

Divergent validity tests that constructs that have no relationship do, in fact, not have any relationship. This was tested through the correlation analysis (seeking coefficients greater than 0.85). Convergent validity tests confirm that constructs that are expected to be related are, in fact, related. The researcher assessed convergent validity through principal component analysis, noting that multi-item constructs have good convergent validity (Su, Xie, & Wang, 2015).

3.11.3 Reliability

Reliability indicates the ability of a research instrument to produce consistent results (Blumberg et al., 2014). An instrument that demonstrates reliability is exempt from random or unstable error. The Cronbach Alpha (α) was used to measure the internal consistency - measuring how closely related a set of items are as a group (Cronbach, 1951). The Cronbach's Alpha ranges from 0 to 1, with higher values indicating greater internal consistency (and ultimately reliability). The commonly accepted parameter for the α evaluation is as follows; $\alpha \leq 0.5$ is unacceptable, $0.5 < \alpha \leq 0.6$ is poor, $0.6 < \alpha \leq 0.7$ is questionable, $0.7 < \alpha \leq 0.8$ is acceptable, and > 0.8 is excellent (Cronbach, 1951; Field, 2017; Radhakrishna, 2007).

The pilot study was used to further measure the reliability of the scales in the research instrument (Appendix D: Research Instrument). These were found to be reliable in the pilot study. Consequently, the researcher pursued the main study.

3.12 Limitations of the Study

- This study is only quantitative, a mixed method approach could have collected richer data, as the addition of a qualitative approach could have helped interrogate the details that inform the results (Segal, Borgia, & Schoenfeld, 2005)
- Limited reach –the research could have gained greater insight if entire organisations completed the questionnaires
- Cross-sectional study - it would have been insightful if telecommunication firms took could take a longitudinal approach and annually assessed their stand on the constructs under study to inform their CE, innovation and risk management strategy

- This study focused on one industry - the telecommunications industry – which is a limitation despite the opportunity to provide in-depth insight on this industry

3.13 Chapter Summary

This study set out to determine the relation between variables under study, based on the verification and refinement of theory pertaining to firms within the telecommunications industry in South Africa. The philosophical viewpoint of this study is postpositivist, the research approach quantitative, the strategy of enquiry, an online survey. This chapter presented the philosophical assumptions that underpin the research, as well the research strategy and the empirical techniques applied. Herein, the research paradigm and design were illuminated amongst existing research traditions. The philosophical assumptions that underlie this research came from the interpretive convention, implying a subjective epistemology and the ontological belief that reality is socially constructed. The research strategy adopted was quantitative and cross sectional as it was designed to look at the variables at a particular point in time. The main data collection technique used in this study was structured online questionnaires distributed to telecommunication firms and employees in South Africa. Sampling technique, research instrument, data collection procedure and data analysis sub-units were described. Ethical considerations, reliability and validity concerns pertaining to the data collection procedures were addressed. Lastly, the study limitations were highlighted.

Chapter 4 : Presentation of Results

4.1 Introduction

This chapter presents the empirical findings of the research. The researcher commences with details surrounding the preliminary examination and subsequent clean-up of the data prior to analysis. This is a quantitative study based on statistical analysis of data. Primary survey data was cleaned and analysed in Statistical Package for the Social Sciences (SPSS) and SAS Studio University Edition. An analysis of the demographics of the respondents with a discussion of some key observations follows. An analysis of the internal consistency, reliability and validity was conducted on the data with appropriate tables displaying the resultant analyses and a discussion around the appropriate action that needed to be taken in the existence of any violations to assumptions. The data was analysed using the analytical methods discussed in Chapter 3. The first section presents the descriptive analysis of the sample of the study. The second section presents results of the reliability and divergent and convergent validity of the study through principal component analysis of the dependent and independent variables. The third and final section of the chapter presents multiple linear regression analyses of the different relationships hypothesised in the conceptual framework presented in Chapter 2. Each research hypothesis is described, and the appropriate data analysis required to prove/disprove each hypothesis is discussed. Data tables and figures are presented for descriptive analysis purposes or to graphically portray relationships between variables of interest.

4.1.1 Data Preparation and Cleaning

The data used for empirical analysis was based on responses from an online survey, which was self-administered on Qualtrics. A CSV format file of responses was exported from the aforementioned survey platform and imported into the Statistical Package for the Social Sciences software. Herein, the data was cleaned to ensure that it was fit for analysis. The following steps were followed (Field, 2017);

- Redundant identifiers in the dataset were omitted (e.g. dates, duration, location IP addresses)

- Checked that all respondents had consented to the study and fell within the telecommunications industry
- Missing value analysis was performed and entries with missing data (Figure 4.1) were excluded to run analysis on complete datasets. Imputing missing values was not necessary as the remaining data permitted further data analysis.
- Variables were checked to ensure that they had the required numerical and categorical types for inferential statistics analysis
- Likert scale was set to reflect a rating scale in numbers over the text alternative
- For ease of analysis, the data was coded into variable acronyms instead of question numbers
- Additional columns were added for each variable under study for analytical purposes

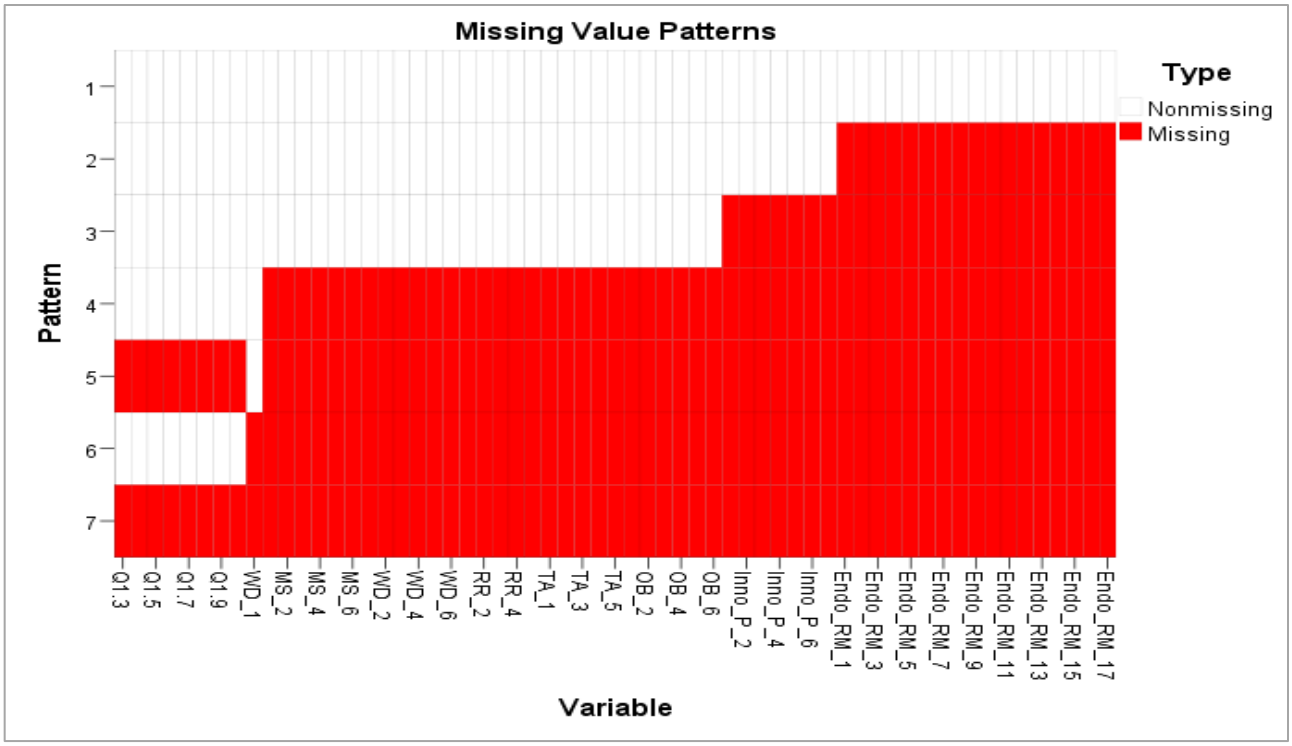


Figure 4.1: Missing Value Analysis – Prior Data Cleaning

Subsequent to data cleaning, missing data analysis was performed utilising the Analyze Patterns function on SPSS to give insight on the percentage of variables with missing data, the percentage of cases with missing data and the number of missing values (Figure 4.2).

The total sample of respondents reached through email and social media impressions was 920. The number of responses received was 414, which were reduced to 187 after data cleaning. The final sample (excluding entries with missing data) used in the empirical analysis represents 45% response rate.

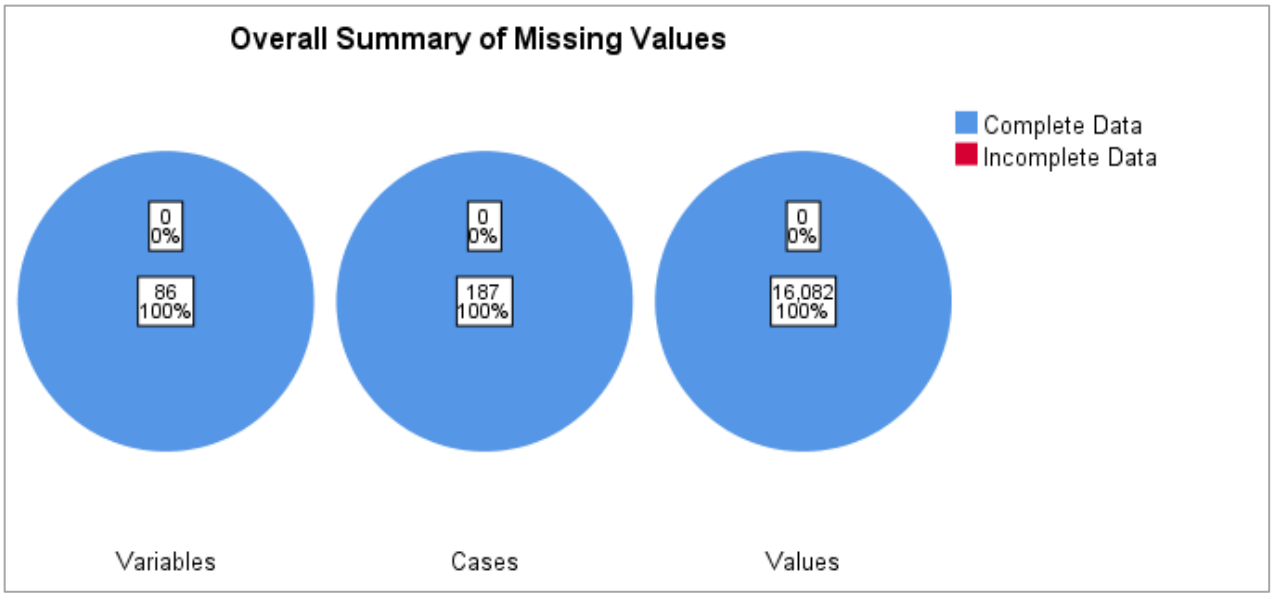


Figure 4.2: Missing Value Analysis – Post Data Cleaning

The researcher gathered over 400 responses in pursuit of the idyllic target of 300 cited by Tabachnick and Fidell (2019). Although this target was not met due to incomplete responses, the final sample was deemed acceptable and safe for further analysis as endorsed by the *rules of thumb* from Nunnally (1978), Kass and Tinsley (1979), Green (1991), Hair et al. (2010), and Field (2017).

4.1.2 Data Coding and Reshaping

The researcher coded all variables in acronyms for ease of analysis. The moderating variable analysis required low vs high levels of endogenous risk management comparison, hence the researcher coded Endo_RM as follows;

- strongly disagree, disagree = low levels of endogenous risk management

- somewhat disagree, neither agree nor disagree, somewhat agree = medium levels of endogenous risk management
- agree and strongly agree = high levels of endogenous risk management

Additional columns were added for log analysis of variables on SPSS. Reverse questions, included to reduce agreement bias, were reversed. (Hopper, 2017).

4.2 Sample Characteristics

A list of the employers comprising the population of employers in the South African Telecommunications sector was compiled, as detailed in the methodology section. From this list, a firm was selected for simple random sampling of employees as laid out in Chapter 3. The researcher also approached employees through social media.

The demographics of the respondents in this study include respondent age, gender, population group, position within the firm and education level. The demographics of the firm included business size, age and location within the nine provinces of South Africa. Reflection on the respondent and firm characteristics provided an enhanced understanding of the context in which the study was performed and the potential inferences on the generalisability of the results.

4.2.1 Respondent Characteristics

Figure 4.3 presents the age distribution of the respondents who participated in the study. Of the total 187 respondents,24, 104, 53 and 6 fell into the categories graphically represented below, respectively. The overall mean of the respondents was 31.9 years of age. This was calculated by determining the midpoint of each age group, multiplying by the frequency of the corresponding class and then diving the sum of the products by the number of values to obtain the mean. The minimum and maximum age categories fell within the 18-24 years and 65 and older classifications respectively (as can be found in Appendix D: Research Instrument), but the results yielded the former age group at 12,8% and the 45 to 54 at 3,2% of the total respondents. The balance of the recorded age variable fell into the 35-44 years (28.3%) and 24-34 years of age. The results show

that the largest age group were youth in the 25-34 year age group at 55,6% of the total number of respondents.

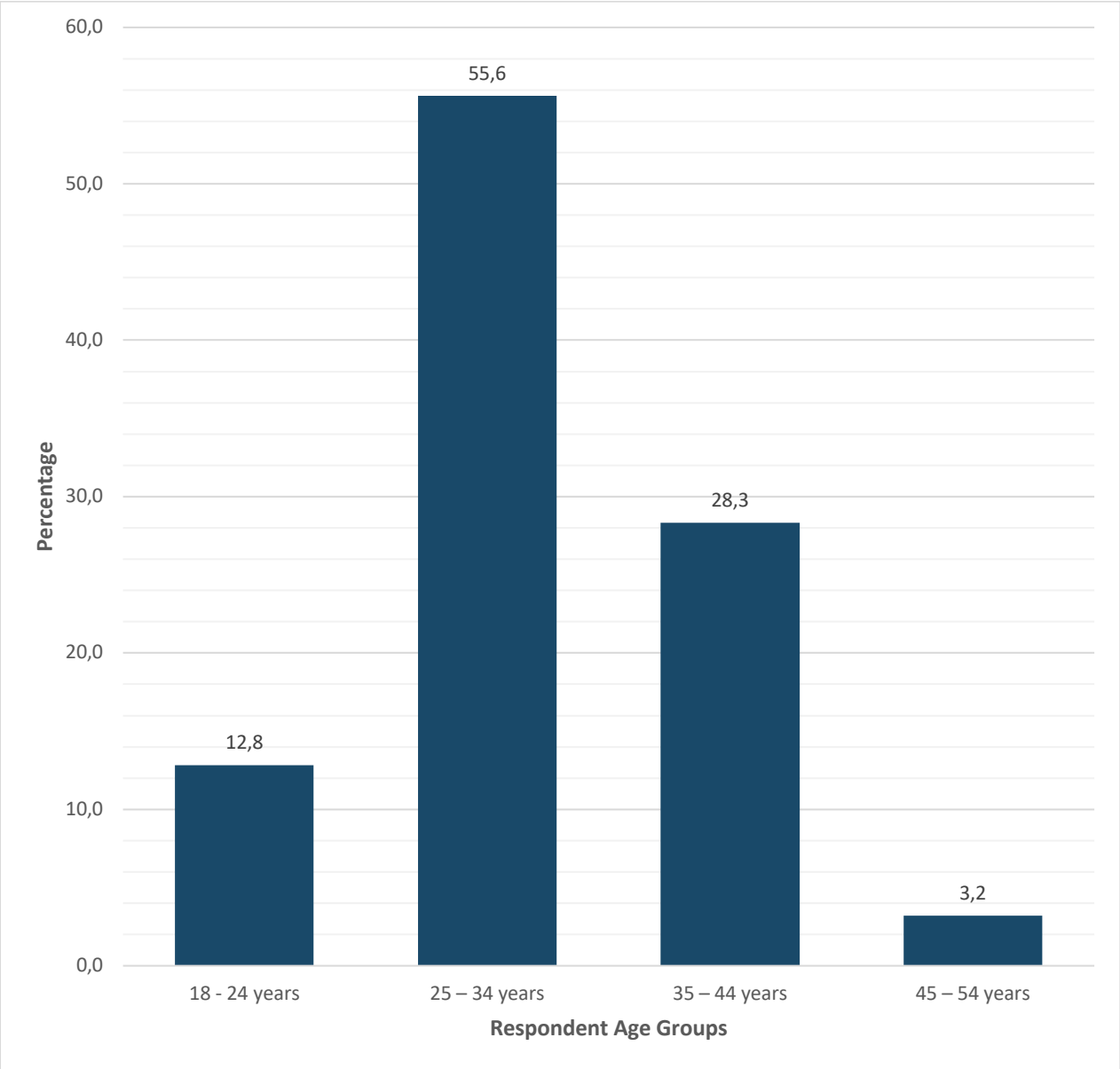


Figure 4.3: Characteristics of respondents by age

The gender composition of the respondents is provided in Figure 4.4 with a slight majority (58%) of the respondents being of female, and the balance (42%) male; 108 and 79 participants respectively.

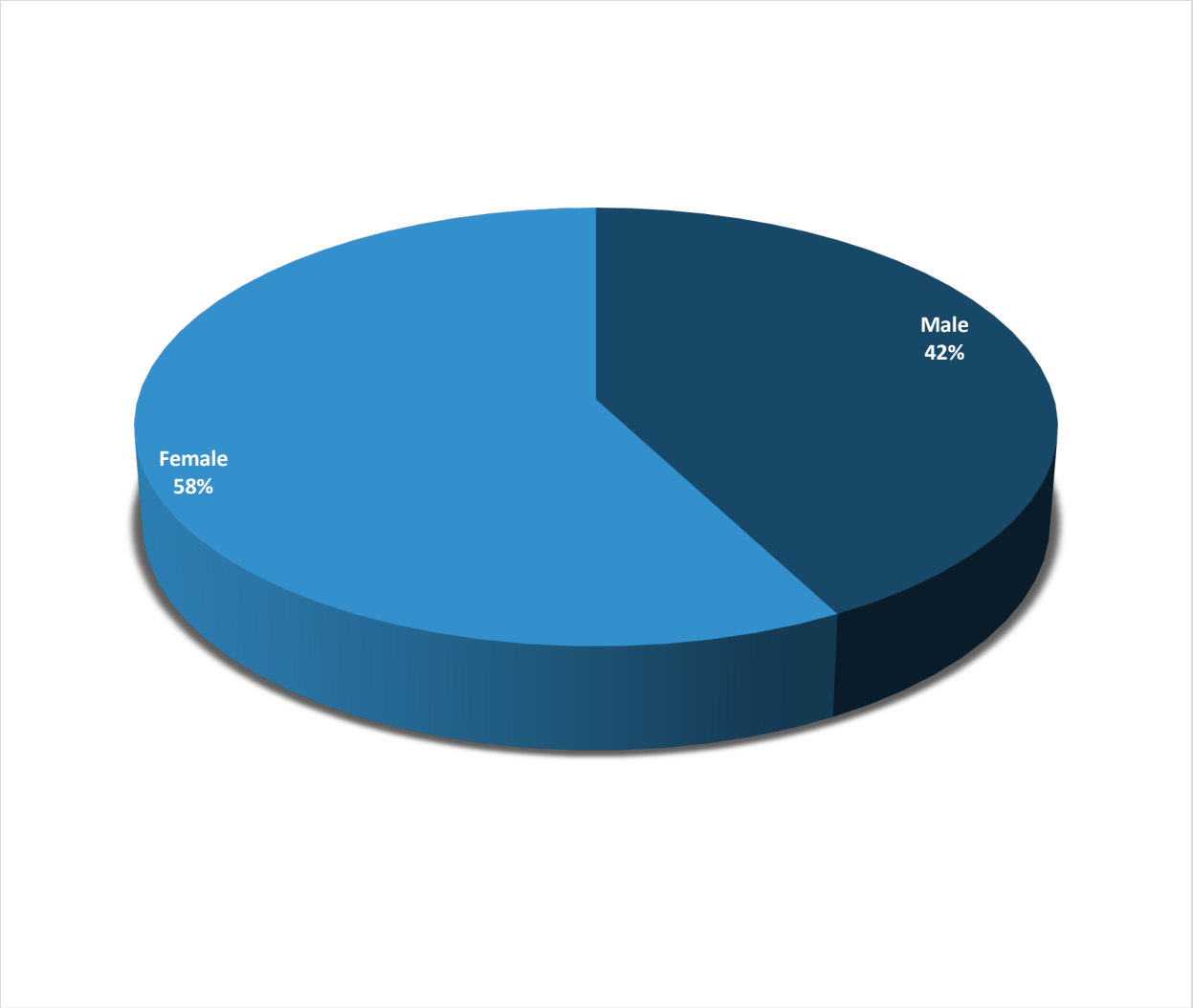
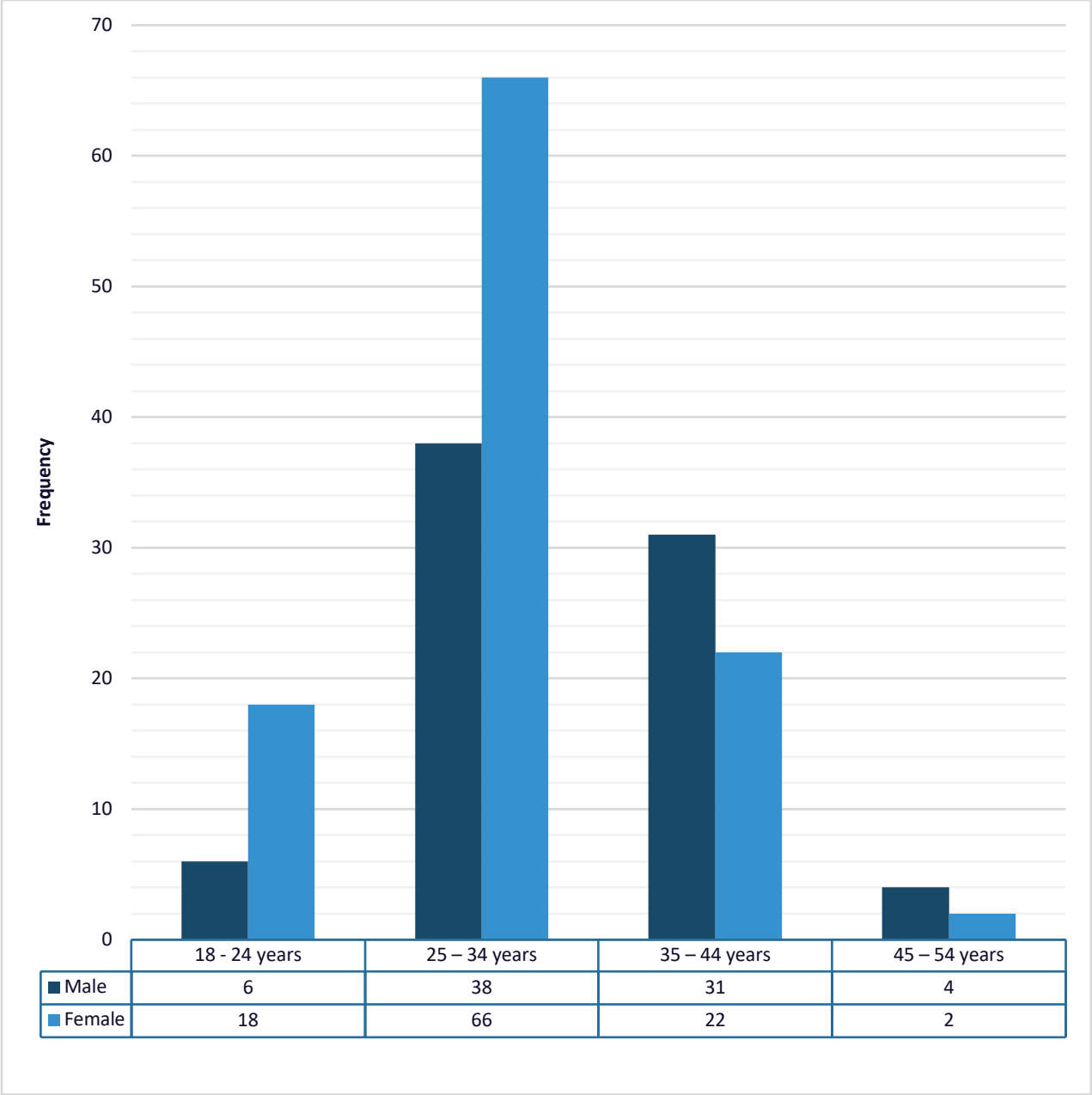


Figure 4.4: Characteristics of respondents by gender

Bivariate analysis explores the relationship between two variables. Various methods of bivariate analysis are available, of which cross tabulation is one of the most commonly used. The following graph exhibits analysis of bivariate data using cross tabulation method. As seen in Figure 4.5 below, the descriptive result of a cross tabulation is a frequency count for each variable in the analysis, namely gender and age of respondent herein. The results show that female youth (under 35, n=66 and *n*=18) form the largest representation across the age groups of the respondents at the telecommunication firms. Both male and female categories were most represented within the 25-24-year age bracket. Age category 45-54 had the least number of respondents for both males and females (*n*=4 and *n*=2 respectively).



	18 - 24 years	25 – 34 years	35 – 44 years	45 – 54 years
Male	6	38	31	4
Female	18	66	22	2

Figure 4.5: Cross-tabulation of gender and age of respondents

Figure 4.6 indicates that 94.7% of the respondents were Black/African, 3.2% were White, 1.6% were Indian and 0.5% were Coloured. Generally, the results show that the largest representation was from the African population group. Potential reasons for this are provided in chapter 5.

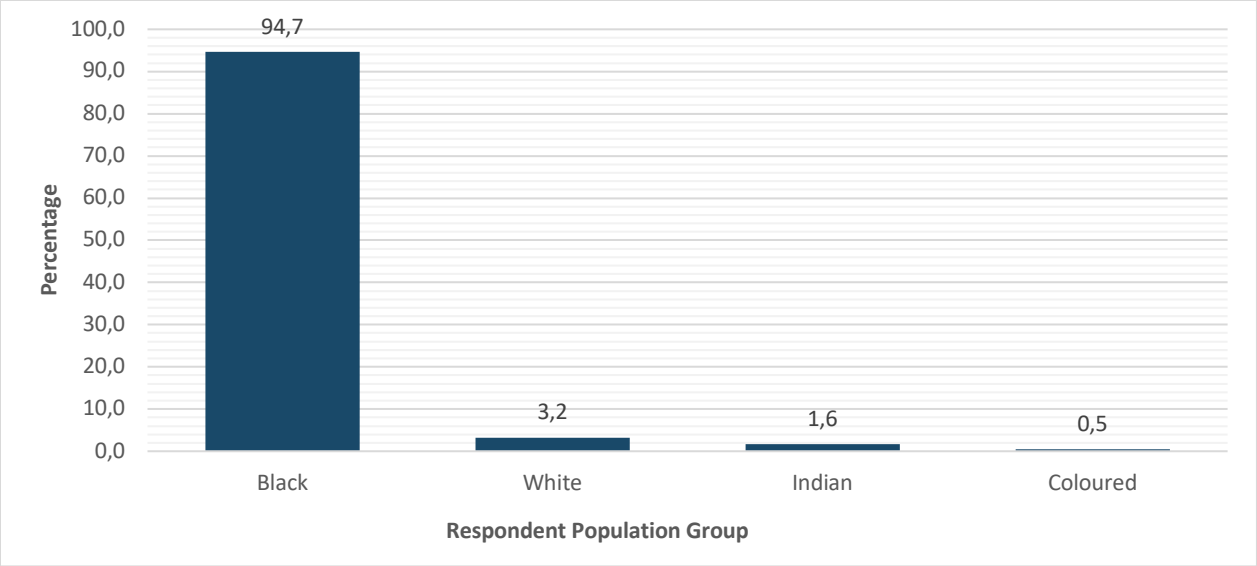


Figure 4.6: Characteristics of respondents by population group

The distribution of the sample, as noted in Figure 4.7, resonates with the socio-economic context of corporate South Africa. The majority (36.9%) of the respondents (which Figure 4.6 depicts as African) held junior management positions in the firms, followed by general staff members (who held no management position – 31.6%), senior management (12.8%), entry level staff members (such as interns – 10.2%) and executive management (8.6%), respectively.

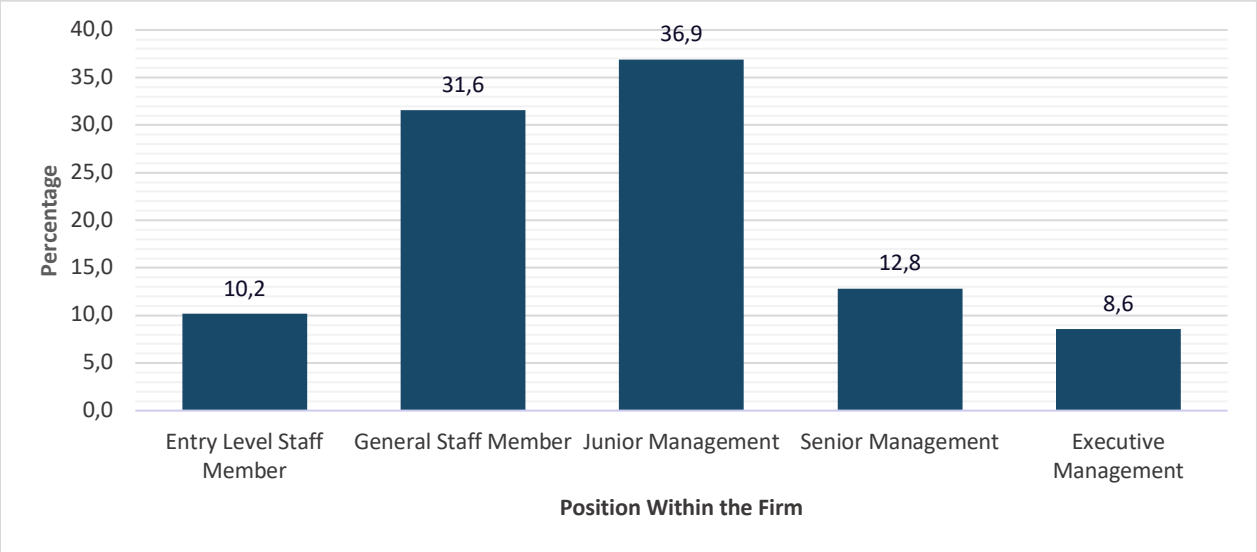


Figure 4.7: Characteristics of respondents by position within firm

The preponderance of respondents in the sample (36.4%) hold a postgraduate qualification, whilst a significant portion have either a bachelor's degree (25.1%) or diploma (23.5%). Respondents in possession of a secondary school qualification (also known as matriculation) formed the fourth largest group (13.4%). Those who did not advance beyond secondary schooling were in the minority (1.6%). The respondents' education level was positively skewed towards a post graduate qualification (Figure 4.8).

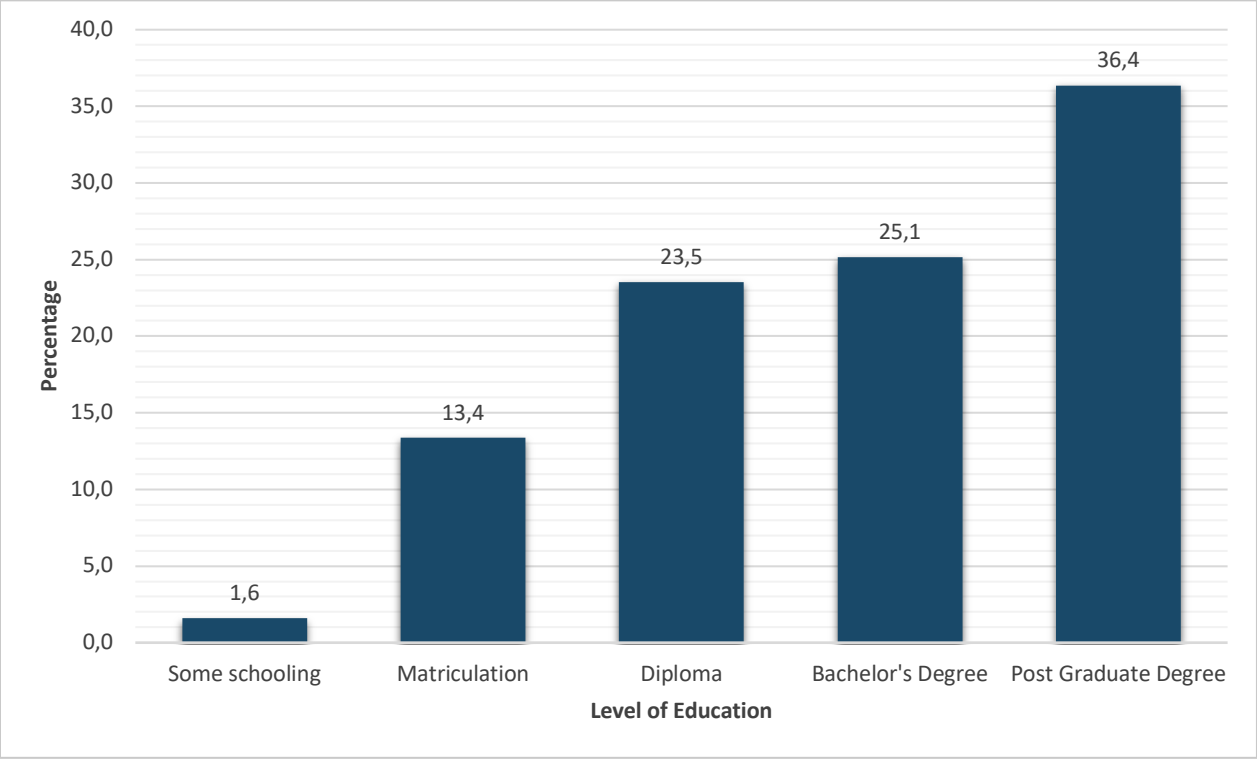


Figure 4.8: Characteristics of respondents by education level

Figure 4.9 shows a cross-tabulation of respondents by gender and education level. From the total male respondents (*n*=79), 41.8% (*n*=33) hold post graduate qualifications, 25.3% (*n*=20) have bachelor degrees, 20.3 % (*n*=16) have a diploma, 10.1% (*n*=8) have matric and 2.5% *(n*=2) have some schooling falling below the secondary school qualification. The bulk of the female respondents, 32.4% (*n*=35), hold post graduate qualifications, 25% (*n*=27) have bachelor's degrees, 25.9% (*n*=28) hold diplomas, 15.7% (*n*=17) have matric, and 0.1% *(n*=1) have some schooling below matric. It can be concluded that the majority of respondents were literate and

possessed more than a secondary school education. Furthermore, it is worth noting that the greater part of the qualification holders (matric to post graduate) were held by female respondents.

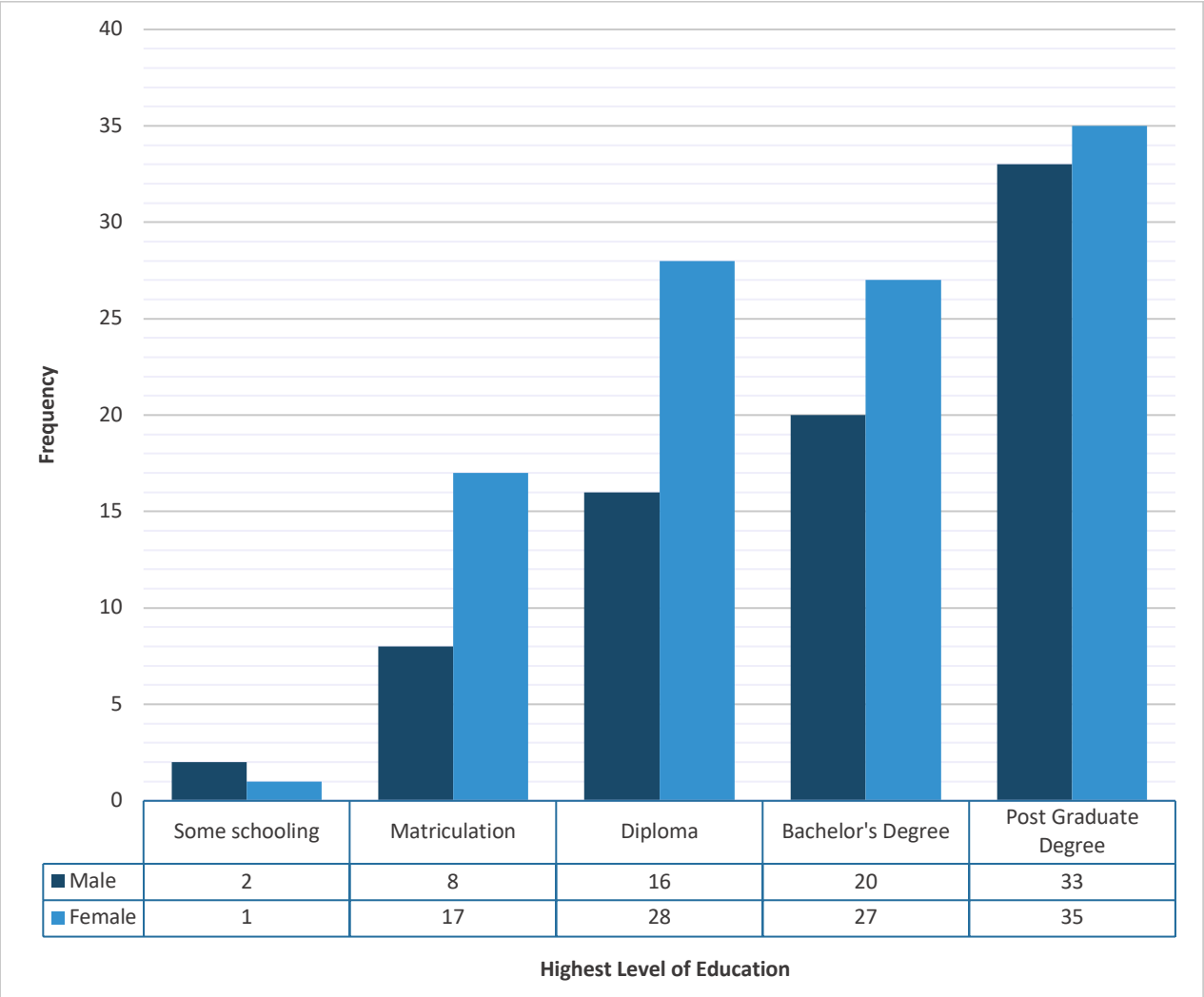
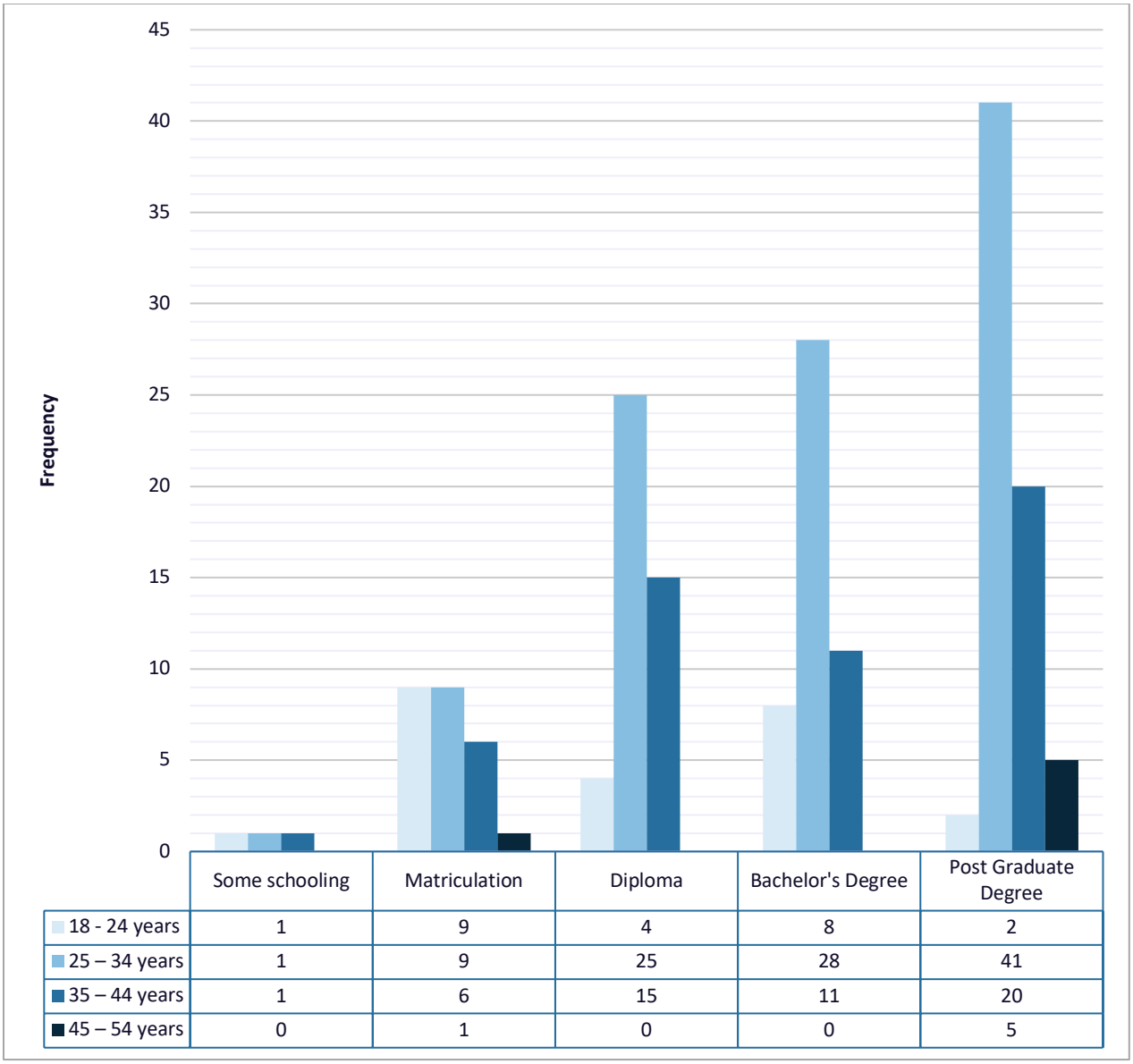


Figure 4.9: Cross-tabulation of educational level and gender of respondents

Distribution of respondents based on age and education level (Figure 4.10) shows that the highest proportion of qualification holders (diploma to post graduate degree) were youth (25-34). This age category held the largest number of diplomas, bachelor's degrees and post graduate qualifications across the various age groups.



	Some schooling	Matriculation	Diploma	Bachelor's Degree	Post Graduate Degree
18 - 24 years	1	9	4	8	2
25 – 34 years	1	9	25	28	41
35 – 44 years	1	6	15	11	20
45 – 54 years	0	1	0	0	5

Figure 4.10: Cross-tabulation of educational level and age of respondents

4.2.2 Firm Characteristics

Figure 4.11 reveals that the bulk (69%) of respondents were from large firms (with 251 or more employees) which is in line with the researcher's expectations based on industry related research (Hawthorne et al., 2016). 11.2% of the participants were from medium sized firms, 7.5% and 12.3% were from small and micro enterprises respectively.

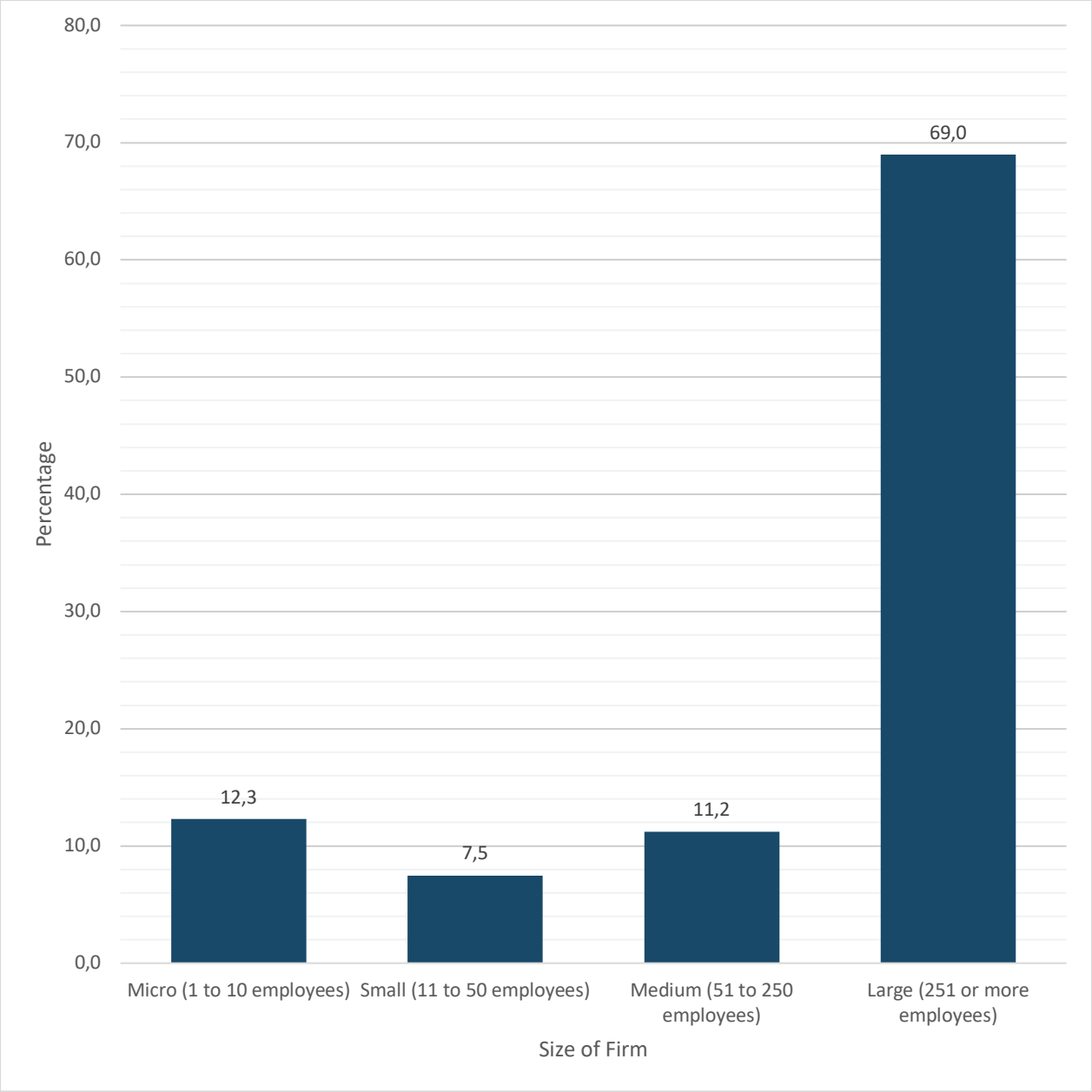


Figure 4.11: Characteristics of firm by size

Figure 4.12 shows that 57.2% of the respondents were employed by firms that had been in operation for 21 years or more in the telecommunications sector, which is in line with expectations for the South African telecommunications landscape. The remainder were as follows: 16% were employed by firms that had been in operation for 11-20 years, 15% for 3.6 to 10 years and 11.8 % by nascent firms that had been in operation for less than 3.5 years.

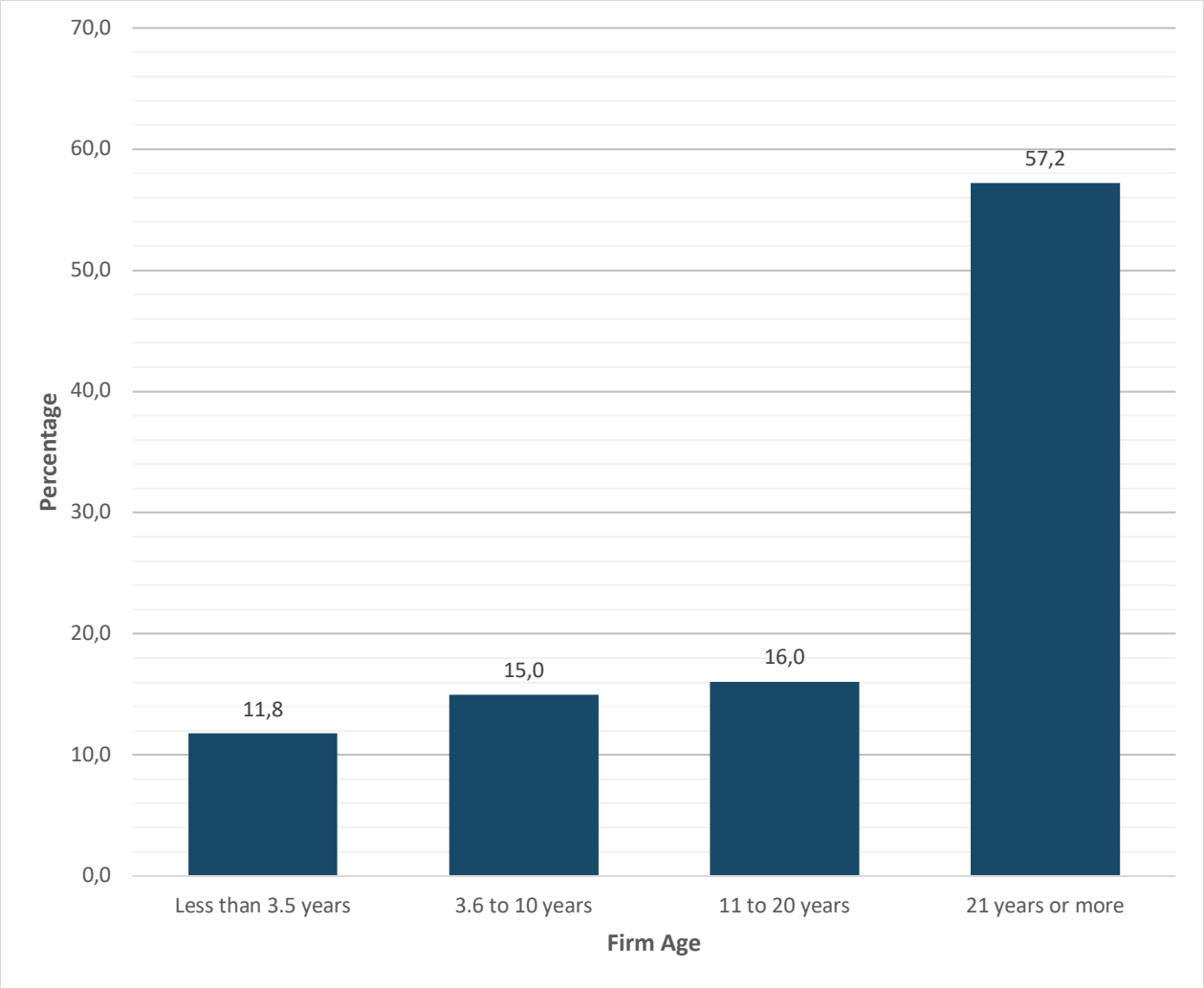


Figure 4.12: Characteristics of firm by age

Figure 4.13 indicates that respondents were dispersed according to provinces across the nation as follows: Gauteng - 75%, KwaZulu Natal - 7%, Eastern Cape - 6%, Limpopo - 3%, Western Cape - 3%, Free State - 2%, North West - 2%, Mpumalanga - 1% and Northern Cape -1%.

