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The effect of innovation in automatic identification technology on new venture sustainability in Southern Africa

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

Student: Christopher Darlington

Student Number: 1969494

Supervisor: Dr Diran Soumonni

Wits Business School

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ABSTRACT

The study explored the effect of innovation in automatic identification technology on new venture sustainability in Southern Africa as measured by entrepreneurial orientation and technological orientation on business performance.

The research evaluates the representation of perceived entrepreneurial orientation & technological orientation of new technology ventures within the Auto ID supply chain and how the continuous adoption of new technologies impacts firm performance within the supply chain. The research investigates how entrepreneurial orientation and EO dimensions moderated by technology orientation affect non-financial business performance of these new technology ventures. An observation identified as a motivation for the study is that new venture opportunities arise after technological breakthroughs or radical changes in existing technology that are offered to retail supply chains. However, within retail supply chains implementation, it is not always done by the new technology ventures who develop it.

The purpose of the research is to conceptualise how NTV's entrepreneurial orientation affects non-financial business performance and how entrepreneurial orientation moderated by technological orientation influences non-financial business performance.

The research design is cross-sectional with primary data in that it is identifying an observational study analysing a population at a specific point in time. The rationale of the research is primarily quantitative. The targeted respondent sample size of 284 returned questionnaires was selected using a form of probability sampling from a targeted 1500 potential respondents. The target population comprised of the following types of NTV's namely; a) Auto ID Software Providers; b) Hardware Suppliers and c) Process Service & Support Providers (Datalogic, 2018). The primary research data was targeted towards senior & middle management or specifically to representatives within the sample population entities as derived from pre-existing database from a reliable auto-ID distributor operating throughout the SADC region.

The main findings highlighted the entrepreneurial orientation scale (H1) results and were successfully interpreted through each of the entrepreneurial orientation dimensions namely; innovativeness, proactiveness, risk-taking, competitive aggressiveness and autonomy and the relationship each variance has to a new technology ventures business performance. The main findings also highlighted a significant relationship within results to business performance from each dimension. Lastly, an in-depth discussion was concluded based on hypothesis H2 which identified technological orientation as a moderator to each entrepreneurial dimension and business performance. The study results were aligned to similar studies which found that technological orientation had a significantly positive influence on business performance.

Practical implications can be summarised as the relationship between EO and business performance on new technology venture. Business performance emphasized that EO refers to responsive behaviour to the retail supply chain market environment and contradicts traditional and adaptive market orientations. New technology ventures engaging in proactive behaviour seek to create compatibility within the retail supply chain environment, through improving the functions of the internal organisation and improving strategic fit, technological innovation, IT competence and information technology proactiveness towards the business environment. Non-financial business performances are said to have a significant relationship with long-term goals and growth potential. Recent findings show that innovative proactiveness affects nonfinancial business performance. To date, research does not clearly explain why entrepreneurs discover these technological opportunities; this leads to a number of conceptual problems in entrepreneurship literature as opportunity recognition is a function of the distribution of information in society.

This study contributes to theories surrounding environmental characteristics and dynamism, competitive strategies, competition intensity, entrepreneurial success factors and personality traits, whereas more can be investigated toward product innovation trends and technology economics. More specifically why entrepreneurial orientation theory and the EO dimensions effect NTV’s business performance, and

how technology orientation is a moderating influence on NTV's entrepreneurial orientation which influences business performance more predominately.

Keywords: Automatic Identification; Entrepreneurship; Technoprenuership Technology S-curve; NTV Performance.

DECLARATION

I, Christopher Charles Darlington, 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 the Field of Entrepreneurship at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Christopher C Darlington

Signed at 1 Hennie Alberts Street, Brackenhurst, Alberton

On 28 March 2019.

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This research report is dedicated to the late Mr. Graham Darlington (father) and late Mr. Alexander Maniakis (Grandfather).

TABLE OF CONTENTS

ABSTRACT ..... **IX**

DECLARATION ..... **IX**

ACKNOWLEDGEMENT ..... **IX**

LIST OF FIGURES ..... **VIII**

LIST OF TABLES ..... **VIII**

1 INTRODUCTION **1**

1.1 THEORTICAL BACKGROUND 1

1.2 PROBLEM STATEMENT 2

1.3 PURPOSE, RESEARCH QUESTION AND AIMS OF THE STUDY 3

1.3.1 OBJECTIVES 3

1.4 CONCEPTUAL/ THEORETICAL DEFINITION OF TERMS 4

1.5 ASSUMPTIONS OF STUDY 4

1.6 CONTRIBUTION OF THE STUDY 5

2 LITERATURE REVIEW **7**

2.1 INTRODUCTION 7

2.2 ROLE OF AIDC WITHIN RETAIL SUPPLY CHAIN 7

2.3 NVT AND ENTREPRENEURIAL ORIENTATION (EO) 8

2.3.1 ENTREPRENEURIAL ORIENTATION (EO) DEFINED 9

2.3.2 ENTREPRENEURIAL ORIENTATION (EO) & BUSINESS PERFORMANCE 9

2.3.3 ENTREPRENEURIAL ORIENTATION (EO) AS A BEHAVIOUR 11

2.3.4 ENTREPRENEURIAL ORIENTATION & TECHNOLOGICAL ORIENTATION 12

2.3.5 DIMENSIONS OF EO 13

2.4 NVT AND TECHNOLOGICAL ORIENTATION 20

2.4.1 TECHNOLOGICAL ORIENTATION DEFINED 20

2.4.2 TECHNOLOGY ORIENTATION & ENTREPRENEURIAL ORIENTATION 21
2.5 THE HYPOTHESIS MODEL 30
2.6 CONLUSION OF LITERATURE REVIEW 31

3 RESEARCH METHODOLOGY 34

3.1 INTRODUCTION 34
3.2 RESEARCH APPROACH/ PARADIGM 35
3.3 RESEARCH DESIGN. 36
3.4 POPULATION AND SAMPLE. 37
3.4.1 SAMPLE TECHNIQUE 39
3.4.2 SAMPLE SELECTION RATIONALE 40
3.5 RELIABILITY. 41
3.6 VALIDITY. 42
3.6.1 EXTERNAL VALIDITY 43
3.6.2 INTERNAL VALIDITY 43
3.7 RESEARCH INSTRUMENT & SCALE 44
3.8 DATA COLLECTION. 45
3.9 METHOD OF ANALYSIS. 45
3.10 LIMITATION OF STUDY. 48
3.11 ETHICAL CONSIDERATION. 48
3.11 CONCLUSION OF METHODOLOGY. 49

4 PRESENTATION OF RESULTS 51

4.1 INTRODUCTION 51
4.2 DESCRIPTIVE STATISTICS 51
4.3 RELIABILITY TESTING OF MEASUREMENT SCALE 58
4.4 EXPLANATORY FACTOR ANALYSIS. 59
4.5 RESULTS PERTAINING TO HYPOTHESIS H1 64
4.6 RESULTS PERTAINING HYPOTHESIS H2. 76

4.7 RESULTS SUMMARY 81

5 DISCUSSIONS OF THE RESULTS 82

5.1 INTRODUCTION 82

5.2 DESCRIPTIVE ANALYSIS 82

5.3 DISCUSSION ON DEPENDENT VARIABLE - BUSINESS PERFORMANCE. 83

5.4 DISCUSSION ON INDEPENDENT VARIABLE - ENTREPRENEURIAL ORIENTATION. 84

5.5 DISCUSSION ON MODERATING VARIABLE - TECHNOLOGICAL ORIENTATION. 93

5.6 CONCLUSION 98

6 CONCLUSION, IMPLCIATIONS AND RECOMMENDATIONS 99

6.1 INTRODUCTION 99

6.2 CONCLUSION OF THE STUDY 99

6.3 SUMMARY OF MAIN OBJECTIVE, HYPOTHESIS AND FINDINGS. 101

6.4 IMPLICATIONS AND RECOMMENDATIONS. 107

6.5 SUGGESTIONS FOR FUTURE RESEARCH. 107

REFERENCES 108

APPENDEXURE A: QUESTIONAIRE 1: EO 120

APPENDEXURE A: QUESTIONAIRE 1: TO 120

APPENDEXURE A: QUESTIONAIRE 1: BP 121

APPENDEXURE B: CONSISTENCY MATRIX 122

PARTICIPATION INFORMATION SHEET 124

CONSENT FORM 126

LIST OF FIGURES

Figure 1.1: Hypothesis model 30
Figure 4.1: Competitive Aggressivness Frequecy Distribution 53
Figure 4.2: Proactiveness Frequency Distribution 53
Figure 4.3: Risk-Taking Frequency Distribution 54
Figure 4.4: Autonomy Frequency Distribution 54
Figure 4.5: Innovativeness Frequecy Distribution 55
Figure 4.6:Technological Orientation Frequecy Distribution 56
Figure 4.7: Business Performance Frequecy Distribution 57

LIST OF TABLES

Table 3.1: Profile of respondents 38
Table 3.2: Sample Technique 39
Table 4.1: frequency distribution from the EO scale responses 52
Table 4.2: Survey results for TO 56
Table 4.3: Survey results for Business performance 57
Table 4.4: Reliability Statistics of individual items 58
Table 4.5: Reliability Statistics of total scales combines 59
Table 4.6: Kaiser-Meyer-Olkin and Bartletts test 60
Table 4.7: EFA Pattern Matrix 61
Table 4.8: Overall Reliability after EFA analysis 62
Table 4.9: General Descriptive Statistics based on aggregated scores 62
Table 4.10: Correlation Matrix of constructs 63
Table 4.11: Analysis of variance table risk-taking-Business performance ... 64
Table 4.12: Regression estimated Coefficients risk-taking-BP 65
Table 4.13: Regression Model Diagnostics risk-taking-BP 65
Table 4.14: Analysis of variance table proactiveness-BP 66
Table 4.15: Regression estimated Coefficients proactiveness –BP 67
Table 4.16: Regression Model Diagnostics proactiveness – BP 67
Table 4.17: Analysis of variance table innovativeness - BP 68
Table 4.18: Regression Estimated Coefficients: innovativeness -BP 69

Table 4.19: Regression model diagnostics innovativeness – BP 69
Table 4.20: Analysis of variance Table competitive aggressiveness 70
Table 4.21: Regression estimated Coefficients EOCA 71
Table 4.22: Regression model diagnostics competitive aggressiveness 71
Table 4.23: Analysis of variance table autonomy – business performance . 72
Table 4.24: Regression estimated coefficients autonomy – BP 73
Table 4.25: Regression model diagnostics autonomy – BP 73
Table 4.26: Full Model analysis of variance table EO 74
Table 4.27: Full model estimated coefficients entrepreneurial orientation ... 75
Table 4.28: Full Model Regression model diagnostics EO 75
Table 4.29: Innovativeness moderated by technological orientation table .. 76
Table 4.30: Proactiveness moderated by technological orientation table 77
Table 4.31: Risk-taking moderated by technological orientation table 78
Table 4.32: Competitive aggressiveness moderated by TO 79
Table 4.33: Autonomy moderated by TO 80
Table 5.1: Summary of Hypothesis 1 results 85
Table 5.2: Summary of Hypothesis 2 results 94

1 INTRODUCTION

In today's retail business environment, the complexity is ever increasing, measuring the value and performance of a company's omnidirectional supply chain is critical to business success, especially from customer satisfaction and cost management perspective (SAP, 2017). The research topic has been conducted from a Southern African retail industry viewpoint, later defined in Chapter 3. The research evaluates how new technology ventures that introduce auto ID technologies, expressed through Entrepreneurial orientation, moderated by technological orientation effect business performance. The research identifies how technology orientation of new technology firms within the supply chain create IT competence, adaptability and entrepreneurial innovativeness through entrepreneurial proactiveness & pursuit of information. It explores how the optimal fit between information systems creates value which can lead to the necessity of entrepreneurial orientation, and how nascent entrepreneurs and new technology ventures (NTV'S's) are a significant variable in the retail supply chain success. It also seeks to understand how the rate of change in technology affect long term sustainability and business performance of these new technology ventures could further be applied to the findings for future research.

1.1 Contextual background

Technology has essential effects on business operations and how the technological infrastructure affects efficiency, relationship and culture (Oklahoma, 2015); whereas information technology drives innovation, which is becoming the direct path to business success. In more recent times, the formula for business success is to encourage innovation with information technology (BusinessVibes, 2015). Information technology is the DNA for many industries and supply chains. Entrepreneurs are required to be IT savvy in offering new solutions and require both entrepreneurial and technological orientation to compete in a turbulent retail environment. Nascent entrepreneurs are the individuals or group of individuals redefining or creating new industries with information technology. What is considered is the effect of change when adopting new technology and has a limitation as well as a driving force for continuous value creation within the retail supply chain to create a sustainable and long-term performing business.

An exploratory study was done whereby the causal relationship between the relevant information are meant to gather new insights and clarify the understanding of the current problem statement. The research is intended to give structure to the literature review and give enough historical and modern secondary data to define the results and findings to follow.

An observation identified is that new venture opportunities arise after technological breakthroughs or radical changes in existing technology that are proposed to retail supply chains. However, within retail supply chains implementation, it is not always done by the new technology ventures (nascent entrepreneurs) who develop it. New technology ventures (NTV's) can have a positive influence on supply-chains and reinvigorate industries with disruptive technologies. One specific observation that describes the limited survival rate of NTV'; is, empirical evidence by Halman, Podoynitsyna, Song & Van Der Bij (2008) as expressed in the Journal of Product Innovation Management which identified new technology ventures in existence for more than 4 years had only a 36 % (Halman et al., 2008) rate of survival. After five years, the survival rate fell to 21.9 % (Halman et al., 2008). The research will scrutinise the theory on new technology venture technological orientation and entrepreneurial orientation and how technological orientation is a moderating factor required to survive and ensure a sustainable technologically focused firm and sustain growth within its business performance.

1.2 Problem statement

1.2.1 Main Problem

To examine how new technology ventures entrepreneurial orientation, moderated by technological orientation affects non-financial business performance

1.2.2 Sub Problems

Sub Problem 1: To identify how EO moderated by TO based on innovative Automatic Identification Technology solutions are being adopted within retail supply chains by new technology ventures

1.3 Purpose, Aim and defined objectives of the study

Halman et al. (2008) state that due to the high failure rate of NTV's, it is essential to identify what are the main factors leading to the success or failure of the venture. It is evident in current literature that broad factors on New Technology Venture regularly questionable in conflicting theories, divided and lead to different connections between elements. The study will be directed to new technology ventures throughout the Southern African countries, targeting these firms will be difficult in articulating but will be possible through industry-specific contacts and availability to large database specific firms in offering solutions to this sector.

The purpose of the research is to conceptualise the impact that consistent progression and adoption of automatic identification technology innovation have on the sustainability of new technology ventures throughout the Southern African retail supply chain. More specifically, how NTV's entrepreneurial orientation affects business performance and how entrepreneurial orientation moderated by technological orientation influences non-financial business performance. As the information became more detailed, it opened to further research into more information technologies and system constraints, as well as opportunities through a deeper understanding of the technological orientation and entrepreneurial orientation of NTV's. The study and lead to a combination of exploratory (gathering new insights), descriptive in portraying an accurate profile of the interlinking systems and explanatory in establishing the casual relationships between the systems.

1.3.1 Specific Objectives

This research aims to generate findings to;

1.3.1.1 Identify how entrepreneurial orientation (EO) affects business performance of new technology ventures within the retail supply chain.

1.3.1.2 Identify how entrepreneurial orientation (EO) moderated by technological orientation (TO) affects the business performance of new technology ventures within the retail supply chain.

1.4 Conceptual framework/ theoretical definition of terms

1.4.1 Retail supply chain management is the systematic managing of the entire supply chain of all types of retail organisations. A considerable difference between Retail Supply Chain management from other supply chain management may be viewed from the product movement volume and the products fast-moving nature of the retail industry. Retail supply chain must be monitored accurately, maintained properly and continuously as minimization of product defects and very low cycle times with rapid movement of materials across the supply chain is crucial to the success of any organisation in the retail industry (HCL, 2017).

1.4.2 **Automatic identification technology (Auto ID)** is a process of automatic data identification of information via a set of technologies & methods, Hardware devices, such as bar code readers, radio frequency identification (RFID), magnetic stripe cards/readers and the software solutions that manipulate this data. (Micheal, 2018).

1.4.3 **New High technology firms (NTV's)** are technological entrepreneurs that create solutions/ applications for specific problems using technological means Halman et al. (2008)

1.4.4 **Nascent entrepreneurs** are individuals or groups of individuals who are actively trying to start up a business (Urban, 2008)

1.5 Assumptions

The assumptions of this research study include:

- The respondents would easily understand the items in the research instrument.
- The respondents would provide relevant data to estimate the proposed hypotheses of the research study.
- The respondents would share their entrepreneurial motivations to engage in sustainable entrepreneurship.

- For the purpose of this study NTV's and nascent entrepreneurs will be used interchangeably based on the target population sample database selected for new firms actively starting a business specifically as new technological driven firms offering automatic identification solutions within the retail supply chain.

1.6 Contribution to the study

Innovation based on such nascent technology may allow for a competitive advantage but requires a high level of specialized skill, increasing costs and long-term return on investments. The study looks to identify why there is a high rate of failure of new technology ventures offering automatic identification solutions once introduced within the Retail Supply Chain fail.

This study examines how technology orientation interacts with innovation to affect business performance in small and medium-sized enterprises (new technology ventures) in an emerging Southern African market. Based on these findings, future research avenues are identified as nascent entrepreneurs to consider innovation as a mediating factor for technology orientation and entrepreneurial orientation to achieve better business performance for their firms.

This study will contribute to theories surrounding environmental characteristics and dynamism, competitive strategies, competition intensity, entrepreneurial success factors and personality traits. More can be investigated toward product innovation trends and technology economics more specifically why entrepreneurial orientation theory and the EO dimensions effect NTV's business performance, and how technology orientation is a moderating influence on NTV's entrepreneurial orientation which influences business performance more predominately. The result emerged a vast amount of theory explaining each study type and interlinking the relationships and situations in search of the technology orientation within the retail supply chain across all areas involved. This direction should give further contribution and findings that may add to supply chain management (SCM), entrepreneurship and new venture creation, competition within IT retail supply chains and change management, exogenous growth theory, technoprenuership, business management and commerce (This has been defined in more detail in the dissertation literature review and research methodology). In particular, the influence of firm resources

and entrepreneurial orientation on the decision to enter into alliances is an under-researched field. The research, the technology orientation has given way to a greater emphasis on diffusion and demand-oriented research collaboration.

2. LITERATURE REVIEW

2.1 Introduction

This Chapter provides a review of the literature on the empirical studies of nascent entrepreneurs or new technology ventures and the need for entrepreneurial orientation (EO), technological orientation (TO) with relation to the technology advancements within the retail supply chain and automatic identification technology. The literature follows a conceptual framework to give empirical evidence of the relevant theories that apply to new technology ventures approach and issues to implementing Auto ID solutions within the retail supply chain and the effect on business performance. The chapter closes with a holistic view of the disruptive technologies on the retail supply chain.

2.2 The role of automatic identification technology within the retail supply chain

Field of information technology is characterized by a very high dynamic, business start-ups emergence, and the opportunity for entrepreneurs to be competitive through a strategic approach. The utilisation of barcode technology and information or data-collection is a very compelling path for organisations in the current & future competitive business environment to enhance financial & business performance and overcome competitive threats and ultimately improve business success (Milne, 2013). The evolution of Auto ID systems, including the introduction and adoption of barcode symbology or scanning and the related hardware such as printers, scanners, and software, has notably enhanced the data collection and entry speed, efficiency and accuracy. Initial applications of barcode scanning, notably; retail point-of-sale, inventory control and item tracking, have been innovated to include more complex applications such as time and attendance, work-in-process, quality control, sorting, order entry, document tracking, shipping and receiving, and controlling access to secure areas (Datalogic, 2017). According to Cameron, & Green (2015), the IT strategic grid identifies two aspects: strategic impact of application development and the strategic impact of existing systems. The Strategic IT grid is practical for determining an organisation's current IT strategic position and identifying how much attention and time must be spent on IT challenges. Most of the major retail chains, stores and outlets may be categorised as ‘Factory’ organisations as they are entirely reliant on

the reliability of their IT systems. The IT systems are not imperative to the organisations' ability to be competitive but are highly dependent on information technology to maintain operational performance (Cameron et al., 2015).

Automatic Identification technology continues to play a needed role in inventory control and distribution, especially in the consumer product market sector but can be found throughout every division of the retail supply chain (Motorola, 2018). Various IT products and solutions, along with their applications, limitations and challenges in adopting them are understood while planning for automatic identification technology implementation.

2.3 New technology ventures and entrepreneurial orientation

According to Venter & Urban (2016) small business management and entrepreneurship may be considered as a reciprocal business, however, they may differ from entrepreneurship in that small business are independently owned, not likely to be dominating in their fields and operate on a diverse product offering. Small business typically focuses on management over innovation in order to remain sustainable to generate a satisfactory profit. Whereas entrepreneurs can be viewed as creative, charismatic and innovative individuals that create solutions or offerings that did not previously exist before in order to exploit change as an opportunity for a different business or service. Entrepreneurship entails processes and behaviours that aim to create new markets (or existing) products or services through existing or new markets (Fazel, Khalili & Nejadhussein, 2013). Establishing and building a new venture that has technology as a foundation for its product or services offering creates its own challenges. From one perspective, the “push” of new technology developed through scientific invention and technological innovation, while on the opposing perspective the “pull” of the chosen market which creates new entrepreneurial opportunities (Mary, 2018).

2.3.1 Entrepreneurial orientation (EO) defined

Throughout the research report, entrepreneurial orientation (EO) will be related to firm-level entities that adopt or pursue entrepreneurial activities. EO can be understood to the degree of entrepreneurial direction adopted by a firm, and while one firm can be more entrepreneurial than its competition, the proposition of EO is that the firm can be mediated as entrepreneurial as a cooperative entity (Hosman, Hughes, Kraus & Rigtering, 2012). EO may then be accepted and deep-rooted in the direction of thinking & predisposition related to entrepreneurship (Covin & Lumpkin, 2011). EO attributes to processes, practices & decision-making exercises that result in newness derived as a result of essential and necessary stakeholders that aim to create a new venture. The key dimensions that characterise an EO include a propensity to act autonomously, a willingness to innovate and take risks, and a tendency to be aggressive toward competitors and proactive relatively to marketplace opportunities (Alain, Basso & Bouchard, 2009).

2.3.2 Entrepreneurial orientation & business Performance

Entrepreneurial orientation (EO) may be a precedent for competitive advantage, firm growth and superior performance. Previous studies have hypothesised and found a positive relationship between EO and business performance, but much of research to date fails to clearly identify what transpires on firm's performance during technological turbulence and change as a result of EO. The research will seek to identify how EO of new technology ventures impact its performance during such periods of technological turbulence, more specifically information technological advancement within the retail supply chain (Hosman et al., 2012).

Business performance can be measured in a number of ways, for the purpose of this research performance can be categorised as 1) perceived financial, 2) perceived non-financial and 3) archival financial (Rauch et al., 2009). The research, however, will only focus on perceived financial and perceived non-financial views on business performance. Perceived measures of a firm's performance rely on objective viewpoints of how well the firm has succeeded in several different areas or accomplishment of goals. Performance is a multidimensional and complex construct that is measured against several indicators. From a firm-level perspective, performance describes the level of success the entity has

been managed and the value delivered to stakeholders. Entrepreneurship and strategic management theory measure financial and economic performance through sales, profit, liquidity, size and leverage, such measures include return on assets, sales growth, sales per employee, current ratio, number of employees, and debt to equity.

Entrepreneurship can lead to increased performance in new technology ventures. As product and business life cycles experience shorter durations and more frequent changes, uncertainty about sustainability and profitability becomes a considerable concern. Nascent entrepreneurs must continuously undertake new idea generation and exploitation and seek new opportunities as well as develop entrepreneurial strategies (Iyigun, 2015). Entrepreneurial orientation affects a firm's performance differently depending on what stage of the life cycle the firm is currently staged. Therefore, technological orientation and innovation are integral elements of entrepreneurial strategy which nascent entrepreneurs require to ensure sustainability of firm performance and growth. The Entrepreneurial dimensions such as autonomy, proactiveness, innovativeness, risk-taking and competitive aggressiveness can lead to improvements in firm performance, continuous technological learning which can increase technology competence and capabilities over time will lead to continuous short-term competitive advantages and higher performance (Fadda, 2018). As learning is time-consuming and required from both market and product strategy experience, the time to realise the full impact of entrepreneurial orientation on performance is long-term (Deepababu, 2016).

The resource-based view (RBV) can be utilised to explain how new technology ventures can utilise their EO to achieve improved performance as firms can control more resources to achieve their objectives. The resources could include assets, capabilities and knowledge which can be enhanced to form valuable, rare, inimitable and non-sustainable resources to sustain a competitive advantage. The theory supposes that the capability of new technology ventures to control resources is heterogenic as it is time-consuming to duplicate such resources (Barney, Ketchen & Wright, 2001). EO can also be considered as a valuable resource or capability and resources can be both tangible or intangible assets. EO is an entrepreneurial method that nascent entrepreneurs utilise to promote innovation, risk-taking behaviour and proactive management that captures opportunities (Mahmood et al., 2016).

2.3.3 Entrepreneurial orientation as a behaviour (at the firm level)

EO postulates that firms can be placed on a theoretical continuum that spans from at the one spectrum being conservative in strategy-creating processes and moves towards highly entrepreneurial in strategy-creating processes which more positively leads to a durable firm-level entrepreneurial behavioural pattern (Wales, 2013). That is EO as a phenomenon is at its core represents an orientation defined by Merriam-Webster Online Dictionary (M-W.com) as “a usually general or lasting direction of thought, inclination, or interest.” Understood more elaborately as a lasting direction, speculation, capability towards entrepreneurship and how it can be conceived as either a dispositional or behavioural construct. EO can be defined as a firm-level disposition to engage in behaviours reflecting risk-taking, innovativeness, proactiveness, autonomy, and competitive aggressiveness that lead to a change in the organisation or marketplace (Eggers & Filser, 2014). EO can also be conceptualised as a set of distinct but related behaviours that have the qualities of innovativeness, proactiveness, competitive aggressiveness, risk-taking, and autonomy (Davis, Fritz & Pearce, 2010). For the purpose of this research, the researcher has chosen to conceptualise entrepreneurship as a firm-level phenomenon, more specifically EO is a strategic business unit level phenomenon where the unit can be classified across technology-specific small to medium enterprises or new technology ventures (NTV) that target business to business transactions throughout the retail supply chain within Southern Africa. Therefore, the focus of the research does not explore entrepreneurs specifically, or individuals’ psychological profiles, nor organisational culture or their experience in the firm-specific entrepreneurial process. Instead, EO is a firm-level attribute, EO consists exclusively of continuous behavioural patterns (resonating on risk-taking, innovativeness, proactiveness, autonomy, and/ or competitive aggressiveness) which in correlation empower entrepreneurship to be identified as a determining idiosyncrasy of the firm (Covin et al., 2011).