It is worth nothing that the majority of telecommunication firms in South Africa operate in multiple provinces. However, for the sake of this study, participants were asked to indicate the provinces in which they were based.

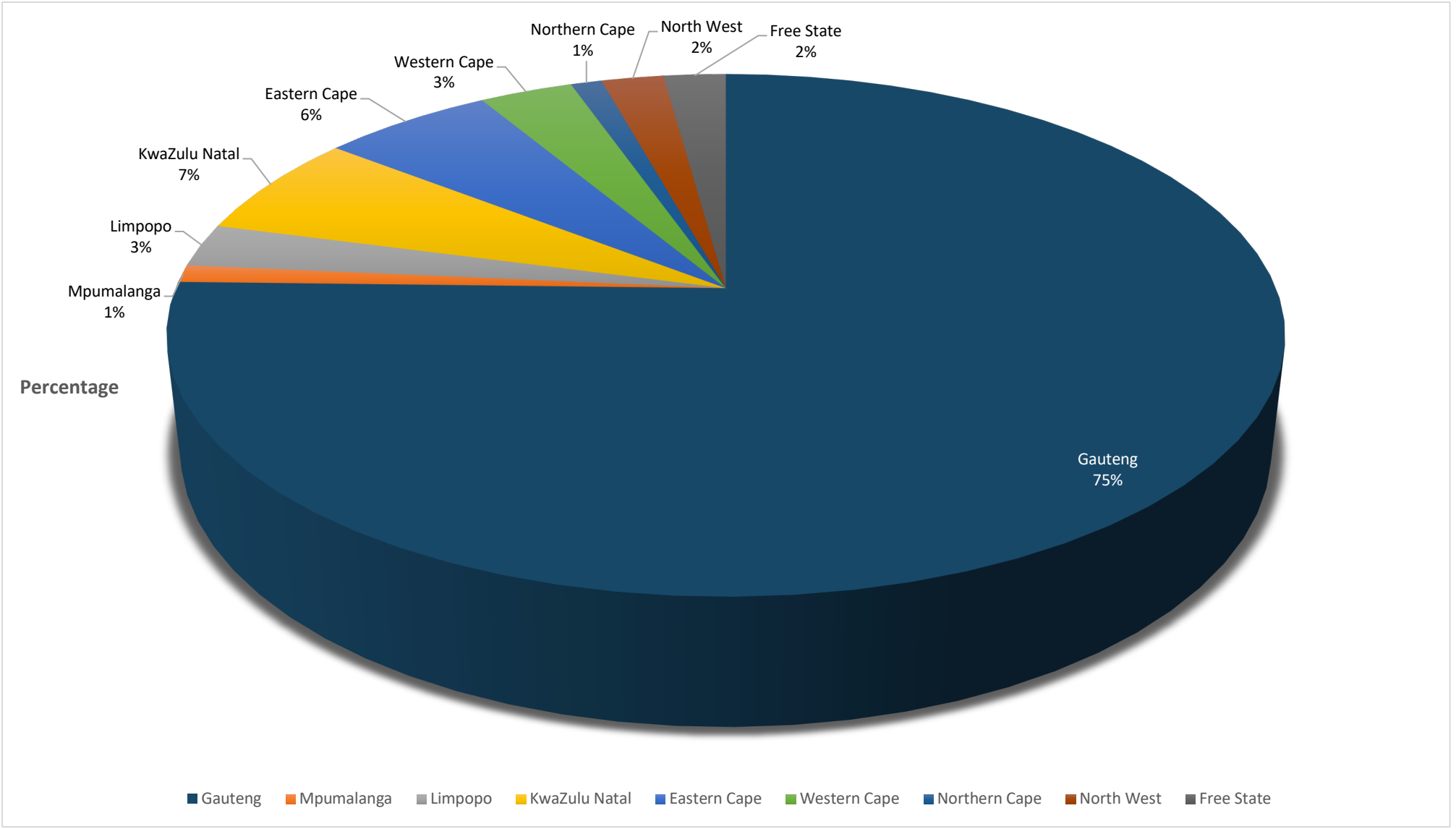
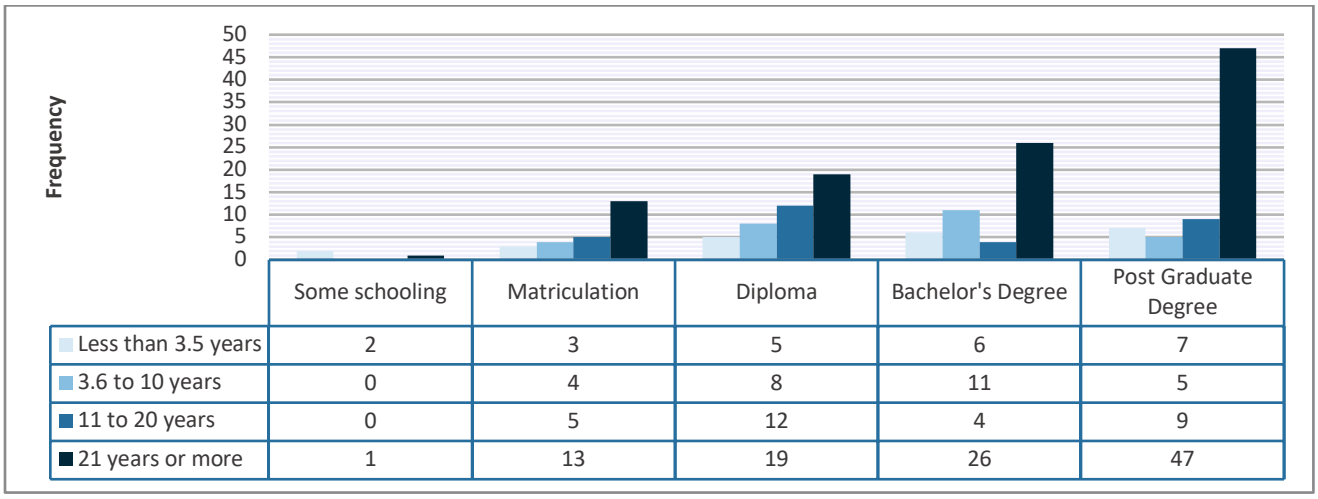


Figure 4.13: Characteristics of firm by location within South Africa

4.2.3 Combined Characteristics

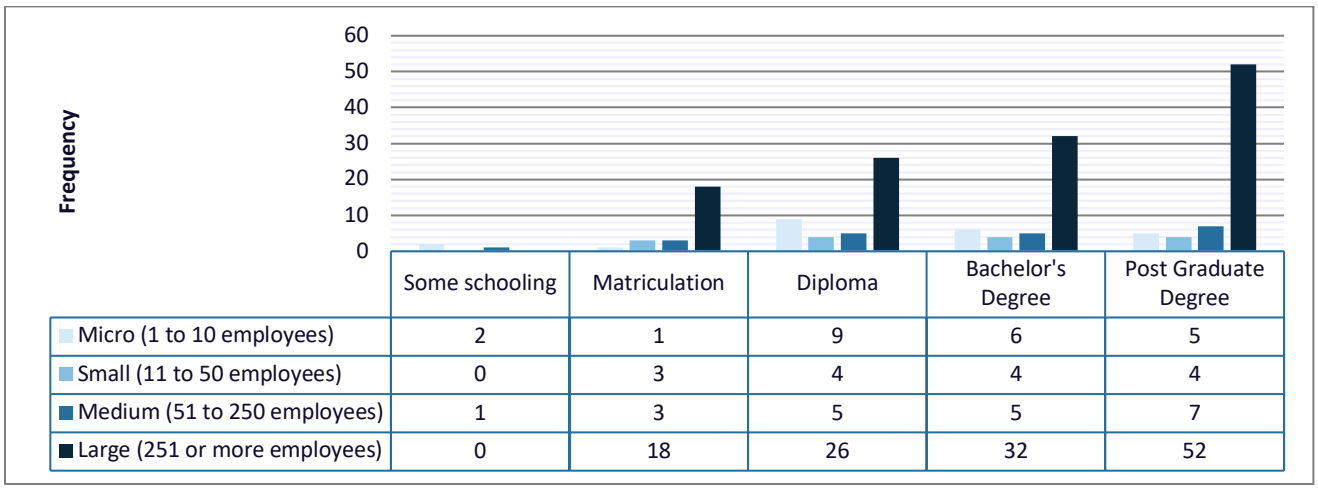
Figure 4.14 shows that the most qualified (matric to post graduate degree) respondents worked for older firms (those that had been in existence for 21 year or more).



	Some schooling	Matriculation	Diploma	Bachelor's Degree	Post Graduate Degree
Less than 3.5 years	2	3	5	6	7
3.6 to 10 years	0	4	8	11	5
11 to 20 years	0	5	12	4	9
21 years or more	1	13	19	26	47

Figure 4.14: Cross-tabulation of education level of respondents and age of firm

Figure 4.15 displays that the most qualified (matric to post graduate degree) respondents worked for large firms (with 251 or more employees), followed by medium sized firms (51 to 250 employees). Small and micro firms had respondents with the least qualifications, respectively.



	Some schooling	Matriculation	Diploma	Bachelor's Degree	Post Graduate Degree
Micro (1 to 10 employees)	2	1	9	6	5
Small (11 to 50 employees)	0	3	4	4	4
Medium (51 to 250 employees)	1	3	5	5	7
Large (251 or more employees)	0	18	26	32	52

Figure 4.15: Cross-tabulation of educational level of respondents and size of firm

4.2.4 Summary – Sample Characteristics

Figure 4.16: Summary Table - sample characteristics

Character	Description	Result
Gender	Male	42.0%
	Female	58.0%
Respondent Age	18-24	12.8%
	25-34	55.6%
	35-44	28.3%
	45-54	3.2%
	55-64	0.0%
	65 or older	0.0%
Education Level	No formal education	0.0%
	Some Schooling	1.6%
	Matric	13.4%
	Diploma	23.5%
	Bachelor's Degree	25.1%
	Post Graduate Degree	36.4%
Position Within the Firm	Entry Level Staff (e.g. Intern)	10.2%
	General Staff Member	31.6%
	Junior Management	36.9%
	Senior Management	12.8%
	Executive Management	8.6%
	Director	0.0%
Population Group	Black	94.7%
	White	3.2%
	Indian	1.6%
	Coloured	0.5%
Firm Location	Gauteng	75.0%
	Mpumalanga	1.0%

	Limpopo	3.0%
	KwaZulu Natal	7.0%
	Eastern Cape	6.0%
	Western Cape	3.0%
	Northern Cape	1.0%
	North West	2.0%
	Free State	2.0%
Firm Age	Less than 3 ½ years	11.8%
	3 ½ to 10 years	15.0%
	11 to 20 years	16.0%
	21 years or more	57.2%
Firm Size	Micro (1 to 10 employees)	12.3%
	Small (11 to 50 employees)	7.5%
	Medium (51 to 250 employees)	11.2%
	Large (251 or more employees)	69.0%

4.2.5 Descriptive Statistics Summary

In order to provide a general description of the responses, the researcher made use of descriptive statistics (detailing the mean and standard deviation of each variable). The mean (sum of the data values divided by the number of valid responses) provided insight on the average of distribution of responses on specific variables (Gall & Olson, 2012). Standard deviation, on the other hand, provided information on the average variance from the mean among the responses (Field, 2009).

The minimum to maximum rating scale for Inno_P was created to measure performance as follows: 1 - extremely poorly, 2 - poorly, 3 - slightly poorly, 4 - neither poorly nor well, 5 - slightly well, 6 - well and 7 - extremely well. The rating scale for CE and Endo_RM was 1 - strongly disagree, 2 - disagree, 3 - slightly disagree, 4 - neither agree nor disagree, 5 - slightly agree, 6 - agree and 7 - strongly agree.

Table A.11: Descriptive statistics in section of AC of Appendix B shows the descriptive statistics of the study per scale item. These are then summarised in Figure 4.17 per scale indicating a mean value per scale. Corporate entrepreneurship antecedent OB (5.1) had the highest value (level of agreement), followed by Endo_RM (4.9), Inno_P (4.8), WD (4.8), RR (4.5), MS (4.4) and TA (4.4) respectively.

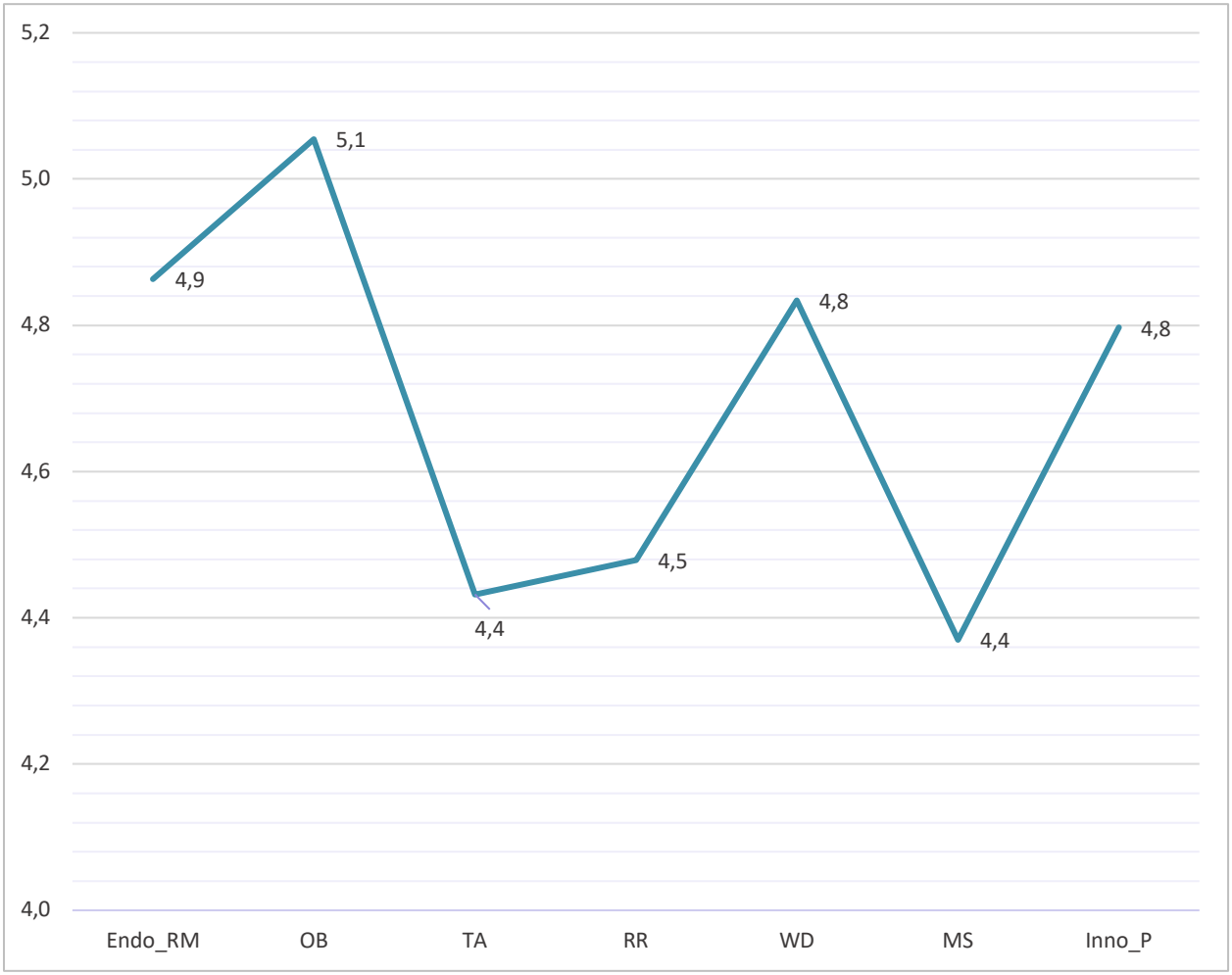


Figure 4.17: Descriptive mean statistics per variable

From the above-mentioned scales, the highest mean values (level of agreement) are presented in Table 4.1 below.

Table 4.1: Highest mean item per scale

Scale Item	Mean
MS_7: My manager helps me get my work done by removing obstacles	4.75
WD_1: I have much autonomy on my job and am left on my own to do my own work.	5.28
RR_2: My supervisor will give me special recognition if my work performance is especially good.	4.66
TA_4: I feel that I am always working with time constraints on my job.	4.80
OB_5: I clearly know what level of work performance is expected from me in terms of amount, quality, and timelines of output	5.66
Inno_P_1: Number of new products or services developed	5.07
Endo_RM_4: This firm has a strong presence of control-related policies to manage risk that may arise from within the firm.	5.24
Endo_RM_13: Risk management is integrated across the firm	5.24

4.3 Testing of Measurement Scales

At the heart of a competent and effective study lies two important characteristics of any measurement procedure - reliability and validity.

4.3.1 Reliability of Measurement Scale Results

Reliability analysis was conducted to gauge the internal consistency of the scale used in this research using Cronbach's alpha (also known as the coefficient alpha). A reliability coefficient (alpha) of greater than .70 is considered acceptable (Radhakrishna, 2007). Reliability testing of each scale is presented below.

4.3.1.1 Corporate Entrepreneurship

All constructs of the instrument scored above the threshold value of 0.7, indicating acceptable reliability of the scales (Table 4.2). The alpha for the 7 items representing MS was 0.871, which indicates that the items form a scale that has excellent internal consistency reliability. Similarly, the alpha for the WD scale (0.817) and RR (0.856) indicated very good internal consistency. TA (0.767) and OB (0.732) demonstrated acceptable reliability. It is worth noting, for TA, that α improved to .767 (greater than 0.70) after removing TA_2 and TA_4 as seen in Table 4.5: Independent Variables Rotated Component Matrixa) with only TA_1, TA_3 and TA_5 remaining.

Table 4.2: Reliability Statistics – Corporate Entrepreneurship

Reliability Statistics - CE			
	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Management Support	.871	.871	7
Work Discretion/Autonomy	.817	.816	6
Rewards/ Reinforcement	.856	.855	5
Time Availability	.767	.766	3
Organisational Boundaries	.732	.747	5

4.3.1.2 Innovation Performance

To assess whether the seven items that were averaged to create the Innovation Performance score formed a reliable scale, Cronbach's alpha was computed. The alpha for the seven items was 0.932 (Table 4.3), which indicates that the items form a scale that has excellent internal consistency reliability.

Table 4.3: Reliability Statistics – Innovation Performance

Reliability Statistics Inno_P		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.932	.932	7

4.3.1.3 Endogenous Risk Management

Similarly, Cronbach's alpha for the Endo_RM scale was 0.942 (Table 4.4), indicating a close to perfect internal consistency.

Table 4.4: Reliability Statistics – Endogenous Risk Management

Reliability Statistics Endo_RM		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.942	.946	17

4.3.2 Principal Component Analysis

Principal components analysis was used for data analysis in this study. Correlations (or variances) between the original measures were calculated. The correlation matrix was subjected to transformations, resulting in a new set of linear combinations that account for decreasing proportion of the total variance (Budaev, 2010)

Validity testing of the instrument was conducted by means of construct validity. Construct validity assesses convergent (set of items that presume to measure a construct) as well as discriminant validity (extent in which a construct is truly distinct from other constructs). Discriminant validity was met by ensuring that the correlations were not above 0.85 between the constructs (Kline, 2011). Two measures, namely Kaiser-Mayer-Olkin Measure of Sampling Adequacy (KMO) and Bartlett's Test of Sphericity were utilised to determine whether component analysis was feasible or if there was sufficient correlation between the items in the data collected (Bajpai & Bajpai, 2014; Cerny & Kaiser, 1977; Kaiser, 1974). The results are presented below.

4.3.2.1 Dependent Variable - Innovation Performance

As exhibited in section AA of Appendices Appendix A: Additional Results, principal component analysis was conducted to assess the innovation performance structure. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was statistically significant (p-value = 0.000) at 0.854 (Table A.1, page 220). This was greater than 0.70, indicating that there were sufficient items to measure the innovation performance variable adequately. Communalities (Table A.2) (also called h2), which are defined as a common variance that ranges between 0 and 1, were well above 0.5 indicating that the proportion of each variable's variance that can be explained by the retained factors were well represented in the common factor space. Total variance explained by the innovation performance construct items was 71.125%, making it an acceptable measure as it was above the generally accepted 60% (Cerny & Kaiser, 1977; Field, 2017).

4.3.2.2 Independent Variable - Endo_RM & CE

As presented in section AB of Appendices Appendix A: Additional Results, principal component analysis with varimax rotation was conducted to assess the underlying structure for the 47 questions that formed the independent variables. This research set out to investigate the influence of corporate entrepreneurship (MS, WD, RR, TA, and OB) and endogenous risk management as independent variables. Consequently, only six factors were expected in the results. Conversely, Table A.8: Independent Variables Total Variance Explained, indicates how the variance was divided among the 43 possible factors that were extracted. Of the 43 factors that loaded, only ten had eigenvalues (a measure of explained variance) greater than 1.0, which is a conventional criterion for a factor to be considered valuable. Both the Scree Plot (Figure A.2) and the eigenvalues (Table A.8, page 225) supported the conclusion that the 47 items can be reduced to ten factors which account for 71.638% of the total variance. In alignment with the study, the highest six contributors to variance were sought to account for total variance. The first factor had the strongest influence – it accounted for 24.054% of the variance in all IV variables, followed by the second factor which accounted for 9.076%, the third factor accounted for 7.838%, the fourth one, 7.492%, the fifth 5.570% and the sixth 5.255%. In total, all accounted for 59.285% of the variance explained (Table A.8, page 225). To understand the nature of the extracted factors, the

rotated component matrix was studied (Table 4.5: Independent Variables Rotated Component Matrixa). This table displays the items and factor loadings for the rotated factors. The researcher examined the items that loaded heavily onto each factor and decided on the construct that was most common. Subsequently, the researcher named the factor according to the most prevalent and pertinent construct. Loadings with values of less than 0.40 were omitted to improve clarity. The first factor, which seemed to index *Endogenous Risk Management,* loaded most strongly on the fifteen questions, which loaded in the first column. The second factor, which appeared to index *Rewards/Reinforcement*, was composed of the five questions loaded in column 2. The third factor seemed to index *Work Discretion/Autonomy*, with five questions loaded in column 3. Column 4, 5 and 6 emerged as *Management Support, Time Availability and Organisational Boundaries*, with six, three and four questions, respectively.

The KMO statistic (Table A.6: Independent Variable KMO and Bartlett's Test) of 0.911 exceeded 0.70, indicating that there were sufficient items for each factor. It is also statistically significant as *p*-value = 0.000).

Table 4.5: Independent Variables Rotated Component Matrix[a]

Rotated Component Matrix[a]

	Component									
	1	2	3	4	5	6	7	8	9	10
Endo_RM_8	.881									
Endo_RM_10	.875									
Endo_RM_11	.872									
Endo_RM_7	.864									
Endo_RM_9	.857									
Endo_RM_12	.850									
Endo_RM_17	.842									
Endo_RM_6	.816									
Endo_RM_3	.779									
Endo_RM_13	.703							-.431		
Endo_RM_4	.682						.351			
Endo_RM_1	.661						.421			
Endo_RM_2	.657						.399			
Endo_RM_16	.647									
Endo_RM_15	.617			.313					.346	
RR_4		.772								
RR_2		.754								
RR_3		.737								
RR_1		.656								
RR_5		.575			.330					
MS_7	.331	.469	.324							
WD_2			.784							
WD_1			.743							

WD_4			.713							
WD_6			.678							
WD_5	.353		.636							
MS_3	.319			.716						
MS_2				.636			.329			
MS_5			.320	.623						
MS_4		.311		.577						
MS_6		.370		.576						
MS_1		.321		.495			.425			
TA_1					.815					
TA_3					.801					
TA_5					.660					
OB_4						.753				
OB_5						.680				
OB_6				.321	.336	.562				
OB_1						.404	.314	-.307		
Endo_RM_14								.776		
OB_2									.826	
OB_3		.339				.399			.451	
WD_3										.889

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.[a]

a. Rotation converged in 10 iterations.

Figure 4.18: Summary Table – Loadings per Construct

Factor	Items Loaded	Coefficient
Endogenous Risk Management Factor 1	Endo_RM_8	.881
	Endo_RM_10	.875
	Endo_RM_11	.872
	Endo_RM_7	.864
	Endo_RM_9	.857
	Endo_RM_12	.850
	Endo_RM_17	.842
	Endo_RM_6	.816
	Endo_RM_3	.779
	Endo_RM_13	.703
	Endo_RM_4	.682
	Endo_RM_1	.661
	Endo_RM_2	.657
	Endo_RM_16	.647
	Endo_RM_15	.617
Rewards/Reinforcement Factor 2	RR_4	.772
	RR_2	.754
	RR_3	.737
	RR_1	.656
	RR_5	.575
Work Discretion Factor 3	WD_2	.784
	WD_1	.743
	WD_4	.713
	WD_6	.678
	WD_5	.636

Management Support Factor 4	MS_3 MS_2 MS_5 MS_4 MS_6 MS_1	.716 .636 .623 .577 .576 .495
Time Availability Factor 5	TA_1 TA_3 TA_5	.815 .801 .660
Organisational Boundaries Factor 6	OB_4 OB_5 OB_6 OB_1	.753 .680 .562 .404

4.4 Hypothesis Testing

4.4.1 Correlational Results

The correlation coefficient, *r* (sample correlation coefficient), which is about the strength and direction of the linear relationships was used to ascertain the correlations between the variables under study. The Pearson test was conducted on SPSS. From Table 4.6: Statistical Correlation Analysis, the researcher found the following;

- The correlation coefficient (*r*) between management support and innovation performance is 0. .470, which is significant at the .01 level. The strength of the relationship is moderate.

- The correlation coefficient between work discretion/autonomy and innovation performance is .194, which is significant at the .01 level. The strength of the relationship is very weak.

- The correlation coefficient between rewards/reinforcements and innovation performance is 0.452 which is significant at the .01 level. The strength of the relationship is moderate.

- The correlation coefficient between time availability and innovation performance is 0.317 which is significant at the .01 level. The strength of the relationship is weak.

- The correlation coefficient between organisational boundaries and innovation performance is 0.372 which is significant at the .01 level. The strength of the relationship is weak.

- The correlation coefficient between endogenous risk management and innovation performance is 0.616, which is significant at the .01 level. The strength of the relationship is strong.

Table 4.6: Statistical Correlation Analysis

		Endo_RM	OB	TA	RR	WD	MS	Inno_P
Endo_RM	Pearson Correlation	1						
	Sig. (2-tailed)	.000						
	N	187						
OB (CE)	Pearson Correlation	.436**	1					
	Sig. (2-tailed)	.000	.000					
	N	187	187					
TA (CE)	Pearson Correlation	.317**	.385**	1				
	Sig. (2-tailed)	.000	.000	.000				
	N	187	187	187				
RR (CE)	Pearson Correlation	.486**	.514**	.371**	1			
	Sig. (2-tailed)	.000	.000	.000				
	N	187	187	187	187			
WD (CE)	Pearson Correlation	.336**	.301**	.290**	.327**	1		
	Sig. (2-tailed)	.000	.000	.000	.000			
	N	187	187	187	187	187		
MS (CE)	Pearson Correlation	.568**	.391**	.313**	.597**	.504**	1	
	Sig. (2-tailed)	.000	.000	.000	.000	.008		
	N	187	187	187	187	187	187	
Inno_P	Pearson Correlation	.616**	.372**	.317**	.452**	.194**	.470**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.008	.000	
	N	187	187	187	187	187	187	187

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

1	Perfect	0.80 to .999	Very Strong	0.60 to 0.799	Strong	0.40 to 0.599	Moderate	0.20 to 0.399	Weak	0.00 to 0.199	None to extremely weak

In the correlation analysis, MS exhibited the strongest relationship with Inno_P followed by RR – both showed moderate strength in relation to innovation performance. TA and OB showed a weak positive relation, whilst WD showed the weakest relation.

In the section that follows, scatterplot diagrams and accompanying tables display the strength, direction and form of the relationship between two quantitative variables under study in each segment.

4.4.1.1 Correlation - Graphical

The coefficient of correlation (B) shows a moderate relationship between management support and innovation performance (Table 4.7). The coefficient of determination (R^2), of 0.221, further confirms that there is a moderate-positive relationship between management support and innovation performance (Figure 4.19). These results show that only 22.1% of variation in innovation performance can be explained by management support. The *p* value (0.000) shows the relationship is significant as it is less than 0.05.

Table 4.7: Correlation analysis - management support and innovation performance relation

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.792	.291		9.591	.000
	Management Support	.459	.063	.470	7.234	.000
a. Dependent Variable: Innovation Performance						

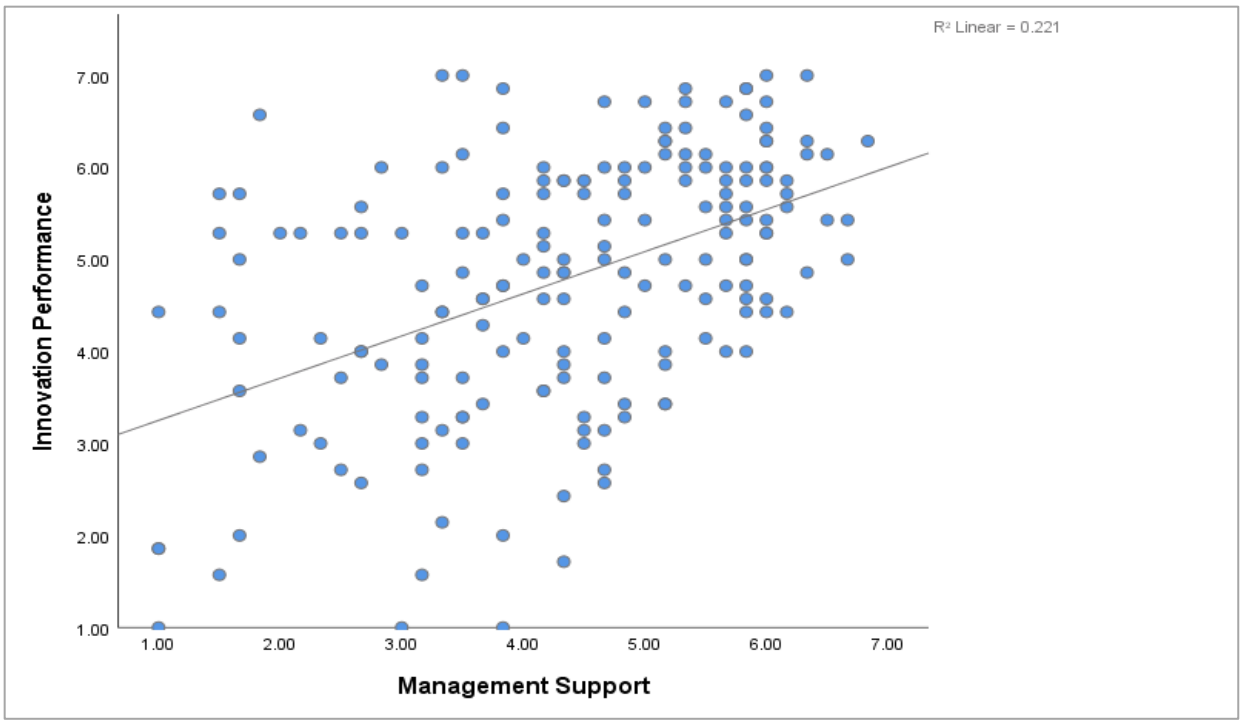


Figure 4.19: Scatterplot - management support and innovation performance relation

The coefficient of correlation (B) shows an extremely weak relationship between work discretion/autonomy and innovation performance (Table 4.8). The coefficient of determination (R^2), of 0.038, further confirms that there is an extremely weak-positive relationship between work discretion/autonomy and innovation performance (Figure 4.20). These results show that 3.8% of the variation in innovation performance can be explained by work discretion/autonomy. The *p* value (0.008) expresses the significance of this relationship as it is less than 0.05.

Table 4.8: Correlation analysis - work discretion and innovation performance relation

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.797	.385		9.875	.000
	Work Discretion/Autonomy	.207	.077	.194	2.690	.008
a. Dependent Variable: Innovation Performance						

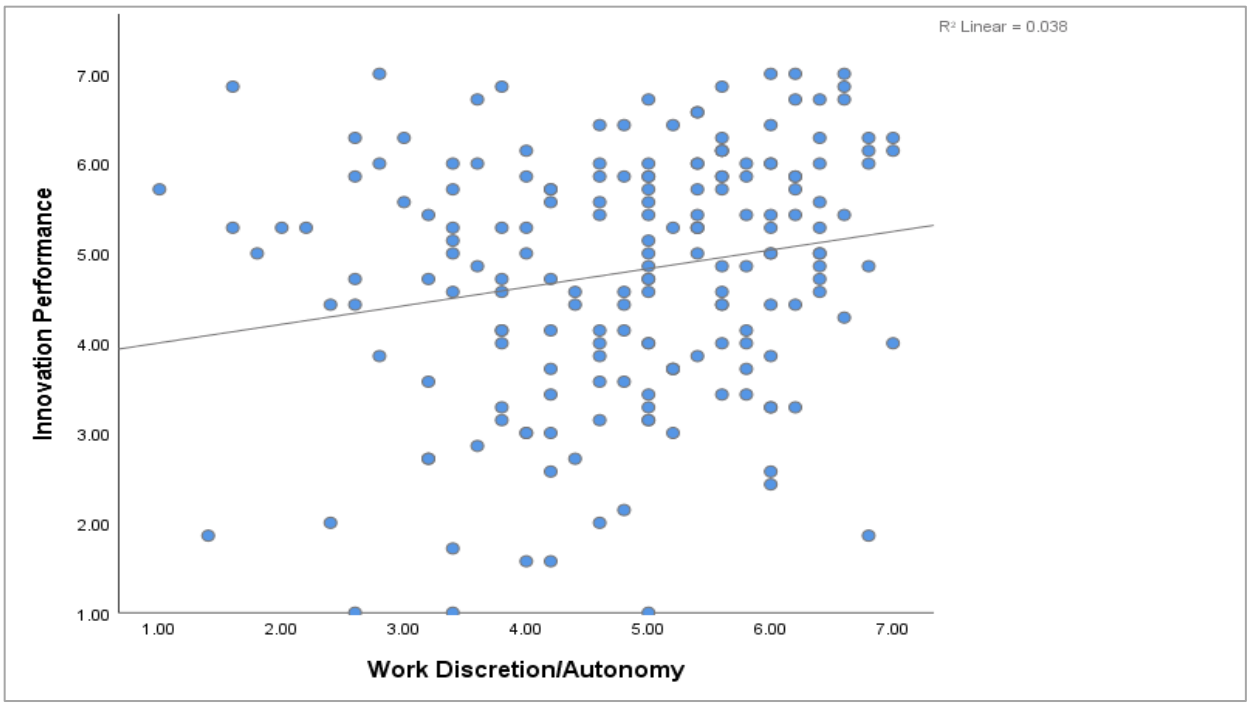


Figure 4.20: Scatterplot - work discretion and innovation performance relation

The coefficient of correlation (B) shows a moderate relationship between management support and innovation performance (Table 4.9). The coefficient of determination (R^2), of 0.205, further confirms that there is a moderate-positive relationship between management support and innovation performance (Figure 4.21). These results show that 20.5% of the variation in innovation performance can be explained by rewards/reinforcements. The *p* value (0.000) shows that this relationship is significant as it is less than 0.05.

Table 4.9: Correlation analysis - rewards/reinforcement and innovation performance relation

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.956	.282		10.497	.000
	Rewards/ Reinforcement	.411	.060	.452	6.900	.000
a. Dependent Variable: Innovation Performance						

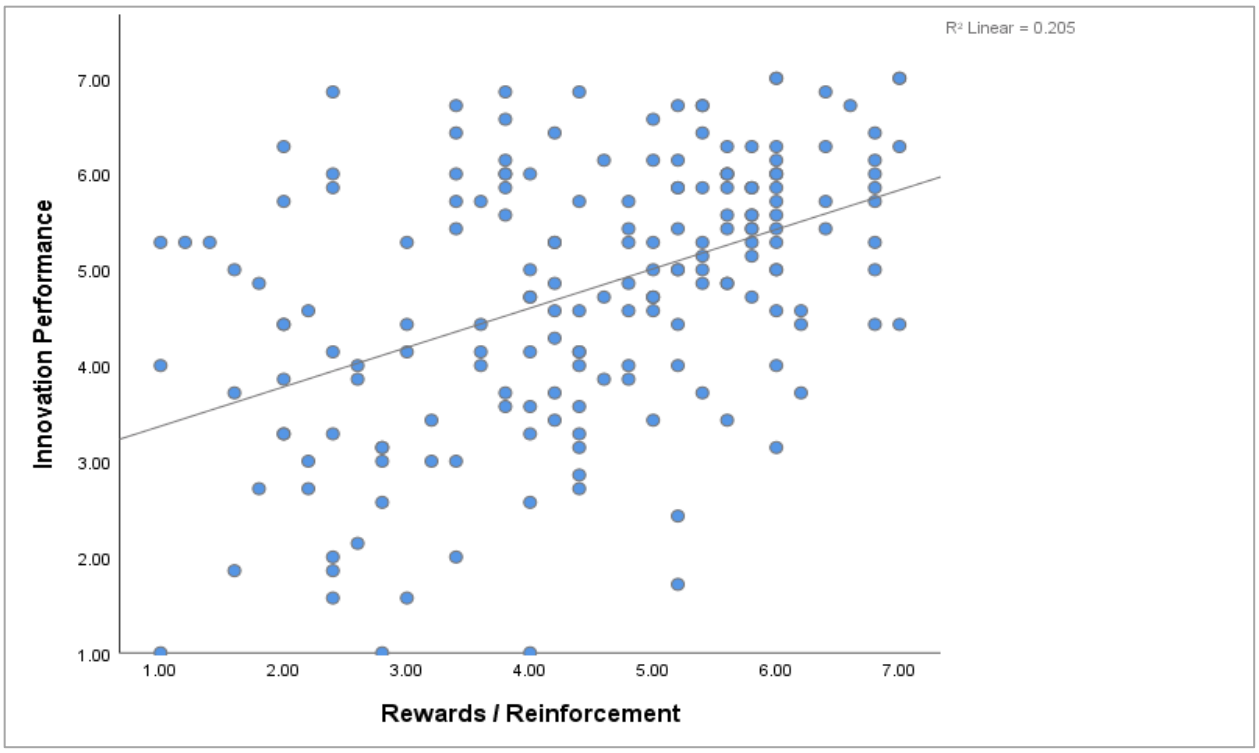


Figure 4.21: Scatterplot - rewards & reinforcement and innovation performance relation

The coefficient of correlation (B) shows a weak, significant relationship between time availability and innovation performance (Table 4.10). The coefficient of determination (R^2), of 0.101, further confirms that there is a weak-positive relationship between time availability and innovation performance (Figure 4.22). These results show that 10.1% of the variation in innovation performance can be explained by time availability. The *p* value (0.000) shows that this relationship is significant as it's less than 0.05.

Table 4.10: Correlation analysis - time availability and innovation performance relation

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.697	.471		5.722	.000
	Time Availability	.474	.104	.317	4.549	.000
a. Dependent Variable: Innovation Performance						

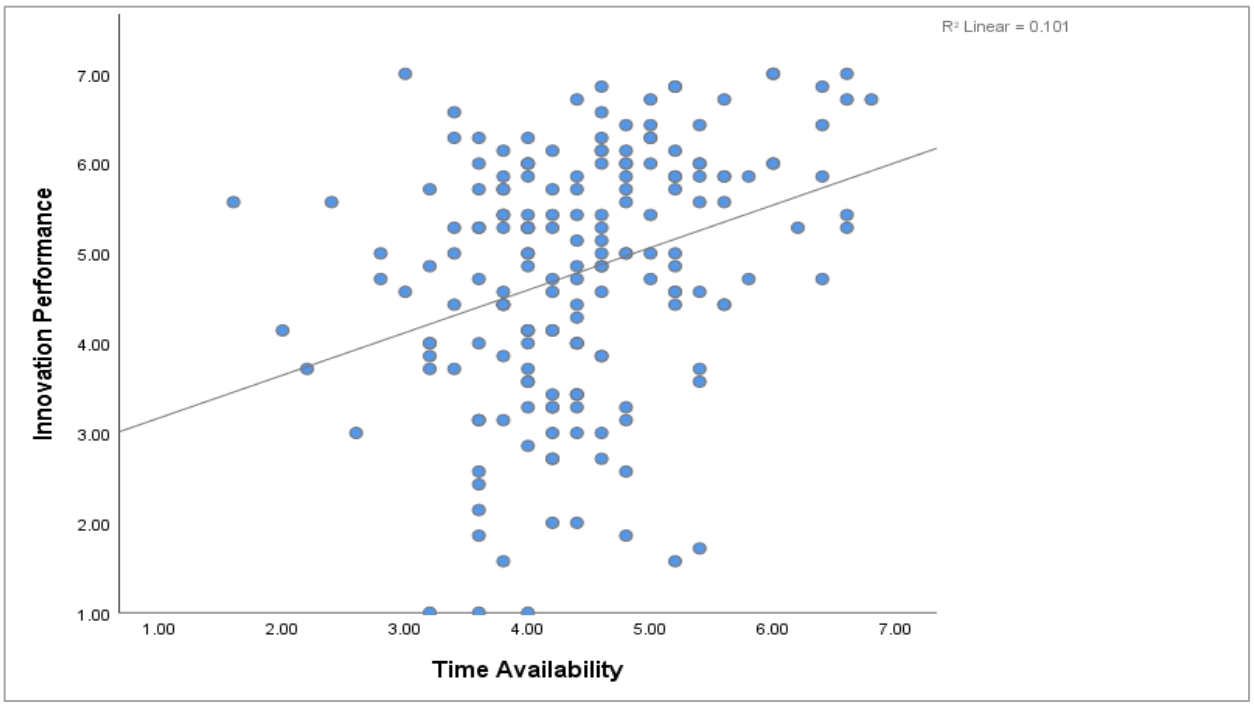


Figure 4.22: Scatterplot - time availability and innovation performance relation

The coefficient of correlation (B) shows a weak relationship between organisational boundaries and innovation performance (Table 4.11). The coefficient of determination (R^2), of 0.138, further confirms that there is a weak-positive relationship between organisational boundaries and innovation performance (Figure 4.23). These results show that 13.8% of the variation in innovation performance can be explained by organisational boundaries. The *p* value (0.000) shows that this relationship is significant as it is less than 0.05.

Table 4.11: Correlation analysis - boundaries and innovation performance relation

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.399	.450		5.330	.000
	Organisational Boundaries	.474	.087	.372	5.448	.000
a. Dependent Variable: Innovation Performance						

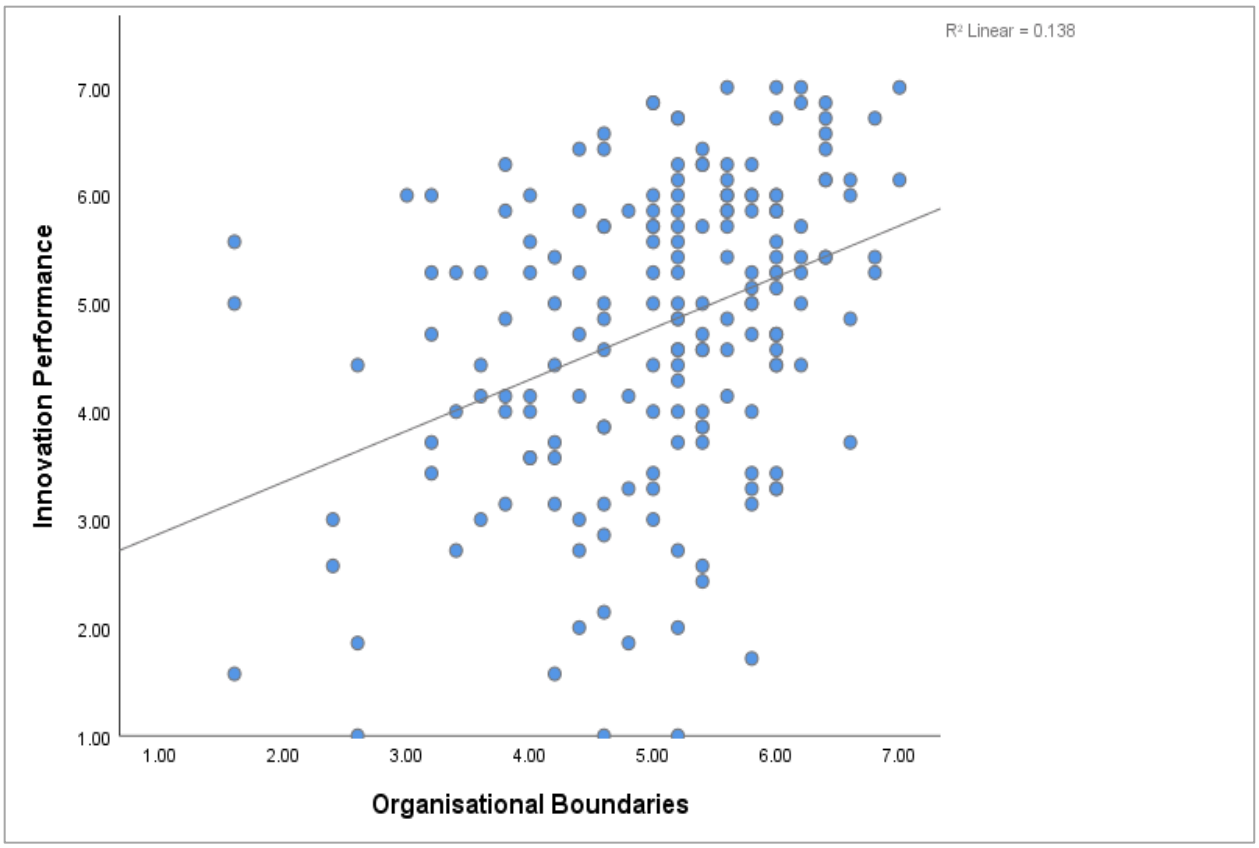


Figure 4.23: Scatterplot - organisational boundaries and innovation performance relation

4.4.2 Multiple Regression Results

The researcher established that there is a linear relationship between the variables under study. Multiple regression was conducted to determine the best linear combination of all the factors that predict the innovation performance score. Prior to this, the researcher ran diagnostics of the model to assess its fitness and credibility as a tool from which the researcher could draw conclusions and make inferences on the rest of the population. The outcome of regression analysis is noted below.

4.4.2.1 Model Diagnostics

The researcher embarked on a process of identifying the model, assessing its fitness and applying modifications where necessary to ensure that the model satisfied regression assumptions and that the results could be utilised to make inferences on the rest of the population (telecommunications

industry). Model 1 (found in Table A.14: Model 1 – Diagnostics Ordinary Least Squares) showed the following results:

- Although the normal probability plot shows an approximately linear pattern consistent with a normal distribution, the histogram suggests the presence of outlying residuals, which violate regression assumptions.
- The plot of standardised predicted values versus the studentized residuals show that the residuals are not scattered evenly on the surface, which indicates that the residuals have non-constant variance (heteroscedasticity).
- On moderation – including an interaction resulted in a multicollinearity problem. The researcher addressed this issue by using the Andrews programme which uses standardized factors instead of unstandardized ones. This eradicated the collinearity problem as seen in model 3 results.

When non-constant variance is detected, a variance-stabilising solution is the weighted regression, with weights inversely proportional to the magnitude of the residuals. The above-mentioned violations were addressed using weighted least squares instead of ordinary least squares. The subsequent models improved model 1 using the weighted least squares regression as a remedial measure to handle the non-constancy of variance. For model 3, the R^2 value (0.880) and adjusted R^2 (0.875) indicate that the predictors explain at least 80 of the variance in the outcome variable, innovation performance. It also includes all the variables under study – as per Figure 2.9: Detailed Conceptual Model of Study (on page 63). Lastly, other values indicate that the model fits the data well. This renders the model adequate and fit for further analysis.

The weighted least squares model 3 found in Table 4.16: Various Model Summaries, meets all the regression assumptions noted below.

1. **Linearity** - the relationship between the independent variables and the dependent variable was found to be linear as seen in Figure 4.24.