2.3.4 Entrepreneurial orientation and technological orientation (Technoentrepreneurs)

Technopreneurs refer to a technical entrepreneur that aims to identify high-potential, technology-intensive commercial opportunities, and this may be accomplished by collecting resources, talent & capital and adapting to the constant risk and rapid growth and having to use many attributes and knowledge towards decision making. It is required for the technopreneurs or business owner-manager to focus on novelty (being new, obscure and unknown) for the business offering relative to the customer experience. The technopreneurs are also required to stay innovative ahead of the competition and the perspective on the effect of external to firm related to the market and competition and the high degree of uncertainty namely; the level of output that is generated, the time in which these returns are produced and specific application. This uncertainty is the primary consideration of whether results expected from an investment will be achieved, future profits received through effort and development (Urban, 2016).

Technical entrepreneurs or technopreneurs can be best understood as entrepreneurs who present a high level of technological expertise and apply dependence as owner-manager to their small technology-based venture which drive new forms of technological products or services with a focus in application technology and innovation. They have the ability to be flexible to rapid change with high rates to entry and exit to opportunities and markets (Smith, 2010).

Entrepreneurial Orientation can be conceptualised as either a) unidimensional (composite construct) which identifies the firm only manifests innovativeness, risk-taking and proactiveness concurrently, but can be insufficient or as a single level quality to label a firm as entrepreneurial; or as b) a multidimensional construct which views the construct as a set of five independent dimensions, namely risk-taking, innovativeness, proactiveness, competitive aggressiveness and autonomy (Covin et al., 2011). According to Dess and Lumpkin, the five dimensions of EO identifies attributes at the firm level which all incorporate factors that work together to enhances the firm's entrepreneurial performance (Venter et al., 2017).

2.3.5 New technology venture risk-taking:

2.3.5.1 Risk-taking & EO

Strategic risk-taking identifies actions undertaken that can be viewed as highly risky due to their nature of risk versus reward or level of uncertainty in outcome and is commonly associated with entrepreneurship as entrepreneurial firms typically pursue such opportunities can either result in enhanced performance discrepancies or produce a negative result for the organisation and uncertain expected returns from investment. Risk-taking of new technology ventures is common behaviour or strategic position that refers to the firm ‘s acceptance and competence to assigned increased resources to solutions which outcome is uncertain based on calculated risk (DeepaBabu & Manalel, 2016).

H1a: Risk-taking isolated as a construct within the auto ID sector does not affect business performance

2.3.6 New technology venture proactiveness

Proactiveness can best be expressed as an opportunity-seeking, forward-looking viewpoint of firms that offer new goods or services before competition and in preparation of future demand which may best be represented by the first-mover strategy as a firm aims to be the first within a market or industry to offer a differentiated product which has both pro’s or cons. For the purpose of this research, specific results are not identified or analysed on such a business strategy. However previous research in entrepreneurship also identified the proactive nature of an organisation as an essential contributor to the entrepreneurial nature of an organisation. Hence, proactiveness, which refers to taking the initiative, anticipating and creating new markets or participating in emerging ones, is also associated with entrepreneurship and is an essential dimension of entrepreneurial orientation (DeepaBabu et al., 2016).

According to Coleman (2013) markets led by established corporations with more substantial capital, precise budgets and economies of scale create the perception of difficult barriers to entry. However, personal service, quality, flexibility, value and specialised offerings are proving to be effective strategies to penetrate established highly competitive markets. They can be flexible and adaptable to meet customers' needs. Many

NTV'S's or nascent entrepreneurs have successfully seen an opportunity in the marketplace to offer products and services, which in many cases larger firms are not in the position to see or cannot be dynamic enough to capitalise on the opportunity effectively or efficiently. Whereas in more complex, broader supply chains, the certain size, experience and direction of larger organisations lead the systems application process with established technology offerings and superiority.

H1b: Proactiveness as an isolated construct within the auto ID sector has a positive effect on business performance

2.3.7 New technology venture innovativeness

2.3.7.1 Innovation & EO

Innovation is seen as an antecedent for a firm to achieve a sustainable competitive advantage and survive in a turbulent environment and competitive market in which product life cycles, technologies, competitors, laws and even whole societies go through rapid changes. It is these innovations that allow firms to learn and build on their tangible and intangible assets and resources to adapt and evolve to overcome turbulent market challenges and competitive strategies and is a major antecedent to business performance involving people, process & product. Innovation can be viewed as an outcome of innovativeness. While innovativeness is the capacity to innovate and the extent to which it can be achieved, innovativeness is the firm's overall innovative capability through a combination of strategic orientation with innovative behaviour and process. Therefore, innovativeness can be seen as a firm's technological orientation, its tendency to adopt an innovation, but the extent to which the firm is innovative depends on the number of innovations adopted and is the actual process of turning ideas into product or services (Kamaruddeen, Yusof & Said, 2010).

Innovation on the other hand is an important element within the entrepreneurial process and can be described as a process of creative destruction to generate wealth through progressive enhancement on existing or new structures, which lead to adjustment in resources all stemming from the vision of an entrepreneur through efforts of entrepreneurial orientation, which aim in establishing a competitive advantage. Through

creativity, experimentation and exploitation, the entrepreneur must instil a technological leadership to create unique products or services.

Therefore, innovativeness can be understood as the disposition of a firm's readiness to analyse and support new ideas. While according to (Dess & Lumpkin, 2005), innovations are classified into three: - technological innovativeness, product-market innovativeness and administrative innovativeness. A) Technological innovativeness focuses more on design, engineering primarily of research efforts towards creating new products and processes. B) Product market innovativeness refers to market research, product design, and innovations in advertising and promotion. C) Administrative innovativeness includes novelty in management systems, control techniques, and organisational structure (Deepabaku et al., 2016).

Innovation is the blending of ideas with the science and practice of engineering, specifically, in the growing adoption of identification technologies. Substantial advantage has been taken on progress in production, microcircuit design & computer science, the internet and other mechanical technologies. Automatic Identification aims to provide a technology infrastructure for merging data, information and physical objects together, that creates an ever-evolving networked typology similar to the structure & theory of the internet (Allen et al., 2007).

Both innovation and innovativeness are key to sustain success in the digital age, information technology is an ever-changing field of study, where change is the only static phenomenon in an ever increasing competitive and complex business environment which relies on being innovative to thrive, to do this, firms must rely on information technology (Koutakis, 2018). Various information technology components are ranging from hardware, AIDC, databases, and networking to software solutions. Technology components and the emerging technological changes that impact the retail industry are evolving daily. These developments in the field of IT have stressed technology providers and managers of business organisations to use and upgrade themselves through the utilisation of innovativeness in the latest technologies. As IT evolves to meet these demands in these areas, nascent entrepreneurs & organisations must determine how to reinvent themselves by assessing their competitive positions within evolving ecosystems, the need to learn the new technology and explore the possibility of its use in the retail arena (Karlin, 2017). In

order to increase customer loyalty and satisfaction and create competitive advantage for the organisation, it is important to continuously apply innovativeness to reach markets and building a firm that focuses on innovation to stay abreast of market and consumer change as emerging technologies affect users and creators of the applications throughout the supply chain (Joshi, 2009).

Consumers are facing more choices of products and how to source them. It is therefore important for retail supply chains and the nodes within them to adapt to evolve with modern technology and strategic innovation in order to become more adaptable to more copious amounts of data and consumer analytical intelligence with the primary aim of satisfying the growing needs of the consumer while enhancing performance and overcoming competitive challenges (Siebrecht, 2017).

2.3.7.2 Innovativeness & business performance

Innovativeness and business performance innovation is an important determinant of business performance in a changing competitive environment. Business performance is related to the ability of the firm to gain profit and growth in order to achieve its general strategic objectives. Business performance is the consequence of the exchange between decisions taken in relation to competitive forces that grant the new technology venture to adapt to the external environment, thereby integrating the efficiency and effectiveness. By reiterating that the firm's innovation performance depends on the opportunities granted by their external environment. New technology ventures within Southern Africa utilize innovation and innovativeness to accomplish greater business performance. Previous research reports have identified a positive correlation between innovation and firm profitability and sales growth, while others have identified that innovation does not have an effect on return on investment. The purpose of the research is to determine if there is a correlation between New Technology Venture innovation and business performance within the retail supply chain (Altalib et al., 2015).

H1c: Innovativeness isolated as a construct within the Auto ID sector has a significant effect on business performance.

2.3.8 New technology venture competitive aggressiveness:

2.3.8.1 EO & competitive aggressiveness

Competitive aggressiveness refers to the level of effort a firm adopts to better or differentiate themselves from their competition. It entails aggressive stance to outperforming the competition in order to have a more dominant position to a situation within an industry and are forceful in their response to competitor tactics and employ an antagonistic stance towards competition in order to counteract any threats to firm survival or position within the industry. The firm's aggressiveness can be described by their eagerness to be idiosyncratic rather than rely only on conventional approaches to competing, commonly applied through responsive behaviour as in head-to-head competition as a straightforward approach on competitors or an already existing player in an industry. Whereas reactive behaviour is seen as a straightforward reaction to competitors' actions. Therefore, it may be said that competitive aggressiveness is the attitude to handle rivalry successfully. It is the firm 's strategic response to competitions to protect its competitive market position (Deepabaku et al., 2016).

2.3.8.2 Competitive aggressiveness on business performance

Competitive advantage is created and sustained through a highly localised process. Competitive success has been based on contributions from differences in national economic values, cultures, structures, institutions and histories (Porter, 1998). Globalisation plays an essential role in competition within a local nation. With fewer barriers to entry to protect domestic firms & industries, the home nation becomes increasingly significant due to its source of skills and technology created which helps to reduce or undermine competitive advantage as well as sustain it. It is where a firm's strategy is set, and the core product and process technologies are maintained (Cuervo-Cazurra, 2011).

2.3.8.3 Competitive aggressiveness within retail supply chain & NVT

The pressures of a retail supply chain getting up to speed to compete are intense, there is a comparable apprehension about oversight, and that some older retail organisations have been slower to adapt in flexibility and change (Bradfield et al., 2004). Without surprise, it

is these stagnant retailers who are not adopting modern technology are falling behind their technology-focused competition. It is imperative that to be a more effective retailer, and a bold direction is required to adopt new technologies, specifically data capture, analytics and a continuous innovation (Siebrecht, 2017).

Over the years, retailers have been slow to adapt and incorporate new technology into their stores resulting in a technology gap with the in-store consumer experience (Harrison & O'Neil, 2017). In many retailers, the technology is exclusive to the point-of-sale system which is at the end of the process. Their only goal is to collect the transaction information accurately. However, there are so many other opportunities for automatic identification technology to better assist the retail supply chain (Pontius, 2018). Retailers clearly understand the value of technology - they invest in point-of-sale technology to collect transaction data. They also invest in the supply chain to optimise and reduce expenses using technology. However, there is a noticeable lack of focus and investment in specific aspects throughout the retail supply chain (Hess, 2017).

There has been seen a shift in retail from an operational centric approach to a consumer-centric mindset. The next wave of retailer innovators will match their operational expertise with a clear understanding of the consumer to create a compelling experience (Brief, 2017). This approach is best described as a point-based deployment of a new technology and is typically not successful for a few key reasons – a) It is not completely integrated into the business process of the retailer; b) It raises the expectation of the consumer but delivers a limited capability; c) It is usually fixed in nature and does not evolve, adapt or scale with the business or customer expectations. In other words, too often retailers deploy consumer engagement technology as a tactical solution to meet an immediate need. Retailers must shift their mindset on consumer engagement solutions so that they become a strategic part of their business (Hess, 2017).

According to Kaku (2017), the Intel co-founder Gordon Moore predicted in 1965 that technology advances will double every two years and has recently surpassed the 50 years of being uninterrupted. The name of this trend was coined "Moore Law" which is not a physical law, but more a guideline to predict accuracy in the semiconductor industry. It states that the number of transistors that can be fitted on a computer chip (being electrical computer switches) represented by binary digits (0 & 1) will exponentially double yearly.

Ultimately this means that technology processing power develops incredibly fast. This leads to incredibly fast growth in computing power without a collateral expense, driving down prices, increasing expansion of generic or incremental technologies or hardware and superior processing ability which further enhance the processing and immediate availability of data (Sneed, 2015).

Following this trend coined as “Moore’s Law”, since 1985 computing output has increased roughly 16,000 (Bryne, 2015) times over; data output increase was even more significant. New technology utilises pattern recognition algorithms to sort through large amounts of real-time information to try further predicting consumer buying habits, trends and demands on SKU’s and locations. This real-time availability of data is a necessary adjustment from existing modelling tools and reflect accurate datasets that were otherwise unforeseeable or able to anticipate but are pivotal to current and future financial performance. This does not refer to the singularity of artificial intelligence, or machine output has surpassed human beings but is undoubtedly more efficient on accuracy and timing (Bryne, 2015). NTV’s must adopt and continuously interact within the supply chain must continuously adapt, and technological learning is imperative in order to remain competitive, and progress to sustain a competitive advantage during periods of high growth and low margin within the retail technology industry.

H1d: Competitive aggressiveness isolated as a construct within the Auto ID sector has no effect on business performance.

2.3.9 EO & autonomy:

Autonomy can be seen as the flexibility, and freedom employees have within an organization to follow entrepreneurial aspirations, business concepts or vision through their initiatives, independence and at their own time to develop them into fruition. This concept of management decision making at their independence allows both teams and individuals the flexibility in solving business issues or problems and define the variables more uniquely.

Autonomy is a critical aspect within leveraging strengths against processes within an EO framework that can lead members to identify opportunities that are typically not readily envisioned or within existing capabilities but now allow the development of improving

practices and development of new ventures. Therefore, it has been suggested that autonomy should exist at the strategic level to achieve a high level of EO (Deepabaku et al., 2016).

With the generalised offering and size has allowed NTV'S's to be more specialised within an IT or automated technology within the retail supply chain paving the way to capture opportunities. A larger company can implement the functional broad roles of IT on a generic basis but may not be focused, enthusiastic or technically minded enough to a solution for a complex technical adjustment or solution defining the nature of how nascent entrepreneurs come to form. By offering personal IT solutions for particular needs, adapting to changes with consistency and continuity. Large firms are bound in many forms of bureaucracy that hinders trust and longer-term business relationships (Coleman, 2013). Significantly, those who seek to capitalise on the value of customised/ personalised offerings ultimately lead IT managers to become nascent entrepreneurs and NTV'S's. But at what point as new firms must understand technology, create the solution and fund the technology with limited capital (Coleman, 2013).

H1e: Autonomy isolated as a construct within the Auto ID sector has no effect on business performance

2.4 New technology ventures technological orientation

Technological orientation (TO) can be expressed as a firm's propensity to enhance the IT competence or skills and uses of technology-based resources and programs. It involves the value of technological means and determining technological sources of information to approach a problem, as well as having the mindset of using technology, staying up to date with technology and continuously learning technologies and adapting with it as it changes (California Academic, 2018)

As information technology is an extremely complex and broad technological adoption throughout the retail supply chain the research seeks to identify the relationship between EO and business performance and the sustainability of new technology firms through such advanced technological turbulence and change. Therefore, the research uses technology orientation or technology competence as a mediating variable. Firms with superior EO must invest in valuable innovations with a degree of risk and combination of resources to

explore and exploit ideas and efforts into a sustainable competitive advantage or a product or service suitable for the retail industry. This superior technological orientation can lead to new technology ventures having some advantages over their rivals because of the relationship between EO and business performance. Firms with superior EO can also inevitably lead to them having a more superior technological orientation (Mahmood & Pratono, 2105).

2.4.1 Technological orientation defined

Technological orientation (TO) can be defined in organisational decisions as (1) aggressive technological posture, (2) automation and process innovation, and (3) new product development. Technology and innovativeness can result in the creation of new technology competencies through the process of trial-and-error and creativity as explained by effectuation (Heydenrych & Urban, 2015).

Technology orientation (TO) can be viewed as a strategic resource and previous studies highlight the importance of high commitment as response behaviour to changing the market and technological environments. New technology ventures play an important role in economic growth and can have a competitive advantage over larger firms due to their flexibility and openness to creating new innovations and technological advancement. It can also be hindered in growth due to several challenges such as lack of economies of scale, limited resources, smaller market size, and more prone to market vulnerability and shifts. The Southern African retail industry is an emerging market with one of the largest and fastest growing industries throughout Africa. Most of Africa is still lagging the rest of the world in technology adoption, and many of the ideas are generated offshore and implemented locally, but the market is still one based on the knowledge economy and integrating faster into the world economy which tries adapting to international standards (Altalib, Al-Ansari & Sardoh, 2015).

2.4.2 NTV technology orientation and EO

Technology orientation and innovation, the technical proficiency of the firm is an important factor in developing new processes, products and services. The firm’s internal technology policy reflects its innovative attitude and commitment to innovation. Attitudes to technology and innovation can determine the firm’s achievement of competitive advantage. Firms that

proactively acquire new and advanced technologies might be more innovative owing to their emphasis on applying these technologies to developing new processes, products and services to meet customer needs. The level of technology orientation of a firm has a significant influence on its ability to innovate and is viewed as being a source of competitive advantage, which can lead to better business performance. It may be articulated that new technology ventures with limited resources may seek innovation along the value chain. Such innovations require less investment in technological adoption and/ or development. However, technological adoption and/or development in Southern Africa vary for different NTV's due to a dynamic and highly competitive marketplace, rapid technological change and a short product life cycle. These factors may influence their long-term investment in technological resources and capabilities and in turn their innovation outcomes.

It is important for the research to analyse the moderating effect the retail supply chain environment and the auto ID information technology industry changes have on the relationship between EO and business performance. The EO aspect allows the NTV's to have an idea or awareness of the industry requirements and the decision makers can identify at an early stage the industry changes which can ultimately lead to firm sustainability. The advancing capability of nascent entrepreneurs or NTV's to efficiently manage technological change requires identification between relative homogenous resources and how quickly market and industry trends can change as well as how short these resources capabilities or technology competence can be in the face of rapidly changing technologies. NTV's or nascent entrepreneurs who have a greater combination of EO dimensions can adapt quickly to industry changes, while the retail environment can have a negative impact on business performance, specifically financial performance can have a stronger impact on smaller firms. In uncertain times, firms can undertake certain risk factors that either enhance or negatively affect performance. This can be seen through the allocation of resources or use of newer technologies. EO is required by the entrepreneurs to foresee technological trends and forecast against poor performance. New technology ventures in the case of uncertain industry turbulence can only offer marginal solutions or cost-conscious technologies when analysing dynamic retail supply chain technology adaption due to the financial investment that may be within their capability rather than undertake a larger uncertain risk due to technological change and changing retail supply chain preferences or processes. Therefore, the relationship

between EO and business performance cannot be inherently positive due to entrepreneurial firms being heterogeneous (Mahmood & Pratono, 2015).

According to Schumpeter (1983), an extremely critical function of entrepreneurs is to build or reinvent a constant value generation by exploiting new discoveries. Globalisation, knowledge and the increasing requirement for innovation within technological schemes characterises the modern world and is driving ideology into the industrial revelation 4.0, technological entrepreneurship, and technological orientation of entrepreneurs are leading to new types of entrepreneurial ecosystems. It is this rationality that is leading some firms to be more advanced than others, and their sustainability lies in fostering new technologies more creatively (Roja & Naste, 2014).

The basis of Schumpeter's theory of creative destruction (1983) is that market equilibriums are distorted by technopreneurs who bring out combinations of new products, markets or innovations. Technological innovativeness is correlated to radical innovations, and the novelty of new business developments which require technological competence and how far and fast it can be applied, sustainable creativity and selection of strategies that can be continuously executed successfully, these choices can be interpreted throughout the new technology ventures technology strategies, resource adoption and core capabilities or IT competencies. The successful collaboration of new technology ventures chosen strategies and choices of technologies can lead to greater technological investments and sustainable competitive advantage that supports firm goals and market positioning (Heydenrych & Urban, 2015).

2.4.2.1 Technological orientation and stages of equilibrium in uncertainty

According to Abernathy and Utterback (1978), Smith (2010) and Urban (2016), a distinction between incremental & radical innovation was made to identify how developed industries experience stages of stability with changes accumulated by incremental innovations. It was identified that inevitably the stability is interrupted by a highly disruptive radical innovation; this results in a pivotal climax between the stage of stability and equilibrium. Initial uncertainty of the new technology leads to experimentation and instability. As more people adopt and understand the technology, the changes become incrementally better and stability and equilibrium return.

Punctuated Equilibrium is a theory whereby innovation is a central force forging the pattern of technology and evolves via a succession of inconsistent and irregular intervals, an incremental cumulative process until a radical advance succeeds it. The discontinuities that effect stages of equilibrium are technical step changes and are so compelling that no development in scale, efficiency or design can make redundant technologies competitive with the new technology. These technological discontinuities require new skills, new abilities and new knowledge; these innovations can be competence destroying. Better summarised is that preceding firms are unable to use the knowledge and experience they have invested in during the stage of equilibrium (Smith, 2010)

2.4.2.2 Technological orientation and innovativeness

Past Studies have identified three approaches to innovation theory 1) Schumpeterian view whereby the entrepreneur is viewed as contributor to innovation through continuous disturbance to market equilibrium 2) Marshallian view that identifies the industrial district as the original innovation system and 3) Technology-Push / Demand Pull theory whereby technological or scientific changes or market pull is based on customer needs. New technology ventures must identify a technology-push to efficiently and effectively offer superior customer value and market pull with new and better products and services to reduce costs and maximize on competitive advantage and by transformations through resource generation, acquiring and implementing solutions through continuous advancements (Altalib et al., 2015).

- **Technology orientation, EO & technology push—demand pull**

Past studies have identified consumer needs as the driver of product & technology innovation to which consumers would want to perceive an unconscious conditional experience, what new technologies which support that experience, and to what extent retailers apply the best innovation. Therefore, retailers only utilise a technology that has been developed by someone more knowledgeable & experienced regarding a specific technology and show reliable value add and consistent EO innovativeness, thus leading to a strategy to apply only introduction or adoption of a technology (Pantono, 2014). Technology push is a very conventional viewpoint on the development of innovation & EO innovativeness as an added investment and focuses on technology R&D will inevitably lead to increased innovation. Whereas demand pull of technology views the process of

innovation as more market central, which refers to the ageing of many technology-placed industries having a developing idea that consumer requirements are becoming more refined (Smith, 2010).

Retail is progressively becoming represented by consumers rather than the retailers. A major influence which couldn't be more obvious in the retail landscape is on the impact technology push has on the 'Gen Y', better known as the 'Millennial Generation'. Millennials can be described as individuals between the ages of 18 and 34 (Tomkins, 2018) and are the first generation subjected to technology and digital communication from a young age. As a 'connected' generation who is projected to account for $65 billion (Tomkins, 2018) in technological product sales over the next ten years, retailers are expected to expand their cross-channel offerings to ensure loyal customers (Tompkins, 2018). With the vast number of technologies that are on offer to the different forms of retail supply chains, it requires a growing investment in researching and adopting technology and firm technological orientation. The route to the commercial application has its origin in a broader scope of related research that offers an important theoretical insight into what is necessary to improve the customer experience, increase revenue and capture data.

H2a: Innovativeness moderated by TO has a positive effect on business performance.

2.4.2.3 Technology orientation and proactiveness

Collaborative production refers to a situation in which people from diverse fields work on a project and upgrade and share results of the project, especially applications. As a result of usage and refinement and testing, new projects or technologies emerge, become important and take centre stage. This is uniquely a style of the adoption process and not a result of single direction or inbound marketing of any new technology ventures, but technology is collaborative throughout the supply chain through shared knowledge experience and project scope (Joshi, 2009).

Spillovers tend come about when a company can benefit from the efforts and insight of another companies R&D which leads to incremental & radical innovations easily imitated and is most evident in situations where it is difficult to allow others to gain from the invested invention or solution. The success is reliant on the firm being able to secure an appropriability regime. However, it is not always easy to avoid knowledge spill, more

commonly so in retail supply and the collaborative sharing of knowledge and expertise (Smith, 2010). The aggregation of knowledge is one of the main considerations for technology implementation in the retail supply chain. The stock of technology or knowledge can be improved by considerable contribution to R&D capital or by the diffusion of existing technology. It is these innovations that are ascertained from technology spill-overs and stock of knowledge that differentiate or sustain a competitive advantage with improving productivity. R&D not only stimulates innovation but also contributes to the company's ability to identify, assimilate, and exploit new market knowledge. However, technology diffusion is not an automated reaction from the existence of others knowledge stock but also requires that the retail firm retain the capacity to ingest and utilize the technology and that R&D activities will help strengthen the prevalence of technology spill-overs by intensifying the firm's absorptive capacity. Stakeholders within the retail supply chains directly increase the technology knowledge stock by adding enhanced, new information (innovation) which enhances the absorptive capacity of the companies and benefits from technology spill-overs indirectly (Kinoshita, 2000).

Innovation has interactive demand-side (customers) and supply-side (research outcomes) elements. Evaluation of a firm's competitive strategies to achieve better business performance must be done by the entrepreneur to ensure constant technological orientation throughout the organisation. For a firm to better improve its core technology orientation will aid in determining the correct product or service mix to adapt and implement within the retail supply chain and provide a better understanding to help achieve it. From a technology competence analysis, the links between the technology orientation of NVT's and their innovation and business performance and to explore whether such links exist in an emerging market context. According to this view, organisational structures, procedures, skills and decision-making rules determine the entrepreneur's ability to build, integrate and reconfigure the firm's internal and external capabilities and competencies. Building these core competencies enables the firm to obtain a strategic fit with its changing environments to create opportunities and capture values for long-term profitability (Altalib et al., 2015).

H2b: Proactiveness moderated by TO has a positive effect on business performance.

2.4.2.4 Technology orientation and risk-taking, autonomy & competitive aggressiveness

Dynamic capabilities differ with changing market environment creating strategic flexibility and sustaining competitive advantage through specific objectives and creative behaviours, which are later considered to be pattern oriented. The advantages of the firm are in responding quickly with innovations that meet specific market needs, while simultaneously exploring basic research areas for potentially major innovations that more significantly alter the market landscape. This is why the firm's innovation efforts should be focused on nurturing and enhancing these capabilities and competencies to achieve better business performance. The rate and direction of innovation within the firm can be driven by 'technology-push' based on scientific and technological changes and/or by 'market-pull' based on unmet market needs. Firms are experiencing a shift from 'technology-push' to 'market-pull' due to increasing customer sophistication and the complexity of customers' needs and can be argued that firms creating products and services in response to 'market-pull' rather than 'technology-push' are more successful in meeting customers' needs. Firms need to have new product and service development structures that are balanced with greater integration of internal technologies and external needs. So, successful innovation requires the firm to connect technical and market opportunities for better business performance. However, this study is concerned with the "technology-push" of the firm, and so it explores the links between technology orientation, innovation and business performance in the context of NTV's in Southern Africa due to constant growth within information technology and technology of retail supply chain (Altalibet al., 2015).