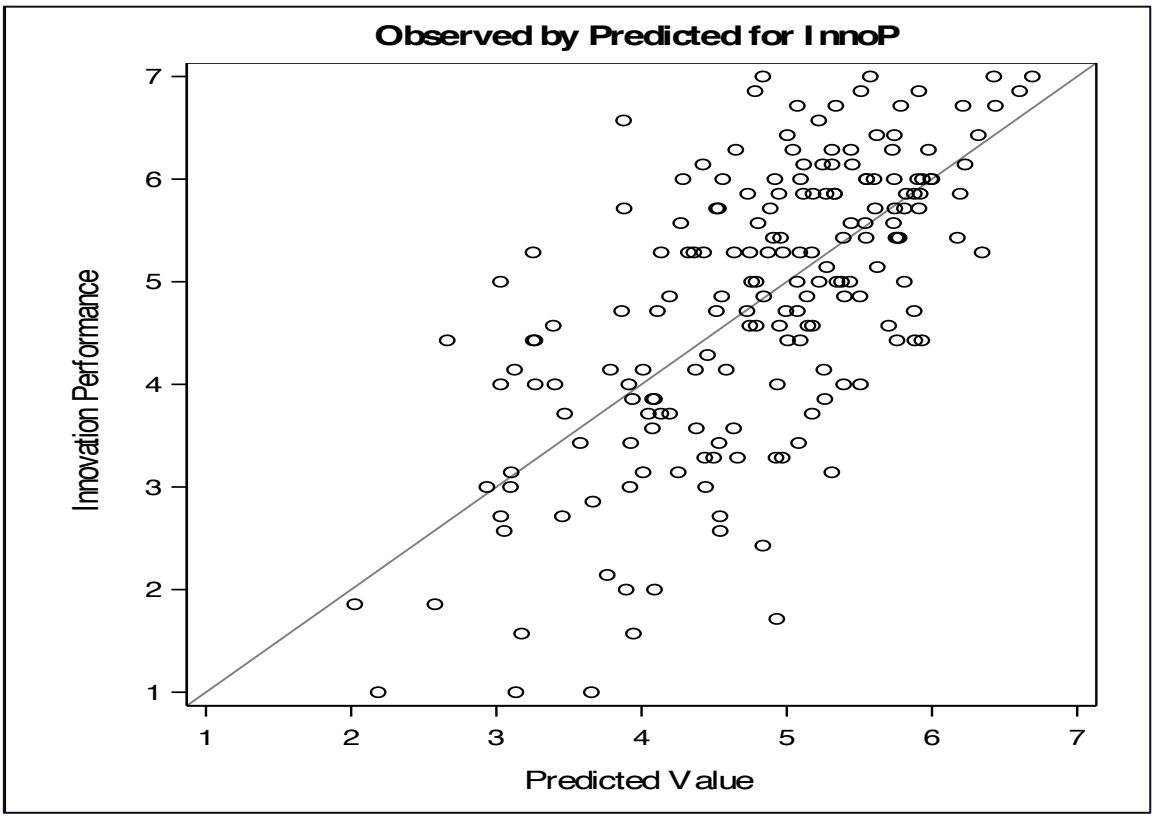


Figure 4.24: Linearity – Observed Predicted Value against Inno_P

2. **Multicollinearity** - there is no multicollinearity in the data. To test for multicollinearity, the researcher first examined the correlations table (Table 4.6) for correlations of more than 0.8, which are said to pose a multicollinearity problem and the researcher found that there were none, as the highest correlation is $r = 0.616$ (Field, 2017). Furthermore, the researcher used the VIF and Tolerance statistics to assess this assumption. For the assumption to be met, VIF scores must be well below 10, and tolerance scores must be above 0.2; which was the case in the results for this study (VIF values are all below 5 and Tolerance value are all above 0.2 as seen in Table 4.14: Model Coefficients).

3. **Independent Errors -** for any pair of observations, the values of the residuals ought to be independent/uncorrelated. The researcher tested this by selecting the Durbin-Watson statistic under residual when doing regression statics on SPSS. The Durbin-Watson statistic (which ought to be close to 2) was 1.701 (as seen in Table 4.12: Model Summary).

4. **Homoscedasticity** (the variance of the residuals is constant) is the assumption that the variation in the residuals is similar at each point across the model. The distribution residuals should be fairly constant at each point of the predictor variables (or across the linear model). The researcher produced a special scatterplot on SAS University Edition to assess the plotting the standardised values of our model would predict, against the standardised residuals obtained.

The standardized residual (ZPRED) is the residual divided by its standard error. The distribution of the residuals is approximately normal, as 95% of the standardized residuals fall between -2 and +2, as can be seen in Figure 4.25. The researcher used this to identify outliers (Norusis, 1998), which, however, were not significant.

As the predicted values increase, along the X-axis as shown in Figure 4.25, the variation in the residuals shows a random array of dots, in line with regression assumptions.

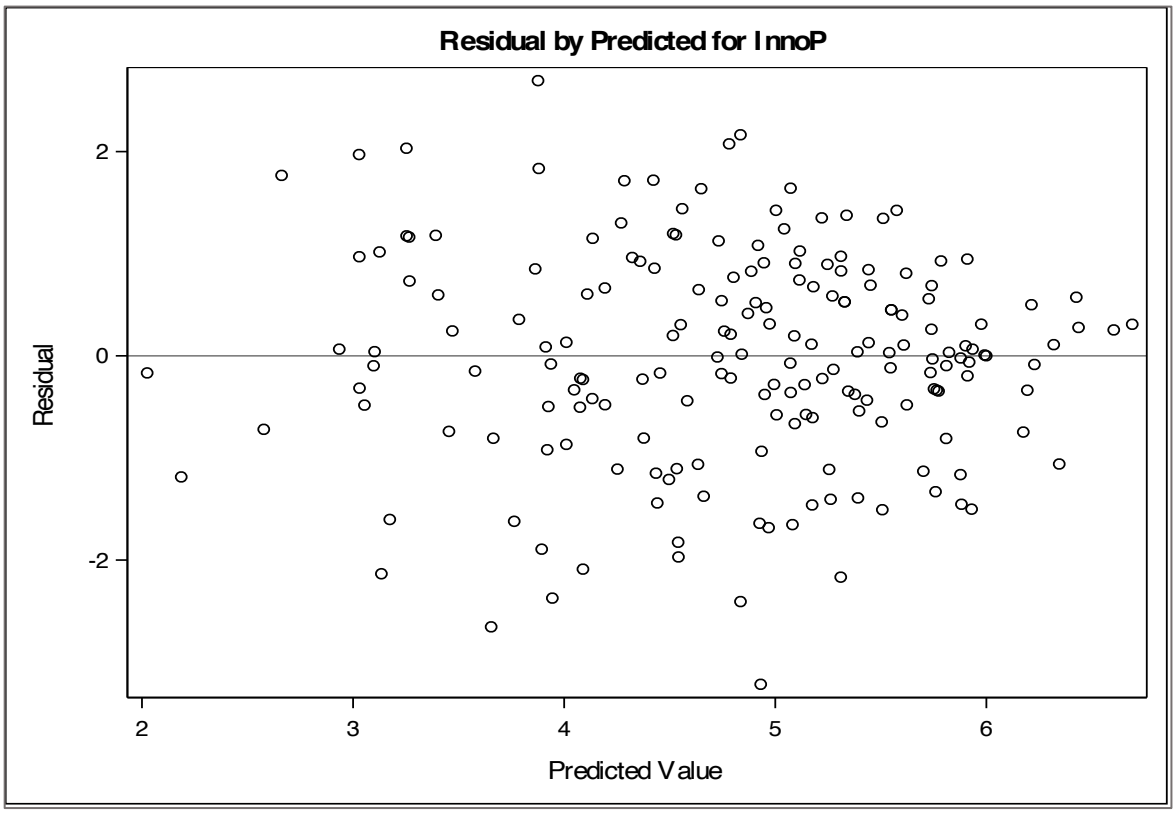


Figure 4.25: Regression Standardized Residuals

In Figure 4.26, the studentized residuals (SRESID) takes into account the variance of the predicted value used in calculating residuals. The studentized residuals fell between -2 and +2. The researcher used this to study stability of the model (Norusis, 1998).

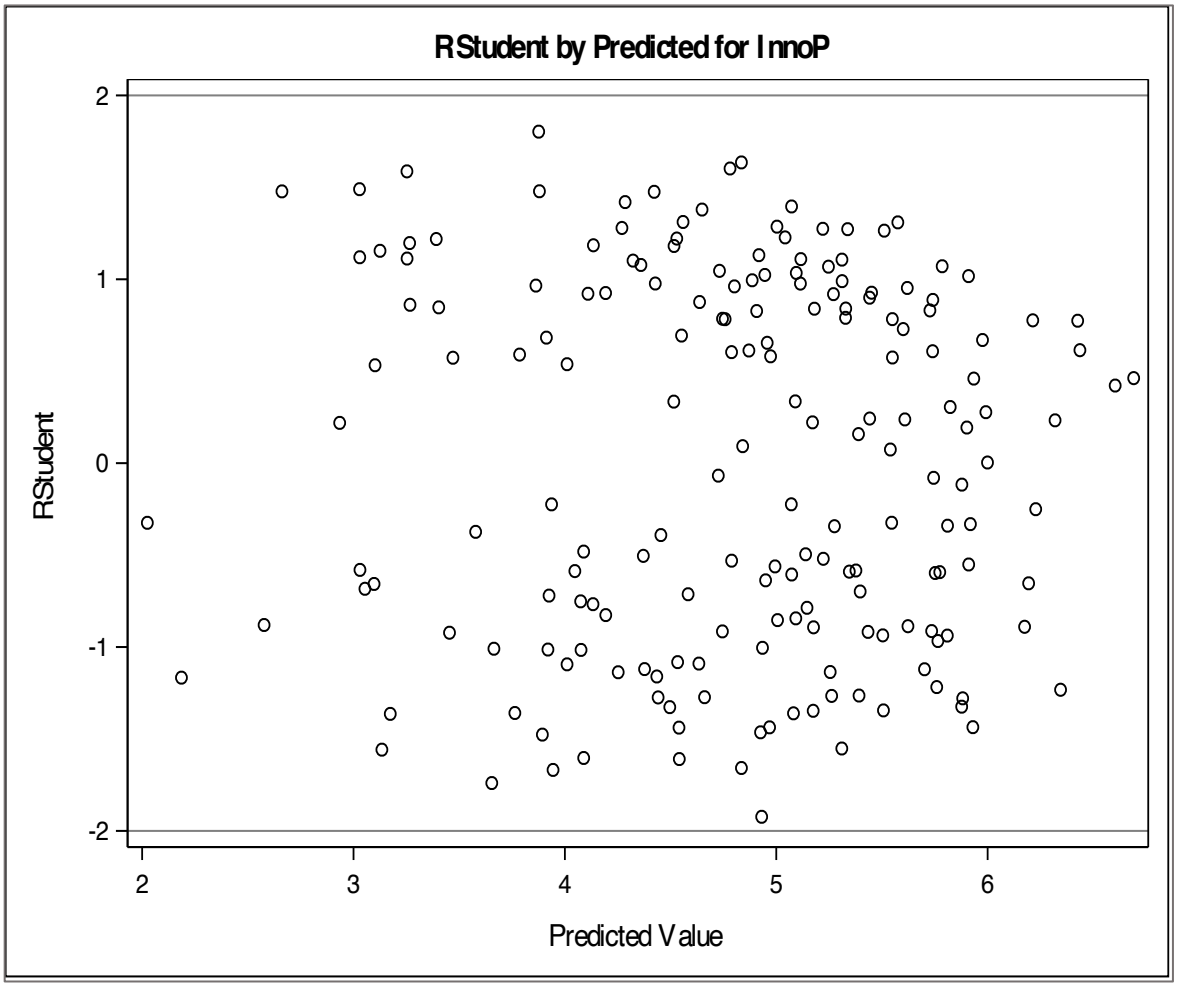


Figure 4.26: Regression Studentized Residual

The Residual by Regressors for Inno_P (Figure 4.27) diagram shows that residuals were approximately normal, as 95% of the standardized residuals and fell between -2 and +2 for each of the variables under study.

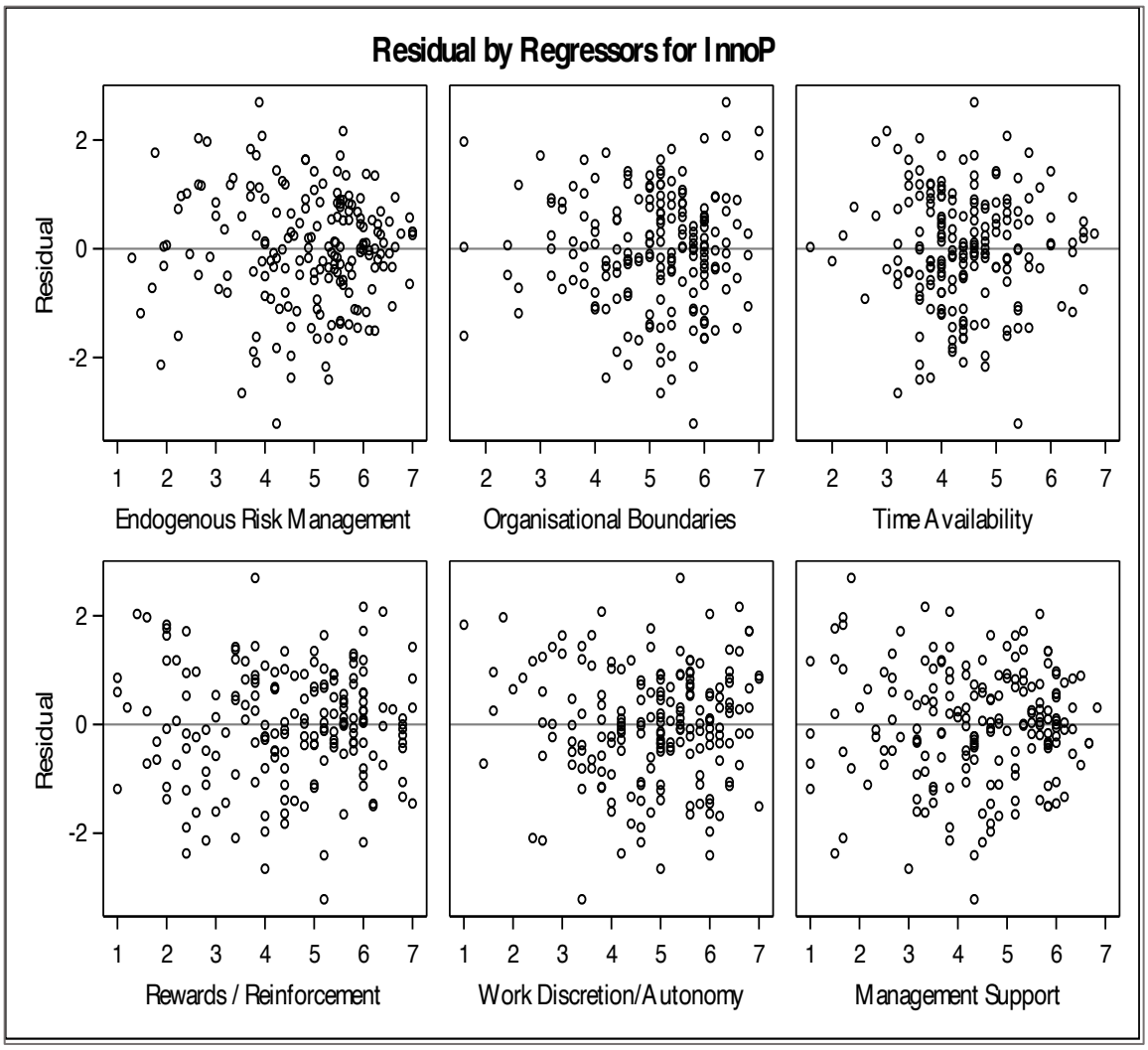


Figure 4.27: Residuals by Regressors for Inno_P

5. **Normality** - The residuals should be normally distributed. There are no significant outliers. As seen in the histogram and Q-Q plot below, the residuals (errors) of the regression approximate normal distribution and the response variables are normally distributed.

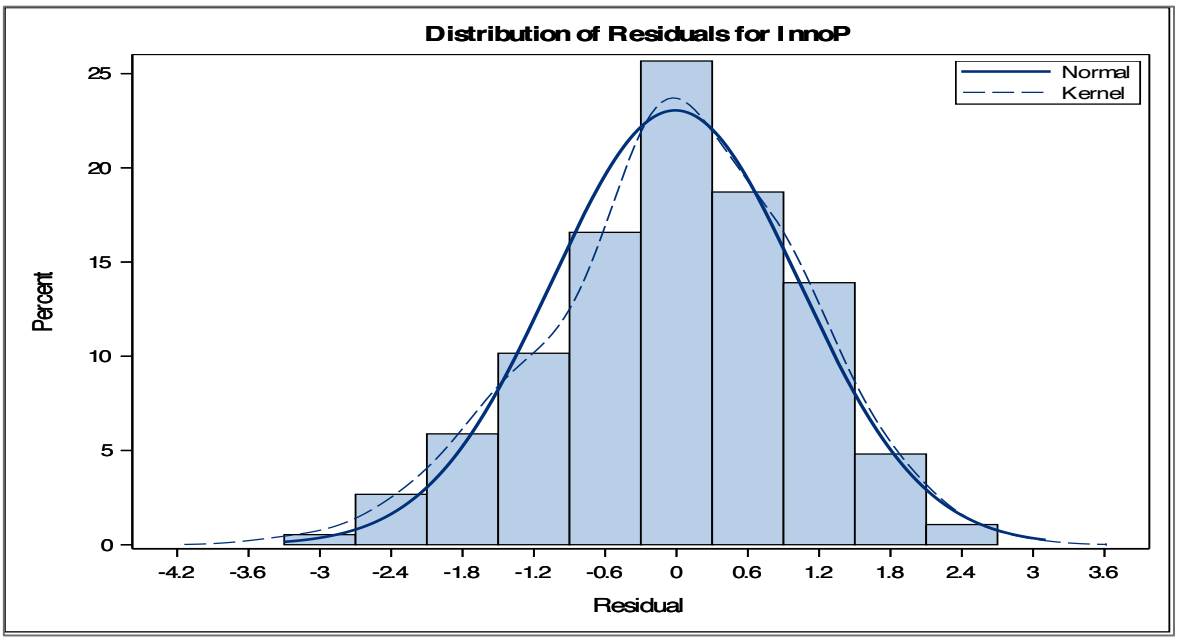


Figure 4.28: Normality Histogram - Model 3

This normality assumption was tested by looking at the Q-Q plot for the model. The closer the dots are to the diagonal line, the closer to normal the residuals are distributed. The majority of the data points in Figure 4.29 touch the line, indicating the normality in model three (3).

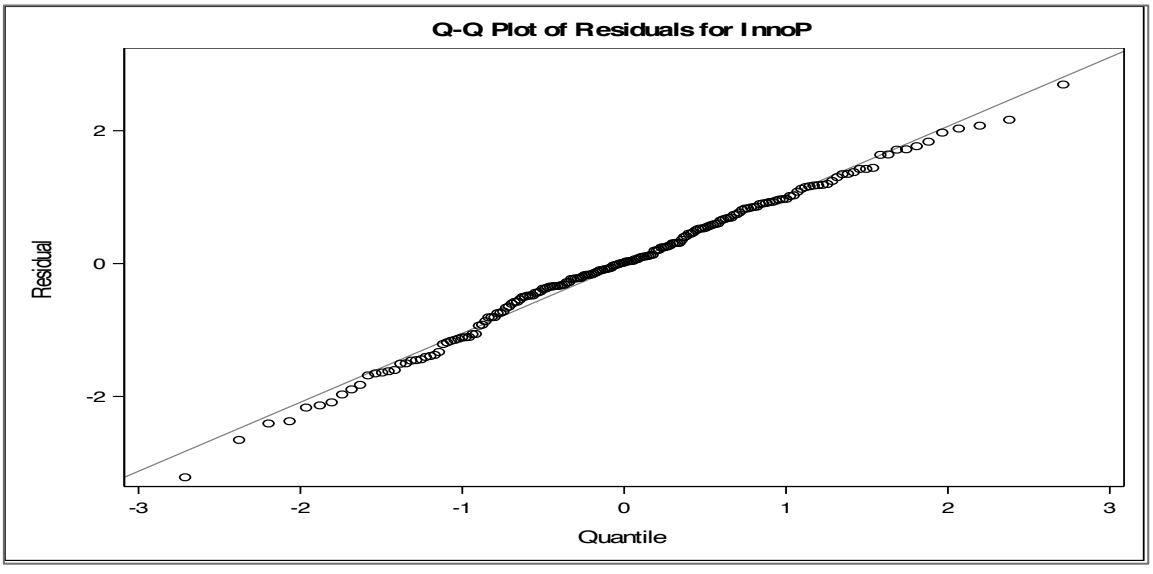


Figure 4.29: Normality Q-Q Plot - Model 3

4.4.2.2 Model Regression Results

In the model summary, Table 4.12, R (0.938) shows the correlation between the observed values of the outcome and the values predicted by the model. R^2 (0.880) exhibits the proportion of variance accounted for by the model. Adj. R^2 (0.875).

The ANOVA (Table 4.13) shows the F-test which looks at whether the variance explained by the model (SS_M) is significantly greater than the error within the model (SS_R). It shows that using the regression model is a significantly better way of predicting values of the outcome than using the mean of the outcome.

The Coefficients Table 4.14 shows the b-values which are the change in the outcome associated with a unit change in the predictor. The final regression analysis included the tolerance statistic for each independent variable. Tolerance is used to determine the existence of multi-collinearity by measuring the strength of the linear relationship amongst the independent variables. Multicollinearity was measured by variance inflation factors (VIF) and tolerance. Tolerance should be more than 0.2 (Menard, 1995) and VIF should be less than 10 (Field, 2017).

In addition, Table 4.14 also shows that for this model, Endogenous Risk Management, t (178) =14.74, $p < 0.05$, Organisational Boundaries, t (178) = 0.991, $p < 0.05$, Work Discretion/Autonomy, t (178) = -4.877, $p < 0.05$, Management Support, t (178) = 3.923, $p < 0.05$, Time Availability, t (178) = 3.547, $p < 0.05$, Rewards /Reinforcement, t (178) = 3.077, $p < 0.05$, Firm Age, t (178) = -0.414, $p < 0.05$ and Firm Size, t (178) = 1.689, $p < 0.05$.

From the magnitude of the aforementioned statistics, it is evident that all the variables (Endo_RM, MS, WD, RR and TA) are statistically significant predictors of Inno_P excluding OB, Firm Age and Firm Size which are not.

Table 4.12: Model Summary

Model Summary[b,c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
3	.938[a]	.880	.875	.92266	.880	163.568	8	178	.000	1.701

a. Predictors: (Constant), Firm Size, Management Support, Work Discretion/Autonomy, Time Availability, Organisational Boundaries, Endogenous Risk Management, Rewards / Reinforcement, Firm Age

b. Dependent Variable: Innovation Performance

c. Weighted Least Squares Regression - Weighted by Weight1

Table 4.13: Model ANOVA[a]

ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
3	Regression	1113.962	8	139.245	163.568	.000[c]
	Residual	151.531	178	.851		
	Total	1265.493	186			

a. Dependent Variable: Innovation Performance

b. Weighted Least Squares Regression - Weighted by Weight1

c. Predictors: (Constant), Firm Size, Management Support, Work Discretion/Autonomy, Time Availability, Organisational Boundaries, Endogenous Risk Management, Rewards / Reinforcement, Firm Age

Table 4.14: Model Coefficients

Coefficients[a,b]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
3	(Constant)	.562	.247		2.276	.024		
	Endogenous Risk Management	.509	.035	.610	14.741	.000	.393	2.548
	Organisational Boundaries	.044	.044	.039	.991	.323	.442	2.262
	Work Discretion/Autonomy	-.120	.025	-.145	-4.877	.000	.760	1.316
	Management Support	.143	.037	.148	3.923	.000	.470	2.128
	Time Availability	.162	.046	.122	3.547	.000	.570	1.754
	Rewards / Reinforcement	.125	.040	.131	3.077	.002	.370	2.704
	Firm Age	-.021	.051	-.020	-.414	.679	.290	3.444
	Firm Size	.086	.051	.077	1.689	.093	.320	3.123

a. Dependent Variable: Innovation Performance

b. Weighted Least Squares Regression - Weighted by Weight1

The study applied multiple linear regression analyses to estimate the relationships between IVs and DV. Innovation performance is conceptualised as a function of CE, Endo_RM x CE and control variables as illustrated in Equation 4.1 and Equation 4.2 below. The multiple regression equation for this study reads as follows;

Equation 4.1: Multiple Regression Equation

The multiple regression equation for the model that the researcher selected as the soundest is;

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \varepsilon_1 \quad (4.1a)$$

Where:

Y_i : Dependent variable – Innovation Performance

β_0 : Constant

β_i : Regression coefficients (Population Slope Coefficient)

X_1: Management Support (IV)

X_2: Work Discretion/Autonomy (IV)

X_3: Rewards / Reinforcement (IV)

X_4: Time Availability (IV)

X_5: Organisational Boundaries (IV)

X_6: Endogenous Risk Management (IV)

X_7: Firm Age (CV)

X_8: Firm Size (CV)

ε_i : Random Error Term

And the fitted model is: $\hat{Y} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8$ (4.1b)

Where $\hat{Y}$ is the predicted value of the response variable for a given value of X. From the data in Table 4.16, the model reads as follows;

$$\hat{Y} = 0.562 + 0.509X_1 + 0.044X_2 + 0.162\ X_3 + 0.125X_4 - 0.120X_5 + 0.143X_6 - 0.21X_7 + 0.086X_8 \quad (4.1c)$$

From the multiple regression analysis of model 3 (Table 4.16), the researcher was able to deduce the following:

- β_1 = 0.143 indicates that as MS increases by 1 standard deviation, Inno_P increases by 0.143 of a standard deviation. A directly proportional relationship exists between the two variables.

- β_2 = - 0.120 indicates that as WD increases by 1 standard deviation, Inno_P decreases by 0.120 of a standard deviation. An indirectly proportional relationship exists between the two variables.

- β_3 = 0.125 indicates that as RR increases by 1 standard deviation, Inno_P increases by 0.125 of a standard deviation. A directly proportional relationship exists between the two variables.

- β_4= 0.162 indicates that as TA increases by 1 standard deviation, Inno_P increases by 0.162 of a standard deviation. A directly proportional relationship exists between the two variables.

- β_5 = 0.044 indicates that as OB increases by 1 standard deviation, Inno_P increases by 0.044 of a standard deviation. A directly proportional relationship exists between the two variables.

- β_6 = - 0.021 indicates that as Firm Age (CV) increases by 1 standard deviation, Inno_P decreases by 0.210 of a standard deviation. An indirectly proportional relationship exists between the two variables.

- β_7 = 0.086 indicates that as Firm Size (CV) increases by 1 standard deviation, Inno_P increases by 0.086 of a standard deviation. A directly proportional relationship exists between the two variables.

Equation 4.2: Multiple Regression Equation - Moderation

The moderation equation: $Y_i = \beta_0 + \beta_1 X + \beta_2 Z + \beta_3 XZ + \varepsilon_i$ is populated in the table below using moderation results found in section AE - Multiple Regression and Moderator Analysis of this report. Where:

- Y_i : Dependent variable – Innovation Performance
- β_0 : Constant /intercept
- β_i : Regression coefficients (Population Slope Coefficient)
- X: Independent variable
- Z: Independent variable
- XZ: Interaction term /moderator
- β_1 : Regression coefficients - effect of X on Y
- β_2 : Regression coefficients - effect of Z on Y
- β_3 : Regression coefficients - effect of XZ on Y
- ε_i : Random Error Term

And the fitted model is;

Table 4.15: Moderation Effect Equations

MS x Endogenous Risk Management (IV)	$Y_i = 4.782 + 0.299X + 0.692Z - 0.030XZ$	(4.2a)
WD x Endogenous Risk Management (IV)	$Y_i = 4.806 + 0.047X + 0.896Z - 0.033XZ$	(4.2b)
RR x Endogenous Risk Management (IV)	$Y_i = 4.829 + 0.265X + 0.646Z - 0.066XZ$	(4.2c)
TA x Endogenous Risk Management (IV)	$Y_i = 4.771 + 0.299X + 0.879Z + 0.169XZ$	(4.2d)
OB x Endogenous Risk Management (IV)	$Y_i = 4.820 + 0.216X + 0.747Z - 0.065XZ$	(4.2e)

From the multiple regression analysis of the moderation effect results (AE - Multiple Regression and Moderator Analysis), the researcher was able to deduce the following:

- β_{3a} = - 0.030 indicates that as MS x Endo_RM increases by 1 standard deviation, Inno_P decreases by 0.030 of a standard deviation. An indirectly proportional relationship exists between the two variables (as seen in equation 4.2a).

- β_{3b} = - 0.033 indicates that as WD x Endo_RM increases by 1 standard deviation, Inno_P decreases by 0.033 of a standard deviation. An indirectly proportional relationship exists between the two variables (as seen in equation 4.2b).
- β_{3c} = - 0.066 indicates that as RR x Endo_RM increases by 1 standard deviation, Inno_P decreases by 0.066 of a standard deviation. An indirectly proportional relationship exists between the two variables (as seen in equation 4.2c).

- β_{3d} = 0.169 indicates that as TA x Endo_RM increases by 1 standard deviation, Inno_P increases by 0.169 of a standard deviation. A directly proportional relationship exists between the two variables (as seen in equation 4.2d).

- β_{3e} = - 0.065 indicates that as OB x Endo_RM increases by 1 standard deviation, Inno_P decreases by 0.065 of a standard deviation. An indirectly proportional relationship exists between the two variables (as seen in equation 4.2e).

Table 4.16: Various Model Summaries

Predictor variable		Model 1 (OLS)	Model 2 (Weighted least squares)	Model 3 (WLS with Control variables)	Model 4 (WLS with Firm Age)	Model 5 (WLS with Firm size)
(Constant)		0.920*	0.866****	0.562****	0.697***	0.559**
Endogenous Risk Management		0.497****	0.507****	0.509****	0.509****	0.507****
Organisational Boundaries		0.065	0.051	0.044	0.047	0.044
Time Availability		0.143	0.161****	0.162****	0.154***	0.160**
Rewards / Reinforcement		0.106	0.108*****	0.125****	0.123***	0.127**
Work Discretion/Autonomy		-0.124*	-0.127****	-0.120****	-0.120****	-0.118****
Management Support		0.142*	0.144*****	0.143****	0.137****	0.141****
Firm Age				-0.21	0.046	
Firm Size				0.086*		0.07**
	AIC	**559.7056**	**380.707**	**391.1011**	**392.0754**	**389.2815**
	R Square	**0.433**	**0.888**	**0.880**	**0.878**	**0.880**
	Adjusted R Square	**0.414**	**0.884**	**0.875**	**0.874**	**0.875**
Change Statistics	R Square Change	0.433	0.888	0.003	0.001	0.003
	F statistic	22.897****	237.637****	163.568****	184.614****	187.779****
	df1	6	6	8	7	7
	df2	180	180	178	179	179
	Durbin-Watson	1.916	1.804	1.701	1.702	1.724
	P value		*p < 0.1	**p < 0.05	***p < 0.01	**** p < 0.001

4.4.2.3 Hypothesis One - Corporate Entrepreneurship and Innovation Performance

H1. The organisational antecedents of corporate entrepreneurship are positively related to innovation performance.

- H_{01a}. There is no statistically significant relationship between management support and innovation performance.
- H_{1a}. Management support is positively related to innovation performance.

Hypothesis H_{1a} states that management support is positively related to innovation performance. The value of the Pearson correlation coefficient for the relationship between MS and Inno_P is $r\ (187) = 0.470$. This positive value suggests that a directly proportional relationship exists between the two variables. The strength of the relationship is moderate. The 2-tailed significance test yielded $p = 0.000$ which is less than 0.05, therefore the correlation coefficient indicates a significant relationship between MS and Inno_P. When taking into account other variables in the regression analysis, a significant and positive relation (0.143) is confirmed between these two variables. Consequently, there is sufficient evidence to conclude that there is a significant linear relationship between MS and Inno_P because the correlation coefficients are significantly different from zero. The null hypothesis H_{01a} states that there is no statistically significant relationship between the variables at hand. The null hypothesis is therefore rejected, and the alternative hypothesis is supported.

- H_{01b}. There is no statistically significant relationship between work discretion/autonomy and innovation performance.
- H_{1b}. Work discretion/autonomy is positively related to innovation performance.

Hypothesis H_{1b} states that work discretion/autonomy is positively related to innovation performance. The value of the Pearson correlation coefficient for the relationship between WD and Inno_P is $r\ (187) = 0.194$. Being a positive value, it suggests that a directly proportional relationship exists between the two variables. The strength of the relationship is very weak. The

2-tailed significance test yielded p = 0.008 which is less than 0.05, therefore the correlation coefficient indicates a significant relationship between WD and Inno_P. When taking into account other variables in the regression analysis, a significant but negative relation (-0.120) is evident between these two variables. Consequently, there is sufficient evidence to conclude that there is a significant negative linear relationship between WD and Inno_P, when other variables are considered. The null hypothesis H_{01b}., which states that there is no statistically significant relationship between the variables at hand is rejected whilst the alternative hypothesis is not supported (as the relationship is negative) despite the significant relationship.

- H_{01c}. There is no statistically significant relationship between rewards/reinforcements and innovation performance.
- H_{1c}. Rewards/reinforcements are positively related to innovation performance.

Hypothesis H_{1c} states that rewards/reinforcements are positively related to innovation performance. The value of the Pearson correlation coefficient for the relationship between RR and Inno_P is $r\ (187)$ = 0.452. This positive value suggests that a directly proportional relationship exists between the two variables. The strength of the relationship is moderate. The 2-tailed significance test yielded p = 0.000 which is less than 0.05, therefore the correlation coefficient indicates that a significant relationship exists between RR and Inno_P. When taking into account other variables in the regression analysis, a significant and positive relation (0.125) is confirmed between these two variables. Consequently, there is sufficient evidence to conclude that there is a significant and positive linear relationship between RR and Inno_P. The null hypothesis H_{01c}. states that there is no statistically significant relationship between the variables at hand. The null hypothesis is therefore rejected, and the alternative hypothesis is supported.

- H_{01d}. There is no statistically significant relationship between time availability and innovation performance.
- H_{1d}. Time availability is positively related to innovation performance.

Hypothesis H_{1d}. states that time availability is positively related to innovation performance. The value of the Pearson correlation coefficient for the relationship between TA and Inno_P is $r\ (187)$

= 0.317. Being a positive value, it suggests that a directly proportional relationship exists between the two variables. The strength of the relationship is weak. The 2-tailed significance test yielded *p* = 0.000 which is less than 0.05, therefore the correlation coefficient indicates that a significant relationship exists between TA and Inno_P. When taking into account other variables in the regression analysis, a significant and positive relation (0.162) is confirmed between these two variables. Consequently, there is sufficient evidence to conclude that there is a significant and positive linear relationship between TA and Inno_P because the correlation coefficients are significantly different from zero. The null hypothesis H_{01d}. states that there is no statistically significant relationship between the variables at hand. The null hypothesis is therefore rejected, and the alternative hypothesis is supported.

- H_{01e}. There is no statistically significant relationship between organisational boundaries and innovation performance.
- H_{1e}. Organisational boundaries are positively related to innovation performance

Hypothesis H_{1e} states that organisational boundaries are positively related to innovation performance. The value of the Pearson correlation coefficient for the relationship between OB and Inno_P is *r (187)* = 0.372. This positive value suggests that a directly proportional relationship exists between the two variables. The strength of the relationship is weak. The 2-tailed significance test yielded *p* = 0.000 which is less than 0.05, therefore the correlation coefficient indicates that a significant relationship exists between OB and Inno_P. When taking other variables into account in the regression analysis, a positive but insignificant relation (0.044) is evident between these two variables. Although OB has some significant correlation with Inno_P, the coefficient of OB is not significant when other variables are considered. Consequently, there is sufficient evidence to conclude that a significant linear relationship does not exist between OB and Inno_P when other variables are regarded. As a result, the null hypothesis H_{01e}, which states that there is no statistically significant relationship between the variables at hand, stands. The alternative hypothesis is supported; however, the relation is not significant.

4.4.2.4 Hypothesis Two - Moderating Effect of Endo_RM on CE-Inno_P

The moderating effect of endogenous risk management on the CE-Inno_P relation is presented in this segment. To provide a pertinent analysis linked to objectives of the study and address the research questions (and hypotheses), endogenous risk management was coded as follows;

- Strongly disagree and disagree = low levels of endogenous risk management
- Somewhat disagree, neither agree nor disagree and somewhat agree = medium levels of endogenous risk management
- Agree and strongly agree = high levels of endogenous risk management

H_2. Risk management moderates the relationships between the organisational antecedents of corporate entrepreneurship and innovation performance.

Hypothesis 2a – Endo_RM on MS-Inno_P Relation

- $H_{02a.}$ Endogenous risk management does not have a statistically significant moderating effect on the relationship between management support and innovation performance.

- H_{2a}. The relationship between management support and innovation performance is more positive under low than high levels of risk management.

To assess the moderating effect of Endo_RM on the CE-Inno_P relationship the following regression analysis steps were taken. In the first step, two variables were included: management support and endogenous risk management. These variables accounted for an insignificant amount of variance in innovation performance, $R^2 = .0322$, $F\ (2, 184) = 43.747$, $p > 0.05$. To avoid potentially problematic high multicollinearity with the interaction term, the variables were centred and an interaction term between MS and Endo_RM was created (Aiken & West, 1991).

In the second step, the interaction term, MS x Endo_RM, was added to the regression model, which accounted for an insignificant proportion of the variance in innovation performance, $\Delta R^2 = 0.000$,

ΔF (1, 183) = 0.135, p = .0.714, b = 0.298, t (183) = 0.367, $p > 0.05$ (as seen in Table 4.17 and Table A.19). In Table 4.18, it is evident from the F statistic values that the predictive power of the model is reduced when the interaction term is introduced (model 1 value is 43.747 and model 2 is 29.073). Examination of the interaction plot (Figure 4.30) shows an insignificant enhancing effect; as MS and Endo_RM increase, innovation performance increases. Firms with high management support and Endo_RM exhibited the highest innovation performance.

Furthermore the researcher used the simple slope (Figure 4.30) to investigate the level of Endo_RM at which Inno_P was more positive. The researcher calculated the gradient of each line (low and high Endo_RM levels) utilising the points on the graphs. High levels of Endo_RM exhibited a steeper/more positive (0.444) gradient in comparison to low levels of Endo_RM (0.392). As a result, the findings of this research are such that the relationship between management support and innovation performance is more positive under high than low levels of endogenous risk management. This contradicts hypothesis H_{2a}.

Based on this, the researcher failed to reject the null hypothesis (H_{02a}) as there was no evidence of a significant moderating relationship. The alternative hypothesis (H_{2a}) was not supported.

Table 4.17: MS x Endo_RM Interaction Term Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.568[a]	.322	.315	1.14075	.322	43.747	2	184	.000
2	.568[b]	.323	.312	1.14344	.000	.135	1	183	.714

a. Predictors: (Constant), Management Support, EndoRM_CODED

b. Predictors: (Constant), Management Support, EndoRM_CODED, EndoRMxMS_CODED

Table 4.18: MS x Endo_RM Interaction Term ANOVA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	113.857	2	56.929	43.747	.000[b]
	Residual	239.441	184	1.301		
	Total	353.298	186			
2	Regression	114.034	3	38.011	29.073	.000[c]
	Residual	239.265	183	1.307		
	Total	353.298	186			

a. Dependent Variable: Innovation Performance

b. Predictors: (Constant), Management Support, EndoRM_CODED

c. Predictors: (Constant), Management Support, EndoRM_CODED, EndoRMxMS_CODED

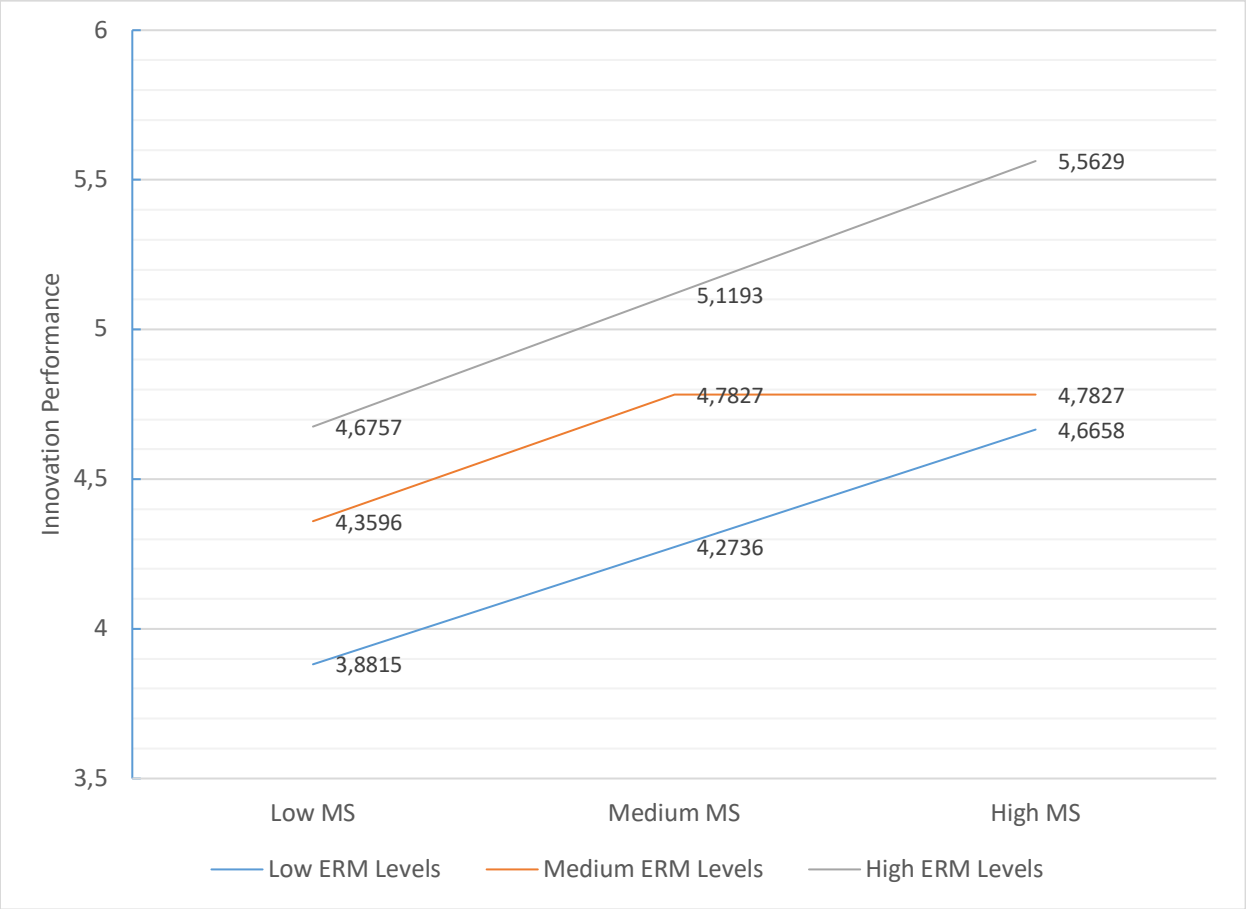


Figure 4.30: Moderating effect of Endo_RM on MS and Inno_P

Hypothesis 2b – Endo_RM on WD-Inno_P Relation

- $H_{02b.}$ Endogenous risk management does not have a statistically significant moderating effect on the relationship between work discretion/autonomy and innovation performance.

- H_{2b}. The relationship between work discretion/autonomy and innovation performance is more positive under high than low levels of risk management.

Work discretion/autonomy and endogenous risk management variables were added for regression analysis. These variables accounted for an insignificant amount of variance in innovation performance, $R^2 = 0.251$, F (2, 184) = 30.781, $p > 0.05$.

When the interaction term, WD x Endo_RM, was added to the regression model, it accounted for an insignificant proportion of the variance in innovation performance, $\Delta R^2 = 0.001$, ΔF (1, 183) = 0.127, p = .0.722, b = 0.329, t (183) = - 0.357, $p > 0.05$ (as seen in Table 4.19 and Table A.20). In Table 4.20, it is evident from the F statistic values that the predictive power of the model is reduced when the interaction term is introduced. Examination of the interaction plot (Figure 4.31) shows an insignificant enhancing effect; as WD and Endo_RM increase, innovation performance increases. Firms with high work WD and Endo_RM exhibited the highest innovation performance.

Furthermore, the researcher used the simple slope (Figure 4.31) to investigate the level of Endo_RM at which Inno_P was more positive. Low levels of Endo_RM exhibited a steeper/more positive (0.092) gradient in comparison to high levels of Endo_RM (0.040). As such, the findings of this research show that the relationship between work discretion and innovation performance is more positive under low than high levels of endogenous risk management, which contradicts hypothesis H_{2b}.

Based on this, the researcher failed to reject the null hypothesis (H_{02b}) as there was no evidence of a significant moderating relationship. The alternative hypothesis (H_{2b}) was not supported.

Table 4.19: WD x Endo_RM Interaction Term Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			
					R Square Change	F Change	df1	df2	Sig. F Change
1	.501[a]	.251	.243	1.19947	.251	30.781	2	184	.000
2	.501[b]	.251	.239	1.20233	.001	.127	1	183	.722

a. Predictors: (Constant), Work Discretion/Autonomy, EndoRM_CODED

b. Predictors: (Constant), Work Discretion/Autonomy, EndoRM_CODED, EndoRMxWD_CODED

Table 4.20: WD x Endo_RM Interaction Term ANOVA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	88.571	2	44.285	30.781	.000[b]
	Residual	264.728	184	1.439		
	Total	353.298	186			
2	Regression	88.755	3	29.585	20.466	.000[c]
	Residual	264.544	183	1.446		
	Total	353.298	186			

a. Dependent Variable: Innovation Performance

b. Predictors: (Constant), Work Discretion/Autonomy, EndoRM_CODED

c. Predictors: (Constant), Work Discretion/Autonomy, EndoRM_CODED, EndoRMxWD_CODED

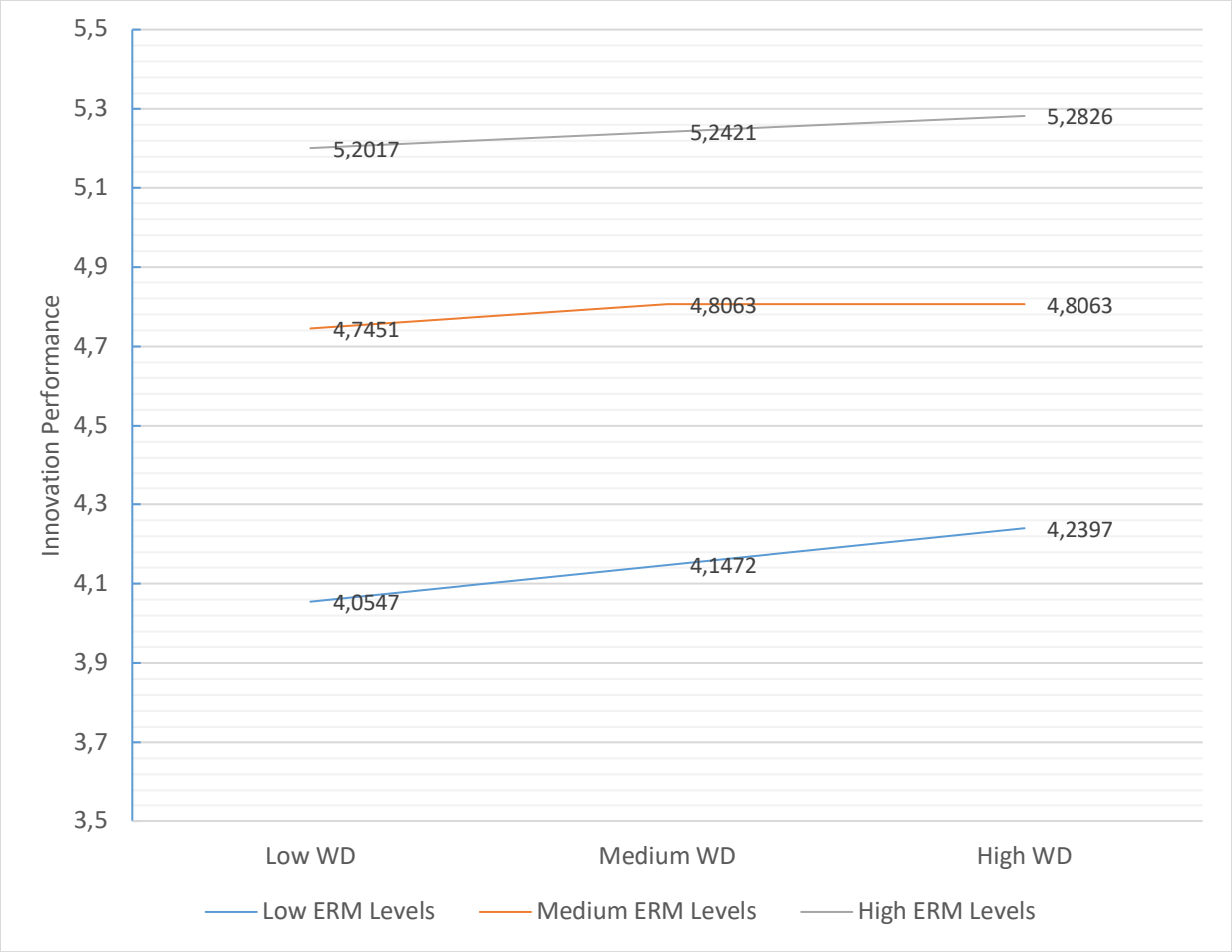


Figure 4.31: Moderating effect of Endo_RM on WD and Inno_P

Hypothesis 2c – Endo_RM on RR-Inno_P Relation

- H_{02c}. Endogenous risk management does not have a statistically significant moderating effect on the relationship between rewards/reinforcements and innovation performance.

- H_{2c}. The relationship between rewards/reinforcements and innovation performance is more positive under high than low levels of risk management.

Rewards/reinforcements and endogenous risk management variables were added for regression analysis. These variables accounted for an insignificant amount of variance in innovation performance, $R^2 = 0.317$, $F\ (2, 184) = 40.668$, $p > 0.05$.

When the interaction term, RR x Endo_RM, was added to the regression model, it accounted for an insignificant proportion of the variance in innovation performance, $\Delta R^2 = 0.003$, $\Delta F\ (1, 183) = 0.678$, $p = .0.411$, b = - 0.066, $t\ (183) = - 0.823$, $p > 0.05$ (as seen in Table 4.21 and Table A.21). In Table 4.22, it is evident from the F statistic values that the predictive power of the model is reduced when the interaction term is introduced in model 2. Examination of the interaction plot (Figure 4.32) shows an insignificant enhancing effect; as RR and Endo_RM increase, innovation performance increases. Firms with high work RR and Endo_RM exhibited the highest innovation performance.

Furthermore, the researcher used the simple slope (Figure 4.32) to investigate the level of Endo_RM at which Inno_P was more positive. Low levels of Endo_RM exhibited a steeper/more positive (0.476) gradient in comparison to high levels of Endo_RM (0.354). As such, the findings of this research show that the relationship between rewards/reinforcements and innovation performance is more positive under low than high levels of endogenous risk management, which contradicts hypothesis H_{2c}.

Based on this, the researcher failed to reject the null hypothesis (H_{02c}) as there was no evidence of a significant moderating relationship. The alternative hypothesis (H_{2c}) was not supported.