According to Erasmus, Rothmann & Eden (2015), retail supply chains are continuously seeking innovative ways to be more profitable and create a competitive advantage. This has led to organisations adopting more efficient ways to retrieve data. According to Bryne (2015); however, most larger firms are reducing planning departments to reduce the number of statisticians, while increasing stock-keeping unit (SKU) propagation leads to increased items to manage. 40% of consumer goods are acquired new annually, which may imply that it's not physically or financially feasible to hire stock counters to manually perform the rigorous calculations to gain value from the many numbers and data Bryne (2015). Forecasts must be updated each day ahead of time to realise the strategic benefits of an agile and demand-driven supply chain. The only viable consideration is

automation which has begun to unlock new frontiers throughout the supply chain as has been seen in industries like finance, logistics and advertising, while in conventional demand planning, it is estimated that 75% are manual systems namely; data entry, interpreting point-of-sale (POS) data and fitting models to history (Bryne, 2015).

One way of achieving improved data-collection is through the use of information technology is by employing an enterprise resource planning (ERP) system. According to SDC (2018) considerable improvement in inventory and overall value in supply chains is derived from best-of-class solutions. Corporate system integrators will push solutions from enterprise resource planning (ERP) modular solutions while the potential for better opportunities may come from NTV'S's who avoid modular packaged solutions and develop on business results through the implementation of customised best-in-class products on the top of ERP backbones that satisfy specific application requirements (Bryne, 2015). An ERP system can be customized and integrated throughout the entire organisations supply chain and is a software-based system that manages the entities system requirements in all business operational functions such as finance, human resources, manufacturing, sales and marketing, however, the implementation of an ERP is seen as a tedious and cumbersome but never the less a significant organisational enhancement. These systems can also be costly and troublesome to finalise as most ERP projects turn out to be over budget, not on time and unsuccessful. Auto ID technology is a primary system tool used throughout the supply chain that allows certain functions of an ERP to work optimally.

ERP project & auto ID implementation failures may be the causal effect of, insufficient system understanding & training, limited top management support, unclear objectives, unsatisfactory user acceptance, ineffective integration of systems and inadequate project communication. The continuous level of financial effort and resources which may not be successful in the long run has led larger organisations within the retail supply chain to seek solutions and require workable solutions before investments can be made, this requires retail executives, managers, operations and IT personnel to research and examine the efficiencies of information technology acceptance and utilisation before investment. ERP users report that the most important factors within a South African retail supply chain environment are (1) a satisfying user experience, (2) simplicity and ease of use, (3) fast

system response, (4) meeting user work output expectation and (5) self-learning (Erasmus et al., 2015).

Therefore, the reciprocal action between technological composition and human factors, i.e. complexity, ergonomics and operator usability, both during the pre-implementation and post-implementation phases, are regarded as important industrial and organisational (I/O) psychologists. Information technology (IT) and Auto ID acceptance research have yielded many competing models for explaining the relation between user opinion, perceptions and assumptions and successful solution implementation. Respective models to consider are the adoption/ diffusion process of innovations, reasoned action theory, the theory of planned behaviour and the technology acceptance model (Erasmus et al., 2015). As described by strategic management, the routine is a guide for thinking and acting, and retail supply chain strategic decision making must be improved upon through the firm's alignment with the external market, driving change and relevance to adapt needs (Bradfield, Burt, Cairns, Wright & Van Heijden, 2004). The term Strategic Inertia is defined as the degree of commitment to current strategy which may develop defined periods unless the status quo has been disrupted by business performance stress (Carvalho, De Almeida & Filho, 2018).

Meeting data-driven needs and adapting towards an ever-changing customer has led to more stress for retailers to cope with fast pace change and adapting continuously to advancing technology, the challenge of the retail supply chain is determining which technologies and Auto ID solutions, its services and hardware will be best to improve overall efficiency. This has led to retail supply chains to evaluate these technologies before committing to purchase. The planning stages can be long and ill-defined; this may lead to costs being absorbed by the nascent entrepreneurs who are developing the solution or offering the products (Cox, 2018).

The resource-based view identifies new technology ventures with greater levels of EO as intangible assets and capabilities. These firm resources can lead to a unique innovation that is not easy imitated, substituted, slow to depreciate and superior in satisfying a need. For new technology ventures to survive, is it important to improve, enhance or alter a previous economic structure as valuable resources with niche market orientation allow small business to develop their IT competencies and capabilities. Entrepreneurial

opportunities refer to several circumstances that make it possible to recombine resources to generate profit through business idea generation and how to capitalise these ideas and resources to sustain a profit and performance (Mahmood et al., 2016).

H2c: Risk-taking moderated by TO has a negative effect on business performance.

H2d: Competitive aggressiveness moderated by TO has a positive effect on business performance.

H2e: Autonomy moderated by TO has a positive effect on business performance.

2.5 The Hypotheses Model

Figure 1.1 depicts the Entrepreneurial dimensions, namely competitive aggressiveness, risk-taking, autonomy, proactiveness and innovation. These entrepreneurial dimensions have been hypothesised as influencing the dependent variable, business success, moderated by variable technological orientation.

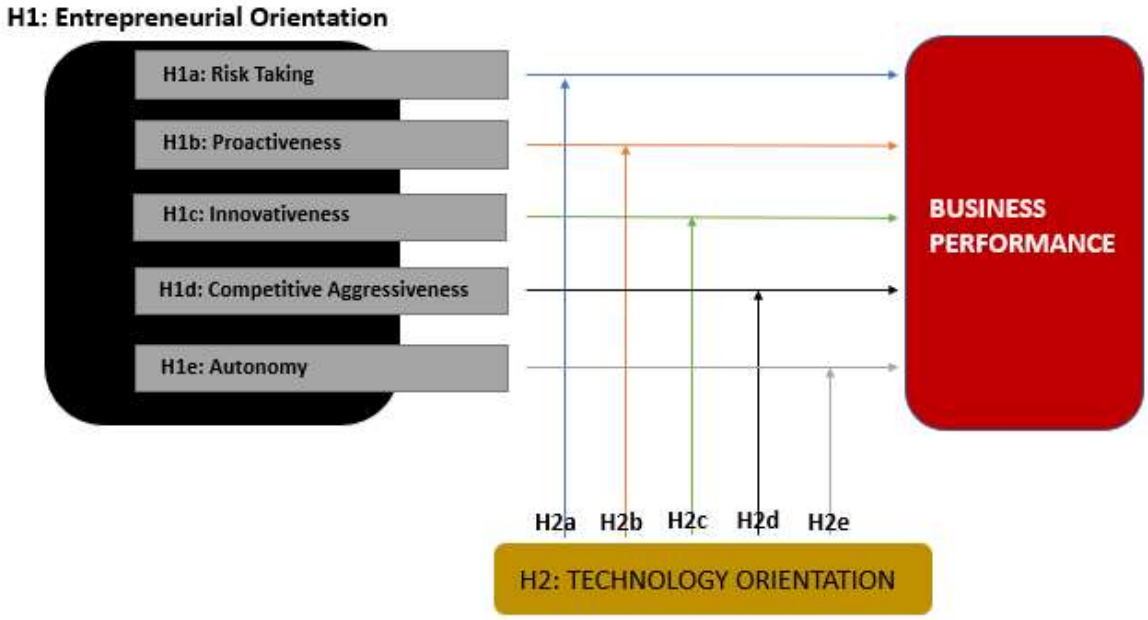


Figure1.1: Hypotheses Model EO moderated by TO on business performance

For the purpose of this research, the dependent variable, business performance has been influenced by the independent variable, entrepreneurial orientation and also moderated by technological orientation. The following hypothesis is:

H1a: Risk-taking isolated as a construct within the Auto ID sector has no effect on firm performance.

H1b: Proactiveness as an isolated construct within the Auto ID sector has a positive effect on firm performance.

H1c: Innovativeness isolated as a construct within the Auto ID sector has a significant effect on firm performance.

H1d: Competitive aggressiveness isolated as a construct within the Auto ID sector has no effect on firm performance.

H1e: Autonomy isolated as a construct within the Auto ID sector has no effect on firm performance.

H2a: Innovativeness moderated by TO has a positive effect on business performance.

H2b: Proactiveness moderated by TO has a positive effect on business performance.

H2c: Risk-Taking moderated by TO has a negative effect on business performance.

H2d: Competitive Aggressiveness moderated by TO has a positive effect on business performance.

H2e: Autonomy moderated by TO has a positive effect on business performance.

2.6 Conclusion of Literature Review

According to O'Brien (2003) information technology is much more than just computers. It is the convergence of hardware, software, telecommunication, data, networks, multimedia, images, internet, applications and people. The use of technologies is increasing at a fast pace, especially with the availability of the internet and high-quality telecommunication networks. Information technology has infiltrated society and has made it indispensable. The continuously evolving power and rapidly declining costs of technology advancement are creating a virtual world of information technology and growing information systems (Gierl, 2018).

As mentioned by Apparel (2009) the IT industry and its growth in computing power double in potential every 18 months and improved performance of microprocessors over 25 000 times since the introductory phase 30 years ago. With user-friendly software, information technology can calculate vast numerical pools of data and simulate complex physical and logical processes with animated drawings, sound and even tactual feedback and still holds true to the exponential growth in today's technology advancement (Green, 2015). Information technology influences all facets of our lives and will have an ever-growing effect on commerce and industry. Progress depends on what the information system will achieve. The market success of a new technology ventures will be determined upon what its technology infrastructure implemented and IT competence and capabilities and how its adoption of technology or technological orientation creates a differentiator based on its design and efficiency. The technology ventures of today must be prepared for tomorrow. These shifts in technology capabilities and potential have led many theorists to forecast a paradigm shift within the retail industry over the next five years (MacKenzie, Meyer & Noble, 2018) more than it has over the past century requiring retails to act quickly to ensure survival in the long run.

Industry and market turbulence and change affect new technology ventures and their ability to sustain performance objectives. It is therefore imperative for new technology ventures to combine resources and IT competencies and contingency variables through careful decision-making to achieve optimal performance. Industry turbulence refers to a business environmental component relating to customers and their new product needs and preferences which change over time as seen through the diffusion process and product life cycles. As products become easily imitated or substituted, so does the features and price change, the industry can go through stability where preferences or needs are predictable versus times of market or paradigm shifts. (Mahmood et al., 2016). Globalisation and the rapid expansion of the internet are reducing the learning curve of competitors and consumers, through this increased access of information, preferences and understanding of needs to improve and compete are enhanced. The opposite also holds true that through so much technological change, markets are changing rapidly and in different ways. The retail supply chain is becoming differentiated through the supply chain which makes it difficult for new technology ventures to identify adequate market opportunities or signals (Cavallo, 2016)

According to Agostinho et al. (2013) the global marketplace is extremely dynamic and constantly changing, with increased competition and large uncertainty on future markets and customer needs which has led entities and technology to evolve exponentially as previously described with the trend of “Moore’s Law”, surpassing unimaginable unpredictable technological and solution ceilings. Entrepreneurial & corporate entrepreneurial paradigms have adjusted from a standalone vision into complex and collaborative ecosystems where supply chains break down physical and hypothetical barriers to improve synergies within the Retail Supply Chain to be more efficient and create a sustainable competitive advantage. The multi-faceted retail supply chain is built on the infrastructure of technology & software paired with networking and enterprise integration, enterprise information systems (EIS) interoperability, ensuring increasing productivity and efficiency leading to the capture of data for automated information exchange. This means that naturally, information systems will become dynamic. Interfaces that are effective today are inefficient tomorrow, slow adoption of technology & interoperability enablers and communication software services are becoming ineffective as a sustainable solution and the need for continuous adoption is the necessity for remaining sustainable in retrieving data information as well as improving and sustaining business performance.

The relationship between EO and business performance on new technology venture business performance can be emphasised that EO refers to responsive behaviour to the retail supply chain market environment and contradicts traditional and adaptive market orientations. New technology ventures engaging in proactive behaviour seek to create compatibility within the retail supply chain environment, through improving the functions of the internal organisation and improving strategic fit, technological innovation, IT competence and information technology proactiveness towards the business environment.

3. RESEARCH METHODOLOGY

3.1 Introduction

In Chapter one, the problem statement was given with additional explanatory information around the motivation for researching the role automatic identification plays within the Southern African retail supply chain, with a specific focus on how the rate of change and constant adoption of new automatic identification technology effects new technology ventures success and sustainability. In the subsequent sections, the research background and hypotheses are presented based on entrepreneurial orientation moderated by technological orientation and their multidimensional effects on business performance. The study methods are then introduced, including information about the sample, study measures, data analysis, and test results. This is followed by a discussion of the results and their implications as well as the limitations and directions for future research of the study are offered.

The study is followed by the research approach/paradigm adopted explaining clearly the reasons for which primary and secondary data has been applied. The research paradigm has been interpreted to the social phenomena from which a singular paradigm of the research was gathered, and interpretation attempted.

The research design is explained with attention to the different frameworks for the collection techniques and the way in which data is analysed.

The population and sample identified providing reliability and validity in the survey design to which findings are based. Finally, a brief understanding of the research data collection procedures and methods of analysis.

The research focused on auto ID information technology as a construct and how it affects the retail supply chain, but also how the constant technological change affect performance of the new technology ventures which touches on use from an operationalization viewpoint, however it does not delve into the meta-analysis of application specifics or heterogenous specifics such as an individual, an organization or a territory, the nature of population sampled, typology of issues or quality of results. The research is focused on

firm-level within the Auto ID industry results with relevance to EO dimensions (Alain et al., 2009).

3.2 Research Approach / paradigm

Based on the fundamental ontological question of what the form or nature of reality is, relating to the research question, the presumption was that the way the world is conducted, and the commitment occupied is a singular outlook (Lewis et al., 2007). The research is based on quantitative data to fill the knowledge gap leading to the epistemological question of what is the essential assumption about knowledge and what can be known?

The path to an inquiry of this research was based on an objectivist's theory of knowledge, including that of management & technology from a non-interactive, distant perspective of analysis (Lewis et al., 2007). The research is primarily quantitative in focus based on a positivism paradigm implying that the exploration of the research topic to gaining an understanding of the relationship through observation and reason (Nel, 2016).

The phenomena that the researcher observed lead to the development of credible data. To generate a research strategy to collect these data the research uses existing theory to develop a hypothesis. The hypothesis was tested & confirmed in whole or part or refuted leading to further development of theory which can be tested further. The knowledge obtained uses a composite of the positivism perspective paradigm in that the diversified processes and technologies adopted throughout the retail supply chain are not only based on a constantly changing definable technologies and processes and alter incrementally or radically amongst the variations of entities and their business models but are all reliant on adoption and implementation of the user (Blumberg, 2014). As the continuous and relentless adoption of new technology changes throughout the supply chain leads to increased barriers to entry for new firms, but also for nascent entrepreneurs and their limited resources to sustain financial or tacit growth in new areas without implementation, revenue generations and research development. This ultimately leads to increased information required to deliver the end product which can be objectively viewed depending on either viewing the research from an NTV's or a consumer (retail supply chain division) perspective.

The research approach was deductive as identified by relevant theories, data is gathered through a questionnaire and will test those theories and is a descriptive study of the literature referring to new technology ventures offering Auto ID solutions within the retail supply chain. Descriptive research depicts an accurate profile of the population, phenomena or situations studied, attempt to determine, describe or identify what was and can be developed. This was adopted throughout Chapter 2: Literature Review to further interpret the barriers to entry within the retail supply chain, aiding in defining the criteria for NTV's to be sustainable within the supply chain, and more specifically data analysis showed a distinct set of variables within the retail supply chain influenced by EO dimensions and moderated by TO where applicable (Dudovskiy, 2007).

3.3 Research Design

In focusing on the various forms of research design, consideration was made to the diverse frameworks for the collection and analysis of data. Thus, resulting in a framework for the creation of evidence that is suited both to a certain set of criteria and to the research question in which the investigator was interested (Blumberg, Cooper & Schindler, 2014). The research design is cross-sectional with primary data in that it is identifying an observational study analysing a population at a specific point in time.

The rationale of this research is primarily quantitative in the analysis to highlight patterns and made the analysis more robust as the theory emerges from the research. Quantitative methods reiterate objective measurements and the statistical, mathematical, or numerical analysis of data collected (Marshall, 2016), through the questionnaire designed in chapter 4, and by shaping statistical data using computational techniques. The quantitative research focused on the collection of numerical data and generalising the population to further explain the correlation of NTV's firm sustainability between the cost of ownership versus the cost of implementing new Auto ID systems within the retail supply chain.

A perspective questionnaire was utilised through Qualtrics; an online survey platform to gain organisational information such as entrepreneurial orientation dimensions, technological orientation elements and business success perspectives within the multi-facet cross channels of the retail supply chain, as outlined by the questionnaire.

The researcher defines the theoretical framework on the formulated hypothesis through deduction in that the structure of the research is based on the academic literature such as entrepreneurship, corporate entrepreneurship, technological product innovations, information systems, change management, business management as well as online secondary data through articles and similar information on retail supply chain. This has led to results of the research findings and identifying the nature of a problem as it may or may not exist and to which the researcher formulated this theory to follow the data generated from the questionnaire (Lewis, Saunders & Thornhill, 2007).

3.4 Population and sample

Actioning population adequately is highly imperative as inaccuracy can lead to misleading data rendering it invalid. There are several approaches used in population sampling to safeguard that the individual can be used to induce data aiding in generalisations about a larger population (Castillo, 2011).

The targeted respondent sample size of 284 returned questionnaires was selected using a form of random sampling from the preselected database consisting of 1500 potential respondents. This is based notwithstanding on the restricted resources which can be divided into two relevant and significant strata (categories) based on similar attributes.

The population for this research was based on the Southern African Development Community (SADC), a regional economic community founded & maintained by countries in Southern Africa. SADC is made up of 16 member states namely; are Angola, Botswana, Comoros (since August 2017), Democratic Republic of Congo (DRC), Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, United Republic of Tanzania, Zambia and Zimbabwe. (SADC, 2017).

The target population was subdivided into three major categories, namely; a) Auto ID Software Providers; b) Hardware Suppliers and c) Process Service & Support Providers, these were made up from a predefined database acquired from DCI Scanning Systems, a leading distributor for Auto ID products within the SADC region (Datalogic, 2018). There is an estimated information technology market total of around $12 billion, but this figure has reduced from $14 billion in 2016 (International Trade Administrations, 2018).

South Africa's AIDC products and services industry is penetrating the fast-growing African market. South African companies and locally based subsidiaries of international companies have supplied the hardware, software and services either abroad or from South Africa.

The primary research data was targeted towards senior & middle management or specifically to representatives within the sample population entities. These representatives were required to have direct involvement in overseeing implementation or transactional relationships with a degree of decision-making responsibility and understanding of the relationship, the scope and requirement of the customer and the itemized offering relating to automatic identification products/ services/ support within the relevant division of the retail supply chain customer or sector (target market).

Table 3.1: Profile of respondents

Description of targeted study sample /respondent type	Number to be sampled
Categories: Auto ID Software Providers, Hardware Suppliers & Process Service & Support Providers	+/- 300 (of 1500)
Actual respondents	284 (of 1500

3.4.1 Sampling Techniques

The available sampling techniques can be categorised into two forms: probability (representative) sampling and non-probability (judgemental) sampling.

Table 3.2: Sample Technique

Variable	Description
Target population	New technology ventures & retail supply chains within Southern Africa
Target sample size of respondents	New technology ventures: 1500
Geographical	Southern Africa
Target study sample size	+/-300 NTV within the retail supply chain
Sampling unit	New technology ventures within the retail supply chain
Sampling error	(Confidence level) 90%
Respondents	Founders / Managers

3.4.1.1 Probability Sampling

Probability sampling (or representative sampling) is most commonly correlated with survey-based research designs requiring the researcher to make conjectures from the sample about a population to respond to the research queries or to meet the research objectives (Lewis, 2007). In probability sampling, every respective participant in the population has the invariable opportunity of being selected as a subject for the research. This method assures that the selection process is completely randomised and without bias. The advantage of using probability sampling was the effectiveness of the statistical methods after the observation aiding in the evaluation of the population parameters in the application as a depiction of the total population (Castillo, 2009).

A stratified random sampling technique was used to conduct the research. The researcher aims to articulate the population with coinciding perspectives and controversies relating to Auto ID solutions, new technology venture product offerings and their respective retail supply chain positioning, a detailed examination relating to the limited time and financial resources to gather data from a sample exceeding +/-300 respondents within the targeted industry-specific population must be mentioned and was achievable, the final respondent count that was useable data was 284 of 1500 respondents.

According to Lewis (2007), stratified random sampling is an adaption of random sampling in which the population is divided into two or more pertinent and indicative strata based on one or a number of aspects. In so doing results in the population being divided into an arrangement of suitable strata – meaning the representative sample being accurate and represented proportionally within the said sample. The researcher applied the stratified random sampling method to the database received from DCI Scanning in that the entire potential respondent database was reduced to only firms that could be categorised within the following strata; Auto ID Software Providers, Auto ID Hardware Suppliers & Auto ID Process Service & Support Providers. The researcher has decided stratified random sampling due to the homogeneity in stratifying the sample using a number of comparable attributes. The sample was stratified into definitive levels within the retail supply chain, corporate entity representative and hierarchal position within their firm and new technology venture and hierarchical position within their micro – small/medium entity. This ensured that the perspective accumulated was not biased and induced the sustainability of NTV'S's within the retail supply chain or catered for an inverse or null relationship between retail supply chain generation and NTV's idea generation.

3.4.2 Research Sample Selection Rationale

The sample selection rationale has been established on various divisions within the retail supply chain and new technology venture entities with relation to the automatic identification industry. In order to increase the success of responses from the potential study sample, the researcher chose to expand the questionnaire to NTV's throughout the SADC region as categorised by DCI Scanning's existing database. It is this existing database which allowed the researcher to categorise the necessary New Technology ventures which met the adequate criteria to form part of the potential study sample. Namely

Auto ID Software Providers, Hardware Suppliers & Process Service & Support Providers. As Auto ID is a niche market which requires specific hardware and skillsets, it was the opinion of the researcher to not further define demographics, knowledge, region or technological advancements or capabilities as would fall outside of the scope of relevant information for the study. Demographic information can be used as a source of control variables. In the research control variables were regarded as demographic information.

During the sample population survey, some respondents did not answer the demographic questions suitably which led to a large portion being removed from data analysis. It was also noted that time was an important aspect and the only questions that could be compromised at that stage of the study were demographic related questions. Any further elimination of ordinal scale questions from the EO, TO and business performance variables would have compromised the data.

For purposes of this study, it can be noted that all respondents held middle to a senior position and were from the automatic identification industry in Southern Africa. As anonymous links were sent out via WhatsApp and email, no further accurate demographics can be deduced. For reference, it can be noted that a previous study showed that when asked about qualifications, a majority had completed a matric certification, while a smaller portion had some form of tertiary education or higher learning (Venter, 2014). The researcher did not expect to find alternative results if qualification demographics were asked for the purpose of this study.

3.5 Reliability

Reliability can be defined as the degree to which an instrument measures the same way each time it is used under the same condition with the same subjects and is the consistency of the measurement needed to gather data for the research. It is the repeatability of the research measurement. A measure is determined as reliable if the sample outcome collected is the same given twice as similar. It is important to consider that reliability was estimated (Allemen et al., 2018).

The targeted sample had 30 days duration to complete the online questionnaire as per the time allocation timetable to complete the survey starting from the month of February 2019 pending Wits Business School MMENVC masters research panel approval. This duration

was intended to reduce the element of pressure or responsibility to complete the survey under a time constraint or scrutiny, but rather in their own time at their own discretion, ultimately reducing the participant subject error or bias as there was no affiliation to any of the sample population in relation to this research or its outcome. The survey completion had no influence or prejudice on any formal or informal relationship or financial gain between entities as the sole purpose of this research is for academic purpose.

A preferred standard to the structure of the questionnaire design was attempted, to avoid confusion, bias, influence or misleading in any form or direction towards answering.

Internal consistency concludes reliability by aligning questions in a survey that measure the same concept – meaning two sets of question classes have been selected to measure the same concept. It was concluded the completed survey was a correlation between these classes determined that the instrument was a reliable measure of the hypothesis. Reliability testing was done using Cronbach's alpha to measure internal consistency (the Coefficient of reliability), that is how closely related a set of items are as a group. Exploratory factor analysis was run to check dimensionality as a measure of scale reliability.

3.6 Validity

According to Bolarinwa (2016), validity is concerned with research achievement at measuring what the research intended to measure and can be defined as the extent to which the research meticulously emulate or assesses the definitive approach that the researcher was attempting to measure, and was an adequate way to collect the data necessary to conclude the research and deduce insights into the presumptions of the limited sustainability of NTV's within the retail supply chain due to the adoption and continuous advancement of new technology innovations.

With deliberate examination including intensive and definable structure and design of the survey confirmed with automatic identification industry peer input, ensures the validity of the format and design to gather the information accurately.

According to Newman (2013), content validity is established on the intensity to which measurement reflects the precise expected domain of content. The research implies

content validity as it incorporates the domains of content relatable to automatic identification technologies potentially implemented within the retail supply chain by NTV's. The research is representative of a sample, and the measurement represents the specific content, an equal amount of the sample population to complete the survey have been identified to validate the varies components:

- Entrepreneurial orientation Dimensions.
- Technology Orientation elements.
- Perceived business performance elements.

3.6.1 External Validity

Generalisability is attributed as external validity relevant to the research problem statement and the hypothetical outcome. With ideal efforts to minimize the generalisation of the literature review, and avoid bias towards the possible findings, the researcher aimed to follow the relevant auto ID industry trends and available knowledge clearly. However, partial generalised answers were an acceptable response as the generalisation may invoke further future researchers on the same topic to subjectively build on the research findings and more explicitly identify irregularities and dysfunctionalities depicted by survey respondents within the retail supply chain.

3.6.2 Internal Validity

According to Bezuidenhout, Davis & Plooy-Cilliers (2015), internal validity refers to how the research method and design will answer the research topic "The effect of innovation in automatic identification technology on new venture sustainability within Southern Africa". The research methodology has been designed with the aim to be as accurate as research deems possible in order to answer the research question without prejudice or inaccuracy in the results, this has been extensively elaborated on throughout the research methodology chapter, the researcher appreciates any formal or informal input in order to further improve the validity of future research.

3.7 Research Instrument & Scales

The primary data was collected using a structured research instrument as displayed in the appendix. It is made up of comprehensive questionnaires made up of 3 sections namely H1: Entrepreneurial Orientation – EO Dimensions; H2: Technological Orientation – IT Competence and Change and H3: Business performance - Financial. All sections of the questionnaire were surveyed online to the three main category groups: a) Auto ID hardware suppliers b) software suppliers and c) support and service providers targeted as retail supply chain executive, managers, operational & IT users. These were electronically sent out via email and SMS to the targeted sample from the existing database.