Table 4.21: RR x Endo_RM Interaction Term Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.563[a]	.317	.309	1.14531	.317	42.668	2	184	.000
2	.565[b]	.319	.308	1.14631	.003	.678	1	183	.411

a. Predictors: (Constant), Rewards / Reinforcement, EndoRM_CODED

b. Predictors: (Constant), Rewards / Reinforcement, EndoRM_CODED, EndoRMxRR_CODED

Table 4.22: RR x Endo_RM Interaction Term ANOVA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	111.939	2	55.970	42.668	.000[b]
	Residual	241.359	184	1.312		
	Total	353.298	186			
2	Regression	112.830	3	37.610	28.622	.000[c]
	Residual	240.469	183	1.314		
	Total	353.298	186			

a. Dependent Variable: Innovation Performance

b. Predictors: (Constant), Rewards / Reinforcement, EndoRM_CODED

c. Predictors: (Constant), Rewards / Reinforcement, EndoRM_CODED, EndoRMxRR_CODED

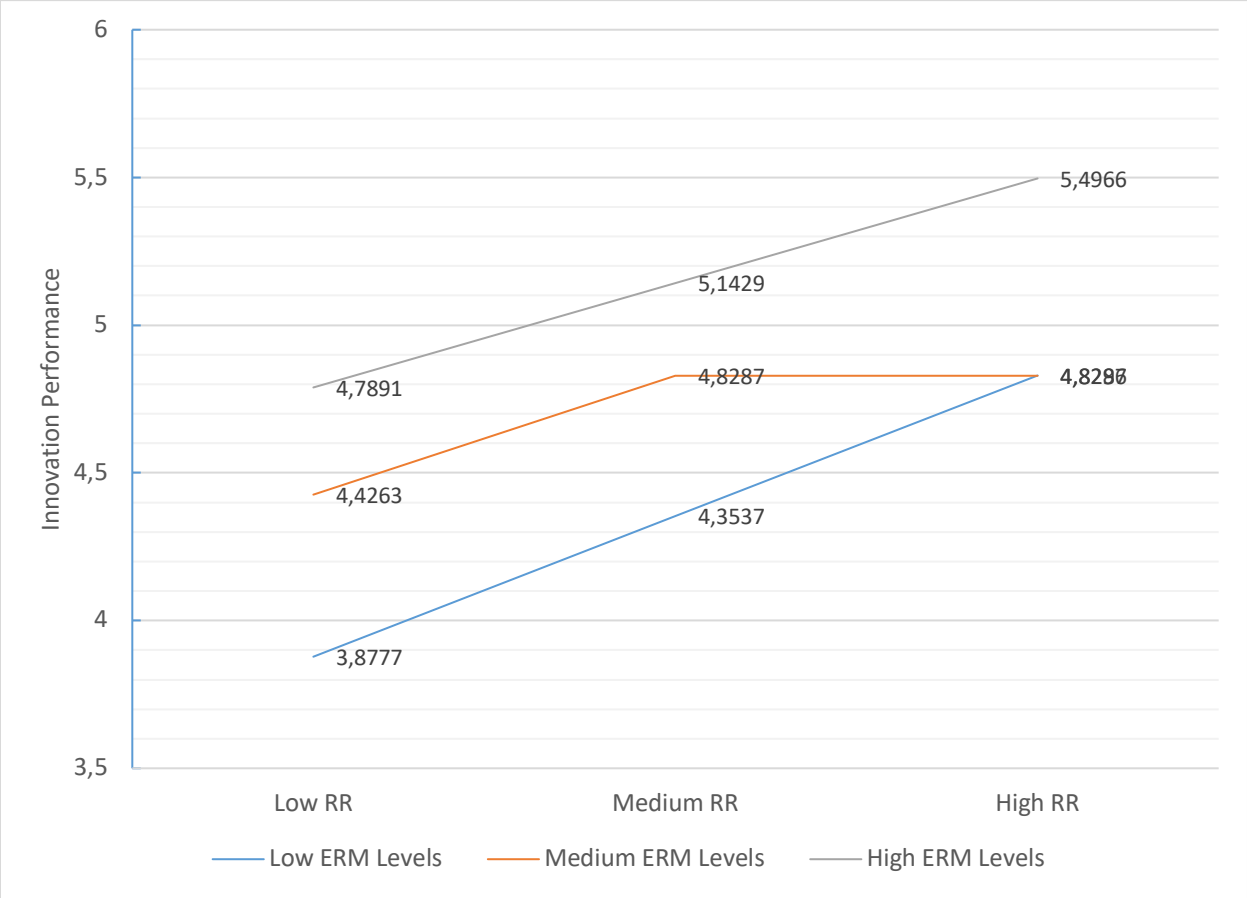


Figure 4.32: Moderating effect of Endo_RM on RR and Inno_P

Hypothesis 2d – Endo_RM on TA-Inno_P Relation

- $H_{02d.}$ Endogenous risk management does not have a statistically significant moderating effect on the relationship between time availability and innovation performance.

- H_{2d}. The relationship between time availability and innovation performance is more positive under low than high levels of risk management.

Time availability and endogenous risk management variables were added for regression analysis. These variables accounted for an insignificant amount of variance in innovation performance, $R^2 = 0.293$, F (2, 184) = 38.151, $p > 0.05$.

When the interaction term, TA x Endo_RM, was added to the regression model, it accounted for an insignificant proportion of the variance in innovation performance, $\Delta R^2 = 0.005$, ΔF (1, 183) = 1.287, p = .0.258, b = 0.169, t (183) = 1.134, p > 0.05 (as seen in Table 4.23 and Table A.22). In Table 4.24, it is evident from the F statistic values that the predictive power of the model is reduced when the interaction term is introduced in model 2. Examination of the interaction plot (Figure 4.33) shows an insignificant enhancing effect; as TA and Endo_RM increase, innovation performance increases. Firms with high work TA and Endo_RM exhibited the highest innovation performance.

Furthermore, the researcher used the simple slope Figure 4.33 to investigate the level of Endo_RM at which Inno_P was more positive. High levels of Endo_RM exhibited a steeper/more positive (0.352) gradient in comparison to low levels of Endo_RM (0.161). As such, the findings of this research are such that the relationship between time availability and innovation performance is more positive under high than low levels of endogenous risk management. This contradicts hypothesis H_{2c}.

Based on this, the researcher failed to reject the null hypothesis (H_{02d}) as there was no evidence of a significant moderating relationship. The alternative hypothesis (H_{2d}) was not supported.

Table 4.23: TA x Endo_RM Interaction Term Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.541[a]	.293	.285	1.16502	.293	38.151	2	184	.000
2	.546[b]	.298	.287	1.16411	.005	1.287	1	183	.258

a. Predictors: (Constant), Time Availability, EndoRM_CODED

b. Predictors: (Constant), Time Availability, EndoRM_CODED, EndoRMxTA_CODED

Table 4.24: TA x Endo_RM Interaction Term ANOVA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	103.562	2	51.781	38.151	.000[b]
	Residual	249.737	184	1.357		
	Total	353.298	186			
2	Regression	105.305	3	35.102	25.902	.000[c]
	Residual	247.993	183	1.355		
	Total	353.298	186			

a. Dependent Variable: Innovation Performance

b. Predictors: (Constant), Time Availability, EndoRM_CODED

c. Predictors: (Constant), Time Availability, EndoRM_CODED, EndoRMxTA_CODED

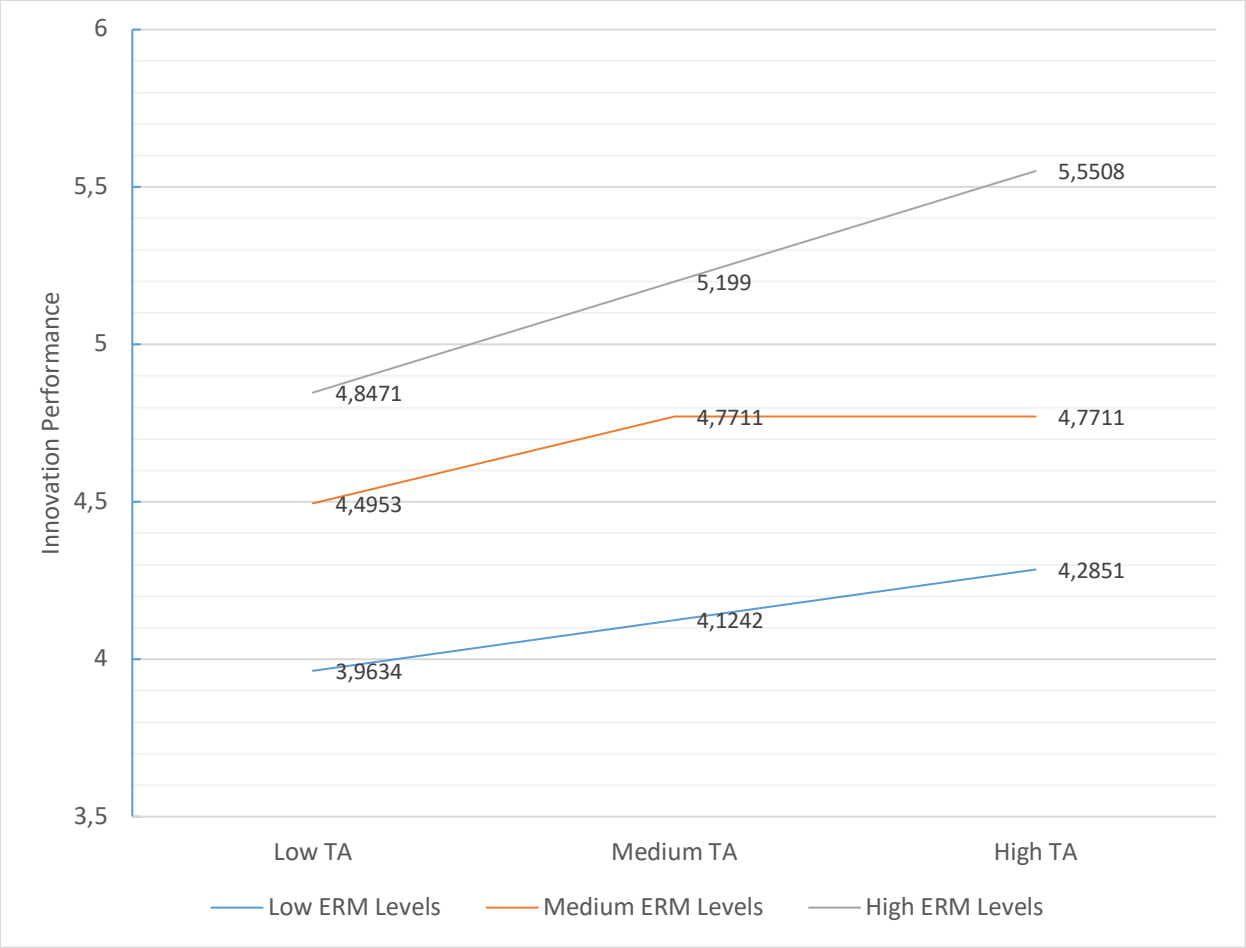


Figure 4.33: Moderating effect of Endo_RM on TA and Inno_P

Hypothesis 2e – Endo_RM on OB-Inno_P Relation

- H_{02e}. Endogenous risk management does not have a statistically significant moderating effect on the relationship between organisational boundaries and innovation performance.

- H_{2e}. The relationship between organisational boundaries and innovation performance is more positive under high than low levels of risk management.

Organisational boundaries and endogenous risk management variables were added for regression analysis. These variables accounted for an insignificant amount of variance in innovation performance, $R^2 = 0.275$, $F\ (2, 184) = 34.811$, $p > 0.05$.

When the interaction term, OB x Endo_RM, was added to the regression model, it accounted for an insignificant proportion of the variance in innovation performance, $\Delta R^2 = 0.002$, ΔF (1, 183) = 0.412, p = .0.522, b = - 0.065, t (183) = - 0.642, p > 0.05 (as seen in Table 4.25 and Table A.23). In Table 4.26, it is evident from the F statistic values that the predictive power of the model is reduced when the interaction term is introduced in model 2. Examination of the interaction plot (Figure 4.34) shows an insignificant enhancing effect; as OB and Endo_RM increase, innovation performance increases. Firms with high work OB and Endo_RM exhibited the highest innovation performance.

Furthermore, the researcher used the simple slope (Figure 4.34) to investigate the level of Endo_RM at which Inno_P was more positive. Low levels of Endo_RM exhibited a steeper/more positive (0.284) gradient in comparison to high levels of Endo_RM (0.199). As a result, the findings of this research are such that the relationship between organisational boundaries and innovation performance is more positive under low than high levels of endogenous risk management, contradicting hypothesis H_{2e}.

Based on this, the researcher failed to reject the null hypothesis (H_{02e}) as there was no evidence of a significant moderating relationship. The alternative hypothesis (H_{2e}) was not supported.

Table 4.25: OB x Endo_RM Interaction Term Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.524[a]	.275	.267	1.18026	.275	34.811	2	184	.000
2	.525[b]	.276	.264	1.18215	.002	.412	1	183	.522

a. Predictors: (Constant), EndoRM_CODED, Organisational Boundaries

b. Predictors: (Constant), EndoRM_CODED, Organisational Boundaries, EndoRMxOB_CODED

Table 4.26: OB x Endo_RM Interaction Term ANOVA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	96.984	2	48.492	34.811	.000[b]
	Residual	256.314	184	1.393		
	Total	353.298	186			
2	Regression	97.560	3	32.520	23.271	.000[c]
	Residual	255.738	183	1.397		
	Total	353.298	186			

a. Dependent Variable: Innovation Performance

b. Predictors: (Constant), EndoRM_CODED, Organisational Boundaries

c. Predictors: (Constant), EndoRM_CODED, Organisational Boundaries, EndoRMxOB_CODED

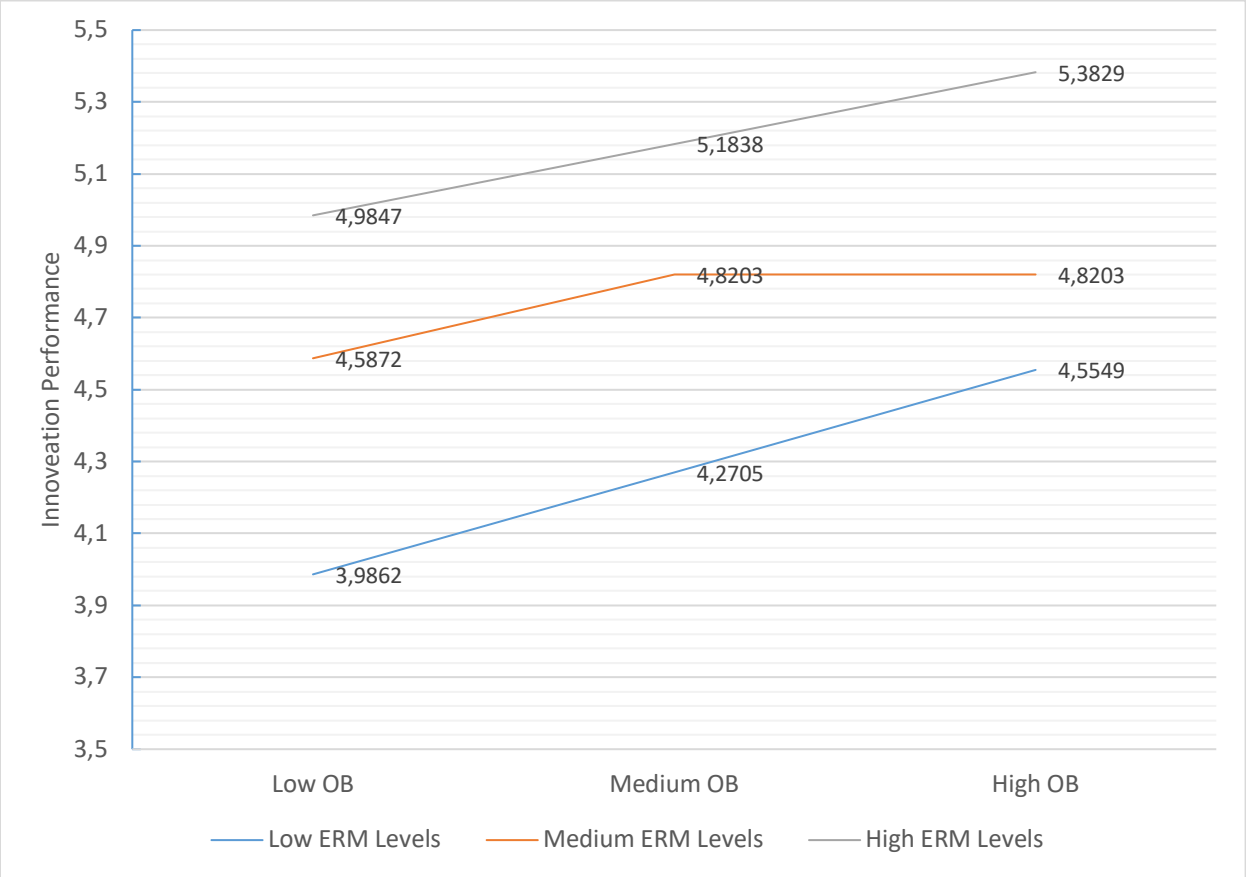


Figure 4.34: Moderating effect of Endo_RM on OB and Inno_P

4.5 Chapter Summary

This chapter commenced with descriptions of sample characteristics (individual and firm) as well as descriptive statistics. The majority of the respondents were black youth females from Gauteng who held junior management positions or lower ranking positions in the respective telecommunication firms that participated in the study.

It was highlighted that at the heart of a competent and effective study, lies fundamental characteristics of any measurement procedure - reliability and validity. As such, reliability tests were run. The tests showed for each scale, all constructs of the instrument scored above the threshold value of 0.7, indicating acceptable reliability of the scales. Furthermore, discriminant validity and convergent validity as well as correlation analysis and principal component analysis were conducted respectively.

The research used the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity in the correlation test to identify whether the items were suitable for the component analysis. From the correlations analysis, the researcher found that there is a significant positive relationship between MS ($r = 0.470$), RR ($r = 0.452$), OB ($r = 0.372$,) TA ($r = 0.317$), WD ($r = 0.194$) and innovation performance (listed in order of strength) as per the Pearson test results at a 99% confidence level. All correlations were statistically significant at the 0.01 alpha level (2-tailed) as $p < .001$.

Thereafter the principal component analysis (principal component method and varimax rotation) were employed to find the component factors (Sunindijo & Zou, 2013). When the eigenvalue was above 1.00, the component factor was utilised. According to the eigenvalue and scree plot, the result showed that the cumulative percentage of the six component factors extracted accounted for 59.3 percent of all factors, indicating that the items were suitable for analysis. The factors that loaded with at least three items with coefficients above 0.4, were used to for further analysis. The regression results show which hypotheses were supported and/or significant as depicted in Table 4.27. Furthermore, using the Andrew Hayes plug-in, the researcher was able to deduce from the regression results that Endo_RM had an insignificant enhancing effect on all dimensions of corporate entrepreneurship in relation to innovation performance. The empirical findings of this

study are summarised in Figure 4.35 and Table 4.27 below. All the beta values are significant at **** $p < 0.001$, with the exception of organisational boundaries, firm age and firm size, which have a p-value that is above 0.05. R^2 is a measure of how much of the variance in Inno_P is explained by the model (Field, 2017).

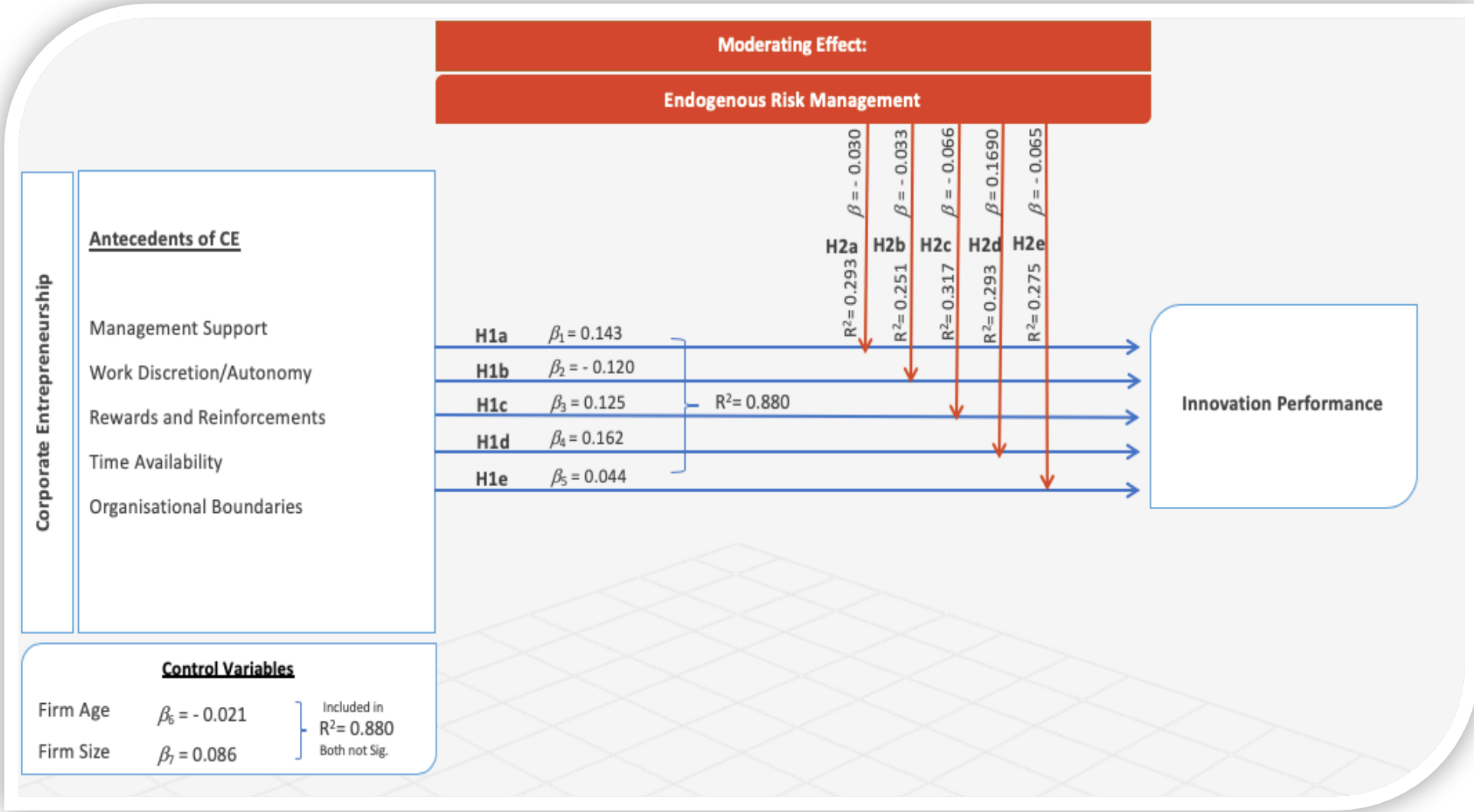


Figure 4.35: Summary of regression results - the structural model

Table 4.27: Summary of Findings

Research Question	Hypothesis	Expectation	Finding	Supported /Not	Significant / Not	Null Hypothesis
Research Question One	H1a (MS-Inno_P)	+	+	Supported	Significant	Rejected
	H1b (WD-Inno_P)	+	-	Not Supported	Significant	Rejected
	H1c (RR-Inno_P)	+	+	Supported	Significant	Rejected
	H1d (TA-Inno_P)	+	+	Supported	Significant	Rejected
	H1e (OB-Inno_P)	+	+	Supported	Not Significant	Rejected
Research Question Two	H2a (Endo_RM on MS-Inno_P)	[+] More + L > H	[-] More + H > L	Not Supported	Not Significant	Failed to reject
	H2b (Endo_RM on WD-Inno_P)	[+] More + H > L	[-] More + L > H	Not Supported	Not Significant	Failed to reject
	H2c (Endo_RM on RR-Inno_P)	[+] More + H > L	[-] More + L > H	Not supported	Not Significant	Failed to reject
	H2d (Endo_RM on TA-Inno_P)	[+] More + L > H	[+] More + H > L	Not Supported	Not Significant	Failed to reject
	H2e (Endo_RM on OB-Inno_P)	[+] More + H > L	[-] More + L > H	Not Supported	Not Significant	Failed to reject

Chapter 5 : Discussion of Results

5.1 Introduction

Growing emerging market economies will be the focus of the next century. It has been predicted that seven of the world's top twenty fastest growing economies will be in Africa (Mol et al., 2017; Zoogah et al., 2015). Telecommunications has been marked as one of the key vehicles through which emerging economies will see economic growth and participation whilst simultaneously addressing socio-economic challenges (Achterberg, 2010; Hawthorne et al., 2016; Naidoo, 2004). As global competition grows in the business arena, more and more organisations are turning to innovation for competitive advantage and longevity (da Silva Etges & Cortimiglia, 2017). Within this ambit, in the South African emerging economy context, this study endeavoured to shed light on what the significant (and most influential) predictors of innovation performance are in the telecommunications sector. Furthermore, it investigated how endogenous risk management moderates the relationship between the organisational antecedents of corporate entrepreneurship and innovation performance in the aforementioned context so as to understand whether it offers a significant enhancing effect.

This chapter discusses the key findings of the study against the literature reviewed in chapter two. Although not exhaustive, it illuminates similarities and differences found in existing bodies of knowledge. In the event that findings contradict theories or widely held opinions about supposed relationships, the researcher offers possible explanations the contradictions.

This chapter discusses sample characteristics, the research questions and hypotheses. It concludes with a summary of the chapter.

5.2 Profile of Respondents

5.2.1 Age of Respondent

Research on age and corporate entrepreneurship is relatively underdeveloped. With the exception of China, emerging economies tend to be characterised by younger populations (Kautonen, Down,

& Minniti, 2014) and the results for South Africa in this study were no different. In alignment with the above and the latest population statistics information available on South Africa (Stats SA, 2019), the age distribution of the respondents who participated in this study (Figure 4.3) show that the largest (55, 6%) age group were indeed youth aged between 25-34 years. The overall mean age of the respondents of 31, 9 years of age also fell within this expectation. Similar to Figure 5.1, the next largest working age group fell into the 35-44 years (28, 3%) category. The maximum available age group was 65 and older but the study recorded the eldest participants in the 45 to 54 age group, which was not surprising given that the general retirement age in the country is 60 years of age (Tondini, Ardington, & Woolard, 2017).

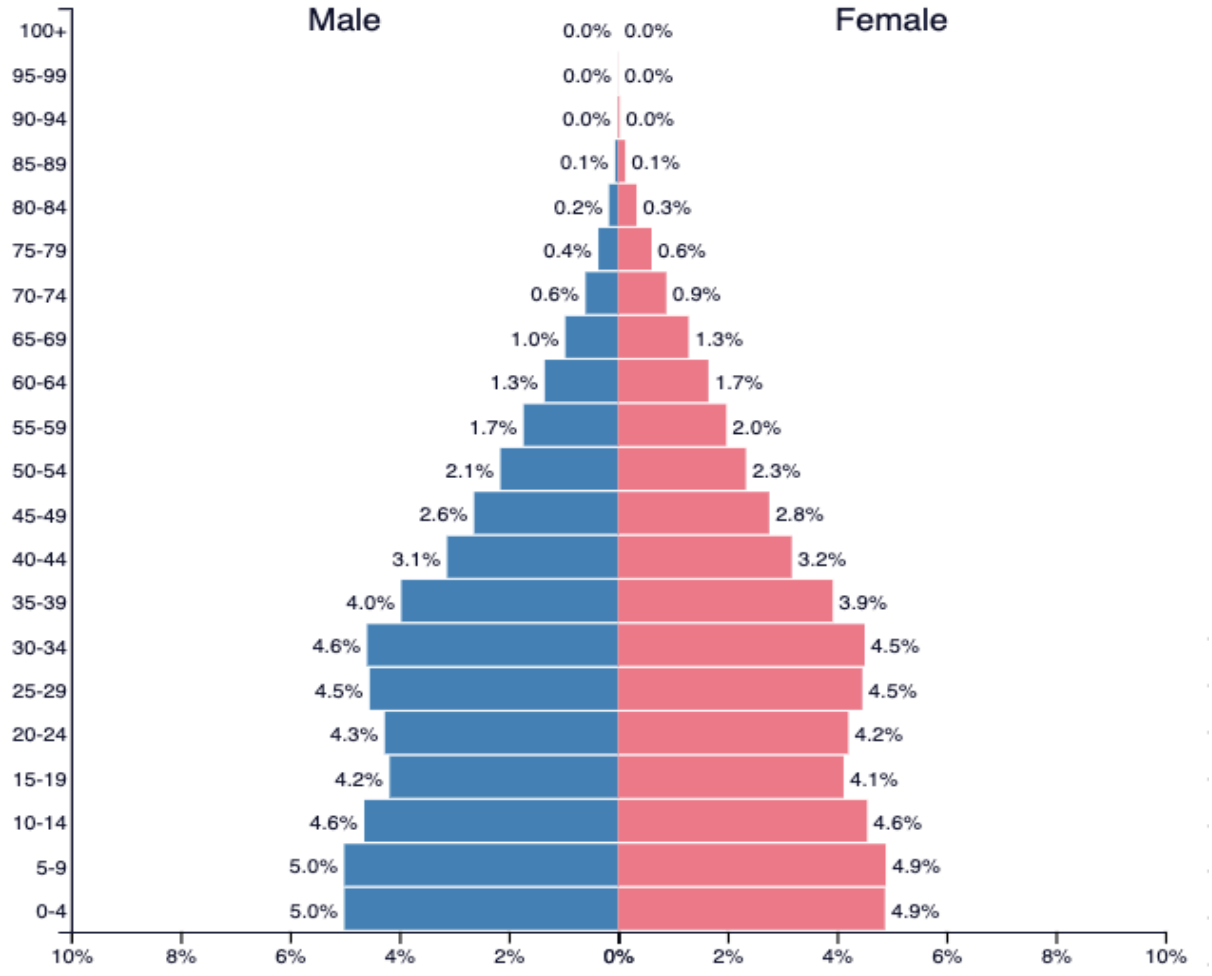


Figure 5.1: Population Pyramids of South Africa

Source: Polulation Pyramids (2019) in alignment with Stats SA (2019)

5.2.2 Gender of Respondents

The results on gender composition (Figure 4.4) show that the sample comprised a slight majority (58%) of female respondents and a balance of (42%) male respondents: 108 and 79 participants respectively. This finding varied from the expectation set by t ICASA (2019b), which gives an account of the telecommunication employment breakdown per gender, skills and disabilities. This report chronicled that 37% of the employees in the South African telecommunication sector are female. The Stats SA (2019) report on population statistics, details that the general South African workforce consists of 43.8% women. Herrington et al. (2010), on the other hand, highlighted that South African women make up 52% of the adult population, but only 41% of this form part of the active working population and only 14.7% find themselves in executive management positions (influencing strategic decisions pertaining to CE, Endo_RM and Inno_P).

The descriptive result of a cross tabulation (Figure 4.5) between gender and age showed that female youth (under 35, n=66 and *n*=18) formed the largest representation across the age groups of the respondents at the telecommunication firms. Furthermore, the slightly larger representation of female youth in the study may be due to the heightened willingness of youth to engage with technology, which could also suggest that the group is the ideal initial target that firms can engage in relation to innovation/entrepreneurial initiatives.

5.2.3 Population Groups of Respondents

The ethnicity of the respondents (Figure 4.6) indicated that 94.7% of the respondents were Black/African, 3.2% were White, 1.6% were Indian and 0.5% belonged to the Coloured population group. Generally, this was in line with national demographic estimates provided by Stats SA (2019). Table 5.1 shows that the largest ethnic representation nationally is the African population group, followed by smaller representations of other ethnic groups.

Table 5.1: Population estimates for South Africa by population group and sex

Population group	Male		Female		Total	
	Number	% distribution of males	Number	% distribution of females	Number	% distribution of total
Black African	23 124 782	80,7	24 318 477	80,8	**47 443 259**	**80,7**
Coloured	2 513 221	8,8	2 663 530	8,8	**5 176 750**	**8,8**
Indian/Asian	768 594	2,7	734 413	2,4	**1 503 007**	**2,6**
White	2 266 151	7,9	2 385 855	7,9	**4 652 006**	**7,9**
Total	**28 672 747**	**100,0**	**30 102 275**	**100,0**	**58 775 022**	**100,0**

Source: Stats SA (2019)

5.2.4 Position of Respondents Within the Firm

The distribution of the sample (Figure 4.7) in relation to positions held within the firm was consistent with the socio-economic context of corporate South Africa. The principal segment (36.9%) of respondents (which graph Figure 4.6 illustrates as African) held junior management positions, followed by general staff members, who were neither interns nor part of any level of management (31.6%), senior management (12.8%), entry level staff members (such as interns – 10.2%) and executive management (8.6%), respectively.

The above is most likely a reflection of the South African historic context that still lingers within corporate South Africa. A growing body of literature argues that increased diversity in senior management, including more women and racial ethnicities, improves firm performance and ultimately drives economic growth. This will provide organisations with access to unique networks, information and human capital, which in due course improves performance (Carter, D'Souza, Simkins, & Simpson, 2010; Hlobo, 2019). Based on prior research, pertinent information flow and knowledge dissemination are essential for both endogenous risk management (Everson et al., 2016; Mishra et al., 2019) and innovation (Alegre et al., 2013; Rauter et al., 2019; Zahra & George, 2002).

Nevertheless, the researcher is of the view that the significant representation of general employees as well as junior management (combined 68.5%) may reflect a less biased view of the firm on

variables under study, as senior management representatives may be more inclined to reflect more positively on corporate governance (Willows & van der Linde, 2016) of the firm, despite anonymity.

5.2.5 Level of Education of Respondents

Based on the human capital theory, education forms an important part of the innovation process. Ideas and other intellectual properties are considered human capital (Woodruff, 2019). Education is said to develop an individual's skills and knowledge base, thereby enhancing individual's ability to create/discover and exploit opportunities (Davidsson & Honig, 2003). Limitations in education have been identified as the principal inhibitor of entrepreneurial activity in South Africa. General levels of education and training, social and cultural norms and the regulatory environment were found to hold a significant and potentially negative role in this regard (Herrington et al., 2010).

Although the ICASA (2019b) report does not explicitly cover education levels within the industry, the report indicated that employees in the telecommunication sector are segmented as follows: 46% of total employees are semi-skilled , 34% are skilled and 6% unskilled. This indicates that the majority of employees find themselves with little to no skills.

The results of this study show that the largest segment of respondents in the sample (36.4%) held a postgraduate qualification, whilst a significant portion had the following undergraduate qualifications: bachelor's degree (25.1%) or diploma (23.5%). Respondents in possession of a secondary school qualification and those who did not advance beyond secondary schooling were in the minority. The respondents' education level was positively skewed towards a post graduate qualification (Figure 4.8).

Consistent with the human capital theory, this positive skewedness towards a post graduate qualification indicates that the human resource directive of the telecommunication entities place value on education. This approach circumvents the aforementioned limitations in education that have been cited as principal inhibitors of entrepreneurial activity in South Africa.

5.3 Profile of Firm

5.3.1 Firm Age

The telecommunications industry is dominated by large firms that have been in existence for decades (Achterberg, 2010). The results of this study were in alignment with this claim, as 57.2% (Figure 4.12) of the respondents were employed at firms that have been operating in the telecommunications sector for a period of 21 years or more, while 16% were employed by firms that have been in operation for 11-20 years. The remainder fell into firms that have been operational for a decade or less, which is not surprising given the high industry entry barriers for telecommunications (Hawthorne et al., 2016). As indicated in the literature review, notwithstanding new entrants (e.g. Rain), the South African telecommunications industry is still vastly dominated by a handful of established firms (such as Telkom, Vodacom, MTN and Cell C) with the smaller players involved in the less resource intensive spaces, such as ICT related service providers (Achterberg, 2010; ICASA, 2017; Naidoo, 2004).

Furthermore, it is worth noting that the study controlled for the influence of firm age – which has been said to influence firm innovation performance (Goodale et al., 2011). Younger firms are said to be more innovative, proactive and risk taking as they have less to lose (Soininen, Puumalainen, Sjögrén, Syrjä, & Richter, 2015).

5.3.2 Firm Size

The results (Figure 4.11) revealed that the bulk (69%) of respondents were from large firms (with 251 or more employees) which is in line the researcher's expectations based on previous research conducted on the industry (Hawthorne et al., 2016). The remainder of the participants 11.2 % were from medium sized firms, 7.5% from small firms and 12.3% from micro enterprises. The latter are envisaged to be the result of corporate venturing or players from within the market spaces with lower entry barriers such as value-add service providers. Due to the dominance of large firms in the South Africa telecommunications industry, the above results fell within expectations based on literature reviewed (Hawthorne et al., 2016) (Achterberg, 2010; ICASA, 2017; Naidoo, 2004).

Furthermore, it is noteworthy to highlight that the study controlled for the influence of firm size as this was expected to influence firm innovation performance (Goodale et al., 2011). de Villiers-Scheepers (2012) highlighted that large firms draw from a greater resource base than start-ups and as such this would cause variation in innovation outcomes.

5.3.3 Firm Location

According to Stats SA (2019), not only is Gauteng the economic hub of the country with the largest GDP contribution to the South African economy, it is also the most populous (Figure 5.2). KwaZulu-Natal is the second largest in both respects. The results of this study (Figure 4.13) were in line with this expectation. The respondents' telecommunication employers were dispersed as follows across the nation: Gauteng - 75%, KwaZulu Natal - 7%, Eastern Cape - 6%, Limpopo - 3%, Western Cape - 3%, Free State - 2%, North West - 2%, Mpumalanga - 1% and Northern Cape -1%.

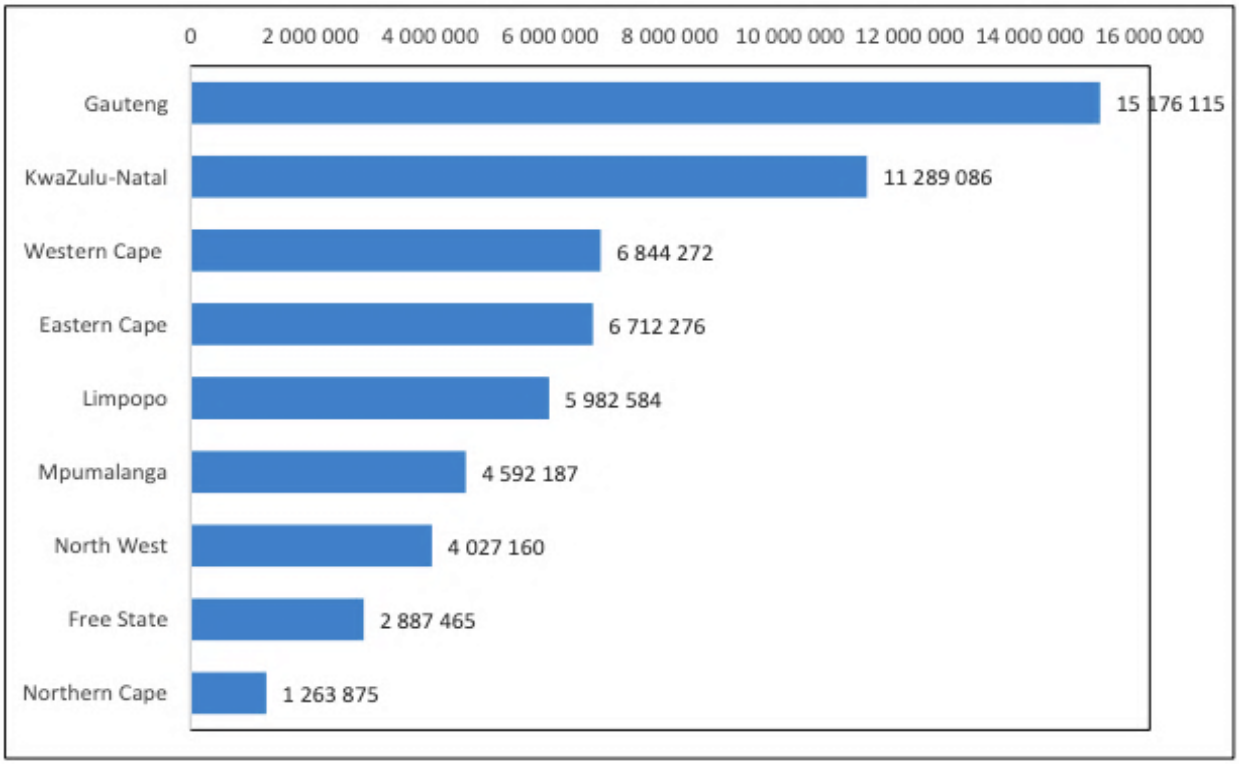


Figure 5.2: Mid-year population estimates for South Africa by province, 2019
Source: Stats SA (2019)

5.4 Discussion of Results

Neyman and Pearson (1928); (1933) proposed a framework of statistical inference for applied decision making and quality control in research. In this framework, two hypotheses were proposed: the null hypothesis of no effect and the alternative hypothesis of an effect, along with a control of the long run probabilities of making errors. The researcher utilised this framework as a frame of reference for hypothesis formulation, results presentation and subsequent discussion.

5.5 Discussion of Research Question One

This segment discusses the results for research question one of this study which reads as follows;

- In relation to the organisational antecedents of corporate entrepreneurship, what are the significant (and most influential) predictors of innovation performance in telecommunication firms in South Africa*?*

5.5.1 Hypothesis 1a Results

Based on existing literature, it was postulated that organisational antecedents of corporate entrepreneurship are positively related to innovation performance. Hypothesis 1a;

- H_{01a}. There is no statistically significant relationship between management support and innovation performance.
- H_{1a}. Management support is positively related to innovation performance.

Literature reviewed on the relationship between management support and firm innovation converged to a consensus of a positive relationship between these variables. According to Ireland et al. (2006) the willingness of top-level managers to facilitate and promote entrepreneurial behaviour among employees enables CE activities within an organisation. When managers champion innovative ideas whilst providing the resources needed, employees are encouraged to partake in entrepreneurial behaviour, leading to greater innovation performance (Hornsby et al.,

1993). As management invest in, support, facilitate, and promote entrepreneurial behaviour among employees, employees are encouraged to solve problems in innovative ways, seek opportunities in a proactive manner and embark on moderately risky undertakings. Kuratko, Hornsby, et al. (2014) stated that top management support has been found to have a direct positive relationship with an organisation's innovative outcomes.

Based on prior research (Goodale et al., 2011; Hornsby et al., 1999), a number of questions in the research instrument (Appendix D: Research Instrument) such as "Upper management is aware and very receptive to my ideas and suggestions", "Money is often available to get new project ideas off the ground", "Those employees who come up with innovative ideas on their own often receive management encouragement for their activities", "People are often encouraged to take calculated risks with new ideas around here", assessed the aforementioned notions at telecommunication firms and found that it paralleled as follows.

The results of the study aligned with the overarching theory on the MS-Inno_P relationship. There was sufficient evidence to conclude that there exists a significant and positive linear relationship between MS and Inno_P. Not only were the correlation coefficients ($r\ (187)$ = 0.470) found to be significantly different from zero, but the null hypothesis H_{01a}., which states that there is no statistically significant relationship between the variables at hand, was rejected, and the alternative hypothesis supported based on the multiple regression results. The latter exhibited a significant and positive relation (0.143) between the two variables in question.

From the correlation analysis, the strength of the MS-Inno_P relationship was found to be moderate. When taking into account other variables in the regression analysis, the significant and positive relation (0.143) between these two variables made the management support dimension of CE the second strongest predicator of innovation performance among the South African telecommunication firms.

5.5.2 Hypothesis 1b Results

- H_{01b}. There is no statistically significant relationship between work discretion/autonomy and innovation performance.
- H_{1b}. Work discretion/autonomy is positively related to innovation performance.

Research on work discretion revealed numerous contradictory findings stemming from prior studies conducted on the subject. Behavioural agency theory, which focuses on agent behaviour, with particular emphasis on internal governance, highlighted how lack of autonomy can be demotivating to employees, which in turn, can be counterproductive towards the desired firm innovation outcomes (Shi et al., 2017). Further evidence suggested that changing the work climate to support autonomy positively changes the extent to which employees internalise work rules, standards, and procedures whilst simultaneously encouraging them to act creatively, volitionally, and proactively (Stone et al., 2009).

Lumpkin and Dess (1996) argued that employees must be given freedom to exercise their creativity and that firms should champion promising ideas. A study carried out by Orth and Volmer (2017) affirmed that innovative behaviour exists when there is a presence of work autonomy, enhancing firm innovation performance. This was confirmed by Kumar and Appu (2016) who reiterated that three dimensions of work autonomy generate workplace creativity and newness and that newness is an outcome of innovation (Baskaran, 2017; Shane & Venkataraman, 2000). Kuratko, Hornsby, et al. (2014) and Baskaran (2017) highlighted that employees should be given an opportunity to exercise their work discretion in performing their duties as this leads to improvement in innovation outcomes.

In contrast, Alpkan et al. (2007) found that despite the claim that work discretion creates entrepreneurial orientation (innovation, risk taking) among employees, work discretion was negatively associated.

Based on prior research (Goodale et al., 2011; Hornsby et al., 1999)), some extracts of the research instrument (Appendix D: Research Instrument) that assessed this dimension were; "I have much

autonomy on my job and am left on my own to do my own work", " It is basically my own responsibility to decide how my job gets done", " I feel that I am my own boss and do not have to double-check all of my decisions", " This organisation provides freedom to use my own judgment", " This organisation provides me the chance to be creative and try my own methods of doing my job".

The results of this study were in alignment with Alpkan et al. (2007) study findings. The two variables were negatively associated. Despite a positive correlation coefficient (is $r\ (187) = 0.194$), when taking into account other variables in the regression analysis, the empirical evidence revealed that there exists a significant but negative (-0.120) relationship between work discretion and innovation performance. Consequently, the null hypothesis H_{01b}., was rejected whilst the alternative hypothesis was not supported (as the relationship was negative) despite the significant relationship. Work discretion/autonomy was found to have the least predictive power of innovation performance.

This finding may be attributed to a number of reasons. Based on further research, the researcher proposes the following as possible explanations: feeble national work ethic and/or lack of clear directive or objectives from employers to employees in pursuit of innovation. Herrington et al. (2010) reported that South Africa has a poor work ethic in the national labour force. Jonck, van der Walt, and Sobayeni (2017) chronicled South Africa as highly intolerant of failure and low in general work ethic. So left to their own discretion, the employees at the firms may not produce desired innovation outcomes. Slabbert (2011) also found that there is substantive negativity in the work ethic of the South African labour force, perhaps in relation to historical and cultural factors. When compared to that of China, it was found to be contradictory to that of South Africa. The disparity between China and South Africa may be due to differences in self-efficacy, national pride and patriotism, as these were found to be weaker in the South African labour force.

Kuratko, Covin, et al. (2014) were of the view that corporate innovation is commonly elusive for most companies due to a lack of understanding on what type of innovation is being sought. As such, this lack of clarity may substantiate the negative relationship between WD and Inno_P.

5.5.3 Hypothesis 1c Results

- H_{01c}. There is no statistically significant relationship between rewards/reinforcements and innovation performance.
- H_{1c}. Rewards/reinforcements are positively related to innovation performance.

Literature reviewed on the relationship between rewards/reinforcement and innovation performance implied a positive relationship. Rewards and reinforcement were said to foster the motivation of employees to engage in innovative, proactive and moderate risk-taking behaviour (Fry, 1987; Goosen et al., 2002; Shi et al., 2017) based on the prospect of rewards (Kuratko, Hornsby, et al., 2014). Numerous researchers cited the prospect theory for its predictions on how compensation structures influence employee behaviour and influence how employees make decisions (Parker, 2009; Shi et al., 2017; Wennberg et al., 2010). Similarly, the reinforcement theory, highlighted how positive reinforcements can promote innovation performance, through employee entrepreneurial activity (Olusadum & Anulika, 2018). However, Gordon (2007) argued that intentionality, which plays a significant role in employee decision making, was absent from this theory. The Locke goal-setting theory, offered an integrative model of motivation that views goals as key determinants of behaviour. Clear goal setting was cited as key to achieving innovation objectives that enhance firm innovation performance (Locke & Latham, 1991; Locke & Latham, 2019). Kuratko, Hornsby, et al. (2014) acknowledged reward and resource availability as a fundamental determinant of entrepreneurial behaviour that leads to greater firm innovation performance.

Based on prior research (Goodale et al., 2011; Hornsby et al., 1999)), some extracts of the research instrument (Appendix D: Research Instrument) that assessed this dimension were; “The rewards I receive are dependent upon my work on the job”, “My supervisor will give me special recognition if my work performance is especially good”, “My manager would tell his boss if my work was outstanding”, “Individuals with successful innovative projects receive additional reward and compensation for their ideas and efforts beyond the standard reward system.”, “Promotion usually follows the development of new and innovative ideas”.

In line with the literature above, the study found a significant and positive linear relationship between RR and Inno_P. The Pearson correlation coefficient (*r (187)* = 0.452) indicated a directly proportional relationship between the two variables. This finding prevailed, when taking into account other variables in the regression analysis (0.125). The rewards/reinforcement dimension of CE was found to be the third strongest predictor of innovation performance out of the five antecedents.

5.5.4 Hypothesis 1d Results

- H_{01d}. There is no statistically significant relationship between time availability and innovation performance.
- H_{1d}. Time availability is positively related to innovation performance.

Literature reviewed on the relationship between time availability and innovation performance revealed that in order for innovation performance to be heightened, employees need to be afforded the time to pursue innovations and that their jobs should be structured in a way that supports such effort (Ireland et al., 2006; Kreiser et al., 2019; Kuratko, Hornsby, et al., 2014; Kuratko et al., 2005; Osasuyi & Mwakipsile, 2017; Piyachat, 2017; Zahra et al., 2013).

Mowlaei (2017) highlighted that the significance of time availability rests heavily on learning and securing of new information, which is vital for enhanced innovation performance. (Chima & Kasim, 2018) proposed that the absence of time set aside for such activities may result in diminished innovation performance. Morris et al. (2008) also agree that time is an important factor. Freeing up employees' time by allowing them to try new things is essential in promoting corporate entrepreneurship behaviour. Suvonova et al. (2019) highlighted that the psychological stress of employees can be reduced when employees are provided with blocks of free time, which may help employees to successfully develop and implement work-related innovative ideas (Abbas & Raja, 2015). Urban and Verachia (2019) and Covin and Slevin (1989) emphasised that time availability, among other resources, is vital for improving entrepreneurial outcomes.

Based on prior research (Goodale et al., 2011; Hornsby et al., 1999)), some extracts of the research instrument (Appendix D: Research Instrument) that assessed this dimension were; " I always seem to have plenty of time to get everything done", "I have just the right amount of time and workload to do everything well", " My co-workers and I always find time for long-term problem solving".