The research instrument was designed to collect data on how the EO dimensions influence business performance (moderated by TO) within the retail supply chain. The scales were adapted from prior research economic indicators, there was a level of subjectivity to an implication of success, but an objective response was required to identify the respondents perception towards each dimension of the questionnaire. The aim was to find a better understanding of how NTV value or perceive idea generation (innovativeness), entrepreneurial orientation and technological orientation from their existing work perspective. Scale indicators from secondary literature were applied to ensure better reliability of the research instrument – this was later dismissed to a more experienced scale. According to Lumpkin and Dess (1996, p. 137) who suggested that the dimensions of entrepreneurial orientation vary independently of each other in a given context it was decided by the researcher to adopt a Hughes and Morgan (2007) EO scale in order to avoid limitations to a formative measurement scale, yet the factors of entrepreneurial firms are assessed correctly.

As the five EO dimensions are distinct constructs, the strength of their relationships with particular antecedents and emanations were uniquely determined using the Hughes and Morgan (2007) Scale items. It was also beneficial to independently examine entrepreneurial orientation dimensions in assessing likely variations in the stability of antecedent-to-dimension or dimension-to-outcome relationships over time. Overall, despite the assumed limitation of such a “segregated” approach to EO’s assessment (i.e., such assessments implicitly overlook both relationships among EO’s sub-dimensions and

how their interrelationships may affect [or be affected by] other variables), the researcher believed that separately assessing entrepreneurial orientation dimensions using individual reflective-type scales was a reasonable measurement approach (Covin & Wales, 2012). The design of each question was designed to determine the type of data needed. There is a combination of closed questions to which the researcher grouped and coded responses of each question to the relevant data analysis (Lewis et al., 2007).

Ranking question scales have been used to ask the respondent to place their answers in rank order allowing the researcher to discover relative importance and based on the respondent's beliefs on the importance of a series of features. Ranking questions have been used on the following through the questionnaires found in the appendix, namely entrepreneurial orientation consisting of 19 questions, technology orientation consisting of 6 questions and business performance consisting of 4 questions (Lewis et al., 2007). A data table can be viewed in the appendix depicting the clear constructs, their items and sources.

3.8 Data Collection Procedures

The primary data collected refers specifically to information collected on this specific research topic. The primary data was primarily quantitative research and gathered through an electronic questionnaire research instrument required for empirical analyses. Results were automatically submitted online once the respondent completed the questionnaire through Qualtrics an online survey portal and collected from February 2019. The data was compiled as raw data within a CSV file and then imported in IBM SPSS Statistics 25 data tool, cleaned and analyses for interpretation and findings.

3.9 Methods of data analysis

To accurately answer the research objectives defined in Chapter 2, the researcher explored and elaborated on a large amount of information collected and studied and used as theoretical evidence. Inaccurate evidence is information which will not be trusted and is not admissible towards the research objectives. Accurate evidence is information that stems from dependable sources and through ethical methods that address influential questions. The research evidence is accurate as it was designed to be completed through reliable sources that are theoretically and technically consistent to the retail supply chain

and the adopted of the Auto ID technology as a product offering, this has been discussed in more detail in section 3.7 Reliability and section 3.8 Validity.

Two broad information types have been adapted to the research method, namely

a) Descriptive Information: which is the information gathered on Auto ID Industry, its technology types and process characteristics, the Auto ID entity being corporate or NTV's capability and performance as well as the knowledge gained from industry peers.

b) Judgemental information: which relates to the opinions from industry professionals, specific divisions within the Retail Supply Chain preferences or requirements and target audience assumptions and ideals.

A content analysis data type has been used which review documentation, written text and vocal speech to see what best materialises. This being the most frequent topics and prevalent themes that correlate, as well as finding latent significance on the view of the industry which is implicit.

Questionnaire results superseded the process of analysis and were composed of three concurrent sub-processes:

- Data reduction consists of summarising and simplifying the data collected and selectively focusing on partial elements of the data. The process intended to transform and condense the data.
- Data display involves organising and assembling the reduced and selected data into diagrammatic or visual displays
- Drawing and verifying conclusions on the data

The data analysis was assessed in two stages:

The first stage was to ensure each section of the questionnaire to allow unique patterns to emerge, using data reduction and a number of diverse graphs to accurately distinguish between these variables. Ultimately this led to a conclusion of the data and affected how the results were interpreted in relation to the industry theories and sample groups opinions.

The second stage was to merge similar variables from each section to seek familiar patterns; this comprises an aggregate of distinct graphical representations and data

collection results identifying the familiar variables across the survey sections. This assisted in clarifying the results to research objectives. An additional theory was included to identify by virtue of the data, resulting in findings with significance to new technology venture's sustainability within the Southern African retail supply chain.

3.9.1 General Descriptive Statistics

Descriptive statistics were implemented to gather general information about the major constructs of the study. The following descriptive statistics were computed: mean, variance and some measures of distributions such as skewness and kurtosis. Frequency distribution plots were computed to assess if the aspect of normality was present in the variables.

3.9.2 Explanatory Factor Analysis

Explanatory factor analysis was used as a data reduction approach. In assessing the possibility of applying Explanatory factor analysis the Bartlett test of Sphericity and Kaiser Meyer Olkin measure of sampling adequacy was used. Explanatory Factor analysis was used to extract maximum variance from the data set with each component thus reducing a large number of variables into a smaller number of factors (Fidell & Tabachnick, 2007).

Overall, the factor loadings were fairly similar, and there was a need to perform rotation regardless of the extraction technique (Fidell et al., 2007). It was best to pick the extraction technique based on the research question and the ease of interpretation.

Factors were rotated for better interpretation since unrotated factors are ambiguous. The goal of rotation was to attain an optimal simple structure which attempts to have each variable load on a few factors as possible but maximises the number of high loadings on each variable (Rummel, 1970). Ultimately, the simple structure attempted to have each factor define a distinct cluster of interrelated variables so that interpretation was easier (Fidell et al., 2007).

3.9.3 Correlation and Regression analysis

To address the research hypothesis, Pearson Correlations were computed and also the linear regression based on the aggregated scores of the constructs.

Simple linear regression is a statistical method that allowed the researcher to summarise and study relationships between two continuous (quantitative) variables: One variable denoted x, is regarded as the predictor, explanatory, or independent variable. The other variable denoted y is regarded as the response, outcome, or dependent variable.

The general equation is given in the form: $y = \boldsymbol{\beta_0} + \boldsymbol{\beta_1 x_{is}}$ Where**;**

- β_0 is the constant of the model
- β_1 is the estimated coefficients of independent variables of the study
- x_{is} represents the independent variables, (risk-taking, proactiveness, innovativeness, competitive aggressiveness, autonomy and technological orientation).
- y is the dependent variable (business performance)?

3.10 Limitations of the study

There were several obvious limitations, which were noticed at this initial stage of the research. The below in brief express these limitations of the research:

- Sample population respondent omissions: Respondents were reluctant to divulge accurate information or incomplete answers which resulted in data irregularities.
- Resource timing and availability. The scheduled scope of the research duration was limited to 6 months.

As the research developed, future unforeseen limitations became evident and were strategically resolved and stated.

3.11 Ethical Considerations

Ethics is defined to the norms or standard of the researcher's behaviour in association to the rights of those who become subject of the research, or are afflicted by it (Cooper et al., 2014).

For the purpose of this research in-depth financial, economic measures of specific firms were not considered. The research was focused primarily on perceived non-financial measures, the questions designed to form the performance indicators are based on the new technology ventures medium to high-level employees subjective view of profitability, growth and market positioning relative to the automatic identification industry. The reason for this was to avoid sensitive firm information which could affect the sample participation. Many studies, on the other hand, have shown that subjective and objective performance measures are regularly strongly positively correlated which support the validity of the subjective performance measures (Deepababu et al., 2016).

The research has been managed in a generalised approach to attain an observation of the limited survival rate of NTV's within the retail supply chain, specifically within the Auto ID industry and the sustainability of NTV's with the continuous adoption of auto ID technological advancements. The population targeted to have an influencing connotation to the research question which aims to determine the effect of innovation in automatic identification technology on new venture non-financial business performance within Southern Africa.

The ethical concern for confidentiality & anonymity were considered by the researcher in order to respect dignity and fidelity suggesting that anonymity is protected when the subject's identity could not be linked with personal responses. The researcher has also established that the reliability and validity of the information are as meticulous as possible and determined by the researcher. The research is ambiguous and not directed towards specific entities. The researcher has not initiated any bias of the retail supply chain or any specific Auto ID hardware, software, process or solution, nor has the researcher aimed to isolate or identify any bias to any stakeholders within the retail supply chain and its suppliers. The sole purpose of the research was to find a correlation to the sustainability of NTV's business performance by understanding the effect of innovation in automatic identification technology as influenced by entrepreneurial and technological orientation dimensions.

3.12 Conclusion

This Chapter elaborated on the way the research was undertaken. The study was quantitative, descriptive and cross sectional with a positivist research paradigm. A Likert

scale was used to collect data as per approach chosen by the researcher to best address the questions pertaining to entrepreneurial orientation, technological orientation and business performance. The results were sorted and analysed using SPSS that further defined descriptive statistics, explanatory factor analysis and Regression Estimated Coefficients and Regression Tool diagnostics. Internal and External validity tests were performed as well as reliability testing of the research.

4. PRESENTATION OF RESULTS

4.1 Introduction

In the following Chapter, the researcher presents the empirical findings generated from the survey. A total of 30 ordinal scale questions were sent out to approximately 1500 potential respondents. The research instrument was circulated as a hyperlink via two methods, namely a) WhatsApp and b) email campaign. The hyperlink was anonymous to approximately 1500 target respondents who are middle to senior management within the automatic Identification industry. Of the 1500 survey sample, a total of 341 respondents completed the survey within the specified time of 22 January 2019 – 21 February 2019. During this period the researcher was satisfied with the total completed responses to further analyse the raw data for presentation and interpretation.

The following chapter excludes a descriptive profile. The researcher determined that a demographic profile was not necessary for the purpose of the research report. During the survey tests and sample survey exercise. A number of demographic questions were asked but mostly excluded by the sample respondents. It must also be noted that the target number of questions was approximately 30 ordinal scale questions. This number was reduced from 100 ordinal scales that were designed to measure the individual variable Entrepreneurial Orientation and its dimensions namely; competitive aggressiveness, risk-taking, autonomy, proactiveness & innovativeness; b) the moderated variable technological orientation and c) the dependent variable business performance. Therefore, for the purpose of reducing the number of questions, demographic questions were eliminated to save time and ensure complete survey responses.

This chapter, however, presents the reliability of measurement scales, a focus on exploratory factor analysis,

4.2 Descriptive Statistics

Below are five figures for the frequency of distribution of responses to the entrepreneurial orientation scale. The survey asked several questions per each dimension of entrepreneurial orientation. Frequency distributions of the major constructs of the study were computed. The distribution of the responses is very important to assess the principle

of normality. As evidenced from the plots below, all the frequency distribution plots are approximately normal but negatively skewed (skewed to the left). Competitive aggressiveness took the shape of a bimodal distribution with two peeks. The plots below justify the possibility of the application of regression analysis as the major assumption underlying the approach is based on the assumption of normality.

4.2.1 Entrepreneurial Orientation Scale

Table 4.1 below presents the frequency distribution from the entrepreneurial orientation scale responses.

Item	Strongly	Disagree	Somewhat	Neither agree	Somewhat	Agree	Strongly
EOCA2	15.85%	**21.83%**	11.62%	7.39%	9.15%	**26.41%**	7.75%
EOCA3	1.06%	1.76%	4.58%	4.58%	16.90%	**48.59%**	**22.54%**
EOPR1	1.41%	8.45%	4.23%	12.68%	**19.01%**	**39.08%**	15.14%
EOPR2	2.11%	4.23%	3.17%	17.61%	**19.72%**	**41.55%**	11.62%
EOPR3	0.70%	2.82%	3.17%	3.17%	17.96%	**49.30%**	**22.89%**
EOPR4	1.06%	3.17%	1.76%	5.63%	18.66%	**42.61%**	**27.11%**
EORT1	6.69%	**19.01%**	10.21%	14.44%	16.20%	**21.48%**	11.97%
EORT2	3.52%	16.20%	8.80%	14.08%	**17.96%**	**27.46%**	11.97%
EOAU1	1.41%	4.93%	4.23%	4.23%	15.49%	**47.54%**	**22.18%**
EOAU2	1.06%	2.46%	4.23%	7.04%	15.49%	**49.65%**	**20.07%**
EOAU3	5.99%	10.21%	8.10%	9.15%	**22.89%**	**32.75%**	10.92%
EOIN1	1.41%	4.93%	4.23%	9.51%	21.13%	**42.25%**	**16.55%**
EOIN2	1.76%	4.58%	4.23%	10.92%	**21.13%**	**41.55%**	15.85%
EOIN3	0.70%	2.82%	2.46%	7.75%	16.55%	**48.94%**	**20.77%**
EOIN4	0.35%	1.41%	2.46%	5.99%	12.68%	**52.11%**	**25.00%**
EOIN5	0.70%	2.11%	3.17%	7.39%	12.32%	**45.77%**	**28.52%**

EOCA2: The question asked the respondent how best the statement described them regarding their thoughts and feelings to the question **"Your firm makes no special effort to win business from competitors?"** Of the respondents of the survey, a majority of the respondents agreed with this statement **26.41%**, while **21.83%** disagreed with the statement.