Consistent with the bulk of literature on the subject, the results of this study showed a significant and positive relationship between time availability and innovation performance. The correlation coefficient indicated this ($r\ (187)$ = 0.317) and when taking into account other variables in the regression analysis, a significant and positive relation (0.162) was also confirmed between these two variables. The time availability dimension was found to be the strongest predictor of innovation performance among the South African telecommunication firms.

Considering that time availability was found to be the most influential predictor of innovation performance for telecommunication firms in South Africa, it was thought-provoking to note that outside of literature, little evidence was found on this as an area of focus or promotion in the industry, that is, time availed for innovative activities or employee entrepreneurial activity.

5.5.5 Hypothesis 1e Results

- H_{01e}. There is no statistically significant relationship between organisational boundaries and innovation performance.
- H_{1e}. Organisational boundaries are positively related to innovation performance

Literature reviewed on the relationship between organisational boundaries and innovation performance showed varying views. Yaşlıoğlu et al. (2017) highlighted that an entrepreneurial environment has organisational boundaries that are not excessively restrictive, allowing for knowledge dissemination practices that facilitate the application of knowledge and interaction among employees (Alegre et al., 2013), that results in superior innovation performance (Ireland et al. (2006) (Goosen et al., 2002). However, large firms were noted as having a bureaucratic inclination in organisational structure that may lead to perceived boundaries, creating obstacles to CE activities (Adeyeye et al., 2018; De Vries & Duque, 2018).

Kuratko, Hornsby, et al. (2014) emphasised that organisational boundaries that are sufficiently flexible motivate, coordinate, and empower entrepreneurial behaviour. Flexible organisational boundaries were noted to have a positive influence on employee performance. They are said to increase the satisfaction level of employees which increases performance (Malarvizhi et al., 2018; Maurice, 2013). Organisational boundaries can ensure the productive use of innovation-enabling resources, yielding greater firm innovation performance (Kuratko, Hornsby, et al., 2014).

Based on prior research (Goodale et al., 2011; Kuratko, Hornsby, et al., 2014), some extracts of the research instrument (Appendix D: Research Instrument) that assessed this dimension were; "My job description clearly specifies the standards of performance on which my job is evaluated", "On my job, I have no doubts about what is expected of me", "I clearly know what level of work performance is expected from me in terms of amount, quality, and timelines of output", "In the past three months, I have always followed standard operating procedures or practices to do my major tasks"

Pertaining to the relationship between organisational boundaries and innovation performance, the results of this study show that a significant linear relationship does not exist between OB and Inno_P. Although the correlation coefficient ($r\ (187) = 0.372$) suggested a weak positive relationship, when taking other variables into account in the regression analysis, a positive but insignificant relation (0.044) was evident between these two variables. Thus, the researcher failed to reject the null hypothesis. The organisational boundaries dimension was the fourth strongest predictor of innovation performance among the South African telecommunication firms.

Perhaps the feeble influence of organisational boundaries on innovation performance within the South African telecommunication sector can be better explained by additional research.

5.6 Discussion of Research Question Two

This segment discusses the results for research question two of this study which reads as follows;

- How does endogenous risk management moderate the relationship between the organisational antecedents of corporate entrepreneurship and innovation performance in telecommunication firms in South Africa?

5.6.1 Hypothesis 2a Results

Literature reviewed suggested that endogenous risk management influences the relationship between the organisational antecedents to corporate entrepreneurship and innovation performance (Goodale et al., 2011). Hypothesis 2a;

- $H_{2a.}$ The relationship between management support and innovation performance is more positive under low than high levels of endogenous risk management.

Management support was said to have a more positive influence on innovation performance when endogenous risk management is low based on implied endorsement through management support that views innovative initiatives as vetted (Zwikael & Sadeh, 2007). When this is the case, additional constraints on the process or emphasis of innovative efforts through an endogenous risk management lens were understood to only serve to obstruct their success (Goodale et al., 2011).

An extract of a few items used to assess the endogenous risk management factor, founded on past research by Goodale et al. (2011); Mishra et al. (2019) Hu and Wu (2016); Kimbrough and Componation (2015); Everson et al. (2016), read as follows; “This firm has a strong presence of control-related structures and systems to manage risk that may arise from within the firm”, “This firm has a strong presence of control-related policies to manage risk that may arise from within the firm., “This firm identifies, analyses evaluates, treats/addresses, controls and monitors risk…”

Contrariwise, the results of this study found that the relationship between management support and innovation performance is more positive under high than low levels of endogenous risk management (Figure 4.30), contradicting hypothesis 2a.In addition it was found that there is no evidence of a significant moderating relationship.

This insignificant enhancing effect may be due to varying study contexts. Similar studies conducted previously were in developed economies. The researcher is yet to find a study that investigates the moderating effect of endogenous risk management in the South African emerging market context. Perhaps additional research in this area could reveal further insights.

5.6.2 Hypothesis 2b Results

- $H_{2b.}$ The relationship between work discretion/autonomy and innovation performance is more positive under high than low levels of endogenous risk management

Literature reviewed held varying view. Behavioural agency theory suggested that ongoing external monitoring and control from managers reduces employees' intrinsic motivation and inhibit desired firm innovation outcomes (Shi et al., 2017). In contrast, Goodale et al. (2011), assert that endogenous risk management facilitate the positive effect of work discretion/autonomy on innovation performance. Lower innovation performance was expected to result from work discretion/autonomy that is not tied to the existence of endogenous risk management.

The results of the study show that the relationship between work discretion and innovation performance is more positive under low than high levels of endogenous risk management (Figure 4.31), contradicting hypothesis 2b. Furthermore, the researcher discovered that there was no evidence of a significant moderating relationship. This finding was in direct contrast to Goodale et al. (2011) study.

This insignificant enhancing effect may be due to varying study contexts. Similar studies conducted previously were in developed economies. The researcher is yet to find a study that investigates the moderating effect of endogenous risk management in the South African emerging market context. Perhaps additional research in this area could reveal further insights.

5.6.3 Hypothesis 2c Results

- $H_{2c.}$ The relationship between rewards/reinforcements and innovation performance is more positive under high than low levels of endogenous risk management.

The existence of rewards/reinforcements for innovative activities is said to enhance innovation performance when risk controls are emphasised. Literature shows that innovative behaviours and initiatives that are both rewarded and have been subjected to careful risk evaluation are likely to gain momentum within organisations (Balkin & Logan, 1988; Kanter, 1994). Rewards were found to prompt and sustain innovative behaviours and initiatives that have been determinedly judged to have an acceptable risk-return probability, a combination which ought to result in high innovation performance outcomes (Goodale et al., 2011).

The results of the study show that the relationship between rewards/reinforcements and innovation performance is more positive under low than high levels of endogenous risk management (Figure 4.32), contradicting hypothesis 2c. Furthermore, the researcher determined that there was no evidence of a significant moderating relationship. This finding was in direct contrast to Goodale et al. (2011) study.

This insignificant enhancing effect may be due to varying study contexts. Similar studies conducted previously were in developed economies. The researcher is yet to find a study that investigates the moderating effect of endogenous risk management in the South African emerging market context. Perhaps additional research in this area could reveal further insights.

5.6.4 Hypothesis 2d Results

- $H_{2d.}$ The relationship between time availability and innovation performance is more positive under low than high levels of endogenous risk management.

In the literature reviewed, the moderating effect of endogenous risk management on the time availability innovation performance relationship was said to be more positively related to

innovation performance when endogenous risk management is low. Time constraints were highlighted as a limitation to innovative behaviours and initiatives, resulting in poor innovative outcomes (Goodale et al., 2011; Ireland et al., 2006; Schuler, 2006).

The results of this study show that the relationship between time availability and innovation performance is more positive under high than low levels of endogenous risk management (Figure 4.33), contradicting hypothesis 2c. Furthermore, the researcher found that there was no evidence of a significant moderating relationship. This finding was in direct contrast to Goodale et al. (2011) study.

This insignificant enhancing effect may be due to varying study contexts. Similar studies conducted previously were in developed economies. The researcher is yet to find a study that investigates the moderating effect of endogenous risk management in the South African emerging market context. Perhaps additional research in this area could reveal further insights.

5.6.5 Hypothesis 2e Results

- $H_{2e.}$ The relationship between organisational boundaries and innovation performance is more positive under high than low levels of endogenous risk management.

In the literature reviewed, organisational boundaries were said to positively influence innovation performance when endogenous risk management is high. This relationship was implied by the possibility that the existence of organisational boundaries that may implicitly sanction innovative behaviours and initiatives, thus pardoning those behaviours and initiatives from critical evaluation may stimulate innovative performance. The presence of endogenous risk management when organisational boundaries are high may ensure that innovative behaviours and initiatives are consistent with the organisation's best interests and likely to result in desirable innovation performance outcomes (Goodale et al., 2011).

The results of this study show that the relationship between organisational boundaries and innovation performance is more positive under low than high levels of endogenous risk

management, contradicting hypothesis H_{2e}. Furthermore, it was determined that there is no evidence of a significant moderating relationship.

This insignificant enhancing effect may be due to varying study contexts. Similar studies conducted previously were in developed economies. The researcher is yet to find a study that investigates the moderating effect of endogenous risk management in the South African emerging market context. Perhaps additional research in this area could reveal further insights.

5.7 Chapter Summary

This chapter commenced with a presentation and discussion on the sample characteristics of the study. Research revealed that emerging economies tend to be characterised by younger populations and the results of the study confirmed these findings in relation to South Africa. The largest segment of the respondents were African female youths based in Gauteng who held junior management positions within their respective telecommunication firms. The bulk of the respondents were from large firms that have been in operation for two decades or longer.

Discussion of the results unpacked a comparison between findings in literature and the key findings of this study. The statistical significance and predictive power of each antecedent of corporate entrepreneurship on innovation performance within telecoms SA was articulated. A ranking based on the strength of each relation was provided. This allowed the researcher to draw conclusions on the most influential dimension of CE on Inno_P. An enhancing but insignificant moderating effect endogenous risk management compared oppositely with findings in literature.

Chapter 6 : Conclusions, Implications, Recommendations

6.1 Introduction

In this study, the researcher sought to empirically examine the correlation between corporate entrepreneurship and innovation performance and establish the dimensions of CE that emerge as the highest predictors of innovation performance within the telecommunications sector in South Africa. Furthermore, it intended to identify any potential moderating effect of endogenous risk management on this relationship. This investigation ought to broaden understanding of CE, Endo_RM and Inno_P within the South African context and potentially, other emerging economies. This chapter provides the conclusions of the study. The envisaged theoretical and practical contributions to the entrepreneurial ecosystem are noted. The chapter also highlights the limitations of the study and offers suggestions for future research.

6.2 Conclusions of the Study

Innovation and risk are indivisible. The mismanagement of risk can carry an enormous penalty. In recent history, the corporate community has observed a number of risk calamities that have resulted in substantial loss. Mounting evidence harmoniously, advocates that effective risk management is an archetypal characteristic of successful firms. At an academic level, literature discusses the importance of an organisational culture and enterprise risk management as a means of improving firm and innovation performance. However, there is scant empirical evidence to support this connection. This was identified as an evident research gap within the South African context. At industry level, the South African telecommunications sector has experienced adverse consequences due to mismanagement of risk that arose from lack of control-related structures, policies, systems, and knowledge management systems pertaining to innovation performance.

Data analysis of the study comprised correlational analysis, backward elimination method, multiple regression and moderation analysis. The antecedents of corporate entrepreneurship namely management support (MS), rewards/reinforcement (RR) and time availability (TA) were found to be significant predictors of innovation performance with a 99 percent confidence level, whilst organisational boundaries (OB) were found to be insignificant predictors of innovation

performance. A significant but indirectly proportional relationship was found between work/discretion/autonomy (WD) and innovation performance.

It is noteworthy that the regression analysis revealed TA, MS and RR, as the most influential predictors of innovation performance, listed in descending order of strength. Firms that avail time to employees, offer rewards/reinforcement and management support for employee entrepreneurial activity are expected to yield prodigious results in innovation performance. Furthermore, the results indicated that endogenous risk management has a moderating effect on the relationship between CE and Inno_P. However, this was discovered to be statistically insignificant for each dimension of CE in relation to Inno_P. Perhaps additional research in this study area could reveal further insights.

6.3 Theoretical Contribution and Recommendation

Identifying factors that moderate or mediate key relationships has been said to fall within the common types of theoretical contribution in academia (Baum & Wally, 2003; Miller & Shamsie, 1996). Extending theory to explain a phenomenon in a new context is also said to do the same (Chatterjee & Hambrick, 2007). This study did both; not only did it investigate for a moderating effect but it did so within a new geographic, economic and cultural context. As such this enriches existing bodies of literature in entrepreneurship and management. Specifically, the study explored enterprise risk management, resource based view, behavioural agency, human capital, prospect, innovation and corporate entrepreneurship theory. The key contributions are as follows.

Pertaining to enterprise risk management, the researcher explored how various levels of endogenous risk management influence the CE_Inno_P relationship. The researcher did this by coding for low, medium and high levels of endogenous risk management and comparatively analysing these for insights on the South African telecommunication sector. What was interesting to note, was that the results of this study showed a precisely reversed reflection on the outcome of the moderating effect when comparing to the previous research conducted in a developed economy context

With regards to innovation, through the human capital theory perspective it was established that a significant portion of the knowledge that is needed for innovation, rests within individuals. Individuals were said to be primary agents of knowledge creation and in the case of tacit knowledge, they are the principal storehouses of knowledge, as such telecommunication firm employees ought to form part of the principal development strategy of the firm. In addition, individual knowledge and skills can sometimes be rare and complex, thus making them difficult to imitate. As a result, in alignment with the human capital theory, human capital is regarded as a critical resource in developing innovations and a sustainable competitive advantage for firms (Hitt et al., 2011).

In relation to corporate entrepreneurship, the researcher explored prospect, reinforcement, resource-based view and behavioural agency theories. The study made a noteworthy contribution to make the dimensions of corporate entrepreneurship. The researcher aspires to further extend the theoretical contribution by introducing a new construct into antecedents of corporate entrepreneurship that ought to play an indispensable role in firm (innovation) performance, namely ***organisational intelligence.***

Glynn (1996) advises that although intelligence has been associated primarily with individuals, some authors have begun to conceptualise and measure it at a collective level (Williams & Sternberg, 1988). The rise in complexity of products and services, shorter life cycles, and rapidly changing market demands require new/different capabilities and management practices to successfully develop innovations and sustain a firm's competitive advantage. These capabilities enable an organisation to learn from and about its environment (Lawson & Samson, 2001). As such, the researcher proposes adding this increasingly important factor (Figure 6.1.) that Rauter et al. (2019) and Yolles (2005), among other scholars, have explored outside of the dimensions of CE.

Yolles (2005) stated that it is widely accepted that an entity's capability to innovate is closely tied to its intellectual capital and its ability to utilise its knowledge resources. There is a clear link between collective knowledge and innovation performance (Andries & Czarnitzki, 2011). The resource based logic is testament to how entrepreneurial opportunities exist mainly because of the

varying value placed on them by those with certain intelligence. How a firm acquires, process and utilises information is a distinct and significant organisational factor used in corporate entrepreneurship that may give rise to variance in firm (innovation) performance among different firms. Consequently, it ought to be recognised as such - an antecedent of corporate entrepreneurship.

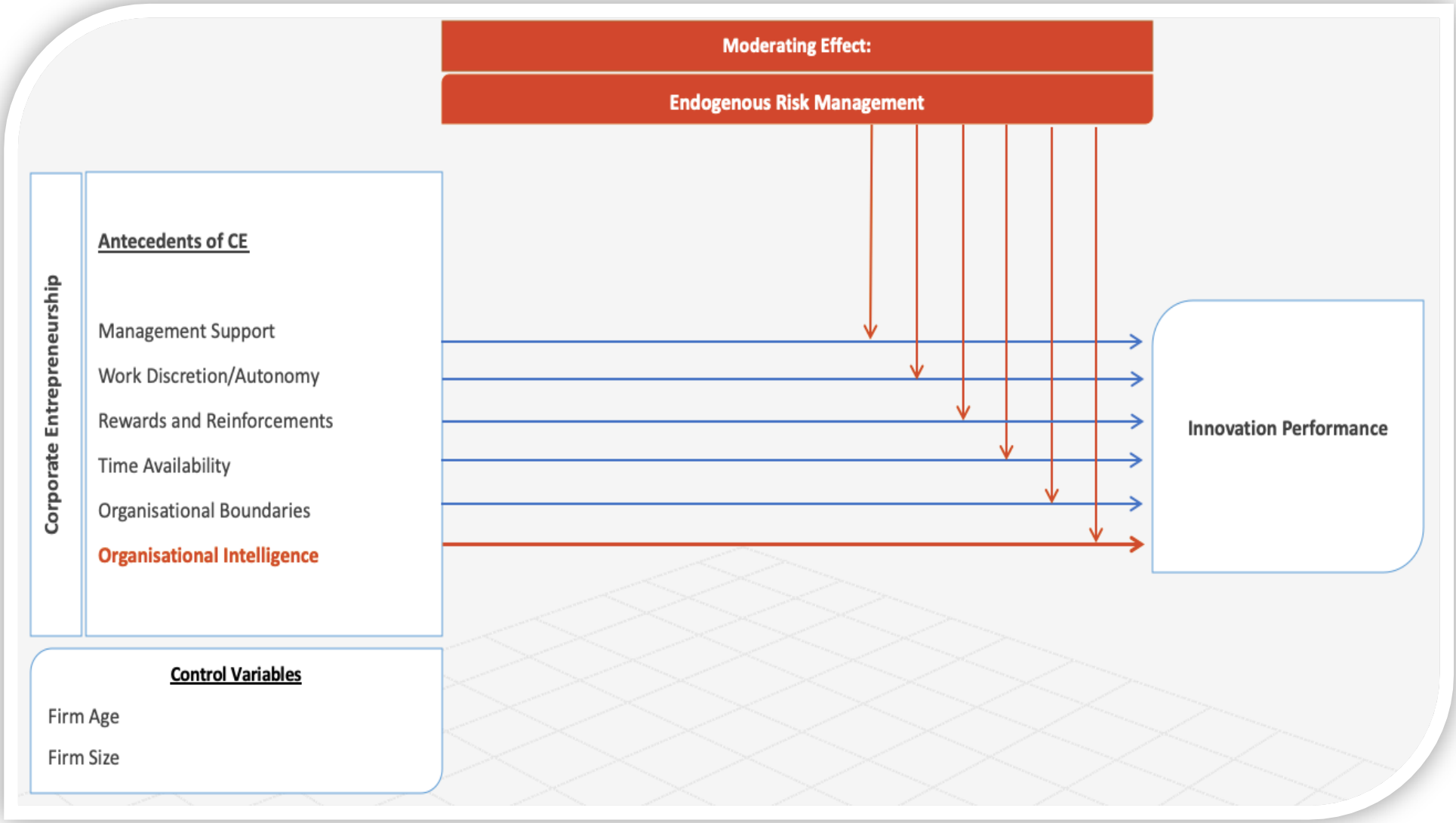


Figure 6.1: Proposed Construct Addition - Corporate Entrepreneurship Model

6.4 Practical Contribution and Recommendation

6.4.1 Practical Implications and Recommendations for Employees

Employees ought to be intentional about building their knowledge base through formal and informal means wherever possible. This will ensure that keep abreast of changing environments. Employees can immerse themselves in invigorating, initiatives and/or contribution, something that may be a little less comfortable for some. They can ensure that no voice is left unheard regardless of personality types. Part of learning and adding value is developing agility in different environments. The greatest innovations may come from where they are least expected.

6.4.2 Practical Implications and Recommendations for Telecommunication Firms

In pursuit of sustainable competitive advantage and longevity it is within telecommunication firms' interest to pay close attention to the internal organisational strategies that cultivate employee entrepreneurial activity, yielding greater innovation outcomes. Proposed below are key insights that have the researcher believes will contribute significantly in generating a creative organisational culture that will enhance innovation performance in telecommunication firms.

- Telecommunication firms can stablish innovation-oriented committees that are responsible for the facilitation of innovation through the creation and maintenance of an enabling environment. This team ought to have diverse representation in ethnicity, gender and employment levels (strategic, tactical and operational) of the firm. One of the priorities of such a committee could be inclusive CE and Endo_RM strategy development that takes context, culture and its uniqueness into account.

- In order to identify any gaps, anonymous feedback loops for the entire organisation should be available to assess how the firm is performing in relation to the variables under study. Measurement gives insights of performance A tool such as the CEAI can serve as a diagnostic device to identify the level of corporate entrepreneurial activity already taking place within the telecommunications organisation and bring to the fore the actions that need

to be taken to improve corporate entrepreneurship and innovation performance. Apt application of the CEAI tool could serve as a powerful tool for CE insights.

- Based on Locke's goal setting theory, which offers an integrative model of motivation, firms can set clear goals as key determinants of behaviour. Through unambiguous setting of innovation goals that are specific, challenging, and accepted, the firm will be in a better position to meet its targets.

- Established firms in South Africa are mandated to set aside resources for training and development for their employees. This resource base can be utilised for intentional human capital development that assists the firm to reach its organisational culture and innovation performance objectives. Employee innovation programmes could be developed from the aforementioned insights - continuous, less structured and focused on individualised and collective knowledge, skills and experience requirements.

- From the resource-based view (RBV) of the firm, we noted that resources and capabilities are regarded as the principal sources of sustainable competitive advantage. Telecommunication firms ought to develop their innovative capabilities in order to improve this advantage. New product introduction rate was highlighted as a function of a firm's ability to manage, maintain and create knowledge. Firms need to be intentional about the resources they offer and the capabilities and abilities that they develop.

- As indicated by de Villiers-Scheepers (2012), established firms draw from a greater resource base than start-ups, but established firms' entrepreneurial capacity for innovativeness, risk-taking and proactiveness is often constrained by structures, systems and processes instituted during the formalisation and growth of the firm to achieve efficiency and effectiveness. Therefore, large firms need to intentionally cultivate their entrepreneurial capabilities through corporate entrepreneurship.

- The time availability dimension of corporate entrepreneurship was found to have the strongest influence on innovation performance. Telecommunication firms in South Africa

can ensure that time is availed for innovation activities or employee entrepreneurial activity.

- The management support dimension of corporate entrepreneurship was found to have the second strongest influence on innovation performance. Based on the resource-based view, telecommunication firms in South Africa can make pertinent resources available. This support from management can manifest in various practises and customs that include, but are not limited to, espousing innovative ideas, acknowledging and appreciating employees that articulate these ideas, making adequate preparation and offering of required resources (financial, nonfinancial, tangible, intangible) and providing the necessary expertise as well as institutionalising entrepreneurial activity within the firm's systems and processes.

- The rewards and reinforcement dimension of corporate entrepreneurship was found to have the third strongest influence on innovation performance. Based on the prospect, reinforcement and behavioural agency theory, telecommunication firms in South Africa can make use of both extrinsic and intrinsic rewards in order to obtain commitment from employees stimulating effort towards reaching set goals. Various rewards and reinforcement methods can be provided by firms to facilitate a culture of creation and innovation, such as performance based bonuses (added incentive to any existing blanket approaches such as the 13th cheque).

- A transparent monitoring tool with spectrum of performance outcome could be used as health competition between departments (homogenous) or heterogeneous teams from across various divisions to make the best use of diverse views and knowledge bases.

- Response to failure – firms ought to ensure that they are unambiguous on their risk appetite and relay this undoubtedly to their workforce. In the event of failure in the innovation process, firms ought to respond in a manner that encourages employees to partake in the process of continuous improvement as per the Japanese Kaizen principle. How the firm responds to one employee will send a message to the rest.

6.4.3 Practical Implications and Recommendations for Policy Makers

Policymakers can encourage greater national innovation outcomes through crafting regulations that simultaneously benefit both firms and employees. If the public policy goal is to grow the economy through entrepreneurial activity in the country, government ought to play the role of setting the tone. The South African government is in a position to be an anchor of meaningful change through apt policy making that incentivises the various stakeholders in the telecommunications entrepreneurial ecosystem.

Where industry holds ambiguous views on matters of national concern, such as labour relations, especially pertaining to innovation, policy makers ought to provide clarity and guidance that protect all parties involved. An example of this could be mandating that all telecommunication firms have a corporate entrepreneurial and/or innovation management policy in place. An explicitly defined stance from the firms on these variables could prevent any adverse consequences that could arise from a lack of control-related structures, policies, systems, and knowledge management systems pertaining to innovation, an issue that is currently brewing in the industry.

Moreover, the government could provide certain tax incentives for firms that offer partial or long-term benefits to employees for innovations created to ensure that relationships with the ecosystem remain symbiotic.

The monumental role played by the telecommunication sector in the maintenance and growth of the micro, meso and macro-economy warrants that policy makers should be concerned about the progression of this industry.

6.4.4 Practical Implications and Recommendations for Industry Regulators

Through apt regulation, industry bodies can ensure the protection of all parties involved in the ecosystem. Activist groups can positively inspire synergies and cohesion between members of this ecosystem though intentional programmes and campaigns.

6.5 Study Limitations

This study is not without limitations. However, these can be overcome through future research.

- First, the researcher focussed on the extension of theory and knowledge within a specific industry, namely the telecommunications industry, which may limit generalisability or inferences of the findings to other industries or contexts.

- Second, this study does not analyse how external factors (e.g. regulatory influences, market conditions and technology developments) impact corporate entrepreneurship, risk management and ultimately the innovation performance of a firm. Additional control variables in future studies may provide more distilled insights.

- Third, the researcher built on a limited number of theories for this study, as such the researcher encourages future exploration of other theories to stimulate scholarly discourse on developing management theories relevant to African firms.

- Fourth, there exists tremendous diversity within the various provinces in South Africa, perhaps a study with a lower quest for frugality and more time could yield some enthralling understandings.

- Fifth, the limitations of the instruments are noted, as products of western/developed economy contexts applied to the emerging market context, specifically South Africa, in order to measure the same elements (key internal organisational factors that influence a firm's entrepreneurial activities and outcomes and the moderating effect of Endo_RM).

- And lastly, a more strategic approach could be undertaken to encourage greater participation from corporates. An increased number of responses may provide a more accurate reflection of the population under study.

It is in light of the above-mentioned limitations that this study's results and associated implications ought to be viewed.

6.6 Suggestions for Future Research

This research stemmed from similar research done in developed economies (e.g. Goodale *et al*, 2011). Insufficient evidence was found on research that seeks to understand the correlation between the three variables under study within the emerging economies context, including South Africa. Several avenues for future research emerge from this study in pursuit of understanding how firms can effectively balance the facilitation and control of innovation within this context. These are noted as follows:

- Characteristics of innovation - most prior systematic investigations, including this one, have considered variations on innovation rather than the characteristics of innovation. As such, it is unclear as to whether the same risk management configurations are equally effective across different innovation types, or how management control systems are employed when pursuing multiple and potentially contradictory innovation modes (Bedford, 2015). Studies that focus on characteristics of innovation would expand theory/literature and understanding in this area.

- Longitudinal study - this study employed a cross-sectional research design where the data were collected at a single point in time. This approach was adequate to gather the amount of data required within the limited time frame. Though it could provide several insights through a snapshot of the viewpoint, it did not address the continual process that occurs in a business environment and did not detect causal effects of variables. A longitudinal study could provide a clearer picture of how firms acquire and practice CE and how the CE influences the innovation performance of telecommunication firms and the moderating effect of Endo_RM over time (Mohamad et al., 2011). Additionally, a longitudinal study would provide the ability to show not only the patterns but potential *sleeper effects* or connections between events that might otherwise have not been linked. This in turn would provide useful and actionable data for telecom firms.

- New context, location and/or culture - other emerging economies, more so the African context would benefit from further research in this area given the pre-empted importance of African economies over the next decade. Furthermore, the respondents were predominantly from the highly developed and urban province of Gauteng. Underdeveloped provinces could provide varying insights that could add to literature on the South African context.

- Exogenous factors - this study focused on endogenous risk management and internal antecedents of corporate entrepreneurship and their impact on innovation performance. Studies with a broader scope may consider external/environmental antecedents (de Villiers-Scheepers, 2012) such as government policy, competition, technology, resources and services, products, markets and demand (Mohamad et al., 2011) as well as exogenous risk management (Hermann, Kessler, & Fink, 2010). Such an approach has the potential to offer a theoretical framework in advancing the field toward greater appreciation of the antecedents of CE and Endo_RM in non-traditional contexts (Hermann et al., 2010; Hughes & Mustafa, 2016).

- This study looked at product/service and process innovation - future research could include investigation on the extent of change/degree of innovation; incremental, disruptive, architectural and radical or across various stakeholders such as employee, customer, supplier, competitor and public innovation.

- Mixed research approach - systematic integration of quantitative and qualitative research within a single investigation could provide insight on nuances that could otherwise be missed in a single approach (such as the singular quantitative approach utilised in this study). A mixed research method could provide qualitative insight on the quantitative responses provided (e.g. on why organisational boundaries are not a significant predictor of innovation performance or work discretion/autonomy is inversely related to Inno_P within the South African telecommunications context as found in this study). This approach

would be especially useful in understanding contradictions between quantitative results and established theories pertaining to variables under study.

- Instrument re-evaluation – the corporate entrepreneurship assessment instrument is a distinguished North American psychometric instrument which attempts to measure the effectiveness of the key internal organisational factors, or climate, that influence innovative activities and behaviours within a firm, as such it was built within a vastly different context. The re-evaluation, potential customisation or development of a CEAI that is best suited for the emerging markets context through systematic and empirical research could benefit the African region theoretically at an academic level and practically at industry level as the instrument may not be a size fits all as argued Van Wyk and Adonisi (2011). In their investigation on the construct validity of CEAI for a South African sample, Van Wyk and Adonisi (2011) contend that psychometric instruments cannot necessarily be transferred between different cultures/contexts. In addition, Vizitiu, Agapie, Paiusan, Hadad, and Nastase (2018) affirm that that psychometric instruments have limited cross-cultural portability.

- Expansion of CEAI framework - through further research, scholars could interrogate the potential benefit of the inclusion of new constructs such as organisational intelligence at a firm level and/or self-efficacy, potentially providing insight that may also address counterintuitive findings such as that found on work discretion/autonomy and organisational boundaries within the SA telecommunications sector.

- Mediation – future research could test for a mediating effect from Endo_RM on the CE-Inno_P relation as there is scant literature on this effect within the African context. Findings could be of value to the industry and potential areas of inference.

6.7 Conclusion

"*If there is no enemy within, the enemy outside can do us no harm*" – African Proverb. Through strategic focus on cultivating internal environments that facilitate grander innovation performance, firms can make boundless use of this aspect of business that lies within their realm of control. Endogenous factors such as CE and Endo_RM are what telecommunication firms have within their sphere of, almost absolute, influence to bring about desired outcomes. The more precise and clearly articulated the innovation objectives of a firm, the more likely they are to receive commitment and acceptance from employees. By nature, the novelty of innovation is accompanied by risk and possibilities of loss. As such, firms ought to be more tolerant and accommodating towards failure and error so as to promote an entrepreneurial culture among employees.

This study sought to provide insight that could help telecommunication firms to effectively balance the facilitation and control of innovation through corporate entrepreneurship and risk management effect insights. This empirical study revealed that through apt focus on corporate entrepreneurship dimensions with greater predictive power such as time availability, management support, and rewards and reinforcements, firms can take their business to new heights through improved innovation performance. Although statistically insignificant, endogenous risk management was found to have an enhancing effect on innovation performance. Further research may reveal noteworthy insights. It may also be beneficial to discover how endogenous risk management acts in association with the determinants of corporate entrepreneurial activity to encourage the innovation outcomes that enable long-term organisational success, when the organisational intelligence dimension is incorporated into the corporate entrepreneurship framework.

The nucleus of this study was the telecommunications industry in South Africa. Within this context and potentially numerous others, the point of equilibrium between *facilitation* and control - *flexibility* and efficiency - is a truth we ought to never tire of pursuing.

Reference List

Abbas, M., & Raja, U. (2015). Impact of psychological capital on innovative performance and job stress. *Canadian Journal of Administrative Sciences, 32*(2), 128–138. doi:https://doi.org/10.1002/cjas.1314

Achterberg, R. (2010). Competition policy and regulation: A case study of telecommunications. *Development Southern Africa, 17*(3), 357-371. doi:https://doi.org/10.1080/713661414

Adeyeye, D., Egbetokun, A., Opele, J., Oluwatope, O., & Sanni, M. (2018). How Barriers Influence Firms' Search Strategies and Innovative Performance. *International Journal of Innovation Management, 22*(1), 1-21. doi:https://doi.org/10.1142/S1363919618500111

Afuah, A. (1998). *Innovation management: Strategies, implementation, and profits.* New York: Oxford University Press.

Aguinis, H., Edwards, J. R., & Bradley, K. J. (2017). Improving Our Understanding of Moderation and Mediation in Strategic Management Research. *Organizational Research Methods, 20*(4), 665-685.

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Thousand Oaks, CA: Sage.

Albors-Garrigos, J., Igartua-Lopez, J. I., & Peiró-Signes, A. (2018). Innovation Management Techniques And Tools: Its Impact On Firm Innovation Performance. *International Journal of Innovation Management ·, 22*(6), 1-31. doi:10.1142/S1363919618500512

Alegre, J., Sengupta, K., & Lapiedra, R. (2013). Knowledge management and innovation performance in a high-tech SMEs industry. *International Small Business Journal, 31*(4), 454-470. doi:https://doi.org/10.1177/0266242611417472

Ali, A., Warren, D., & Mathiassen, L. (2017). Cloud-based business services innovation: A risk management model. *International Journal of Information Management, 37*(6), 639-649. doi:10.1016/j.ijinfomgt.2017.05.008

Alpkan, L., Yilmaz, C., & Kaya, N. (2007). Market orientation and planning flexibility in smes: performance implications and an empirical investigation. *International Small Business Journal, 25*(2), 152–172. doi:https://doi.org/10.1177/0266242607074518

Altman, J., & Zacharakis, A. L. V. N., pp. . (2003). An integrated model for corporate venturing. *Journal of Private Equity, 6*(4), 68 ‐ 76. doi:https://doi.org/10.3905/jpe.2003.320057

Alvarez, S. A., & Busenitz, L. W. (2001). The entrepreneurship of resource-based theory. *Journal of Management, 27*(6), 755–775. doi:https://doi.org/10.1177/014920630102700609

Amabile, T. M., & Conti, R. (1999). Changes in the Work Environment for Creativity During Downsizing. *Academy of Management Journal, 42*, 6. doi:https://doi.org/10.5465/256984

Andries, P., & Czarnitzki, D. (2011). Small Firm Innovation Performance and Employee Involvement. *Small Business Economics volume, 43*(1), 21–38. doi:http://dx.doi.org/10.2139/ssrn.2109277

Antoncic, B., & Hisrich, R. D. (2001). Intrapreneurship: construct refinement and cross‐cultural validation. *Journal of Business Venturing, 16*(5), 495‐527. doi:10.1016/S0883-9026(99)00054-3

Ayankoya, K. (2016). *Entrepreneurship in South Africa - A Solution*. Retrieved from Port Elizabeth, South Africa.:

Bajpai, S., & Bajpai, R. (2014). Goodness of Measurement: Reliability and Validity. *International Journal of Medical Science and Public Health, 3*(2), 112-115. doi:10.5455/ijmsph.2013.191120133.

Balkin, D. B., & Logan, J. W. (1988). Reward Policies that Support Entrepreneurship. *Compensation and Benefits Review 20*(1), 18–25. doi:https://doi.org/10.1177/088636878802000103

Bandura, A., & Locke, E. A. (2003). Negative Self-efficacy and Goal Effects Revisited. *Journal of Applied Psychology, 88*(1), 87–99. doi:10.1037/0021-9010.88.1.87

Baregheh, A., Rowley, J., & Sambrook, S. (2009). Towards a Multidisciplinary Definition of Innovation. *Management Decision, 47*(8), 1313-1339. doi:10.1108/00251740910984578

Barney, J. B., Ketchen, D. J., Wright, M., Ketchen, D. J., & Wright, M. (2011). The Future of Resource-Based Theory. *Journal of Management, 37*(5), 1299-1315. doi:10.1177/0149206310391805

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*(6), 1173-1182.

Bartol, K. M., & Martin, D. (1998). *Management International Edition.* New York: New York: McGraw-Hill.

Barton, T., Shenkir, W., & Walker, P. (2002). *Making Enterprise Risk Management Pay Off*. New Jersey: Pearson Education Inc.

Baskaran, S. (2017). The Role of Work Discretion in Activating Entrepreneurial Orientation among Employees. *Journal of Entrepreneurship and Business, 5*(2), 11-24. doi:10.17687/JEB.0502.02

Baum, J. R., & Wally, S. (2003). Strategic Decision Speed and Firm Performance. *24*(11), 1107-1129. doi:https://doi.org/10.1002/smj.343

Bedford, D. S. B. (2015). Management control systems across different modes of innovation: Implications for firm performance. *28*(1), 12-30. doi:https://doi.org/10.1016/j.mar.2015.04.003

Biggadike, R. (1979). The risky business of diversification. *Harvard Business Review, 57*(3), 103-111.

Bilbao-Osorio, B. a., Dutta, S., & Lanvin, B. (2014). *The Global Information Technology Report 2014: Rewards and Risks of Big Data*. Retrieved from Geneva: http://www3.weforum.org/docs/WEF_GlobalInformationTechnology_Report_2014.pdf

Birchall, D., Chanaron, J., Tovstiga, G., & Hillenbrand, C. (2011). Innovation performance measurement- current practices, issues and management challenges. *International Journal Of Technology Management, 56*(1), 1-21.

Bisbe , J., & Malaguen˜o , R. (2012). Using strategic performance measurement systems for strategy formulation: does it work in dynamic environments? *Manag Account Research, 23*(1), 296–311.

Bisbe, J., & Otley, D. (2004). The Effects of the Interactive Use of Management Control Systems on Product Innovation. *Accounting Organizations and Society, 29*(8), 709-737. doi:https://doi.org/10.1016/j.aos.2003.10.010

Bledow, R., Frese, M., Anderson, N., Erez, M., & Farr, J. L. (2009). A dialectic perspective on innovation: Conflicting demands, multiple pathways, and ambidexterity. *Industrial and Organizational Psychology: Perspectives on Science and Practice, 2*(3), 305–337. doi:10.1111/j.1754-9434.2009.01154.x

Block, Z., & MacMillan, I. C. (1993). *Corporate venturing: Creating new businesses within the firm.* Boston: Harvard Business School Press.

Blumberg, B. F., Cooper, D. R., & Schindler, P. S. (2014). *Business Research Methods* (4th ed.). New York: McGraw Hill.

Boone, C., Lokshin, B., Guenter, H., & Belderbos, R. (2019). Top management team nationality diversity, corporate entrepreneurship, and innovation in multinational firms. *Strategic Management Journal, 40*(2), 277-302. doi:10.1002/smj.2976

Bowers, J., & Khorakian, A. (2014). Integrating risk management in the innovation project. *European Journal of Innovation Management, 17*(1), 25-40. doi:10.1108/ejim-01-2013-0010

Braunscheidel, M. J., & Suresh, N. C. (2009). The organizational antecedents of a firm's supply chain agility for risk mitigation and response. *Journal of Operations Management, 27*(2), 119-140. doi:10.1016/j.jom.2008.09.006

Bromiley, P., McShane, M., Nair, A., & Rustambekov, E. (2015). Enterprise Risk Management: Review, Critique, and Research Directions. *Long Range Planning, 48*(4), 265-276. doi:10.1016/j.lrp.2014.07.005

Bruton, G. D., Ahlstrom, D., & Obloj, K. (2008). Entrepreneurship in Emerging Economies: Where Are We Today and Where Should the Research Go in the Future. *Entrepreneurship Theory and Practice, 32*(1), 1-14. doi:https://doi.org/10.1111/j.1540-6520.2007.00213.x

Budaev, S. V. (2010). Using Principal Components and Factor Analysis in Animal Behaviour Research: Caveats and Guidelines. *Ethology, 116*(5), 472–480. doi:10.1111/j.1439-0310.2010.01758.x

Burgelman, R. A. (1983). Corporate entrepreneurship and strategic management: Insights from a process study. *Management Science, 29*(12), 1349–1363.

Burgelman, R. A., & Grove, A. S. (1996). Strategic Dissonance. *California Management Review 38*(2), 8-28. doi:https://doi.org/10.2307/41165830

Cameron, A., & Trivedi, P. (2005). *Microeconometrics: Methods and Applications*. New York: Cambridge University Press.

Carree, M. A., & Thurik, A. R. (1998). Small Firms and Economic Growth in Europe',. *Atlantic Economic Journal, 26*(2), 137-146. doi:https://doi.org/10.1007/BF02299356

Carter, D. A., D'Souza, F., Simkins, B. J., & Simpson, W. G. (2010). The Gender and Ethnic Diversity of US Boards and Board Committees and Firm Financial Performance. *Corporate Governance, 8*(5), 396-414.

Cerny, C. A., & Kaiser, H. F. (1977). A study of a measure of sampling adequacy for factor-analytic correlation matrices. *Multivariate Behavioral Research, 12*(1), 43-47. doi:10.1207/s15327906mbr1201_3

Ceylan, C. (2013). Commitment-based HR practices, different types of innovation activities and firm innovation performance. *The International Journal of Human Resource Management, 24*(1), 208-226. doi:10.1080/09585192.2012.680601

Chakrabarti, A. K., & Souder, W. E. (1987). Technology, Innovation and Performance in Corporate Mergers: A Managerial Evaluation *Technovation, 6*(2), 103-114. doi:https://doi.org/10.1016/0166-4972(87)90014-9

Chatterjee, A., & Hambrick, D. (2007). It's All about Me: Narcissistic Chief Executive Officers and Their Effects on Company Strategy and Performance. *Administrative Science Quarterly, 52*(3), 351–386. doi:https://doi.org/10.2189/asqu.52.3.351

Chesbrough, H., & Bogers, M. (2014). *Explicating Open Innovation: Clarifying an Emerging Paradigm for Understanding Innovation*. Oxford Oxford University Press.

Chienwattanasook, K., Wattanapongphasuk, S., Prianto, A. L., & Jermsittiparsert, K. (2019). Corporate Entrepreneurship and Business Performance of Logistic Companies in Indonesia. *Industrial Engineering & Management Systems, 18*(3), 541-550. doi:https://doi.org/10.7232/iems.2019.18.3.541

Chima, P., & Kasim, U. (2018). Public-private Partnership as a Strategy for e-governance Funding in Africa: The Gains and the Pains. *International Journal of Public Policy and Administration Research, 5*(2), 37-47. doi:10.18488/journal.74.2018.52.37.47

Chung, L. H., & Gibbons, P. T. (1997). Corporate entrepreneurship: The roles of ideology and social capital. *Group and Organization Management, 22*(1), 10-30.

Cooper, D. R., & Schindler, P. S. (2008). *Business Research Methods (7th ed.)*. New York: McGraw International Edition.

Covin, J. G., & Slevin, D. P. (1989). Strategic management of small firms in hostile and benign environments. *Strategic Management Journal, 10*(1), 75‐87. doi:https://doi.org/10.1002/smj.4250100107

Covin, J. G., & Slevin, D. P. (1991a). A Conceptual Model of Entrepreneurship as Firm Behavior. *Entrepreneurship Theory and Practice, 16*(1), 7-25.

Covin, J. G., & Slevin, D. P. (1991b). A conceptual model of entrepreneurship as firm behavior. . *Entrepreneurship Theory and Practice, 16*(1), 7-25. doi:https://doi.org/10.1177/104225879101600102

Covin, J. G., & Slevin, D. P. (2002). *The entrepreneurial imperatives of strategic leadership. In: Hitt, M., Ireland, R.D., Camp, M., Sexton, D. (Eds.), Strategic Entrepreneurship: Creating a New Mindset.*: Blackwell Publishers, Oxford, UK.

Covin, J. G., & Slevin, D. P. (2009). A Conceptual Model of Entrepreneurship as Firm Behavior. *Entrepreneurship Theory and Practice, 16*(1), 7-25.

Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches (4th ed.).* Thousand Oaks, CA: Sage.

Cronbach, L. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16*(1), 297-334.

da Silva Etges, A. P. B., & Cortimiglia, M. N. (2017). A systematic review of risk management in innovation-oriented firms. *Journal of Risk Research, 22*(3), 364-381. doi:10.1080/13669877.2017.1382558

Danielsson, J., & Shin, H. (2002). Endogenous Risk. *Journal of Econometrics, 64*(1), 375-400. doi:https://notendur.hi.is/ajonsson/kennsla2006/endogenous_risk.pdf

Das, S. R., & Joshi, M. P. (2007). Process Innovativeness in Technology Services Organizations: Roles of Differentiation Strategy, Operational Autonomy and Risk-taking Propensity. . *Journal of Operations Management, 25*(3), 643–660. doi:https://doi.org/10.1016/j.jom.2006.05.011

Davidsson, P., & Honig, B. (2003). The Role of Social and Human Capital among Nascent Entrepreneurs. *Journal of Business Venturing, 18*(3), 301–331. doi:https://doi.org/10.1016/S0883-9026(02)00097-6

de Villiers-Scheepers, M. J. (2012). Antecedents of Strategic Corporate Entrepreneurship. *European Business Review, 24*(5), 400-424. doi:10.1108/09555341211254508

De Vries, L. E., & Duque, L. C. (2018). Small but Sincere: How Firm Size and Gratitude Determine the Effectiveness of Cause Marketing Campaigns. *Journal of Retailing, 94*(4), 352-363. doi:https://doi.org/10.1016/j.jretai.2018.08.002

de Wet, P. (Producer). (2019, March 15). Business Insider South Africa. *Business Insider South Africa*. Retrieved from https://www.businessinsider.co.za/micro-small-and-medium-business-definition-update-by-sector-2019-3

Demirkan, I., Yang, Q., & Jiang, C. X. (2019). Corporate entrepreneurship of emerging market firms: current research and future directions. *New England Journal of Entrepreneurship, 22*(1), 5-30. doi:10.1108/NEJE-04-2019-0024

Dess, G. G., Lumpkin, T. T., & McGee, J. E. (1999). Linking CE to strategy, structure, and process: suggested research directions. *Entrepreneurship Theory & Practice, 99*(3), 85 - 102. doi:https://doi.org/10.1177/104225879902300306

Dodgson, M., Gann, D., & Phillips, N. (2014). *The Oxford Handbook of Innovation Management*: Oxford University Press, Oxford.

Drazin, R., & Rao, H. (2017). Harnessing managerial knowledge to implement product-line extensions: How do mutual fund families allocate portfolio managers to old and new funds? *Academy of Management Journal, 45*(3), 609–619. doi:https://doi.org/10.5465/3069385

Ellis, S., Henry, R. M., & Schockley, J. (2010). Buyer Perceptions of Supply Disruption Risk- A Behavioral View and Empirical Assessment. *Journal of Operations Management, 28*(1), 34-46.

Ernst, H. (2002). Success Factors of New Product Development: A Review of the Empirical Literature. *International Journal of Management Reviews, 4*(1), 1-40. doi:https://doi.org/10.1111/1468-2370.00075

Everson, M. E. A., Chesley, D. L., & Martens, F. J. (2016). *Enterprise Risk Management: Aligning Risk with Strategy and Performance*. Retrieved from New York, USA: https://www.coso.org/Documents/COSO-ERM-draft-Post-Exposure-Version.pdf

Fama, E., & Jensen, M. C. (1983). Separation of ownership and control. *Journal of Law and Economics, 26*(2), 301–325. doi:http://dx.doi.org/10.1086/467037

Field, A. (2017). *Discovering Statistics Using IBM SPSS Statistics: North American Edition*. New York: Sage.

Frappaolo, C. (2006). *Frappaolo, Carl. Knowledge Management*

(2nd ed.): Capstone Publishing Ltd., Southern Gate Chichester, West Sussex.

Frascati Manual. (2004). *A summary of the Frascati manual. Main definitions and conventions for the measurement of research and experimental development (R&D).* (OCDE/GD(94)84). Retrieved from https://www.oecd.org/sti/inno/frascati-manual.htm:

Fry, A. (1987). The Post-it-Note: An entrepreneurial success. *SAM Advanced Management Journal, 52*(3), 4-9.

Galbreath, J., & Galvin, P. (2006). Accounting for performance variation- How important are intangible resources? *International Journal of Organizational Analysis, 1*(60), 150-170.

George, A. C., Bley, S., & Pellegrino, J. (2019). Characterizing and Diagnosing Complex Professional Competencies—An Example of Intrapreneurship. *Educational Measurement: Issues and Practice, 38*(2), 89–100. doi:https://doi.org/10.1111/emip.12257

Gianiodis, P. T., Ellis, S. C., & Secchi, E. (2010). Advancing a Typology of Open Innovation. *International Journal of Innovation Management. , 14* (4), 531-572. doi:https://doi.org/10.1142/S1363919610002775

Giannopoulou, E., Yström, A., & Ollila, S. (2011). Turning Open Innovation into Practice: Open Innovation Research Through the Lens of Managers. *International Journal of Innovation Management, 15*(3), 505-524. doi:http://dx.doi.org/10.1142/S1363919611003465

Glynn, M. A. (1996). Innovative Genius: A Framework for Relating Individual and Organizational Intelligences to Innovation. *The Academy of Management Review, 21*(4), 1081–1111. doi:10.5465/amr.1996.9704071864

Gogia, S. K., & Soni, M. (2017). Impact of reward management system on organizational performance with special reference to hotel industry in Jaipur: a literature review. *Journal of Modern Management and Entrepreneurship, 7*(4), 115-124.

Goodale, J. C., Kuratko, D. F., & Hornsby, J. S. (2008). Influence Factors for Operational Control and Compensation in Professional Service Firms. *Journal of Operations Management 26*(5), 669–688. doi:http://dx.doi.org/10.1016/j.jom.2007.12.001

Goodale, J. C., Kuratko, D. F., Hornsby, J. S., & Covin, J. G. (2011). Operations management and corporate entrepreneurship: The moderating effect of operations control on the antecedents of corporate entrepreneurial activity in relation to innovation performance. *Journal of Operations Management, 29*(1-2), 116-127. doi:10.1016/j.jom.2010.07.005

Goosen, C. J., DeConing, T. J., & Smit, E. V. D. M. (2002). Corporate entrepreneurship and financial performance: The role of management. *South African Journal of Business Management, 33*(4), 21-27. doi:10.4102/sajbm.v33i4.708

Gordon, L. A., Loeb, M. P., & Tseng, C.-Y. (2009). Enterprise risk management and firm performance: A contingency perspective. *Journal of Accounting and Public Policy, 28*(4), 301-327. doi:10.1016/j.jaccpubpol.2009.06.006

Gordon, R. F. (2007). Intentional Behaviorism. *Behavior and Philosophy, 35*(1), 1-55. doi:https://www.jstor.org/stable/27759528

Govindarajan, V., & Trimble, C. (2005). Building breakthrough businesses within established organizations. *Harvard Business Review, 83*(5), 58-68. doi:https://europepmc.org/article/med/15929404

Green, S. B. (1991). How many subjects does it take to do a regression analysis? *Multivariate Behavioral Research, 26*(3), 499-510. doi:https://doi.org/10.1207/s15327906mbr2603_7

Guth, W. D., & Ginsberg, A. (1990). Corporate entrepreneurship. *Strategic Management Journal, 11*(1), 5-15. doi:https://www.jstor.org/stable/2486666

Hackman, R., & Oldham, G. (1975). Development of the job diagnostic survey. *Journal of Applied Psychology, 60*(2), 159-170. doi:http://dx.doi.org/10.1037/h0076546

Hair, J. F., Anderson, R. E., Babin, B. J., & Black, W. C. (2010). *Multivariate data analysis: A global perspective. Upper Saddle River, NJ: Pearson.* Upper Saddle River, NJ: Pearson.

Hansen, G. S., & Wernerfelt, B. (1989). Determinants of Firm Performance: The Relative Importance of Economic and Organizational Factors. *Strategic Management Journal, 10*(5), 399-3411. doi:https://doi.org/10.1002/smj.4250100502

Harris, C. M., Pattie, M. W., & McMahan, G. C. (2015). Advancement along a career path: The influence of human capital and performance. *Human Resource Management Journal, 25*(1), 102-115. doi:https://doi.org/10.1111/1748-8583.12047

Hawthorne, R., Mondliwa, P., Paremoer, T., & Robb, G. (2016). *Competition, barriers to entry and inclusive growth: Telecommunications Sector Study*. Retrieved from https://www.researchgate.net/publication/322581617_Competition_barriers_to_entry_and_inclusive_growth_Telecommunications_Sector_Study

Hayton, J. C. (2005). Promoting corporate entrepreneurship through human resource management practices: A review of empirical research',. *Human Resource Management Review,, 15*(1), 21-41. doi:10.1016/j.hrmr.2005.01.003

Heavey, C., & Simsek, Z. (2013). Top Management Compositional Effects on Corporate Entrepreneurship: The Moderating Role of Perceived Technological Uncertainty. *Journal of Product Innovation Management, 30*(5), 837-855. doi:10.1111/jpim.12033

Henderson, R. M., & Clark, K. B. (1990). Architectural Innovation: The Reconfiguration of Existing Product Technologies and the Failure of Established Firms. *Administrative Science Quarterly, 35*(1), 9-30. doi:10.2307/2393549

Hermann, F., Kessler, A., & Fink, M. (2010). Entrepreneurial Orientation and Business Performance - A Replication Study. *Schmalenbach Business Review, 62*(2), 175-198. doi:10.1007/BF03396804

Herrington, M., Kew, J., & Kew, P. (2010). *Tracking entrepreneurship in South Africa : a GEM Perspective*. Cape Town: Graduate School of Business, University of Cape Town.

Hitt, M. A., Ireland, R. D., Sirmon, D. G., & Trahms, C. A. (2011). Strategic entrepreneurship: creating value for individuals, organizations, and society. *Academy of Management Perspectives, 25*(2), 57 ‐ 75. doi:10.2139/ssrn.1994491

Hitt, M. A., Xu, K., & Carnes, C. M. (2016). Resource based theory in operations management research. *Journal of Operations Management, 41*(1), 77-94. doi:https://doi.org/10.1016/j.jom.2015.11.002

Hlobo, M. (2019). *The Impact of Racial Diversity of Executive Managers on Financial Performance of South African State-Owned Companies*. Paper presented at the The 4th Annual International Conference on Public Administration and Development Alternatives, Southern Sun Hotel, OR Tambo International Airport, Johannesburg, South Africa.

Hoffman, A. (2018). *Africa Telecommunications Infrastructure in 2018: Overview and Policy Recommendations* Retrieved from United States of America:

Hornsby, J., Holt, D. T., & Kuratko, D. F. (2008). The Dynamic Nature of Corporate Entrepreneurship: Assessing the CEAI. *Academy of Management Annual Meeting Proceedings, 2008*(1), 1-6. doi:https://doi.org/10.5465/ambpp.2008.33716544

Hornsby, J. S., Kuratko, D. F., & Montagno, R. V. (1999). Perception of internal factors for corporate entrepreneurship - A comparison of Canadian and U.S. managers.

Entrepreneurship Theory and Practice, 24(2), 9–24. doi:https://doi.org/10.1177/104225879902400202

Hornsby, J. S., Kuratko, D. F., Shepherd, D. A., & Bott, J. P. (2009). Managers' corporate entrepreneurial actions: Examining perception and position. *Journal of Business Venturing, 24*(3), 236-247. doi:10.1016/j.jbusvent.2008.03.002

Hornsby, J. S., Kuratko, D. F., & Zahra, S. A. (2002). Middle managers' perception of the internal environment for corporate entrepreneurship: Assessing a measurement scale. *Journal of Business Venturing, 17*(3), 253–273.

Hornsby, J. S., Naffziger, D. W., Kuratko, D. F., & Montagno, R. V. (1993). An interactive model of the corporate entrepreneurship process',. *Entrepreneurship Theory and Practice, 58*(1), 28-39. doi:https://doi.org/10.1177/104225879301700203

Hu, L., & Wu, H. (2016). Exploratory study on risk management of state-owned construction enterprises in China. *Engineering, Construction and Architectural Management, 23*(5), 674-691. doi:10.1108/ecam-05-2014-0064

Hughes, M., & Mustafa, M. (2016). Antecedents of Corporate Entrepreneurship in SMEs: Evidence from an Emerging Economy. *Journal of Small Business Management.* doi:10.1111/jsbm.12269

Huizingh, E. K. R. E. (2011). Open Innovation: State of the Art and Future Perspectives. *Technovation, 31*(1). doi:https://doi.org/10.1016/j.technovation.2010.10.002

ICASA. (2017). *ICASA Annual Report for 2016/ 2017 financial period*. Retrieved from

ICASA. (2019a). Regulating the Communications Sector in the Public Interest. Retrieved from https://www.icasa.org.za/uploads/files/IndividualECSandECNSlics.xlsx

ICASA. (2019b). *The State of ICT Sector Report 2019*. Retrieved from https://www.icasa.org.za/uploads/files/state-of-ict-sector-report-2019.pdf

Ireland, R. D., Covin, J. G., & Kuratko, D. F. (2009). Conceptualizing corporate entrepreneurship strategy. *Entrepreneurship Theory and Practice, 25*(8), 19-46. doi:https://doi.org/10.1108/sd.2009.05625had.003

Ireland, R. D., Kuratko, D. F., & Morris, M. H. (2006). A health audit for corporate entrepreneurship: Innovation at all levels: Part I. *Journal of Business Strategy, 27*(1), 10-17.

Ireland, R. D., & Webb, J. W. (2007). Strategic entrepreneurship: Creating competitive advantage through streams of innovation. *Business Horizons, 50*(1), 49-59. doi:http://dx.doi.org/10.1016/j.bushor.2006.06.002

Jankensgård, H. (2019). A Theory of Enterprise Risk Management. *Corporate Governance, 19*(3), 565-579. doi:https://doi.org/10.1108/CG-02-2018-0092

Jennings, D. F., & Lumpkin, J. R. (1989). Functioning modeling corporate entrepreneurship: An empirical integrative analysis. *Journal of Management, 15*(3), 485-502.

Jensen, M. C. (1993). The Modern Industrial Revolution..ure of Internal Control Systems. *The Journal of Finance, 48*(3), 831-880. doi:http://www.jstor.org/stable/2329018

Jensen, M. C., & Meckling, W. H. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of financial economics, 3*(4), 305-360. doi:https://doi.org/10.1016/0304-405X(76)90026-X

Jingnan, W., & Yunus, N. K. Y. (2018). The Relationship Between Corporate Entrepreneurship and Innovation in Manufacturing Companies in Perak. *International Journal of Business and Economic Affairs, 3*(1), 33-39. doi:10.24088/IJBEA-2018-31004

Jonck, P., van der Walt, F., & Sobayeni, N. (2017). Investigating the relationship between work values and work ethics: A South African perspective. *SA Journal of Human Resource Management, 15*(1), 1-11. doi:https://doi.org/10.4102/sajhrm.v15i0.780

Jones, G. R., & Butler, J. E. (1992). Managing internal corporate entrepreneurship: An agency theory perspective. *Journal of Management, 18*(4), 733-749. doi:https://doi.org/10.1177/014920639201800408

Jørgensen, B., & Messner, M. (2009). Management Control in New Product Development: The Dynamics of Managing Flexibility and Efficiency. *Journal of Management Accounting Research, 21*(1), 99-124. doi:https://doi.org/10.2308/jmar.2009.21.1.99

Kabir, S. M. S. (2016). *Basic Guidelines for Research: An Introductory Approach for All Disciplines* (1st ed.): Zone Publication.

Kahneman, D., & Tversky, A. (1979). Prospect theory: an analysis of decision under risk. *Econometrica, 47*(2), 263–291. doi:10.2307/1914185

Kaiser, H. (1974). An index of factor simplicity. . *Psychometrika, 39*(1), 31–36. doi:https://doi.org/10.1007/BF02291575

Kanter, R. M. (1994). *Innovative Reward Systems for the Changing Workplace.* New York: McGraw-Hill Publishers.

Kass, R. A., & Tinsley, H. E. A. (1979). Factor Analysis. *Communications, 11*(2), 120-138. doi:https://doi.org/10.1080/00222216.1979.11969385

Katz, R. L. (2009). The economic and social impact of telecommunications output. *Intereconomics, 44*(1), 41-48. doi:10.1007/s10272-009-0276-0

Kautonen, T., Down, S., & Minniti, M. (2014). Ageing and entrepreneurial preferences. *Small Business Economics, 42*(3), 579-594. doi:https://doi.org/10.1007/s11187-013-9489-5

Ketchen, D. J., Ireland, R. D., & Snow, C. C. (2007). Strategic Entrepreneurship, Collaborative Innovation and Wealth Creation. *Strategic Entrepreneurship Journal, 1*(3), 371 - 385. doi:10.1002/sej.20

Khan, Y. (2018). The Effectiveness of Entrepreneurial Activities for Economic Development: A Route to Innovation and Job Generation. *SocioEconomic Challenges., 2*(2), 32-40. doi:10.21272/sec.2(2).32-40.2018

Kimbrough, R. L., & Componation, P. J. (2015). The Relationship Between Organizational Culture and Enterprise Risk Management. *Engineering Management Journal, 21*(2), 18-26. doi:10.1080/10429247.2009.11431803

Kirkwood, J., & Campbell-Hunt, C. (2007). Using Multiple Paradigm Research Methodologies to Gain New Insights into Entrepreneurial Motivations. *Journal of Enterprising Culture, 15*(03), 219-241. doi:10.1142/S0218495807000137

Klapper, L., Laeven, L., & Rajan, R. (2006). Entry Regulations as a Barrier to Entrepreneurship. *Journal of financial economics, 82*(3), 591-629. doi:10.1016/j.jfineco.2005.09.006

Kline, R. B. (2011). *Principles and practice of structural equation modeling.* New York: Guilford Press.

Knight, F. H. (1921). *Risk, Uncertainty and Profit*. Chicago: Houghton Mifflin Company.

Kreiser, P. M., Kuratko, D. F., Covin, J. G., Ireland, R. D., & Hornsby, J. S. (2019). Corporate entrepreneurship strategy: extending our knowledge boundaries through configuration theory. *Small Business Economics, online open access*, 1-20. doi:https://doi.org/10.1007/s11187-019-00198-x

Kumar, R. (2018). *Research Methodology: A Step-by-Step Guide for Beginners* (5 ed.). New Delhi: Sage Publications.

Kumar, S. S., & Appu, A. V. (2016). Work autonomy and workplace creativity: moderating role of task complexity. *Global Business Review, 16*(5), 772–784. doi:10.1177/0972150915591435

Kuratko, D. F. (2009). The entrepreneurial imperative of the 21st century. *Business Horizons, 52*(5), 421-428. doi:https://doi.org/10.1016/j.bushor.2009.04.006

Kuratko, D. F., Covin, J. G., & Hornsby, J. S. (2014). Why implementing corporate innovation is so difficult. *Business Horizons, 57*(5), 647-655.

Kuratko, D. F., Goldsby, M. G., & Hornsby, J. S. (2012). *Innovation acceleration: Transforming organizational thinking*. Upper Saddle River, New Jersey: Pearson/Prentice Hall.

Kuratko, D. F., & Hodgetts, R. M. (2004). *Entrepreneurship: Theory, Process and Practice* (6th ed.). USA: Thompson South-Western.

Kuratko, D. F., Hornsby, J. S., & Covin, J. G. (2014). Diagnosing a firm's internal environment for corporate entrepreneurship. *Business Horizons, 57*(1), 37-47. doi:10.1016/j.bushor.2013.08.009

Kuratko, D. F., Hornsby, J. S., & Hayton, J. (2015). Corporate entrepreneurship: the innovative challenge for a new global economic reality. *Small Business Economics, 45*(2), 245-253. doi:10.1007/s11187-015-9630-8

Kuratko, D. F., Ireland, R. D., Covin, J. G., & Hornsby, J. S. (2005). A Model of Middle Level Managers Entrepreneurial Behavior. *Entrepreneurship Theory and Practice, 29*(6), 699-716. doi:https://doi.org/10.1111/j.1540-6520.2005.00104.x

Kuratko, D. F., Montagno, R. V., & Hornsby, J. S. (1990). Developing an entrepreneurial assessment instrument for an effective corporate entrepreneurial environment. *Strategic Management Journal, 11*(1), 49-58. doi:https://www.jstor.org/stable/2486669

Kuratko, D. F., & Morris, M. H. (2013). *Entrepreneurship and leadership.*: Cheltenham, UK: Edward Elgar.

Kyrgidou, L. P., & Hughes M. (2010). Strategic entrepreneurship: origins, core elements and research directions. *European Business Review, 22*(1), 43 - 63. doi:https://doi.org/10.1108/09555341011009007

Lawson, B., & Samson, D. (2001). Developing Innovation Capability in Organisations: A Dynamic Capabilities Approach. *International Journal of Innovation Management, 5*(3), 377-400. doi:10.1142/S1363919601000427

Lee, K. (2013). *Schumpeterian analysis of economic catch-up*. Cambridge: Cambridge University Press.

Lewis, M. A. (2003). Cause, Consequence and Control: Towards a Theoretical and Practical Model of Operational Risk. *Journal of Operations Management, 21*(2), 205–224. doi:https://doi.org/10.1016/S0272-6963(02)00071-2

Locke, E. A., & Latham, G. P. (1991). A Theory of Goal Setting and Task Performance. *The Academy of Management Review, 16*(2), 480-483. doi:10.2307/258875

Locke, E. A., & Latham, G. P. (2019). The Development of Goal Setting Theory: A Half Century Retrospective. *Motivation Science, 5*(2), 93-105. doi:https://doi.org/10.1037/mot0000127

Lumpkin, G. T., & Dess, G. G. (1996). Clarifying the entrepreneurship orientation construct and linking it to performance. *Academy of Management Review, 21*(1), 135-172. doi:10.2307/258632

Madhoushi, M., Sadati, A., Delavari, H., Mehdivand, M., & Mihandost, R. (2011). Entrepreneurial Orientation and Innovation Performance: The Mediating Role of Knowledge Management. *Asian Journal of Business Management, 3*(4), 310-316.

Malarvizhi, C. A., Nahar, R., & Manzoor, S. R. (2018). The Strategic Performance of Bangladeshi Private Commercial Banks on Post Implementation Relationship Marketing. *International Journal of Emerging Trends in Social Sciences, 2*(1), 28-33. doi:10.20448/2001.21.28.33

Marginson, S. (2019). Limitations of human capital theory. *Studies in Higher Education, 44*(2), 287-301. doi:10.1080/03075079.2017.1359823

Maroofi, F., Ardalan, A. G., & Tabarzadi, J. (2017). The effect of sales strategies in the financial performance of insurance companies, International Journal of Asian Social Science, 7(2), 150-160. *International Journal of Asian Social Science, 7*(2), 50-160. doi:10.18488/journal.1/2017.7.2/1.2.150.160

Martini, A., Neirotti, P., & Appio, F. P. (2017). Knowledge Searching, Integrating and Performing: Always a Tuned Trio for Innovation? *Long Range Planning, 50*(2), 200-220. doi:https://doi.org/10.1016/j.lrp.2015.12.020https://doi.org/10.1016/j.lrp.2015.12.020

Maurice, I. U. (2013). Impact of Product Development and Innovation on Organisational Performance. *International Journal of Management and Sustainability, 2*(12), 220-230. doi:10.18488/journal.11/2013.2.12/11.12.220.230

Miller, D., & Friesen, P. H. (1982). Innovation in Conservative and Entrepreneurial Firms: Two Models of Strategic Momentum. . *Strategic Management Journal, 3*(1), 1-25. doi: https://doi.org/10.1002/smj.4250030102

Miller, D., & Shamsie, J. (1996). The Resource-Based View of the Firm in Two Environments: The Hollywood Film Studios from 1936 to 1965. *The Academy of Management Journal, 39*(3), 519-543. doi:10.2307/256654

Mina, A., Bascavusoglu-Moreau, E., & Hughes, A. (2014). Open Service Innovation and the Firm's Search for External Knowledge. *Research Policy, 43*(5), 853-866. doi:http://dx.doi.org/10.1016/j.respol.2013.07.004

Mishra, B., Rolland, E., Satpathy, A., & Moore, M. (2019). A Framework for Enterprise Risk Identification and Management: The Resource-Based View. *Managerial Auditing Journal, 34*(2), 162-188. doi:https://doi.org/10.1108/MAJ-12-2017-1751

Mohamad, O., Ramayah, T., Puspowarsito, H., Natalisa, D., & Saerang, D. P. E. (2011). Corporate Entrepreneurship and Firm Performance: The Role of Business Environment as a Moderator. *IUP Journal of Management Research, 10*(3), 7-27.

Mol, M. L., Stadler, C., & Ariño, A. (2017). Africa: The New Frontier for Global Strategy Scholars. *Global Strategy Journal, 7*(1), 3-9. doi:https://doi.org/10.1002/gsj.1146

Morris, M. H., Allen, J., Schindehutte, M., & Avila, R. (2006). Balanced management con-trol systems as a mechanism for achieving corporate entrepreneurship. *Journalof Managerial Issues, 18*(4), 468–493. doi:https://www.jstor.org/stable/40604554

Morris, M. H., Kuratko, D. F., & Covin, J. G. (2008). *Corporate Entrepreneurship and Innovation*: Thomson South‐Western Punlishing Co, Mason, OH.

Morris, M. H., Kuratko, D. F., & Covin, J. G. (2011). *Corporate entrepreneurship & innovation (3rd ed.)*. Mason, OH: South-Western/Thomson Publishers.

Mowlaei, M. (2017). The impact of aft on export performance of selected Asian developing countries. *Asian Development Policy Review, 5*(4), 253-261. doi:10.18488/journal.107.2017.54.253.261

Naidoo, J. (2004). Telecommunications and Broadcasting at the official launch of SATRA, 10 February 1997. Minister for Posts. *Occasional Paper, 1*(1), 7.

Narasimhan, R., & Talluri, S. (2009). Perspectives on risk management in supply chains. *Journal of Operations Management, 27*(2), 114-118. doi:10.1016/j.jom.2009.02.001

Neyman, J., & Pearson, E. (1928). On the Use and Interpretation of Certain Test Criteria for Purposes of Statistical Inference: Part I. *Biometrika, 20A*(1-2), 175–240. doi:10.2307/2331945

Neyman, J., & Pearson, E. S. (1933). On the Problem of the Most Efficient Tests of Statistical Hypotheses. *Philosophical Transactions of the Royal Society of London, 231*(694-706), 289-337. doi:https://doi.org/10.1098/rsta.1933.0009

Ngo, H. Y., & Lau, C. M. (2004). The HR system, organizational culture, and product innovation. *International Business Review, 13*(6), 685-703. doi:https://doi.org/10.1016/j.ibusrev.2004.08.001

Nguyen, H. L., Larimo, J., & Wang, Y. (2019). Control, Innovation and International Joint Venture Performance: The Moderating Role of Internal and External Environments. *International Business Review, 28*(6), 1-36. doi:https://doi.org/10.1016/j.ibusrev.2019.101591

Niebel, T. (2018). ICT and Economic Growth – Comparing Developing, Emerging and Developed Countries. *World Development, 104*(1), 197-211. doi:https://doi.org/10.1016/j.worlddev.2017.11.024

Nielson, R. P., Peters, M. P., & Hisrich, R. D. (1985). Intrepreneurship strategy for internal markets-Corporate, nonprofit, and government institution cases. *Strategic Management Journal, 6*(2), 181-189. doi:https://doi.org/10.1002/smj.4250060207

Norusis, M. J. (1998). *Guide to Data Analysis*. New Jersey: Prentice Hall, Inc.

Nunnally, J. C. (1978). *Psychometric theory*. New York: McGraw-Hill.

O'Reilly, C. A., & Tushman, M. A. (2004). The ambidextrous organization. *Harvard Business Review, 82*(4), 74-81.

Oh, K.-B., Ho, B., Pham, N. L. T., Huang, Y., & Wang, J. (2018). *The Process of Enterprise Risk Management. (1st ed.) Management Science - Theory and Application)*. New York: Nova Science Publishers.

Olusadum, N. J., & Anulika, N. J. (2018). Impact of Motivation on Employee Performance: A Study of Alvan Ikoku Federal College of Eduaction. *Journal of Management and Strategy, 9*(1). doi:10.5430/jms.v9n1p53

Orth, M., & Volmer, J. (2017). Daily within-person effects of job autonomy and work engagement on innovative behaviour: The cross-level moderating role of creative self-efficacy.

European Journal of Work and Organizational Psychology, 27(4), 601-612. doi:https://doi.org/10.1080/1359432X.2017.1332042

Osasuyi, J. O., & Mwakipsile, G. (2017). Working Capital Management and Managerial Performance in some Selected Manufacturing Firms in Edo state Nigeria. *Journal of Accounting, Business and Finance Research, 1*(1), 46-55. Retrieved from https://ideas.repec.org/a/spi/joabfr/2017p46-55.html

Parker, S. C. (2009). *The Economics of Entrepreneurship*. Cambridge: Cambridge University Press.

Pearce, J. A., Kramer, T. R., & Robbins, D. K. (1997). Effects of managers' entrepreneurial behavior on subordinates. *Journal of Business Venturing, 12*(2), 147-160. doi:https://doi.org/10.1016/S0883-9026(96)00066-3

Phillips, D. C., & Burbules, N. C. (2000). *Philosophy, theory, and educational research. Postpositivism and educational research*. Lanham, MD, United States: Rowman & Littlefield Publishers.

Pinchot, G. (1985). *Intrapreneuring: Why You Don't Have to Leave the Corporation to Become an Entrepreneur*: University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship.

Piyachat, B. (2017). The Relationships Among Resources Commitment Reverse Logistics Innovation Reverse Logistics Performance and Reverse Logistics Cost Savings: Manufacturing vs Service Industry. . *Journal of Administrative and Business Studies, 3*(3), 122-135. doi:doi:https://doi.org/10.20474/jabs-3.3.2

Polder, M., Leeuwen, G. V., Mohnen, P., & Raymond, W. (2010). *Product, process and organizational innovation: drivers, complementarity and productivity effects:* (MERIT Working Papers 035). Retrieved from https://ideas.repec.org/p/unm/unumer/2010035.html

Polulation Pyramids. (2019). Population Pyramid South Africa 2019.

Popadiuk, S., & Choo, C. W. (2007). Innovation and knowledge creation: How are these concepts related. *International Journal of Information Management, 26*(4), 302-312. doi:https://doi.org/10.1016/j.ijinfomgt.2006.03.011

Popadiuka, S., & Choo, C. W. (2006). Innovation and Knowledge Creation: How are These Concepts Related? *International Journal of Information Management, 26*(4), 302-312. doi:10.1016/j.ijinfomgt.2006.03.011

Prajogo, D. I. (2006). The Relationship between Innovation and Business Performance – A Comparative Study between Manufacturing and Service Firms. *Knowledge and Process Management, 13*, 218-225.

Radhakrishna, R. B. (2007). Tips for Developing and Testing Questionnaires/Instruments. *Journal of Extension, 35*(1), 710–714.

Rauter, R., Globocnikb, D., Perl-Vorbach, E., & Baumgartnerd, R. J. (2019). Open innovation and its effects on economic and sustainability innovation performance. *Journal of Innovation & Knowledge, 4*(4), 226-233. doi:https://doi.org/10.1016/j.jik.2018.03.004

Ravjee, B., & Mamabolo, M. A. (2019). The Impact of Corporate Entrepreneurship on Service Innovation: A case of a South African Banking Institution. *Southern African Journal of Entrepreneurship and Small Business Management, 11*(1), 1-12. doi:https://doi.org/10.4102/sajesbm.v11i1.155

Ritzer, G., & Guba, E. (1991). The Paradigm Dialog by Egon Guba. *The Canadian Journal of Sociology / Cahiers canadiens de sociologie, 16*(4), 446-448. doi:https://www.jstor.org/stable/3340973

Roberts, E. B., & Berry, C. A. (1985). Entering new businesses: Selecting strategies for success. *Sloan Management Review, 26*(3), 3-18.

Rutherford, M. W., & Holt, D. T. (2007). Corporate entrepreneurship: An empirical look at the innovativeness dimension and its antecedents. *Journal of Organisational Change Management, 20*(3), 429-446. doi:https://doi.org/10.1108/09534810710740227

Scheepers, M. J., Hough, J., & Bloom, J. Z. (2008). Nurturing the corporate entrepreneurship capability. *Southern African Business Review, 12*(3), 50-75. doi:https://hdl.handle.net/10520/EJC92879

Schendel, D. (1990). Introduction to the special issue of corporate entrepreneurship. *Strategic Management Journal, 11*(4), 1-3. doi:https://www.jstor.org/stable/2486665

Schollhammer, H. (1982). *Internal corporate entrepreneurship. In C. A. Kent, D. L. Sexton, & K. H. Vesper*: Encyclopedia of entrepreneurship, Englewood Cliffs, NJ: Prentice Hall.

Schuler, R. S. (2006). Fostering and Facilitating Entrepreneurship in Organizations: Implications for Organization Structure and Human Resource Management Practices. *Human Resource Management, 25*(4), 607–629. doi:https://doi.org/10.1002/hrm.3930250408

Schumpeter, J. (1934). *The Theory of Economic Development,* . Cambridge, MA.: Harvard University Press.

Schumpeter, J. A. (1942). *Capitalism, Socialism and Democracy*. New York, NY.: Harper & Brothers.

Schwaninger, M. (2001). Intelligent Organisations: an Integrative Framework. *Systems Research and Behavioural Science, 18*(2), 137 - 158. doi:https://doi.org/10.1002/sres.408

Scott, W. R. (1998). *Organizations: Rational, Natural, and Open Systems.* . New Jersey: Prentice-Hall, Upper Saddle River.

Segal, G., Borgia, D., & Schoenfeld, J. (2005). The motivation to become an entrepreneur. *International Journal of Entrepreneurial Behavior & Research, 11*(1), 42-57. doi:10.1108/13552550510580834

Shane, S., & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Academy of Management Review, 25*(1), 217–226. doi:10.2307/259271

Sharma, P., & Chrisman, J. J. (1999). Towards a reconciliation of the definitional issues in the field of corporate entrepreneurship. *Entrepreneurship Theory & Practice, 23*(3), 11-27.

Shi, W., Connelly, B. L., & Hoskisson, R. E. (2017). External corporate governance and financial fraud: cognitive evaluation theory insights on agency theory prescriptions. *38*(6), 1268-1286. doi:https://doi.org/10.1002/smj.2560

Shields, M. D. (1997). Research in Management Accounting by North Americans in the 1990s. *Journal of Management Accounting Research, 9*(1), 3-61.

Simon, K. (1973). Modern Economic Growth: Findings and Reflections. *The American Economic Review, 63*(3), 247-258. doi:https://www.jstor.org/stable/1914358

Simons, R. (1990). The Role of Management Control Systems in Creating Competitive Advantage: New Perspectives. *Accounting Organizations and Society, 15*(1-2). doi:https://doi.org/10.1016/0361-3682(90)90018-PGet

Simons, R. (1995). *Levers of Control*. Boston: Harvard University Press.

Simons, R. (2000). *Performance Measurement and Control Systems for Implementing Strategies*. Upper Saddle River: Prentice Hall.

Simons, R., systems, S. o. a. t. m. a. t. c., & Strategic Management Journal, pp. 49-62. (1991). Strategic Orientation and Top Management Attention to Control Systems. *Strategic Management Journal, 12*(1), 49-62. doi:https://doi.org/10.1002/smj.4250120105

Slabbert, A. (2011). A comparative analysis of the Chinese and South African work ethic. *International Journal of Social Economics, 38*(8), 734-741. doi:10.1108/03068291111143929

Slife, B. D., & Williams , R. N. (1995). *What's Behind the Research? Discovering Hidden Assumptions in the Behavioral Sciences* Thousand Oaks, California, USA: SAGE Publications http://dx.doi.org/10.4135/9781483327372.

Soininen, J., Puumalainen, K., Sjögrén, H., Syrjä, P., & Richter, C. (2015). What Drives Entrepreneurial Orientation in Small Firms? The Roles of Owner-manager and Financial Conditions. *International Journal of Business Excellence, 8*(1), 85-103. doi:10.1504/IJBEX.2015.065981.

Stats SA. (2019). *Mid-year Population Estimates*. Retrieved from Pretoria, South Africa: https://www.statssa.gov.za/publications/P0302/P03022019.pdf

Stefan, I., & Bengtsson, L. (2017). Unravelling appropriability mechanisms and openness depth effects on firm performance across stages in the innovation process. *Technological Forecasting & Social Change, 120*(1), 252-260. doi:https://doi.org/10.1016/j.techfore.2017.03.014

Stone, D. N., Deci, E. L., & Ryan, R. M. (2009). Beyond Talk: Creating Autonomous Motivation through Self-Determination Theory. *Journal of General Management, 34*(3), 75–91. doi:https://doi.org/10.1177/030630700903400305

Stopford, J. M., & Baden-Fuller, C. W. F. (1994). Creating Corporate Entrepreneurship. *Strategic Management Journal, 15*(7), 521-536. doi:10.1002/smj.4250150703

Su, Z., Xie, E., & Wang, D. (2015). Entrepreneurial Orientation, Managerial Networking, and New Venture Performance in China. *Journal of Small Business Management, 53*(1), 228-248. doi:10.1111/jsbm.12069

Subramaniam, M., & Youndt, M. A. (2005). The Influence of Intellectual Capital on the Types of Innovative Capabilities. *Academy of Management Journal, 48*(3), 450-463. doi:http://dx.doi.org/10.5465/AMJ.2005.17407911

Sunindijo, R. Y., & Zou, P. X. W. (2013). Conceptualizing safety management in construction projects. *Journal of Construction Engineering and Management, 139*(9), 1144-1153. doi:http://dx.doi.org/10.1061/(ASCE)CO.1943-7862.0000711

Sutherland, E. (2015). MTN: A South African Mobile Telecommunications Group in Africa and Asia. *Communicatio South African Journal for Communication Theory and Research, 41*(4), 471-505. doi:https://doi.org/10.1080/02500167.2015.1100645

Suvonova, H., Lee, J., & Park, T. (2019). Organizational Preparedness for Corporate Entrepreneurship and Psychological Capital: Does the Managerial Level Matter? *Asian Journal of Technology Innovation 27*(3). doi:https://doi.org/10.1080/19761597.2019.1679025

Szeto, E. (2000). Innovation capacity: working towards a mechanism for improving innovation within an inter‐organizational network. *The TQM Magazine, 12*(2), 149-158. doi:https://doi.org/10.1108/09544780010318415

Tabachnick, B. G., & Fidell, L. S. (2019). *Using multivariate statistics* (7th ed.): Pearson.

The World Bank. (2019). The World Bank In South Africa. Retrieved from https://www.worldbank.org/en/country/southafrica/overview

Thornhill, S., & Amit, R. (2001). A dynamic perspective of internal fit in corporate venturing. *Journal of Business Venturing, 16*(1), 25-50.

Tian, X., & Wang, T. Y. (2014). Tolerance for failure and corporate innovation. *Review of Financial Studies, 27*(1), 211-255. doi:https://doi.org/10.1093/rfs/hhr130

Tien, C. (1998). *Chief Executive's Commission on Innovation and Technology First Report*. Retrieved from https://www.itc.gov.hk/en/doc/First_report_98_(eng).pdf

Tondini, A., Ardington, C., & Woolard, I. (2017). *Public Pensions and Elderly Informal Employment: Evidence from a Change in Retirement Age in South Africa*. Retrieved from Cape Town: http://hdl.handle.net/11090/868

Tseng, C., & Tseng, C.-C. (2019). Corporate entrepreneurship as a strategic approach for internal innovation performance. *Asia Pacific Journal of Innovation and Entrepreneurship, 13*(1), 108-120. doi:10.1108/APJIE-08-2018-0047

Tugce Hanci-Donmez, & Karacay, G. (2019). High-Performance Human Resource Practices and Firm Performance: Mediating Effect of Corporate Entrepreneurship. *International Journal of Organizational Leadership, 8*, 63-77.

Tummala, R., Xie, C., & Schoenherr, T. (2011). Assessing and managing risks using the Supply Chain Risk Management Process (SCRMP). *Supply Chain Management: An International Journal, 16*(6), 474-483. doi:10.1108/13598541111171165

ul Hassan, M., Shaukat, S., Nawaz, M. S., & Naz, S. (2013). Effects of innovation types on firm performance: An empirical study on Pakistan's manufacturing sector,. *Pakistan Journal of Commerce and Social Sciences, 7*(2), 243-262.

Urabe, K. (1988). *Innovation and the Japanese management system. In K. Urabe, J. Child, & T. Kagono (Eds.), Innovation and management international comparisons.* Berlin: Walter de Gruyter.

Urban, B., & Verachia, A. (2019). Organisational antecedents of innovative firms: a focus on entrepreneurial orientation in South Africa. *International Journal of Business Innovation and Research, 18*(1), 128-144. doi:10.1504/IJBIR.2019.096905

Van Wyk, R., & Adonisi, M. (2011). An Eight-factor Solution for the Corporate Entrepreneurship Assessment Instrument. *African Journal of Business Management, 5*(8), 3047-3055. doi: https://doi.org/10.5897/AJBM09.445

Vesper, K. H., 1984. . (1984). Three Faces of Corporate Entrepreneurship: A Pilot Study. *Frontiers of Entrepreneurship Research*, 294–320.

Vizitiu, C., Agapie, A., Paiusan, R., Hadad, S., & Nastase, M. (2018). Adapting a Corporate Entrepreneurship Assessment Instrument for Romania. *South African Journal of Business Management, 49*(1), 1-7. doi:https://doi.org/10.4102/sajbm.v49i1.8

Wanlapa, T., & Krittapha, S. (2015). The effects of organizational culture and enterprise risk management on organizational performance: A conceptual framework. *International Business Management, 9*(2), 158-163. doi:10.3923/ibm.2015.158.163

Ward, T. B. (2004). Cognition, creativity, and entrepreneurship. *Journal of Business Venturing, 19*(2), 173-188. doi:10.1016/S0883-9026(03)00005-3

Weiss, D., & Maher, M. W. (2009). Operational hedging against adverse circumstances⋆. *Journal of Operations Management, 27*(5), 362-373. doi:10.1016/j.jom.2008.10.003

Wennberg, K., Wiklund, J., DeTienne, D. R., & Cardon, M. S. (2010). Reconceptualizing entrepreneurial exit: divergent exit routes and their drivers. *Journal of Business Venturing, 25*(4), 362–375. doi:http://dx.doi.org/10.1016/j.jbusvent.2009.01.001

Wennekers, S., & Thurik, R. (1999). Linking Entrepreneurship and Economic Growth. *Small Business Economics, 13*(1), 27-55. doi:https://doi.org/10.1023/A:1008063200484

Williams, W. M., & Sternberg, R. J. (1988). Group Intelligence: Why Some Groups are Better than Others. *Intelligence, 12*(4), 351-377. doi:https://doi.org/10.1016/0160-2896(88)90002-5

Willows, G., & van der Linde, M. (2016). Women Representation on Boards: a South African Perspective. *Meditari Accountancy Research, 24*(2), 211-225. doi:https://doi.org/10.1108/MEDAR-01-2016-0001

Woodruff, J. (2019). Factors Affecting Economic Development and Growth, Business. Retrieved from https://smallbusiness.chron.com/factors-affecting-economic-development-growth-1517.html

World Bank. (2018). South Africa Economic Update. *The World Bank, 11*(1), 1-52.

Wright, J. F. (2016). Risk management; a behavioural perspective. *Journal of Risk Research, 21*(6), 710-724. doi:https://doi.org/10.1080/13669877.2016.1235605

Yaşlıoğlu, D. T., Temelli, E., & Aydinlik, A. U. (2017). Intrapreneurial characteristics of NGOs in Turkey. *The International Journal Of Business & Management, 5*(3), 185-190. Retrieved from http://internationaljournalcorner.com/index.php/theijbm/article/view/123494

Yolles, M. (2005). Organisational Intelligence. *Journal of Workplace Learning, 17*(1/2), 99-114. doi:https://doi.org/10.1108/13665620510574496

Zahra, S., & George, G. (2002). Absorptive Capacity: A Review, Reconceptualization, and Extension. *The Academy of Management Review, 27*(2), 185-203. doi:10.2307/4134351

Zahra, S., Randerson, K., & Fayolle, A. (2013). Corporate entrepreneurship research: Where are we? Where can we go from here? *Management, 16*(4), 357–360. doi:https://doi.org/10.3917/mana.164.0357

Zahra, S. A. (1993). A conceptual model of entrepreneurship as firm behavior: A critique and extension. *Entrepreneurship Theory and Practice, 17*(4), 5-21. doi:https://doi.org/10.1177/104225879301700401

Zahra, S. A. (1996). Goverance, Ownership, and Corporate Entrepreneurship: The Moderating Impact of Industry Technological Opportunities. *The Academy of Management Journal, 39*(6), 1713-1735. doi:10.2307/257076

Zahra, S. A. (2015). Corporate entrepreneurship as knowledge creation and conversion: the role of entrepreneurial hubs. *Small Business Economics, 44*(4), 727-735. doi:https://doi.org/10.1007/s11187-015-9650-4

Zajac, E. J., Golden, B. R., & Shortell, S. M. (1991). New organizational forms for enhancing innovation: The case of internal corporate joint ventures. *Management Science, 37*(2), 170-185. doi:10.5555/2913379.2913383

Zoogah, D. B., Peng, M. W., & Woldu, H. (2015). Institutions, Resources and Organizational Effectiveness in Africa. *The Academy of Management Perspectives, 29*(1), 7-31. doi:10.5465/amp.2012.0033

Zwikael, O., & Sadeh, A. (2007). Planning Effort as an Effective Risk Management Tool. *Journal of Operations Management, 25*(4), 755–767. doi:https://doi.org/10.1016/j.jom.2006.12.001

Appendices

A. Appendix A: Additional Results

AA - Dependent Variables – CPA

Table A.1: Dependent Variable KMO and Bartlett's Test

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.854
Bartlett's Test of Sphericity	Approx. Chi-Square	1137.351
	df	21
	Sig.	.000

Table A.2: Dependent Variable Communalities

Communalities

	Initial	Extraction
Inno_P_1: Number of new products or services developed	1.000	.663
Inno_P_2: Number of new products or services brought to market.	1.000	.709
Inno_P_3: Speed with which new products or services are developed.	1.000	.761
Inno_P_4: Speed with which new products or services are brought to market.	1.000	.755
Inno_P_5: Ability to respond quickly to market or technological developments.	1.000	.737
Inno_P_6: Ability to pre-empt competitors in responding to market or technological developments.	1.000	.704
Inno_P_7: Incorporation of technological innovations into internal operations.	1.000	.649

Extraction Method: Principal Component Analysis.

Table A.3: Dependent Variable Total Variance Explained

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.979	71.125	71.125	4.979	71.125	71.125
2	.710	10.140	81.265			
3	.526	7.513	88.778			
4	.329	4.697	93.475			
5	.189	2.694	96.169			

6	.161	2.300	98.470			
7	.107	1.530	100.000			

Extraction Method: Principal Component Analysis.

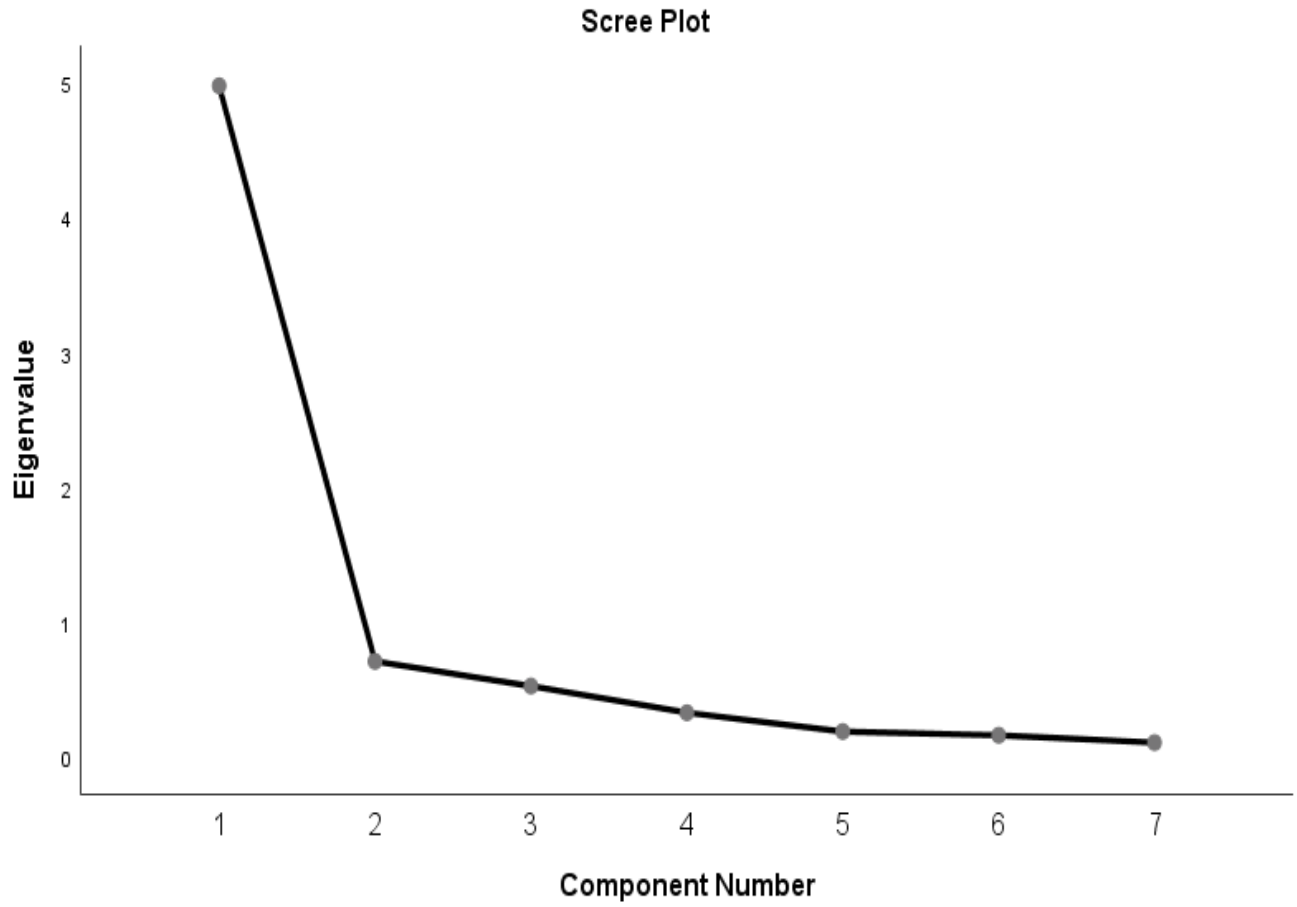


Figure A.1: Dependent Variable Scree Plot

Table A.4: Dependent Variable Factor Matrix[a]

Component Matrix[a]

	Component 1
Inno_P_3	.872
Inno_P_4	.869
Inno_P_5	.859
Inno_P_2	.842
Inno_P_6	.839
Inno_P_1	.814
Inno_P_7	.806

Extraction Method: Principal Component Analysis.[a]

a. 1 components extracted.

Table A.5: Rotated Factor Matrix[a]

Rotated Component Matrix[a]

a. Only one component was extracted. The solution cannot be rotated.

AB - Independent Variables – CPA

Table A.6: Independent Variable KMO and Bartlett's Test

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.911
Bartlett's Test of Sphericity	Approx. Chi-Square	5816.786
	df	903
	Sig.	.000

Table A.7: Independent Variables Communalities

Communalities

	Initial	Extraction
MS_1	1.000	.692
MS_2	1.000	.724
MS_3	1.000	.747
MS_4	1.000	.668
MS_5	1.000	.602
MS_6	1.000	.677
MS_7	1.000	.605
WD_1	1.000	.648
WD_2	1.000	.671
WD_3	1.000	.883
WD_4	1.000	.625
WD_5	1.000	.704
WD_6	1.000	.722
RR_1	1.000	.616

RR_2	1.000	.763
RR_3	1.000	.652
RR_4	1.000	.717
RR_5	1.000	.672
TA_1	1.000	.711
TA_3	1.000	.729
TA_5	1.000	.632
OB_1	1.000	.605
OB_2	1.000	.731
OB_3	1.000	.547
OB_4	1.000	.688
OB_5	1.000	.678
OB_6	1.000	.703
Endo_RM_1	1.000	.717
Endo_RM_2	1.000	.685
Endo_RM_3	1.000	.748
Endo_RM_4	1.000	.703
Endo_RM_6	1.000	.753
Endo_RM_7	1.000	.850
Endo_RM_8	1.000	.869
Endo_RM_9	1.000	.843
Endo_RM_10	1.000	.876
Endo_RM_11	1.000	.848
Endo_RM_12	1.000	.802
Endo_RM_13	1.000	.732
Endo_RM_14	1.000	.715
Endo_RM_15	1.000	.706
Endo_RM_16	1.000	.748

Endo_RM_17	1.000	.797

Extraction Method: Principal Component Analysis.

Table A.8: Independent Variables Total Variance Explained

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	15.395	35.802	35.802	15.395	35.802	35.802	10.343	24.054	24.054
2	3.647	8.480	44.283	3.647	8.480	44.283	3.903	9.076	33.131
3	2.473	5.751	50.033	2.473	5.751	50.033	3.371	7.838	40.969
4	1.893	4.403	54.436	1.893	4.403	54.436	3.221	7.492	48.461
5	1.462	3.400	57.836	1.462	3.400	57.836	2.395	5.570	54.030
6	1.375	3.197	61.033	1.375	3.197	61.033	2.260	5.255	59.285
7	1.291	3.002	64.036	1.291	3.002	64.036	1.509	3.509	62.795
8	1.157	2.691	66.727	1.157	2.691	66.727	1.368	3.180	65.975
9	1.100	2.558	69.285	1.100	2.558	69.285	1.318	3.065	69.041
10	1.012	2.353	71.638	1.012	2.353	71.638	1.117	2.597	71.638
11	.857	1.992	73.630						
12	.840	1.953	75.582						
13	.772	1.796	77.379						
14	.730	1.698	79.077						
15	.677	1.575	80.652						
16	.633	1.472	82.124						
17	.579	1.347	83.471						
18	.560	1.302	84.773						
19	.528	1.227	86.000						

20	.492	1.144	87.144						
21	.451	1.050	88.194						
22	.423	.984	89.178						
23	.406	.945	90.123						
24	.391	.910	91.033						
25	.375	.873	91.905						
26	.361	.839	92.745						
27	.332	.773	93.518						
28	.304	.708	94.226						
29	.280	.651	94.878						
30	.268	.623	95.501						
31	.240	.559	96.060						
32	.234	.545	96.604						
33	.219	.509	97.114						
34	.193	.449	97.563						
35	.183	.426	97.989						
36	.169	.392	98.381						
37	.153	.356	98.737						
38	.140	.325	99.061						
39	.119	.278	99.339						
40	.099	.230	99.569						
41	.082	.190	99.759						
42	.054	.126	99.885						
43	.049	.115	100.000						

Extraction Method: Principal Component Analysis.

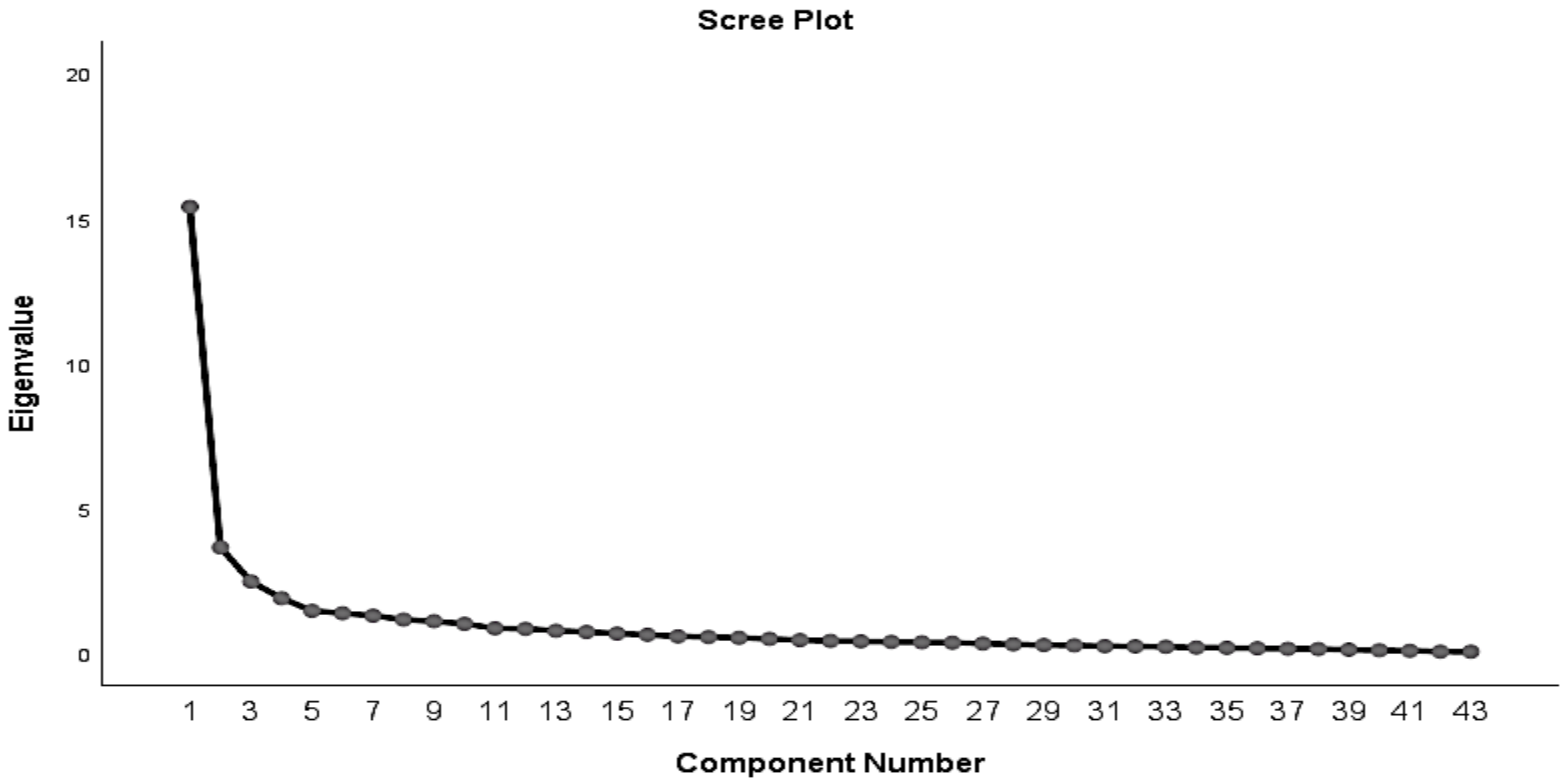


Figure A.2: Independent Variables Scree Plot

Table A.9: Independent Variables Component Matrix[a]

Component Matrix[a]

	Component									
	1	2	3	4	5	6	7	8	9	10
Endo_RM_10	.841	-.334								
Endo_RM_9	.820	-.337								
Endo_RM_12	.811	-.346								
Endo_RM_7	.806	-.368								
Endo_RM_8	.804	-.402								
Endo_RM_11	.802	-.358								
Endo_RM_17	.802	-.362								
Endo_RM_3	.769	-.325								
Endo_RM_6	.751	-.342								
Endo_RM_1	.751									
Endo_RM_16	.738							.369		
Endo_RM_2	.717									
Endo_RM_4	.717									
MS_6	.659	.305								
WD_5	.646	.304	-.371							
Endo_RM_13	.640	-.346								
RR_2	.634		.355							
MS_1	.630	.335								
MS_7	.622									
MS_4	.620	.310								
RR_5	.613									
Endo_RM_15	.607							.483		
MS_3	.591						.319			

MS_2	.590	.337		-.308						
WD_6	.554	.438	-.419							
RR_4	.548	.308		-.331						
OB_5	.547		.367							
RR_3	.527	.344					-.322			
OB_1	.519		.318							
RR_1	.481		.325							
MS_5	.454	.326					.305			
OB_4	.423		.380							
TA_5	.396	.311		.386						
OB_3	.396		.371			.344				
WD_4	.363	.456	-.354	.381						
WD_1	.334	.393	-.308	.383						
WD_2	.301	.391	-.470	.307						
TA_3	.404		.336	.461	.409					
TA_1	.333		.359	.441	.437					
Endo_RM_14					.626					
OB_2						.607		.424	.334	
OB_6	.362		.407				.458		-.357	
WD_3										.768

Extraction Method: Principal Component Analysis.[a]

a. 10 components extracted.

Table A.10: Independent Variables Factor Transformation Matrix

Component Transformation Matrix

Component	1	2	3	4	5	6	7	8	9	10
1	.758	.370	.262	.334	.199	.205	.145	-.015	.071	.040
2	-.630	.404	.510	.311	.196	.144	.115	.019	.036	.094
3	-.122	.386	-.588	-.205	.415	.476	-.077	-.177	.057	-.098
4	.064	-.466	.421	-.428	.565	.197	-.048	-.174	.019	.165
5	-.003	.001	-.150	.108	.571	-.481	-.071	.589	.200	-.133
6	.024	.048	.139	-.168	-.288	.336	-.480	.385	.601	.118
7	-.072	-.541	-.193	.575	.052	.502	.077	.251	-.104	.001
8	-.050	-.192	-.059	.333	.072	-.194	-.045	-.579	.645	-.223
9	-.034	-.043	-.052	-.269	-.110	.102	.844	.192	.387	-.018
10	-.009	.014	-.252	.119	.048	-.165	.039	-.089	.110	.933

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Table A.11: Descriptive statistics – per scale item

Descriptive Statistics

	N	Mean	Std. Deviation	
	Statistic	Statistic	Std. Error	Statistic
MS_1: Upper management is aware and very receptive to my ideas and suggestions	187	4.35	.137	1.868
MS_2: This organisation supports many small and experimental projects realising that some will undoubtedly fail.	187	4.48	.129	1.761
MS_3: Money is often available to get new project ideas off the ground.	187	4.29	.135	1.842
MS_4: People are often encouraged to take calculated risks with new ideas around here	187	4.48	.135	1.844
MS_5: Senior managers encourage innovators to bend rules and rigid procedures in order to keep promising ideas on track.	187	3.91	.136	1.863
MS_6: Those employees who come up with innovative ideas on their own often receive management encouragement for their activities.	187	4.70	.131	1.798
MS_7: My manager helps me get my work done by removing obstacles	187	4.75	.131	1.798
WD_1: I have much autonomy on my job and am left on my own to do my own work.	187	5.28	.120	1.646
WD_2: It is basically my own responsibility to decide how my job gets done.	187	5.14	.130	1.780
WD_3: I seldom have to follow the same work methods or steps for doing my major tasks from day to day.	187	4.81	.131	1.798
WD_4: I feel that I am my own boss and do not have to double-check all of my decisions.	187	4.18	.143	1.962
WD_5: This organisation provides freedom to use my own judgment.	187	4.75	.134	1.838
WD_6: This organisation provides me the chance to be creative and try my own methods of doing my job.	187	4.68	.140	1.919
RR_1: The rewards I receive are dependent upon my work on the job	187	4.65	.137	1.867
RR_2: My supervisor will give me special recognition if my work performance is especially good.	187	4.66	.146	2.000
RR_3: My manager would tell his boss if my work was outstanding.	187	4.61	.141	1.935

RR_4: Individuals with successful innovative projects receive additional reward and compensation for their ideas and efforts beyond the standard reward system.	187	4.56	.137	1.878
RR5: Promotion usually follows the development of new and innovative ideas.	187	3.91	.135	1.840
TA_1: I always seem to have plenty of time to get everything done	187	4.14	.132	1.800
TA_2: During the past 3 months, my workload was too heavy to spend time on developing new ideas.	187	4.64	.133	1.822
TA_3: I have just the right amount of time and workload to do everything well.	187	4.28	.132	1.807
TA_4: I feel that I am always working with time constraints on my job.	187	4.80	.123	1.682
TA_5: My co-workers and I always find time for long-term problem solving.	187	4.31	.129	1.760
OB_1: My job description clearly specifies the standards of performance on which my job is evaluated.	187	5.12	.123	1.682
OB_2: There is little uncertainty in my job.	187	4.62	.135	1.849
OB_3: During the past year, my immediate supervisor discussed my work performance with me frequently.	187	4.58	.142	1.945
OB_4: On my job, I have no doubts about what is expected of me.	187	5.29	.116	1.591
OB_5: I clearly know what level of work performance is expected from me in terms of amount, quality, and timelines of output	187	5.66	.090	1.236
OB_6: In the past three months, I have always followed standard operating procedures or practices to do my major tasks.	187	5.51	.104	1.419
Inno_P_1: Number of new products or services developed	187	5.07	.112	1.533
Inno_P_2: Number of new products or services brought to market.	187	5.04	.107	1.457
Inno_P_3: Speed with which new products or services are developed.	187	4.67	.125	1.712
Inno_P_4: Speed with which new products or services are brought to market.	187	4.69	.123	1.685
Inno_P_5: Ability to respond quickly to market or technological developments.	187	4.65	.127	1.739
Inno_P_6: Ability to pre-empt competitors in responding to market or technological developments.	187	4.70	.120	1.645
Inno_P_7: Incorporation of technological innovations into internal operations.	187	4.75	.122	1.663
Endo_RM_1: The firm communicates its risk management strategy/policy effectively	187	4.78	.141	1.927
Endo_RM_2: This firm emphasises the importance of documenting knowledge created	187	5.04	.133	1.825

Endo_RM_3: This firm has a strong presence of control-related structures and systems to manage risk that may arise from within the firm.	187	5.05	.130	1.776
Endo_RM_4: This firm has a strong presence of control-related policies to manage risk that may arise from within the firm.	187	5.24	.120	1.636
Endo_RM_5: This firm has weak internal controls within the firm in countering risk that arises from the innovation process	187	3.90	.140	1.919
Endo_RM_6: This firm identifies risk effectively	187	5.03	.122	1.675
Endo_RM_7: This firm analyses risk effectively	187	5.06	.124	1.692
Endo_RM_8: This firm evaluates risk effectively	187	5.04	.122	1.662
Endo_RM_9: This firm treats/addresses risk effectively	187	5.06	.122	1.664
Endo_RM_10: This firm controls risk effectively	187	5.08	.118	1.609
Endo_RM_11: This firm monitors risk effectively	187	4.96	.121	1.655
Endo_RM_12: This firm communicates risk effectively	187	4.92	.125	1.713
Endo_RM_13: Risk management is integrated across the firm	187	5.24	.126	1.729
Endo_RM_14: Risk management is the responsibility of a manager or division within the firm	187	3.81	.153	2.090
Endo_RM_15: I have received some training on risk management through this firm	187	4.53	.151	2.069
Endo_RM_16: This firm allows me to report risk without fear of negative consequences	187	5.00	.138	1.892
Endo_RM_17: This firm monitors risk management effectiveness.	187	4.96	.129	1.759
Valid N (listwise)	187			

Table A.12: Descriptive statistics – per variable

Descriptive Statistics Summary

	N	Mean		Std. Deviation
	Statistic	Statistic	Std. Error	Statistic
Endogenous Risk Management	187	4.8636	.09390	1.28401
Organisational Boundaries	187	5.0545	.07899	1.08013

Time Availability	187	4.4321	.06748	.92273
Rewards / Reinforcement	187	4.4791	.11094	1.51712
Work Discretion/Autonomy	187	4.8342	.09458	1.29337
Management Support	187	4.3699	.10316	1.41072
Innovation Performance	187	4.7968	.10078	1.37821
Valid N (listwise)	187			

Model 1 – Ordinary Least Squares

Table A.13: Model 1 – Ordinary Least Squares

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.658[a]	.433	.414	1.05507	.433	22.897	6	180	.000

a. Predictors: (Constant), Rewards / Reinforcement, Work Discretion/Autonomy, Time Availability, Endogenous Risk Management, Organisational Boundaries, Management Support

b. Dependent Variable: Innovation Performance

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	152.927	6	25.488	22.897	.000[b]
	Residual	200.372	180	1.113		
	Total	353.298	186			

a. Dependent Variable: Innovation Performance

b. Predictors: (Constant), Rewards / Reinforcement, Work Discretion/Autonomy, Time Availability, Endogenous Risk Management, Organisational Boundaries, Management Support

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.920	.480		1.919	.057
	Endogenous Risk Management	.497	.077	.463	6.425	.000
	Organisational Boundaries	.065	.089	.051	.738	.461
	Work Discretion/Autonomy	-.124	.070	-.116	-1.755	.081
	Management Support	.142	.080	.145	1.777	.077
	Time Availability	.143	.095	.096	1.507	.134
	Rewards / Reinforcement	.106	.070	.117	1.522	.130

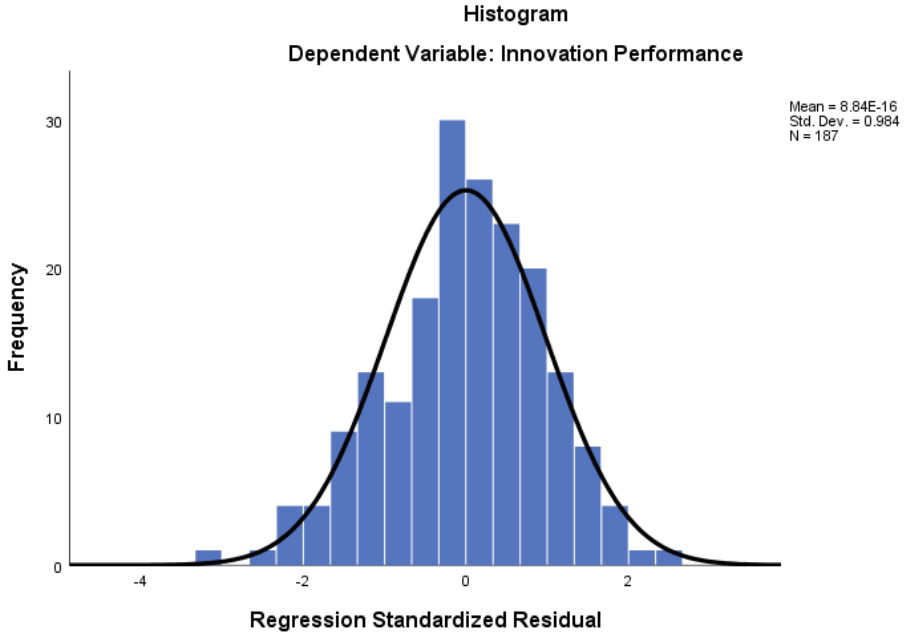
a. Dependent Variable: Innovation Performance

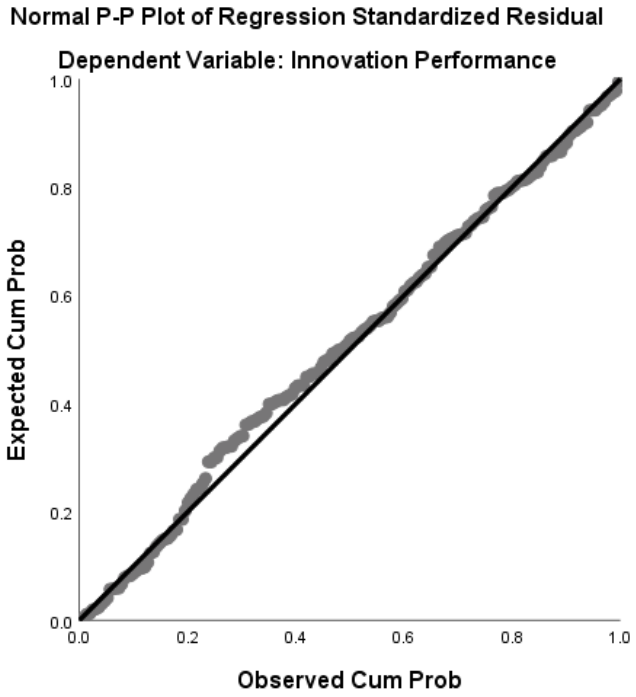
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.1175	6.6197	4.7968	.90675	187
Std. Predicted Value	-2.955	2.010	.000	1.000	187
Standard Error of Predicted Value	.100	.455	.195	.062	187
Adjusted Predicted Value	2.1526	6.6030	4.7890	.91119	187
Residual	-3.20627	2.65213	.00000	1.03791	187
Std. Residual	-3.039	2.514	.000	.984	187
Stud. Residual	-3.086	2.588	.004	1.004	187
Deleted Residual	-3.30564	2.81076	.00779	1.08216	187
Stud. Deleted Residual	-3.162	2.630	.003	1.010	187
Mahal. Distance	.669	33.529	5.968	4.792	187
Cook's Distance	.000	.079	.006	.012	187
Centered Leverage Value	.004	.180	.032	.026	187

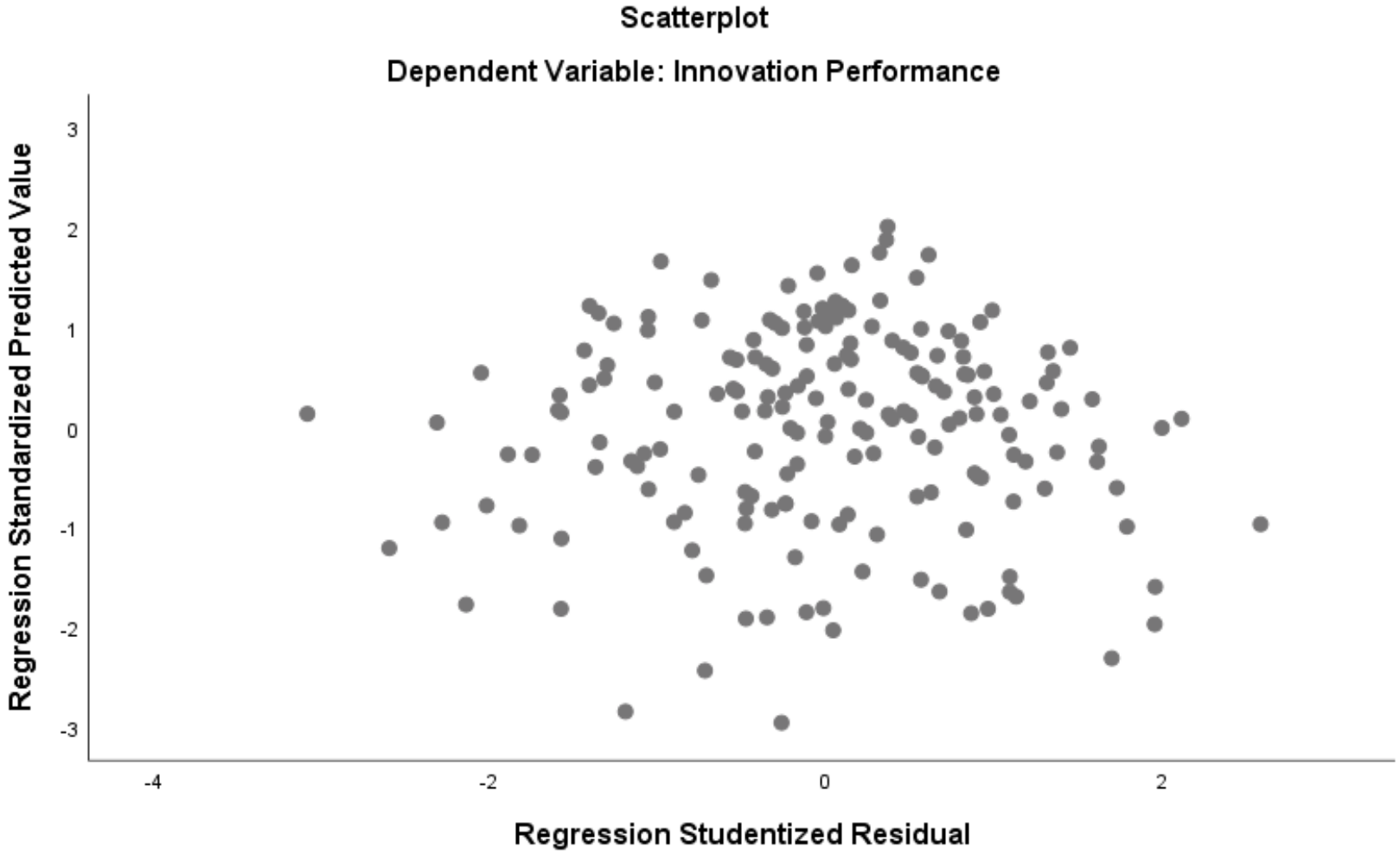
a. Dependent Variable: Innovation Performance

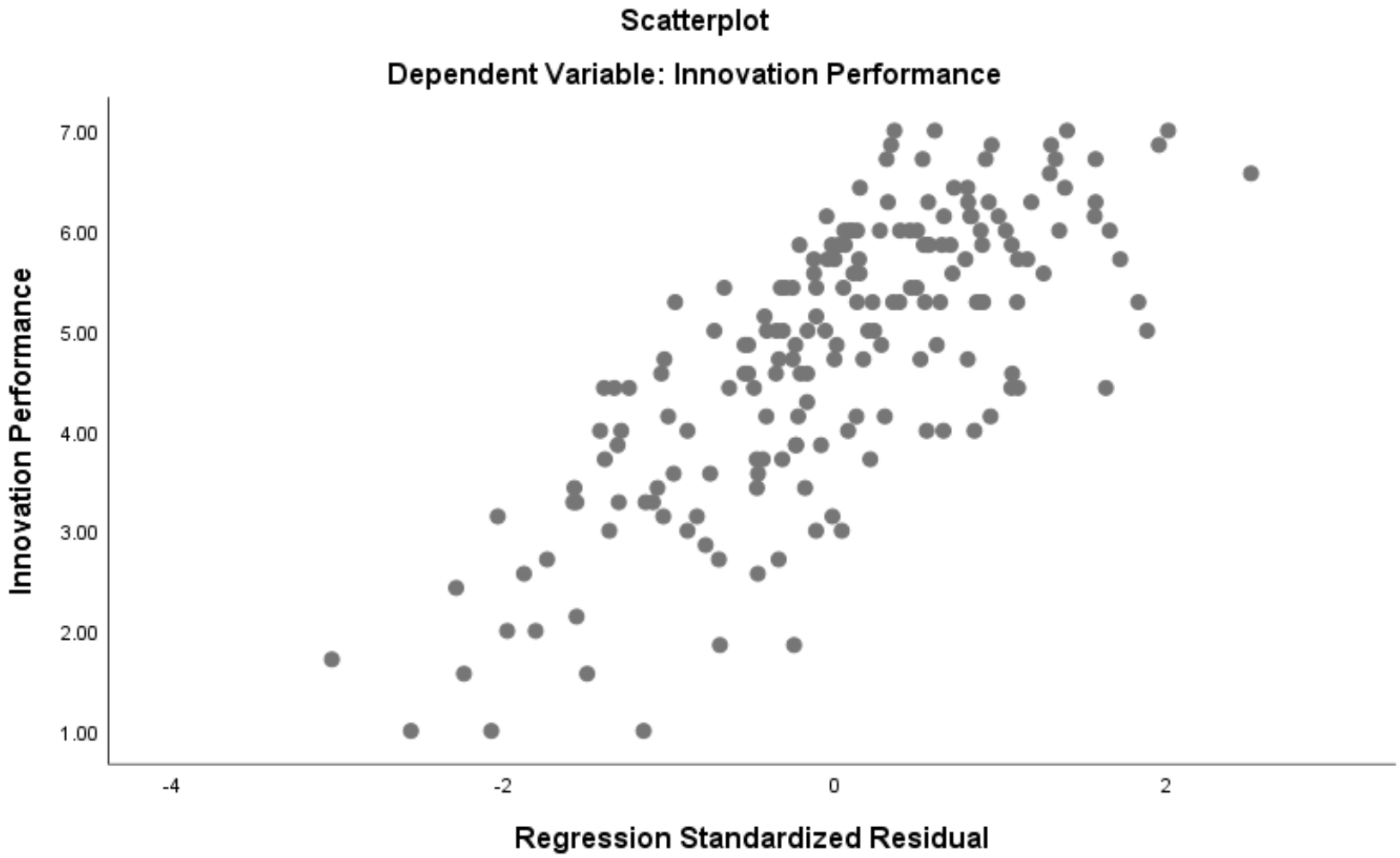
Table A.14: Model 1 – Diagnostics Ordinary Least Squares





Model 1 Diagnostics Continued…




Scatterplot
Dependent Variable: Innovation Performance
Innovation Performance
7.00
6.00
5.00
4.00
3.00
2.00
1.00
-4
-2
0
2
Regression Standardized Residual

Model 2 - Weighted Least Squares

Table A.15: Model 2 - Weighted Least Squares

Model Summary[b,c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
2	.942[a]	.888	.884	.91779	.888	237.637	6	180	.000

a. Predictors: (Constant), Rewards / Reinforcement, Management Support, Work Discretion/Autonomy, Time Availability, Endogenous Risk Management, Organisational Boundaries

b. Dependent Variable: Innovation Performance

c. Weighted Least Squares Regression - Weighted by Weight2

ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
2	Regression	1201.036	6	200.173	237.637	.000[c]
	Residual	151.623	180	.842		
	Total	1352.658	186			

a. Dependent Variable: Innovation Performance

b. Weighted Least Squares Regression - Weighted by Weight2

c. Predictors: (Constant), Rewards / Reinforcement, Management Support, Work Discretion/Autonomy, Time Availability, Endogenous Risk Management, Organisational Boundaries

Coefficients[a,b]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
2	(Constant)	.866	.192		4.520	.000
	Endogenous Risk Management	.507	.032	.717	16.057	.000
	Organisational Boundaries	.051	.040	.061	1.249	.213
	Work Discretion/Autonomy	-.127	.027	-.146	-4.665	.000
	Management Support	.144	.024	.160	5.888	.000
	Time Availability	.161	.041	.136	3.913	.000
	Rewards / Reinforcement	.108	.030	.166	3.561	.000

a. Dependent Variable: Innovation Performance

b. Weighted Least Squares Regression - Weighted by Weight2

Residuals Statistics[a,b]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.0782	6.6717	4.8001	.92099	187
Std. Predicted Value[c]	.	.	.	.	0
Standard Error of Predicted Value	.027	.188	.080	.031	187
Adjusted Predicted Value	2.0994	6.6647	4.7989	.92100	187
Residual	-3.21533	2.68362	-.00333	1.03816	187
Std. Residual[c]	.	.	.	.	0
Stud. Residual	-1.959	1.800	.014	.989	187
Deleted Residual	-3.22328	2.69569	-.00214	1.04588	187
Stud. Deleted Residual	-1.975	1.811	.014	.991	187
Mahal. Distance	.077	116.800	5.968	14.481	187

Cook's Distance	.000	.017	.002	.002	187
Centered Leverage Value	.000	.628	.032	.078	187

a. Dependent Variable: Innovation Performance

b. Weighted Least Squares Regression - Weighted by Weight2

c. Not computed for Weighted Least Squares regression.

Model 3 - Weighted Least Squares with Control Variables (Firm Age and Size)

Table A.16: Model 3 - Weighted Least Squares with Control Variables (Firm Age and Size)

Model Summary[b,c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
3	.938[a]	.880	.875	.92266	.880	163.568	8	178	.000

a. Predictors: (Constant), Firm Size, Management Support, Work Discretion/Autonomy, Time Availability, Organisational Boundaries, Endogenous Risk Management, Rewards / Reinforcement, Firm Age

b. Dependent Variable: Innovation Performance

c. Weighted Least Squares Regression - Weighted by Weight1

ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
3	Regression	1113.962	8	139.245	163.568	.000[c]
	Residual	151.531	178	.851		
	Total	1265.493	186			

a. Dependent Variable: Innovation Performance

b. Weighted Least Squares Regression - Weighted by Weight1

c. Predictors: (Constant), Firm Size, Management Support, Work Discretion/Autonomy, Time Availability, Organisational Boundaries, Endogenous Risk Management, Rewards / Reinforcement, Firm Age

Coefficients[a,b]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
3	(Constant)	.562	.247		2.276	.024		
	Endogenous Risk Management	.509	.035	.610	14.741	.000	.393	2.548
	Organisational Boundaries	.044	.044	.039	.991	.323	.442	2.262
	Work Discretion/Autonomy	-.120	.025	-.145	-4.877	.000	.760	1.316
	Management Support	.143	.037	.148	3.923	.000	.470	2.128
	Time Availability	.162	.046	.122	3.547	.000	.570	1.754
	Rewards / Reinforcement	.125	.040	.131	3.077	.002	.370	2.704
	Firm Age	-.021	.051	-.020	-.414	.679	.290	3.444
	Firm Size	.086	.051	.077	1.689	.093	.320	3.123

a. Dependent Variable: Innovation Performance

b. Weighted Least Squares Regression - Weighted by Weight1

Model 4 - Weighted Least Squares with Firm Age

Table A.17: Model 4 - Weighted Least Squares with Firm Age

Model Summary[b,c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
4	.937[a]	.878	.874	.92743	.878	184.614	7	179	.000

a. Predictors: (Constant), Firm Age, Rewards / Reinforcement, Work Discretion/Autonomy, Time Availability, Organisational Boundaries, Management Support, Endogenous Risk Management

b. Dependent Variable: Innovation Performance

c. Weighted Least Squares Regression - Weighted by Weight1

ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
4	Regression	1111.532	7	158.790	184.614	.000[c]
	Residual	153.961	179	.860		
	Total	1265.493	186			

a. Dependent Variable: Innovation Performance

b. Weighted Least Squares Regression - Weighted by Weight1

c. Predictors: (Constant), Firm Age, Rewards / Reinforcement, Work Discretion/Autonomy, Time Availability, Organisational Boundaries, Management Support, Endogenous Risk Management

Coefficients[a,b]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
4	(Constant)	.697	.235		2.965	.003
	Endogenous Risk Management	.509	.035	.610	14.661	.000
	Organisational Boundaries	.047	.044	.041	1.054	.293
	Work Discretion/Autonomy	-.120	.025	-.145	-4.849	.000
	Management Support	.137	.037	.142	3.754	.000
	Time Availability	.154	.046	.116	3.380	.001
	Rewards / Reinforcement	.123	.041	.130	3.023	.003
	Firm Age	.046	.032	.044	1.459	.146

a. Dependent Variable: Innovation Performance

b. Weighted Least Squares Regression - Weighted by Weight1

Residuals Statistics[a,b]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.0270	6.5984	4.8077	.92571	187
Std. Predicted Value[c]	.	.	.	.	0
Standard Error of Predicted Value	.042	.228	.098	.031	187
Adjusted Predicted Value	2.0412	6.5878	4.8059	.92622	187
Residual	-3.20596	2.63575	-.01091	1.03692	187
Std. Residual[c]	.	.	.	.	0
Stud. Residual	-1.909	1.758	.008	.990	187
Deleted Residual	-3.21225	2.65780	-.00909	1.04760	187
Stud. Deleted Residual	-1.923	1.769	.008	.992	187

Mahal. Distance	.146	95.655	6.963	12.563	187
Cook's Distance	.000	.081	.003	.007	187
Centered Leverage Value	.001	.514	.037	.068	187

a. Dependent Variable: Innovation Performance

b. Weighted Least Squares Regression - Weighted by Weight1

c. Not computed for Weighted Least Squares regression.

Model 5 - Weighted Least Squares with Firm Size

Table A.18: Model 5 - Weighted Least Squares with Firm Size

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.938[a]	.880	.875	.92052	.880	187.779	7	179	.000

a. Predictors: (Constant), Firm Size, Management Support, Work Discretion/Autonomy, Time Availability, Organisational Boundaries, Endogenous Risk Management, Rewards / Reinforcement

ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1113.816	7	159.117	187.779	.000[c]
	Residual	151.677	179	.847		
	Total	1265.493	186			

a. Dependent Variable: Innovation Performance

b. Weighted Least Squares Regression - Weighted by Weight1

c. Predictors: (Constant), Firm Size, Management Support, Work Discretion/Autonomy, Time Availability, Organisational Boundaries, Endogenous Risk Management, Rewards / Reinforcement

Coefficients[a,b]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	.559	.246		2.268	.025		
	Endogenous Risk Management	.507	.034	.607	14.907	.000	.403	2.480
	Organisational Boundaries	.044	.044	.039	1.008	.315	.443	2.259
	Time Availability	.160	.045	.120	3.531	.001	.578	1.731
	Rewards / Reinforcement	.127	.040	.133	3.158	.002	.375	2.664
	Work Discretion/Autonomy	-.118	.024	-.142	-4.915	.000	.797	1.254
	Management Support	.141	.036	.146	3.911	.000	.477	2.095
	Firm Size	.070	.032	.063	2.203	.029	.831	1.204

a. Dependent Variable: Innovation Performance

b. Weighted Least Squares Regression - Weighted by Weight1

Collinearity Diagnostics[a,b]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions					
				(Constant)	Endogenous Risk Management	Organisational Boundaries	Time Availability	Rewards / Reinforcement	Work Discretion/Autonomy

1	1	7.714	1.000	.00	.00	.00	.00	.00	.00
	2	.116	8.145	.00	.01	.00	.00	.00	.42
	3	.088	9.389	.01	.02	.00	.00	.03	.05
	4	.024	17.781	.00	.16	.07	.11	.05	.00
	5	.021	19.286	.08	.59	.06	.17	.00	.31
	6	.015	22.933	.03	.04	.03	.25	.61	.00
	7	.013	24.764	.13	.02	.32	.47	.31	.00
	8	.010	28.410	.75	.16	.51	.00	.00	.22

Collinearity Diagnostics[a,b]

Model	Dimension	Variance Proportions	
		Management Support	Firm Size
1	1	.00	.00
	2	.00	.11
	3	.02	.41
	4	.49	.07
	5	.00	.06
	6	.40	.00
	7	.08	.14
	8	.01	.22

a. Dependent Variable: Innovation Performance

b. Weighted Least Squares Regression - Weighted by Weight1

```
***************** PROCESS Procedure for SPSS Version 3.4 *****************
          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2018). www.guilford.com/p/hayes3
**************************************************************************
```

Table A.19: Endo_RM Moderates Management Support and Inno_P Relationship

```
                                                                Model:3
                                                                Y  : InnoP
                                                                X  : MS
                                                                M  : EndoRM_C

                                                                Sample
                                                                Size:  187
 **************************************************************************
                                                      OUTCOME VARIABLE:
                                                                InnoP

                                                           Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .5681      .3228     1.3075    29.0727     3.0000   183.0000     .0000

                                                                Model
                 coeff         se          t          p       LLCI       ULCI
constant       4.7827      .0920    51.9747     .0000     4.6011     4.9642
MS             .2999       .0671     4.4725     .0000      .1676      .4322
EndoRM_C       .6918       .1388     4.9830     .0000      .4179      .9657
Int_1          .0298       .0812      .3674     .7137     -.1303      .1900

                                                     Product terms key:
                                  Int_1    :       MS       x        EndoRM_C

                              Test(s) of highest order unconditional interaction(s):
                                 R2-chng          F        df1        df2          p
```

```
      X*W       .0005       .1350      1.0000    183.0000       .7137

                                                ----------

                                  Focal predict: MS        (X)
                                        Mod var: EndoRM_C  (M)

     Data for visualizing the conditional effect of the focal predictor:
Paste text below into a SPSS syntax window and execute to produce plot.

                                                DATA LIST FREE/
                                    MS          EndoRM_C    InnoP       .
                                                            BEGIN DATA.
                                         -1.4107     -.7359     3.8815
                                           .0000     -.7359     4.2736
                                          1.4107     -.7359     4.6658
                                         -1.4107      .0000     4.3596
                                           .0000      .0000     4.7827
                                          1.4107      .0000     5.2058
                                         -1.4107      .4866     4.6757
                                           .0000      .4866     5.1193
                                          1.4107      .4866     5.5629
                                                            END DATA.
                                                GRAPH/SCATTERPLOT=
                          MS        WITH      InnoP     BY        EndoRM_C .
```

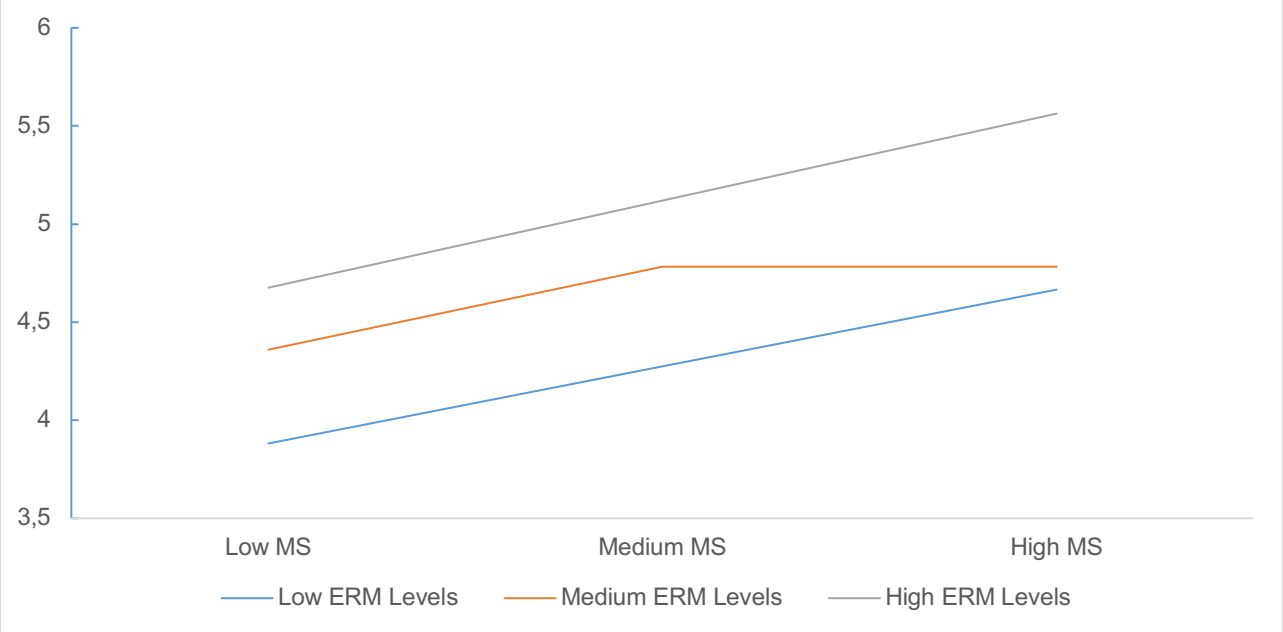


Table A.20: Endo_RM Moderates Work Discretion/Autonomy and Inno_P Relationship

```
                                                                    Model:3
                                                                  Y  : InnoP
                                                                  X  : WD
                                                                  M  : EndoRM_C

                                                                Sample
                                                               Size:  187

**************************************************************************
                                                        OUTCOME VARIABLE:
                                                                  InnoP

                                                                Model Summary
          R        R-sq         MSE          F         df1         df2          p
     .5012       .2512      1.4456     20.4656      3.0000    183.0000      .0000

                                                                      Model
                 coeff          se          t          p        LLCI       ULCI
constant        4.8063       .0919    52.3218      .0000      4.6250     4.9875
WD               .0473       .0718      .6585      .5110      -.0944      .1890
EndoRM_C         .8957       .1302     6.8817      .0000       .6389     1.1525
Int_1           -.0329       .0923     -.3568      .7216      -.2150      .1491

                                                          Product terms key:
                                    Int_1    :        WD       x        EndoRM_C

                          Test(s) of highest order unconditional interaction(s):
                              R2-chng          F        df1        df2          p
                   X*W         .0005       .1273     1.0000    183.0000      .7216
                                                                ----------
                                                  Focal predict: WD       (X)
                                                        Mod var: EndoRM_C (M)

      Data for visualizing the conditional effect of the focal predictor:
     Paste text below into a SPSS syntax window and execute to produce plot.
```

```
                                    DATA LIST FREE/
WD          EndoRM_C    InnoP       .
                                    BEGIN DATA.
     -1.2934      -.7359      4.0547
       .0000      -.7359      4.1472
      1.2934      -.7359      4.2397
     -1.2934       .0000      4.7451
       .0000       .0000      4.8063
      1.2934       .0000      4.8675
     -1.2934       .4866      5.2017
       .0000       .4866      5.2421
      1.2934       .4866      5.2826
                                    END DATA.
                                GRAPH/SCATTERPLOT=
```

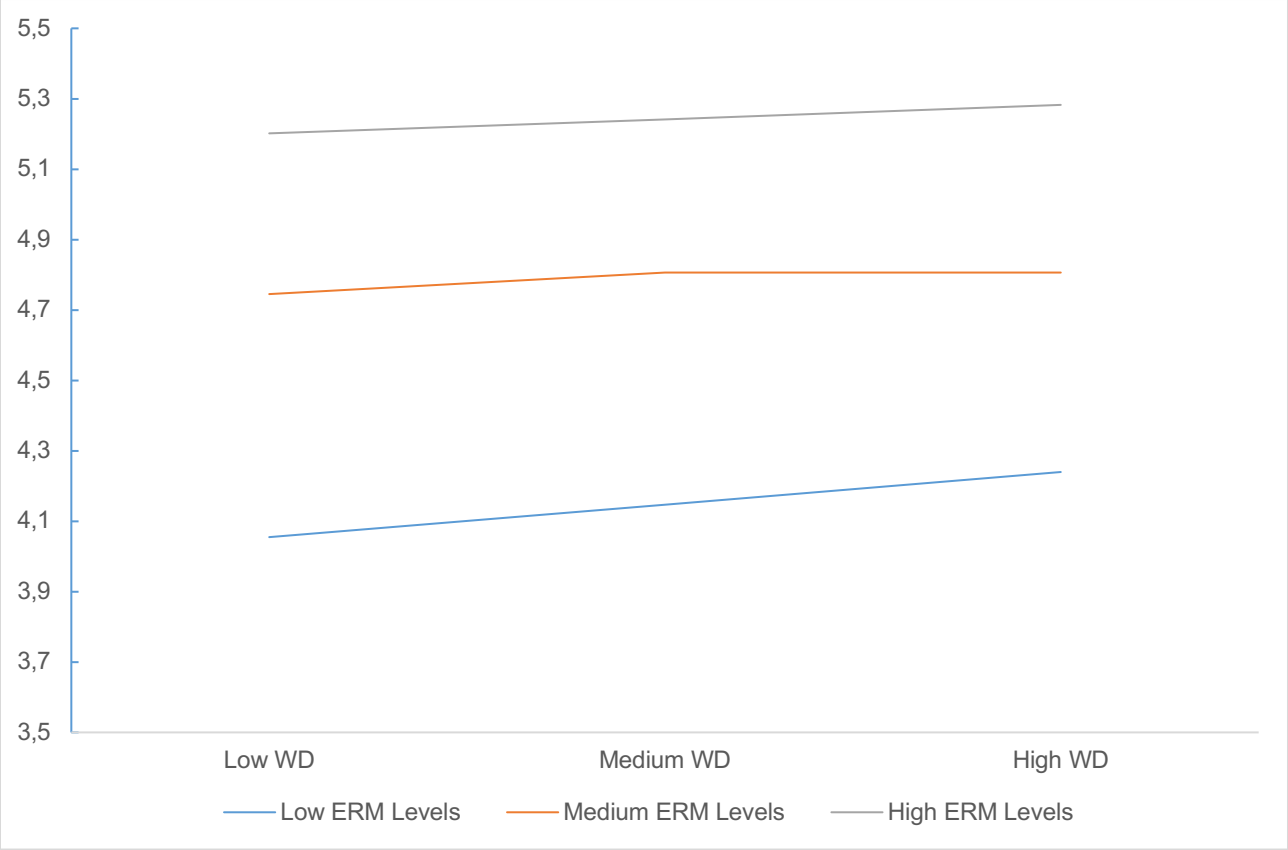


Table A.21: Endo_RM Moderates Rewards/Reinforcement and Inno_P Relationship

```
                                                                    Model:3
                                                                 Y  : InnoP
                                                                 X  : RR
                                                              M  : EndoRM_C

                                                                    Sample
                                                                Size:  187

**************************************************************************
                                                        OUTCOME VARIABLE:
                                                                   InnoP

                                                             Model Summary
          R        R-sq         MSE          F         df1         df2          p
      .5651       .3194      1.3140     28.6217      3.0000    183.0000      .0000

                                                                   Model
                 coeff          se          t          p        LLCI       ULCI
constant        4.8287       .0924    52.2810      .0000      4.6465     5.0109
RR               .2652       .0616     4.3051      .0000      .1437      .3868
EndoRM_C         .6456       .1415     4.5617      .0000      .3664      .9248
Int_1           -.0659       .0800     -.8233      .4114     -.2238      .0920

                                                          Product terms key:
                                  Int_1    :        RR       x        EndoRM_C

                          Test(s) of highest order unconditional interaction(s):
                              R2-chng          F        df1        df2          p
                X*W            .0025       .6779     1.0000    183.0000      .4114
                                                                ----------
                                                    Focal predict: RR       (X)
                                                          Mod var: EndoRM_C (M)

      Data for visualizing the conditional effect of the focal predictor:
     Paste text below into a SPSS syntax window and execute to produce plot.
```

```
                                        DATA LIST FREE/
        RR          EndoRM_C    InnoP       .
                                        BEGIN DATA.
     -1.5171      -.7359      3.8777
       .0000      -.7359      4.3537
      1.5171      -.7359      4.8296
     -1.5171       .0000      4.4263
       .0000       .0000      4.8287
      1.5171       .0000      5.2311
     -1.5171       .4866      4.7891
       .0000       .4866      5.1429
      1.5171       .4866      5.4966
                                      END DATA.
                                    GRAPH/SCATTERPLOT=
  RR        WITH      InnoP     BY        EndoRM_C .
```

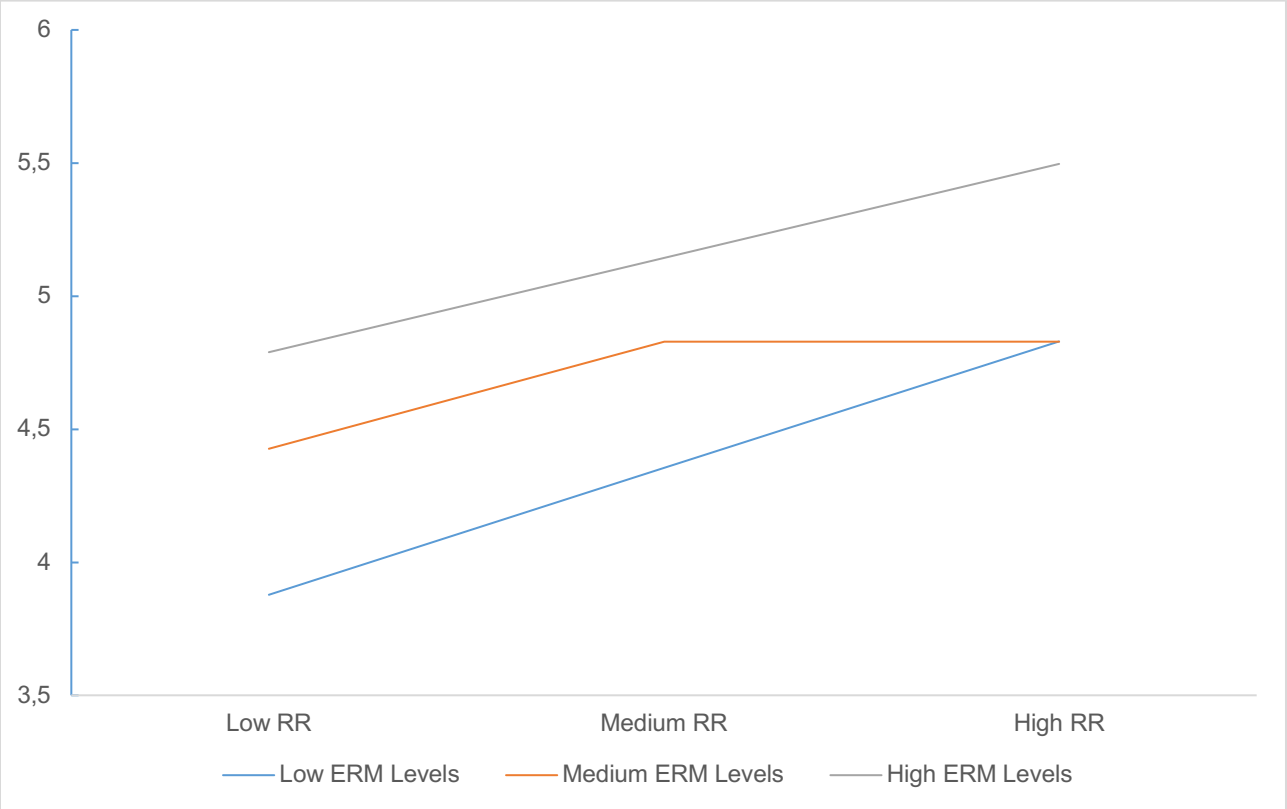


Table A.22: Endo_RM Moderates Time Availability and Inno_P Relationship

```
Model:

                                                    Y  : InnoP
                                                    X  : TA
                                                    M  : EndoRM_C

                                                 Sample
                                                 Size:  187

*************************************************************************
                                                 OUTCOME VARIABLE:
                                                 InnoP

                                                 Model Summary
              R        R-sq         MSE          F         df1          df2
                                                                          p
         .5460      .2981      1.3552     25.9025      3.0000     183.0000
                                                                     .0000

                                                                    Model
              coeff         se          t          p       LLCI       ULCI
constant     4.7711     .0881    54.1693     .0000     4.5974     4.9449
TA           .2989      .0972     3.0741     .0024      .1071      .4908
EndoRM_C     .8791      .1231     7.1391     .0000      .6362     1.1221
Int_1        .1693      .1493     1.1344     .2581     -.1252      .4638

                                                 Product terms key:
                                Int_1    :        TA        x        EndoRM_C

                      Test(s) of highest order unconditional interaction(s):
                          R2-chng          F        df1        df2          p
                X*W       .0049     1.2868     1.0000   183.0000      .2581
                                                                    ----------
                                                 Focal predict: TA       (X)
                                                       Mod var: EndoRM_C (M)
```

```
Data for visualizing the conditional effect of the focal predictor:
Paste text below into a SPSS syntax window and execute to produce plot.

                                        DATA LIST FREE/
                TA          EndoRM_C    InnoP       .
                                        BEGIN DATA.
                             -.9227     -.7359      3.9634
                              .0000     -.7359      4.1242
                              .9227     -.7359      4.2851
                             -.9227      .0000      4.4953
                              .0000      .0000      4.7711
                              .9227      .0000      5.0470
                             -.9227      .4866      4.8471
                              .0000      .4866      5.1990
                              .9227      .4866      5.5508
                                        END DATA.
                                       GRAPH/SCATTERPLOT=
        TA          WITH      InnoP     BY          EndoRM_C .
```

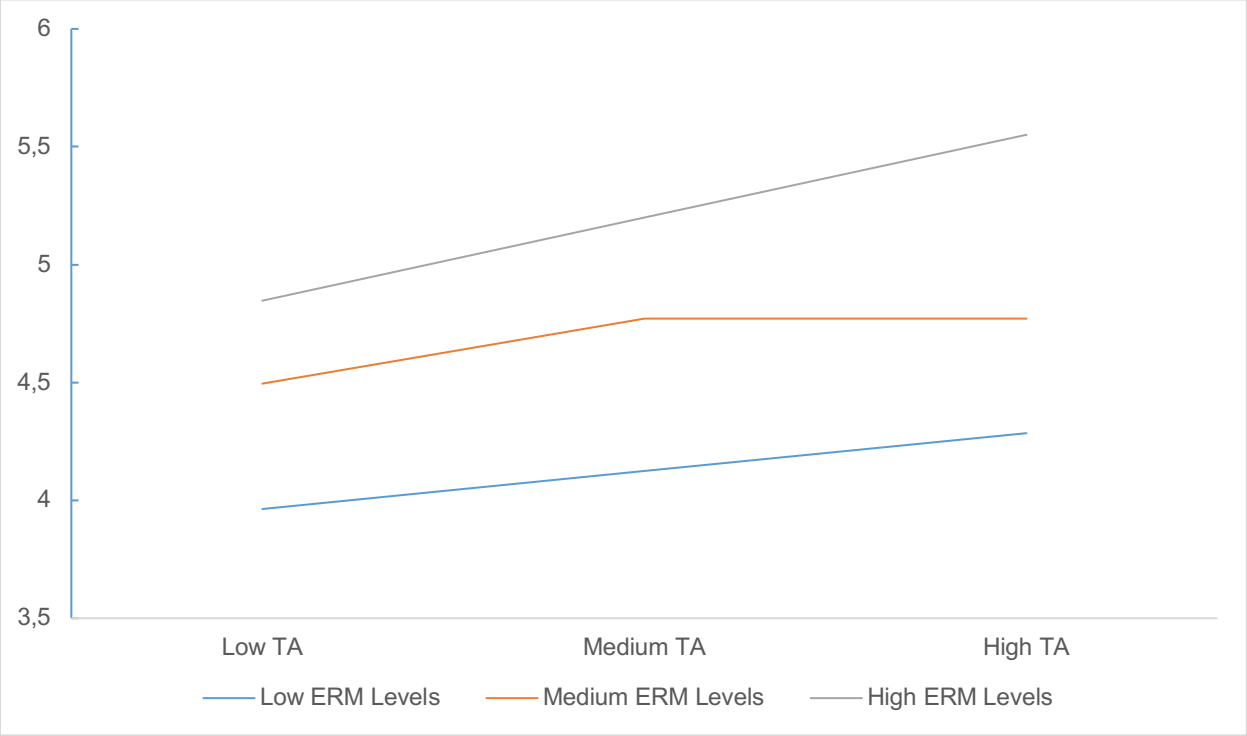


Table A.23: Endo_RM Moderates Organisational Boundaries and Inno_P Relationship

```
                                                                    Model:3
                                                                Y  : InnoP
                                                                X  : OB
                                                              M  : EndoRM_C

                                                                   Sample
                                                                Size:  187

**************************************************************************
                                                    OUTCOME VARIABLE:
                                                                InnoP

                                                            Model Summary
          R       R-sq        MSE          F         df1          df2
                                                                       p
     .5255      .2761     1.3975    23.2705      3.0000    183.0000
                                                                  .0000

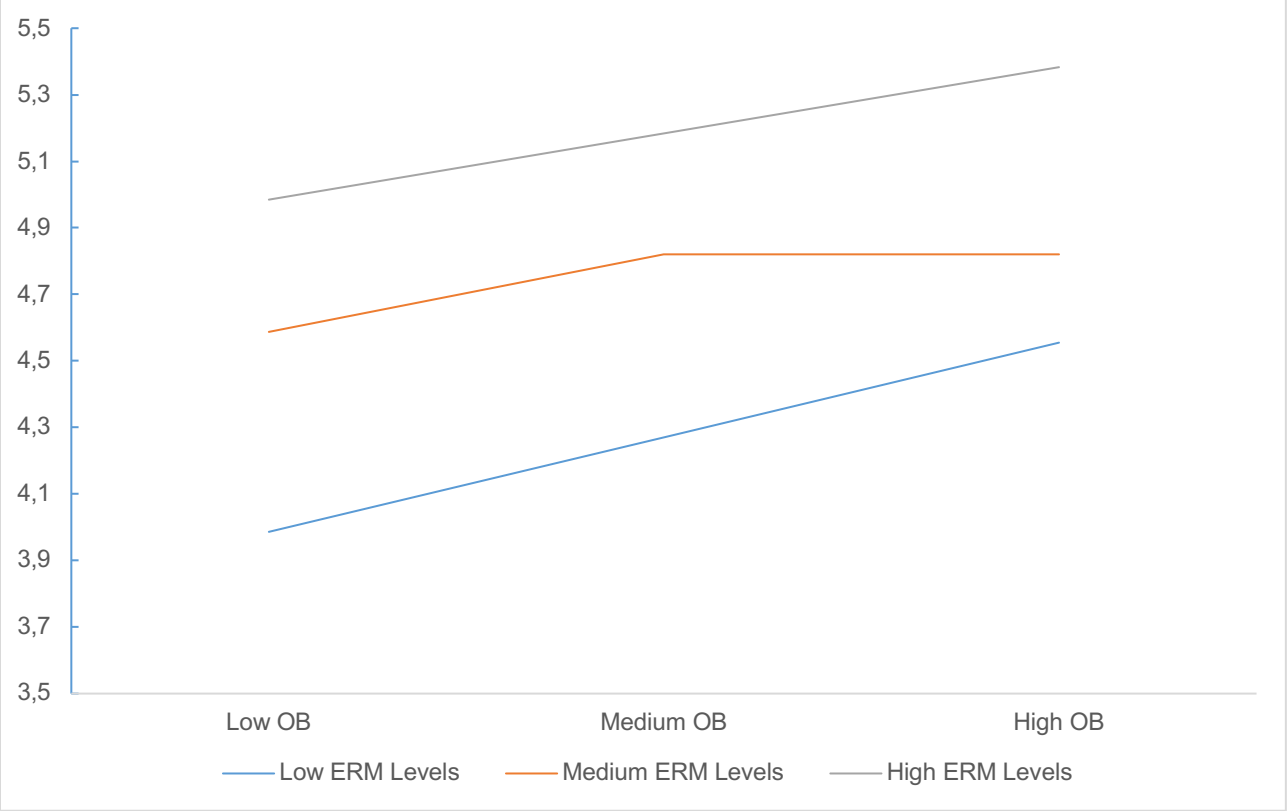
                                                                   Model
          coeff          se          t          p       LLCI       ULCI
constant  4.8203      .0939    51.3587     .0000     4.6351     5.0054
OB         .2157      .0933     2.3121     .0219      .0316      .3998
EndoRM_C   .7470      .1414     5.2833     .0000      .4681     1.0260
Int_1     -.0645      .1006     -.6419     .5217     -.2629      .1338

                                                Product terms key:
                                Int_1    :        OB        x        EndoRM_C

                    Test(s) of highest order unconditional interaction(s):
                       R2-chng          F        df1        df2          p
                X*W      .0016      .4121     1.0000   183.0000      .5217
                                                                ----------
                                                    Focal predict: OB       (X)
                                                          Mod var: EndoRM_C (M)
```

```
Data for visualizing the conditional effect of the focal predictor:
Paste text below into a SPSS syntax window and execute to produce plot.

                                                DATA LIST FREE/
                                    OB          EndoRM_C    InnoP       .
                                                            BEGIN DATA.
                                         -1.0801     -.7359     3.9862
                                           .0000     -.7359     4.2705
                                          1.0801     -.7359     4.5549
                                         -1.0801      .0000     4.5872
                                           .0000      .0000     4.8203
                                          1.0801      .0000     5.0533
                                         -1.0801      .4866     4.9847
                                           .0000      .4866     5.1838
                                          1.0801      .4866     5.3829
                                                            END DATA.
                                                GRAPH/SCATTERPLOT=
                                OB          WITH      InnoP     BY        EndoRM_C .
```



AF - Frequency Tables

What is your highest level of education?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Some schooling	3	1.6	1.6	1.6
	Matriculation	25	13.4	13.4	15.0
	Diploma	44	23.5	23.5	38.5
	Bachelor's Degree	47	25.1	25.1	63.6
	Post Graduate Degree	68	36.4	36.4	100.0
	Total	187	100.0	100.0	

Which province is your firm/branch based in?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Gauteng	141	75.4	75.4	75.4
	Mpumalanga	2	1.1	1.1	76.5
	Limpopo	5	2.7	2.7	79.1
	KwaZulu Natal	12	6.4	6.4	85.6
	Eastern Cape	11	5.9	5.9	91.4
	Western Cape	6	3.2	3.2	94.7
	Northern Cape	2	1.1	1.1	95.7
	North West	4	2.1	2.1	97.9
	Free State	4	2.1	2.1	100.0
	Total	187	100.0	100.0	

How long has your business been in operation?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 3.5 years	23	12.3	12.3	12.3
	3.6 to 10 years	28	15.0	15.0	27.3
	11 to 20 years	30	16.0	16.0	43.3
	21 years or more	106	56.7	56.7	100.0
	Total	187	100.0	100.0	

What is the size of your firm?

	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	Micro (1 to 10 employees)	23	12.3	12.3	12.3
	Small (11 to 50 employees)	15	8.0	8.0	20.3
	Medium (51 to 250 employees)	21	11.2	11.2	31.6
	Large (251 or more employees)	128	68.4	68.4	100.0
	Total	187	100.0	100.0	

What is your position within the firm?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Entry Level Staff Member (e.g. Trainee/Intern)	19	10.2	10.2	10.2
	General Staff Member	59	31.6	31.6	41.7
	Junior Management	69	36.9	36.9	78.6
	Senior Management	24	12.8	12.8	91.4
	Executive Management	16	8.6	8.6	100.0
	Total	187	100.0	100.0	

Which gender do you identify most with?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	79	42.2	42.2	42.2
	Female	108	57.8	57.8	100.0
	Total	187	100.0	100.0	

What is your population group?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Black	177	94.7	94.7	94.7
	White	6	3.2	3.2	97.9
	Indian	3	1.6	1.6	99.5
	Coloured	1	.5	.5	100.0
	Total	187	100.0	100.0	

What is your age?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18 - 24 years	24	12.8	12.8	12.8
	25 – 34 years	104	55.6	55.6	68.4

	35 – 44 years	53	28.3	28.3	96.8
	45 – 54 years	6	3.2	3.2	100.0
	Total	187	100.0	100.0	

MS_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	22	11.8	11.8	11.8
	Disagree	17	9.1	9.1	20.9
	Slightly disagree	19	10.2	10.2	31.0
	Neither agree nor disagree	27	14.4	14.4	45.5
	Slightly agree	37	19.8	19.8	65.2
	Agree	47	25.1	25.1	90.4
	Strongly agree	18	9.6	9.6	100.0
	Total	187	100.0	100.0	

MS_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	16	8.6	8.6	8.6
	Disagree	20	10.7	10.7	19.3
	Slightly disagree	12	6.4	6.4	25.7
	Neither agree nor disagree	29	15.5	15.5	41.2
	Slightly agree	47	25.1	25.1	66.3
	Agree	46	24.6	24.6	90.9
	Strongly agree	17	9.1	9.1	100.0
	Total	187	100.0	100.0	

MS_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	15	8.0	8.0	8.0
	Disagree	29	15.5	15.5	23.5
	Slightly disagree	20	10.7	10.7	34.2
	Neither agree nor disagree	28	15.0	15.0	49.2
	Slightly agree	28	15.0	15.0	64.2
	Agree	51	27.3	27.3	91.4

	Strongly agree	16	8.6	8.6	100.0
	Total	187	100.0	100.0	

MS_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	20	10.7	10.7	10.7
	Disagree	18	9.6	9.6	20.3
	Slightly disagree	14	7.5	7.5	27.8
	Neither agree nor disagree	21	11.2	11.2	39.0
	Slightly agree	47	25.1	25.1	64.2
	Agree	48	25.7	25.7	89.8
	Strongly agree	19	10.2	10.2	100.0
	Total	187	100.0	100.0	

MS_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	20	10.7	10.7	10.7
	Disagree	39	20.9	20.9	31.6
	Slightly disagree	19	10.2	10.2	41.7
	Neither agree nor disagree	34	18.2	18.2	59.9
	Slightly agree	21	11.2	11.2	71.1
	Agree	43	23.0	23.0	94.1
	Strongly agree	11	5.9	5.9	100.0
	Total	187	100.0	100.0	

MS_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	12	6.4	6.4	6.4
	Disagree	20	10.7	10.7	17.1
	Slightly disagree	16	8.6	8.6	25.7
	Neither agree nor disagree	24	12.8	12.8	38.5
	Slightly agree	32	17.1	17.1	55.6
	Agree	58	31.0	31.0	86.6
	Strongly agree	25	13.4	13.4	100.0

	Total	187	100.0	100.0	

MS_7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	13	7.0	7.0	7.0
	Disagree	18	9.6	9.6	16.6
	Slightly disagree	17	9.1	9.1	25.7
	Neither agree nor disagree	14	7.5	7.5	33.2
	Slightly agree	45	24.1	24.1	57.2
	Agree	53	28.3	28.3	85.6
	Strongly agree	27	14.4	14.4	100.0
	Total	187	100.0	100.0	

WD_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	7	3.7	3.7	3.7
	Disagree	13	7.0	7.0	10.7
	Slightly disagree	11	5.9	5.9	16.6
	Neither agree nor disagree	12	6.4	6.4	23.0
	Slightly agree	30	16.0	16.0	39.0
	Agree	74	39.6	39.6	78.6
	Strongly agree	40	21.4	21.4	100.0
	Total	187	100.0	100.0	

WD_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	13	7.0	7.0	7.0
	Disagree	13	7.0	7.0	13.9
	Slightly disagree	9	4.8	4.8	18.7
	Neither agree nor disagree	9	4.8	4.8	23.5
	Slightly agree	37	19.8	19.8	43.3
	Agree	67	35.8	35.8	79.1
	Strongly agree	39	20.9	20.9	100.0
	Total	187	100.0	100.0	

WD_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	10	5.3	5.3	5.3
	Disagree	20	10.7	10.7	16.0
	Slightly disagree	21	11.2	11.2	27.3
	Neither agree nor disagree	13	7.0	7.0	34.2
	Slightly agree	30	16.0	16.0	50.3
	Agree	67	35.8	35.8	86.1
	Strongly agree	26	13.9	13.9	100.0
	Total	187	100.0	100.0	

WD_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	23	12.3	12.3	12.3
	Disagree	28	15.0	15.0	27.3
	Slightly disagree	20	10.7	10.7	38.0
	Neither agree nor disagree	17	9.1	9.1	47.1
	Slightly agree	41	21.9	21.9	69.0
	Agree	36	19.3	19.3	88.2
	Strongly agree	22	11.8	11.8	100.0
	Total	187	100.0	100.0	

WD_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	13	7.0	7.0	7.0
	Disagree	19	10.2	10.2	17.1
	Slightly disagree	17	9.1	9.1	26.2
	Neither agree nor disagree	17	9.1	9.1	35.3
	Slightly agree	38	20.3	20.3	55.6
	Agree	52	27.8	27.8	83.4
	Strongly agree	31	16.6	16.6	100.0
	Total	187	100.0	100.0	

WD_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	17	9.1	9.1	9.1
	Disagree	21	11.2	11.2	20.3
	Slightly disagree	14	7.5	7.5	27.8
	Neither agree nor disagree	16	8.6	8.6	36.4
	Slightly agree	32	17.1	17.1	53.5
	Agree	59	31.6	31.6	85.0
	Strongly agree	28	15.0	15.0	100.0
	Total	187	100.0	100.0	

RR_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	13	7.0	7.0	7.0
	Disagree	25	13.4	13.4	20.3
	Slightly disagree	14	7.5	7.5	27.8
	Neither agree nor disagree	22	11.8	11.8	39.6
	Slightly agree	25	13.4	13.4	52.9
	Agree	64	34.2	34.2	87.2
	Strongly agree	24	12.8	12.8	100.0
	Total	187	100.0	100.0	

RR_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	19	10.2	10.2	10.2
	Disagree	23	12.3	12.3	22.5
	Slightly disagree	11	5.9	5.9	28.3
	Neither agree nor disagree	17	9.1	9.1	37.4
	Slightly agree	32	17.1	17.1	54.5
	Agree	49	26.2	26.2	80.7
	Strongly agree	36	19.3	19.3	100.0
	Total	187	100.0	100.0	

RR_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	16	8.6	8.6	8.6
	Disagree	23	12.3	12.3	20.9
	Slightly disagree	13	7.0	7.0	27.8
	Neither agree nor disagree	29	15.5	15.5	43.3
	Slightly agree	22	11.8	11.8	55.1
	Agree	52	27.8	27.8	82.9
	Strongly agree	32	17.1	17.1	100.0
	Total	187	100.0	100.0	

RR_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	14	7.5	7.5	7.5
	Disagree	22	11.8	11.8	19.3
	Slightly disagree	17	9.1	9.1	28.3
	Neither agree nor disagree	35	18.7	18.7	47.1
	Slightly agree	21	11.2	11.2	58.3
	Agree	48	25.7	25.7	84.0
	Strongly agree	30	16.0	16.0	100.0
	Total	187	100.0	100.0	

RR_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	21	11.2	11.2	11.2
	Disagree	36	19.3	19.3	30.5
	Slightly disagree	16	8.6	8.6	39.0
	Neither agree nor disagree	41	21.9	21.9	61.0
	Slightly agree	25	13.4	13.4	74.3
	Agree	35	18.7	18.7	93.0
	Strongly agree	13	7.0	7.0	100.0
	Total	187	100.0	100.0	

TA_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	14	7.5	7.5	7.5
	Disagree	32	17.1	17.1	24.6
	Slightly disagree	28	15.0	15.0	39.6
	Neither agree nor disagree	22	11.8	11.8	51.3
	Slightly agree	35	18.7	18.7	70.1
	Agree	43	23.0	23.0	93.0
	Strongly agree	13	7.0	7.0	100.0
	Total	187	100.0	100.0	

TA_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	12	6.4	6.4	6.4
	Disagree	21	11.2	11.2	17.6
	Slightly disagree	19	10.2	10.2	27.8
	Neither agree nor disagree	26	13.9	13.9	41.7
	Slightly agree	28	15.0	15.0	56.7
	Agree	55	29.4	29.4	86.1
	Strongly agree	26	13.9	13.9	100.0
	Total	187	100.0	100.0	

TA_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	17	9.1	9.1	9.1
	Disagree	22	11.8	11.8	20.9
	Slightly disagree	23	12.3	12.3	33.2
	Neither agree nor disagree	32	17.1	17.1	50.3
	Slightly agree	33	17.6	17.6	67.9
	Agree	43	23.0	23.0	90.9
	Strongly agree	17	9.1	9.1	100.0
	Total	187	100.0	100.0	

TA_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	7	3.7	3.7	3.7
	Disagree	19	10.2	10.2	13.9
	Slightly disagree	13	7.0	7.0	20.9
	Neither agree nor disagree	35	18.7	18.7	39.6
	Slightly agree	33	17.6	17.6	57.2
	Agree	52	27.8	27.8	85.0
	Strongly agree	28	15.0	15.0	100.0
	Total	187	100.0	100.0	

TA_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	8	4.3	4.3	4.3
	Disagree	32	17.1	17.1	21.4
	Slightly disagree	28	15.0	15.0	36.4
	Neither agree nor disagree	25	13.4	13.4	49.7
	Slightly agree	30	16.0	16.0	65.8
	Agree	48	25.7	25.7	91.4
	Strongly agree	16	8.6	8.6	100.0
	Total	187	100.0	100.0	

OB_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	11	5.9	5.9	5.9
	Disagree	12	6.4	6.4	12.3
	Slightly disagree	9	4.8	4.8	17.1
	Neither agree nor disagree	16	8.6	8.6	25.7
	Slightly agree	30	16.0	16.0	41.7
	Agree	81	43.3	43.3	85.0
	Strongly agree	28	15.0	15.0	100.0
	Total	187	100.0	100.0	

OB_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	14	7.5	7.5	7.5
	Disagree	21	11.2	11.2	18.7
	Slightly disagree	20	10.7	10.7	29.4
	Neither agree nor disagree	18	9.6	9.6	39.0
	Slightly agree	31	16.6	16.6	55.6
	Agree	60	32.1	32.1	87.7
	Strongly agree	23	12.3	12.3	100.0
	Total	187	100.0	100.0	

OB_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	14	7.5	7.5	7.5
	Disagree	32	17.1	17.1	24.6
	Slightly disagree	9	4.8	4.8	29.4
	Neither agree nor disagree	20	10.7	10.7	40.1
	Slightly agree	30	16.0	16.0	56.1
	Agree	53	28.3	28.3	84.5
	Strongly agree	29	15.5	15.5	100.0
	Total	187	100.0	100.0	

OB_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	7	3.7	3.7	3.7
	Disagree	12	6.4	6.4	10.2
	Slightly disagree	9	4.8	4.8	15.0
	Neither agree nor disagree	13	7.0	7.0	21.9
	Slightly agree	30	16.0	16.0	38.0
	Agree	82	43.9	43.9	81.8
	Strongly agree	34	18.2	18.2	100.0
	Total	187	100.0	100.0	

OB_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	1.6	1.6	1.6
	Disagree	4	2.1	2.1	3.7
	Slightly disagree	4	2.1	2.1	5.9
	Neither agree nor disagree	14	7.5	7.5	13.4
	Slightly agree	34	18.2	18.2	31.6
	Agree	87	46.5	46.5	78.1
	Strongly agree	41	21.9	21.9	100.0
	Total	187	100.0	100.0	

OB_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	4	2.1	2.1	2.1
	Disagree	5	2.7	2.7	4.8
	Slightly disagree	12	6.4	6.4	11.2
	Neither agree nor disagree	13	7.0	7.0	18.2
	Slightly agree	34	18.2	18.2	36.4
	Agree	74	39.6	39.6	75.9
	Strongly agree	45	24.1	24.1	100.0
	Total	187	100.0	100.0	

Inno_P_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Extremely poorly	7	3.7	3.7	3.7
	Poorly	6	3.2	3.2	7.0
	Slightly poorly	19	10.2	10.2	17.1
	Neither poorly nor well	19	10.2	10.2	27.3
	Slightly well	49	26.2	26.2	53.5
	Well	57	30.5	30.5	84.0
	Extremely Well	30	16.0	16.0	100.0
	Total	187	100.0	100.0	

Inno_P_2

	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	Extremely poorly	6	3.2	3.2	3.2
	Poorly	7	3.7	3.7	7.0
	Slightly poorly	15	8.0	8.0	15.0
	Neither poorly nor well	25	13.4	13.4	28.3
	Slightly well	49	26.2	26.2	54.5
	Well	63	33.7	33.7	88.2
	Extremely Well	22	11.8	11.8	100.0
	Total	187	100.0	100.0	

Inno_P_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Extremely poorly	10	5.3	5.3	5.3
	Poorly	14	7.5	7.5	12.8
	Slightly poorly	27	14.4	14.4	27.3
	Neither poorly nor well	26	13.9	13.9	41.2
	Slightly well	31	16.6	16.6	57.8
	Well	57	30.5	30.5	88.2
	Extremely Well	22	11.8	11.8	100.0
	Total	187	100.0	100.0	

Inno_P_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Extremely poorly	9	4.8	4.8	4.8
	Poorly	16	8.6	8.6	13.4
	Slightly poorly	28	15.0	15.0	28.3
	Neither poorly nor well	14	7.5	7.5	35.8
	Slightly well	42	22.5	22.5	58.3
	Well	60	32.1	32.1	90.4
	Extremely Well	18	9.6	9.6	100.0
	Total	187	100.0	100.0	

Inno_P_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Extremely poorly	10	5.3	5.3	5.3
	Poorly	14	7.5	7.5	12.8
	Slightly poorly	33	17.6	17.6	30.5

	Neither poorly nor well	16	8.6	8.6	39.0
	Slightly well	43	23.0	23.0	62.0
	Well	44	23.5	23.5	85.6
	Extremely Well	27	14.4	14.4	100.0
	Total	187	100.0	100.0	

Inno_P_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Extremely poorly	7	3.7	3.7	3.7
	Poorly	14	7.5	7.5	11.2
	Slightly poorly	28	15.0	15.0	26.2
	Neither poorly nor well	24	12.8	12.8	39.0
	Slightly well	46	24.6	24.6	63.6
	Well	42	22.5	22.5	86.1
	Extremely Well	26	13.9	13.9	100.0
	Total	187	100.0	100.0	

Inno_P_7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Extremely poorly	9	4.8	4.8	4.8
	Poorly	11	5.9	5.9	10.7
	Slightly poorly	27	14.4	14.4	25.1
	Neither poorly nor well	24	12.8	12.8	38.0
	Slightly well	40	21.4	21.4	59.4
	Well	51	27.3	27.3	86.6
	Extremely Well	25	13.4	13.4	100.0
	Total	187	100.0	100.0	

Endo_RM_1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	16	8.6	8.6	8.6
	Disagree	21	11.2	11.2	19.8
	Slightly disagree	10	5.3	5.3	25.1
	Neither agree nor disagree	21	11.2	11.2	36.4
	Slightly agree	27	14.4	14.4	50.8

	Agree	58	31.0	31.0	81.8
	Strongly agree	34	18.2	18.2	100.0
	Total	187	100.0	100.0	

Endo_RM_2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	10	5.3	5.3	5.3
	Disagree	16	8.6	8.6	13.9
	Slightly disagree	18	9.6	9.6	23.5
	Neither agree nor disagree	14	7.5	7.5	31.0
	Slightly agree	25	13.4	13.4	44.4
	Agree	62	33.2	33.2	77.5
	Strongly agree	42	22.5	22.5	100.0
	Total	187	100.0	100.0	

Endo_RM_3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	13	7.0	7.0	7.0
	Disagree	11	5.9	5.9	12.8
	Slightly disagree	14	7.5	7.5	20.3
	Neither agree nor disagree	16	8.6	8.6	28.9
	Slightly agree	30	16.0	16.0	44.9
	Agree	68	36.4	36.4	81.3
	Strongly agree	35	18.7	18.7	100.0
	Total	187	100.0	100.0	

Endo_RM_4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	9	4.8	4.8	4.8
	Disagree	8	4.3	4.3	9.1
	Slightly disagree	15	8.0	8.0	17.1
	Neither agree nor disagree	12	6.4	6.4	23.5
	Slightly agree	34	18.2	18.2	41.7
	Agree	72	38.5	38.5	80.2

	Strongly agree	37	19.8	19.8	100.0
	Total	187	100.0	100.0	

Endo_RM_5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	17	9.1	9.1	9.1
	Disagree	46	24.6	24.6	33.7
	Slightly disagree	23	12.3	12.3	46.0
	Neither agree nor disagree	25	13.4	13.4	59.4
	Slightly agree	24	12.8	12.8	72.2
	Agree	33	17.6	17.6	89.8
	Strongly agree	19	10.2	10.2	100.0
	Total	187	100.0	100.0	

Endo_RM_6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	11	5.9	5.9	5.9
	Disagree	8	4.3	4.3	10.2
	Slightly disagree	15	8.0	8.0	18.2
	Neither agree nor disagree	22	11.8	11.8	29.9
	Slightly agree	38	20.3	20.3	50.3
	Agree	60	32.1	32.1	82.4
	Strongly agree	33	17.6	17.6	100.0
	Total	187	100.0	100.0	

Endo_RM_7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	8	4.3	4.3	4.3
	Disagree	16	8.6	8.6	12.8
	Slightly disagree	11	5.9	5.9	18.7
	Neither agree nor disagree	17	9.1	9.1	27.8
	Slightly agree	40	21.4	21.4	49.2
	Agree	60	32.1	32.1	81.3
	Strongly agree	35	18.7	18.7	100.0

	Total	187	100.0	100.0	

Endo_RM_8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	7	3.7	3.7	3.7
	Disagree	16	8.6	8.6	12.3
	Slightly disagree	12	6.4	6.4	18.7
	Neither agree nor disagree	19	10.2	10.2	28.9
	Slightly agree	38	20.3	20.3	49.2
	Agree	63	33.7	33.7	82.9
	Strongly agree	32	17.1	17.1	100.0
	Total	187	100.0	100.0	

Endo_RM_9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	8	4.3	4.3	4.3
	Disagree	13	7.0	7.0	11.2
	Slightly disagree	15	8.0	8.0	19.3
	Neither agree nor disagree	17	9.1	9.1	28.3
	Slightly agree	36	19.3	19.3	47.6
	Agree	66	35.3	35.3	82.9
	Strongly agree	32	17.1	17.1	100.0
	Total	187	100.0	100.0	

Endo_RM_10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	5	2.7	2.7	2.7
	Disagree	13	7.0	7.0	9.6
	Slightly disagree	18	9.6	9.6	19.3
	Neither agree nor disagree	21	11.2	11.2	30.5
	Slightly agree	30	16.0	16.0	46.5
	Agree	69	36.9	36.9	83.4
	Strongly agree	31	16.6	16.6	100.0
	Total	187	100.0	100.0	

Endo_RM_11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	7	3.7	3.7	3.7
	Disagree	13	7.0	7.0	10.7
	Slightly disagree	20	10.7	10.7	21.4
	Neither agree nor disagree	21	11.2	11.2	32.6
	Slightly agree	36	19.3	19.3	51.9
	Agree	60	32.1	32.1	84.0
	Strongly agree	30	16.0	16.0	100.0
	Total	187	100.0	100.0	

Endo_RM_12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	8	4.3	4.3	4.3
	Disagree	17	9.1	9.1	13.4
	Slightly disagree	18	9.6	9.6	23.0
	Neither agree nor disagree	17	9.1	9.1	32.1
	Slightly agree	34	18.2	18.2	50.3
	Agree	65	34.8	34.8	85.0
	Strongly agree	28	15.0	15.0	100.0
	Total	187	100.0	100.0	

Endo_RM_13

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	9	4.8	4.8	4.8
	Disagree	12	6.4	6.4	11.2
	Slightly disagree	12	6.4	6.4	17.6
	Neither agree nor disagree	19	10.2	10.2	27.8
	Slightly agree	19	10.2	10.2	38.0
	Agree	72	38.5	38.5	76.5
	Strongly agree	44	23.5	23.5	100.0
	Total	187	100.0	100.0	

Endo_RM_14

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	27	14.4	14.4	14.4
	Disagree	48	25.7	25.7	40.1
	Slightly disagree	17	9.1	9.1	49.2
	Neither agree nor disagree	17	9.1	9.1	58.3
	Slightly agree	20	10.7	10.7	69.0
	Agree	35	18.7	18.7	87.7
	Strongly agree	23	12.3	12.3	100.0
	Total	187	100.0	100.0	

Endo_RM_15

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	24	12.8	12.8	12.8
	Disagree	20	10.7	10.7	23.5
	Slightly disagree	18	9.6	9.6	33.2
	Neither agree nor disagree	15	8.0	8.0	41.2
	Slightly agree	25	13.4	13.4	54.5
	Agree	51	27.3	27.3	81.8
	Strongly agree	34	18.2	18.2	100.0
	Total	187	100.0	100.0	

Endo_RM_16

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	17	9.1	9.1	9.1
	Disagree	14	7.5	7.5	16.6
	Slightly disagree	10	5.3	5.3	21.9
	Neither agree nor disagree	14	7.5	7.5	29.4
	Slightly agree	23	12.3	12.3	41.7
	Agree	74	39.6	39.6	81.3
	Strongly agree	35	18.7	18.7	100.0
	Total	187	100.0	100.0	

Endo_RM_17

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	12	6.4	6.4	6.4
	Disagree	12	6.4	6.4	12.8
	Slightly disagree	15	8.0	8.0	20.9
	Neither agree nor disagree	22	11.8	11.8	32.6
	Slightly agree	31	16.6	16.6	49.2
	Agree	62	33.2	33.2	82.4
	Strongly agree	33	17.6	17.6	100.0
	Total	187	100.0	100.0	

EndoRM_CODED

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	27	14.4	14.4	14.4
	2	37	19.8	19.8	34.2
	3	123	65.8	65.8	100.0
	Total	187	100.0	100.0	

Appendix B: Consistency Matrix

Topic: Corporate entrepreneurship and innovation performance: the moderating role of endogenous risk management in the South African telecommunications sector.							
To understand the CE-Inno_P relation and the moderating role of endogenous risk management in the relationship between the antecedents of CE and Inno_P in the South African telecommunications sector.							
Sub-problem/Aims	**Literature Review**	**Hypotheses**	**Research questions**	**Variables (Independent & Dependent)**	**Source of data**	**Type of data**	**Analysis**
Aim 1: Investigate the relationship between the antecedents of corporate entrepreneurship (CE) and innovation performance (Inno_P)	Kreiser, Kuratko, Covin, Ireland & Hornsby (2019); Urban and Wood (2017); Lomberg, C., Urbig, D., Stöckmann, C., Marino, L. D., and Dickson, P. H. (2017); Hitt M.A, Ireland R.D., Camp S.M., Sexton D.L. (2017); Mueller, B. A., Wolfie, M. T., & Syed, I. (2017); Schuster & Rueck (2017); Donou-Adonsou F., Lim S., Mathey S.A. (2016); Chen, Wang, Nevo, Benitez-Amado and Kou (2015); Crawford, G., & Kreiser, P. (2015); Bierwerth, M., Schwens, C., Isidor, R., and Kabst, R. (2015); Cucculelli, M., & Bettinelli, C. (2015); Batou M.E. (2015); Hon, Lee and Lee (2014); Thorén (2014); Kollmann. T., & Stöckmann, C. (2014); Urban B. and Mumbrika M. (2013); Magaziner D. and Jacobs S. (2013); Kreiser, P.M., Marino, L. D., Karukto, D.F., & Weaver, K. M.(2013); Chavula H.K. (2012); Covin and Lumpkin (2011); Sáez-Martinez F.J., González-Moreno Á. (2011); Morris M.H., Karukto D.F. and Covin J.G.(2008); Gillward A. (2005); Bhuian, S. N., Menguc, B., & Bell, S. J. (2005) Meyer G.D and Heppard K.A (2000).	**H1a. Management support is positively related to innovation performance.**	How does management support affect innovation performance in South African telecommunication firms?	IV1= Management support (MS) DV1= Innovation performance (Inno_P)	Questionnaire - Block 2 & 3 Literature	Ordinal (7 Likert Scale)	Descriptive Analysis Correlational Analysis Regression Analysis
		H1b. Work discretion/autonomy is positively related to innovation performance.	How does work discretion/autonomy affect innovation performance in South African telecommunication firms?	IV2= Work discretion/autonomy (WD) DV2= innovation performance (Inno_P)	Questionnaire - Block 2 & 3 Literature	Ordinal (7 Likert Scale)	Descriptive Analysis Correlational Analysis Regression Analysis
		H1c. Rewards/reinforcements are positively related to innovation performance.	How do rewards/reinforcement affect innovation performance in South African telecommunication firms?	IV3= Rewards/reinforcements (RR) DV3= Innovation performance (Inno_P)	Questionnaire - Block 2 & 3 Literature	Ordinal (7 Likert Scale)	Descriptive Analysis Correlational Analysis Regression Analysis
		H1d. Time availability is positively related to innovation performance.	How does time availability affect innovation performance in South African telecommunication firms?	IV4= Time availability (TA) DV4= Innovation performance (Inno_P)	Questionnaire - Block 2 & 3 Literature	Ordinal (7 Likert Scale)	Descriptive Analysis Correlational Analysis Regression Analysis
		H1e. Organisational boundaries are positively related to innovation performance	How do organisational boundaries affect innovation performance in South African telecommunication firms?	IV5= Organisational boundaries (OB) DV5= Innovation performance (Inno_P)	Questionnaire - Block 2 & 3 Literature	Ordinal (7 Likert Scale)	Descriptive Analysis Correlational Analysis Regression Analysis

Topic: Corporate entrepreneurship and innovation performance: the moderating role of endogenous risk management in the South African telecommunications sector.							
To understand the CE-Inno_P relation and the moderating role of endogenous risk management in the relationship between the antecedents of CE and Inno_P in the South African telecommunications sector.							
Sub-problem/Aims	**Literature Review**	**Hypotheses**	**Research questions**	**Variables (Independent & Dependent)**	**Source of data**	**Type of data**	**Analysis**
Aim 2: Investigate the moderating role of endogenous risk management in the relationship between the antecedents of corporate entrepreneurship (CE) and innovation performance (Inno_P)	Jingan W. and Yunus N.K.Y. (2018); Miller K.D. and Leiblein M.J. (2017) Stefan Schaltegger, Roger Burritt, Holger Petersen (2017); Donou-Adonsou F., Lim S., Mathey S.A. (2016); Liu S. (2015): Bedford D.S, (2015); Karutko, Hornsby and Covin (2014) Cucculelli M. and Ermini B (2013); Hornsby J.S., Kuratko D. F., Holt D.T., and Wales W.J. (2013) Chanakira M. (2013); Goodale, Karukto, Hornsby and Covin (2010) Latham, S. F., and Braun, M. (2009); Gillwald A. (2005).	**H2a. The relationship between management support and innovation performance is more positive under low than high levels of risk management.**	How does endogenous risk management affect the management support-Inno_P relationship within South African telecommunication firms?	IV1= Endogenous risk management (Endo_RM) DV1= MS-Inno_P relation	Questionnaire - Block 2,3 & 4 Literature	Ordinal (7 Likert Scale)	Descriptive Analysis Correlational Analysis Regression Analysis
		H2b. The relationship between work discretion/autonomy and innovation performance is more positive under high than low levels of risk management.	How does endogenous risk management affect the work discretion/autonomy-Inno_P relationship within South African telecommunication firms?	IV2= Endogenous risk management (Endo_RM) DV2= WD-Inno_P relation	Questionnaire - Block 2,3 & 4 Literature	Ordinal (7 Likert Scale)	Descriptive Analysis Correlational Analysis Regression Analysis
		H2c. The relationship between rewards/reinforcements and innovation performance is more positive under high than low levels of risk management.	How does endogenous risk management affect the rewards/reinforcements-Inno_P relationship within South African telecommunication firms?	IV3= Endogenous risk management (Endo_RM) DV3= RR-Inno_P relation	Questionnaire - Block 2,3 & 4 Literature	Ordinal (7 Likert Scale)	Descriptive Analysis Correlational Analysis Regression Analysis
		H2d. The relationship between time availability and innovation performance is more positive under low than high levels of risk management.	How does endogenous risk management affect the time availability-Inno_P relationship within South African telecommunication firms?	IV4= Endogenous risk management (Endo_RM) DV4= TA-Inno_P relation	Questionnaire - Block 2,3 & 4 Literature	Ordinal (7 Likert Scale)	Descriptive Analysis Correlational Analysis Regression Analysis
		H2e. The relationship between organisational boundaries and innovation performance is more positive under high than low levels of risk management.	How does endogenous risk management affect the organisational boundaries-Inno_P relationship within South African telecommunication firms?	IV5= Endogenous risk management (Endo_RM) DV5= OB-Inno_P relation	Questionnaire - Block 2,3 & 4 Literature	Ordinal (7 Likert Scale)	Descriptive Analysis Correlational Analysis Regression Analysis

Appendix C: Ethical Clearance

Graduate School of Business Administration
University of the Witwatersrand, Johannesburg

Wits Business School Ethics Committee
Constituted under the University Human Research Ethics Committee (Non-Medical)

Ethics Clearance Certificate

Ethics protocol number: WBS/BA1806827/562
This certificate is only valid with a legitimate ethics protocol number and signed by the Researcher (below).

Project title	Corporate entrepreneurship and innovation performance: the moderatin role of endogenous risk management in the South African telecommunications sector.
Investigator / Researcher	Ms. Hlengiwe Zondo
Nature of Project	MM (Entrepr & New Venture Creation)
Decision of the Committee	Approved unconditionally
Issue Date of Certificate	2019/12/02
Expiry date	Date of submission of the project report
Chairperson	Prof Anthony Stacey ☎ +27 11 717 3587 +27 82 880 4531 anthony.stacey@wits.ac.za

Declaration by Researcher

One copy must be signed by the Researcher and returned to the Chairperson of the Wits Business School Ethi Committee.

I fully understand the conditions under which I am authorized to carry out the abovementioned research an guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I undertake to resubmit the protocol to the Committee.

Signature

02.12.2019
Date:

Appendix D: Research Instrument



WITS BUSINESS SCHOOL

Welcome to the research study!

Information Sheet and Consent Form

Corporate entrepreneurship and innovation: the moderating role of endogenous risk management in the South African telecommunications sector.

Who I am

Hello, I am Hlengiwe Londiwe Zondo (Student Number: 1806827). I am conducting research for the purpose of completing my studies - Master of Management in Entrepreneurship and New Venture Creation at Wits Business School.

What I am doing

I am conducting a quantitative study to understand the relationship between corporate entrepreneurship (CE) and innovation performance (Inno_P) and the moderating role of endogenous risk management in the relationship between the antecedents of CE and Inno_P in the telecommunications industry within South Africa.

Your participation

Your participation in this survey will take approximately 15 minutes. You have been randomly selected as an employee within the Telecommunications firm and your participation is voluntary. You are not forced to take part in this study. The choice of whether to participate or not, is yours alone. If you choose not to take part, you will not be penalised in any way whatsoever.

Confidentiality, Risks and Benefits

No identifiable information (e.g. the name of company or the respondent, is required ensuring privacy of all respondent. Any study records that may hold potential identify you will be kept confidential to the

extent possible by law. Where necessary, I will refer to you by a code number or pseudonym (another name) in the thesis and any further publication. The records from your participation may be reviewed by people responsible for making sure that research is done properly, including my academic supervisor. Kindly note that there are no risks associated with your participation in this research. There are no immediate benefits to you from participating in this study. However, this study will be helpful in providing industry insight to firms and policymakers as to inform corporate strategy – pertaining to entrepreneurial climate, risk management and innovation performance of telecommunication firms in South Africa. If you would like to receive feedback on the study, I can send you the results of the study when it is completed sometime in April 2020.

Who to contact if you have been harmed or have any concerns

This research has been approved by the Wits Business School. If you would like to contact my supervisor, in this study, to discuss this research, kindly note details for Professor Boris Urban - boris.urban@wits.ac.za.

My own contact details are: email: 1806827@students.wits.ac.za / Cell: +27 76 814 4425

- ○ I consent, begin the study
- ○ I do not consent, I do not wish to participate [Close Survey]

BLOCK1 - DEMOGRAPGIC INFORMATION		
Q1.1: Does your firm fall within the Telecommunications industry?		
Yes	1	CONTINUE
No	2	CLOSE SURVEY
Q1.2: Is your firm based in South Africa?		
Yes	1	CONTINUE
No	2	CLOSE SURVEY
Q1.3: Which province is your firm/branch based in?		
Gauteng	1	CONTINUE
Mpumalanga	2	
Limpopo	3	
KwaZulu Natal	4	
Eastern Cape	5	

Western Cape	6	
Northern Cape	7	
North West	8	
Free State	9	
Q1.4: How long has your business been in operation?		
Less than 3 ½ years	1	CONTINUE
3 ½ to 10 years	2	
11 to 20 years	3	
21 years or more	4	
Q1.5: What is the size of your firm?		
Micro (1 to 10 employees)	1	CONTINUE
Small (11 to 50 employees)	2	
Medium (51 to 250 employees)	3	
Large (251 or more employees)	4	
Q1.6: What is your highest level of education?		
No formal education	1	CONTINUE
Some Schooling	2	
Matric	3	
Diploma	4	
Bachelor's Degree	5	
Post Graduate Degree	6	
Q1.7: What is your position within the firm?		
Entry Level Staff Member (e.g. Trainee/Intern)	1	CONTINUE
General Staff Member	2	
Junior Management	3	
Senior Management	4	
Executive Management	5	
Director	6	
Q1.8: Which gender do you identify most with?		
Male	1	CONTINUE
Female	2	
Q1.9: What is your population group?		

Black	1	CONTINUE
White	2	
Indian	3	
Coloured	4	
Q1.10: What is your age?		
18-24	1	CONTINUE
25-34	2	
35-44	3	
45-54	4	
55-64	5	
65 or older	6	

BLOCK 2 - CORPORATE ENTREPRENEURSHIP

Management Support

Using the seven-point scale below (ranging from 1=strongly disagree to 7= strongly agree), indicate your level of agreement regarding your experiences of management support in your firm.

	Strongly disagree	Disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Agree	Strongly agree
MS1: Upper management is aware and very receptive to my ideas and suggestions	1	2	3	4	5	6	7
MS2: This organisation supports many small and experimental projects realising that some will undoubtedly fail.	1	2	3	4	5	6	7
MS3: Money is often available to get new project ideas off the ground.	1	2	3	4	5	6	7
MS4: People are often encouraged to take calculated risks with new ideas around here	1	2	3	4	5	6	7
MS5: Senior managers encourage innovators to bend rules and rigid procedures in order to keep promising ideas on track.	1	2	3	4	5	6	7
MS6: Those employees who come up with innovative ideas on their own often receive management encouragement for their activities.	1	2	3	4	5	6	7

MS7: My manager helps me get my work done by removing obstacles	1	2	3	4	5	6	7
Work Discretion/Autonomy							
Indicate your level of agreement regarding the autonomy you experience in your job.							
	Strongly disagree	Disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Agree	Strongly agree
WD1: I have much autonomy on my job and am left on my own to do my own work.	1	2	3	4	5	6	7
WD2: It is basically my own responsibility to decide how my job gets done.	1	2	3	4	5	6	7
WD3: I seldom have to follow the same work methods or steps for doing my major tasks from day to day.	1	2	3	4	5	6	7
WD4: I feel that I am my own boss and do not have to double-check all of my decisions.	1	2	3	4	5	6	7
WD5: This organisation provides freedom to use my own judgment.	1	2	3	4	5	6	7
WD6: This organisation provides me the chance to be creative and try my own methods of doing my job.	1	2	3	4	5	6	7
Rewards / Reinforcement							
Indicate your level of agreement regarding the rewards available in your job.							
	Strongly disagree	Disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Agree	Strongly agree
RR1: The rewards I receive are dependent upon my work on the job	1	2	3	4	5	6	7
RR2: My supervisor will give me special recognition if my work performance is especially good.	1	2	3	4	5	6	7
RR3: My manager would tell his boss if my work was outstanding.	1	2	3	4	5	6	7
RR4: Individuals with successful innovative projects receive additional reward and	1	2	3	4	5	6	7

compensation for their ideas and efforts beyond the standard reward system.							
RR5: Promotion usually follows the development of new and innovative ideas.	1	2	3	4	5	6	7
Time Availability							
Indicate your level of agreement regarding time availability and your job.							
	Strongly disagree	Disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Agree	Strongly agree
TA1: I always seem to have plenty of time to get everything done	1	2	3	4	5	6	7
TA2: During the past 3 months, my workload was too heavy to spend time on developing new ideas.	1	2	3	4	5	6	7
TA3: I have just the right amount of time and workload to do everything well.	1	2	3	4	5	6	7
TA4: I feel that I am always working with time constraints on my job.	1	2	3	4	5	6	7
TA5: My co-workers and I always find time for long-term problem solving.	1	2	3	4	5	6	7
Organisational Boundaries							
Indicate your level of agreement regarding the requirements of your job.							
	Strongly disagree	Disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Agree	Strongly agree
OB1: My job description clearly specifies the standards of performance on which my job is evaluated.	1	2	3	4	5	6	7
OB2: There is little uncertainty in my job.	1	2	3	4	5	6	7
OB3: During the past year, my immediate supervisor discussed my work performance with me frequently.	1	2	3	4	5	6	7
OB4: On my job, I have no doubts about what is expected of me.	1	2	3	4	5	6	7

OB5: I clearly know what level of work performance is expected from me in terms of amount, quality, and timelines of output	1	2	3	4	5	6	7
OB6: In the past three months, I have always followed standard operating procedures or practices to do my major tasks.	1	2	3	4	5	6	7
BLOCK 3 - INNOVATION PERFORMANCE							
Based on your perception and knowledge, indicate on the seven-point scale below (ranging from 1 = "extremely poorly" to 7 = "extremely well") the level at which your firm performed in reference to criteria below over the last three years.							
	Extremely poorly	Poorly	Slightly poorly	Neither poorly nor well	Slightly well	Well	Extremely well
Inno_P1: Number of new products or services developed	1	2	3	4	5	6	7
Inno_P2: Number of new products or services brought to market.	1	2	3	4	5	6	7
Inno_P3: Speed with which new products or services are developed.	1	2	3	4	5	6	7
Inno_P4: Speed with which new products or services are brought to market.	1	2	3	4	5	6	7
Inno_P5: Ability to respond quickly to market or technological developments.	1	2	3	4	5	6	7
Inno_P6: Ability to pre-empt competitors in responding to market or technological developments.	1	2	3	4	5	6	7
Inno_P7: Incorporation of technological innovations into internal operations.	1	2	3	4	5	6	7
BLOCK 4 - ENDOGENOUS RISK MANAGEMENT							
Based on your experience, indicate on the seven-point scale below ranging from 1 = "strongly disagree" to 7 = "strongly agree") the degree to which you perceive the statement to reflect your firms internal risk management (holistic – operational, financial, innovation/knowledge risk, internal environmental and legal risk)							
	Strongly disagree	Disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Agree	Strongly agree

Endo_RM1: The firm communicates its risk management strategy/policy effectively	1	2	3	4	5	6	7
Endo_RM2: This firm emphasises the importance of documenting knowledge created	1	2	3	4	5	6	7
Endo_RM3: This firm has a strong presence of control-related structures and systems to manage risk that may arise from within the firm.	1	2	3	4	5	6	7
Endo_RM4: This firm has a strong presence of control-related policies to manage risk that may arise from within the firm.	1	2	3	4	5	6	7
Endo_RM5: This firm has weak internal controls within the firm in countering risk that arises from the innovation process	7	6	5	4	3	2	1
Endo_RM6: This firm identifies risk effectively	1	2	3	4	5	6	7
Endo_RM7: This firm analyses risk effectively	1	2	3	4	5	6	7
Endo_RM8: This firm evaluates risk effectively	1	2	3	4	5	6	7
Endo_RM9: This firm treats/addresses risk effectively	1	2	3	4	5	6	7
Endo_RM10: This firm controls risk effectively	1	2	3	4	5	6	7
Endo_RM11: This firm monitors risk effectively	1	2	3	4	5	6	7
Endo_RM12: This firm communicates risk effectively	1	2	3	4	5	6	7
Endo_RM13: Risk management is integrated across the firm	1	2	3	4	5	6	7
Endo_RM14: Risk management is the responsibility of a manager or division within the firm	1	2	3	4	5	6	7
Endo_RM15: I have received some training on risk management through this firm	1	2	3	4	5	6	7

Endo_RM16: This firm allows me to report risk without fear of negative consequences	1	2	3	4	5	6	7
Endo_RM17: This firm monitors risk management effectiveness.	1	2	3	4	5	6	7
Thank you for your time spent taking this survey. Your response has been recorded.							