EOCA3: The question asked the respondent how best the statement described them regarding their thoughts and feelings to the question **"Your firm offers products/services to customers in a different way from competitors?"** Of the respondents of the survey, the majority of the respondents agreed with this statement **48.59%** or strongly agreed **22.54%.**

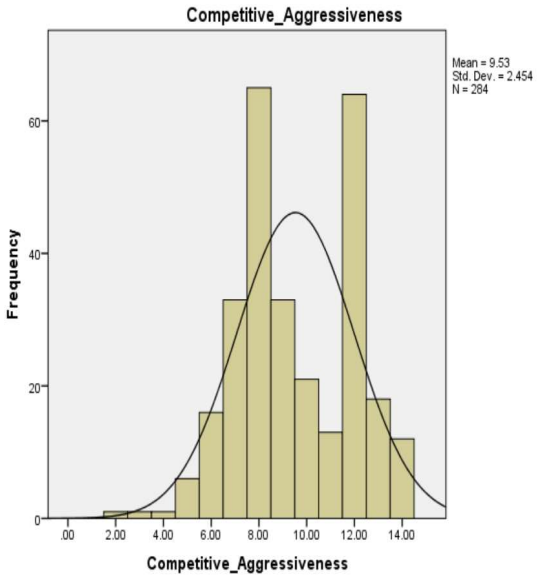


Figure 4.1: Competitive Aggressiveness Frequency Distribution

EOPR: The entrepreneurial orientation questions associated with proactiveness resulted in a large percentage agreeing with the statements respectively EOPR1 (**39.08%**), EOPR2 (**41.55%**); EOPR3 (**49.30%**); EOPR4 (**42.61%**). The remaining results are spread across the remaining options.

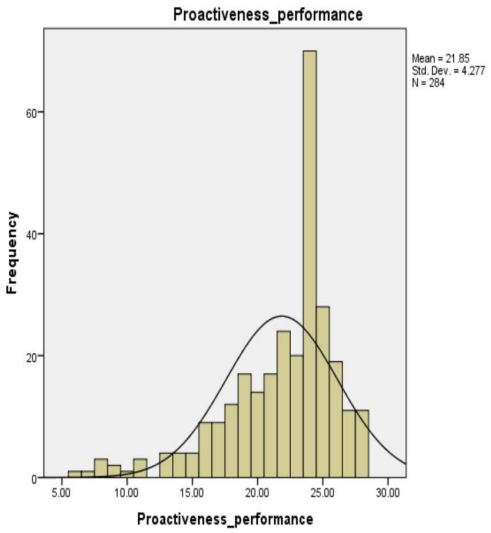


Figure 4.2: Proactiveness Frequency Distribution

EORT: The entrepreneurial orientation questions associated with risk-taking resulted in a fair percentage agreeing with the statements respectively EORT1 (**21.48%**); EORT2 (**27.46%**), while a fair percentage also disagreed with the statement EORT1 (**19.01%**); EORT2 (**16.20%**). The remaining results are spread across the remaining options.

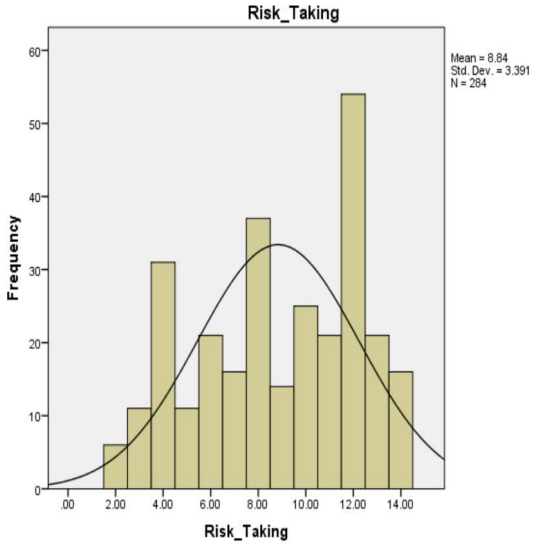


Figure 4.3: Risk-taking Frequency Distribution

EOAU: The entrepreneurial orientation questions associated with autonomy resulted in a fair percentage agreeing with the statements respectively EORT1 (**47.54%**); EORT2 (**49.65%**); EOAU3 (**49.65%**). The remaining results are spread across the remaining options.

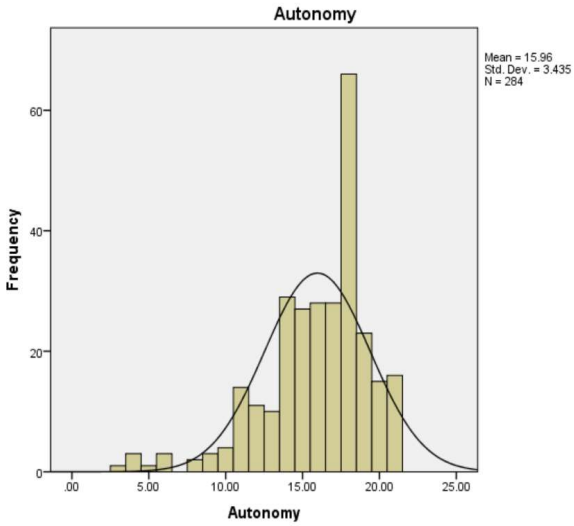


Figure 4.4: Autonomy Frequency Distribution

EOIN: The entrepreneurial orientation questions associated with Innovativeness resulted in a fair majority agreeing with the statements respectively EORT1 (**42.25%**); EORT2 (**41.55%**); EOAU3 (**48.94%**); EOIN4 (**52.11%**); EOIN5 (**45.77%**) The remaining results are spread across the remaining options.

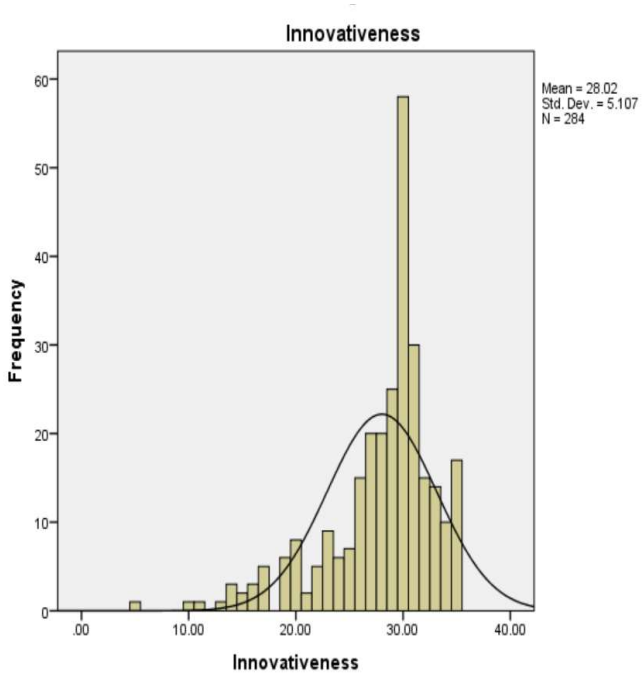


Figure 4.5: Innovativeness Frequency Distribution

4.2.2 Technological Orientation Scale

Table 4.2: Survey results for TO

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
TOITC1	0.35%	2.11%	1.76%	3.52%	12.32%	**48.94%**	30.99%
TOITC2	1.06%	0.70%	1.76%	8.10%	13.38%	**44.37%**	30.63%
TOITC3	1.76%	1.41%	3.17%	11.97%	20.07%	**36.97%**	24.65%
TOITC4	2.11%	2.82%	2.46%	8.80%	17.61%	**41.90%**	24.30%
TOITC5	2.46%	7.39%	5.99%	13.38%	15.49%	**37.68%**	17.61%
TOITC6	1.76%	4.58%	7.39%	11.97%	19.37%	**39.44%**	15.49%

TIOTC: The technological orientation questions resulted in a fair majority agreeing with the statements respectively TOITC1 (**48.94%**); TOITC2 (**44.37%**); TOITC3 (**36.97%**); TOITC4 (**41.90%**); TOITC5 (**37.68%**); TOITC6 (**39.44%**). The remaining results are spread across the remaining options.

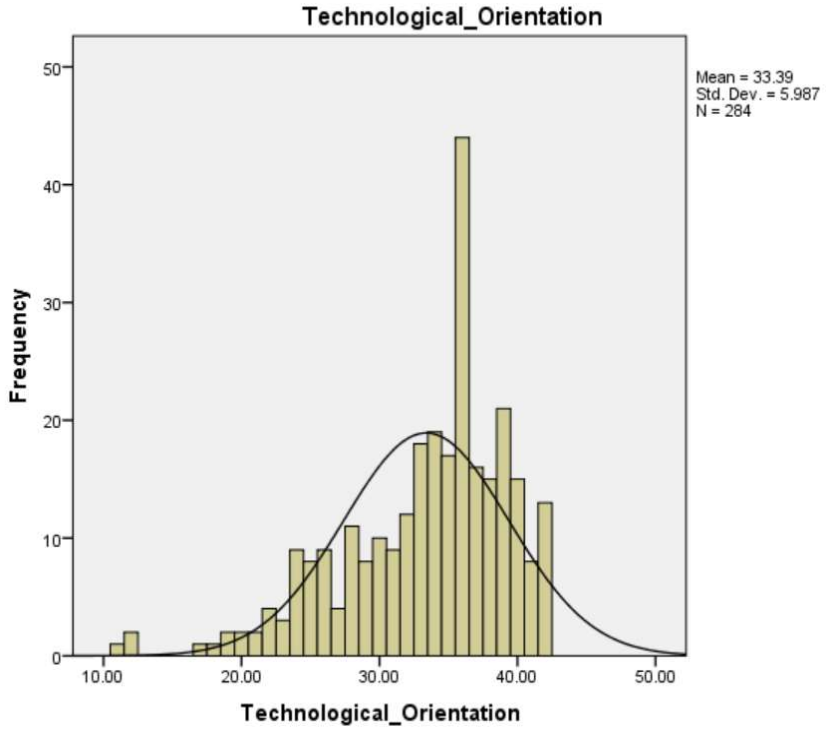


Figure 4.6: Technological Orientation Frequency Distribution

4.2.3 Business Performance Scale

Table 4.3: Survey results for business performance

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
BPGR1	1.06%	2.82%	3.17%	12.68%	14.08%	**42.96%**	23.24%
BPGR2	1.06%	2.82%	5.99%	12.68%	16.55%	**39.79%**	21.13%
BPGR3	2.11%	2.82%	5.63%	15.49%	15.14%	**39.08%**	19.72%
BPGR4	2.11%	2.46%	4.58%	10.92%	13.03%	**46.13%**	20.77%

BPGR: The business performance questions resulted in a fair majority agreeing with the statements respectively BPGR1 (42.96%); BPGR2 (39.79%); BPGR3 (39.08%); BPGR4 (46.13%). The remaining results are spread across the remaining options.

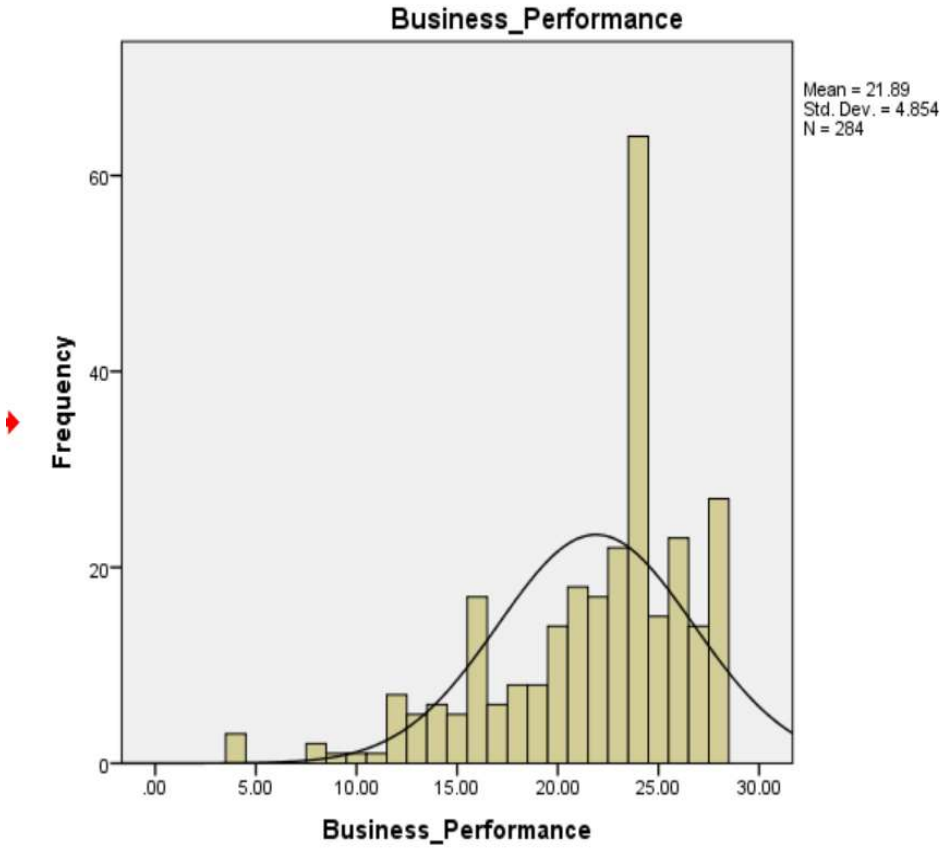


Figure 4.7: Business Performance Frequency Distribution

4.3 Reliability testing of the measurement scales

Reliability testing has been completed on the summated scales designed to measure the underlying constructs. Reliability testing on the three scales namely entrepreneurial orientation, technological orientation and business performance using Cronbach's Alpha to determine the internal consistency and average correlation on the research instrument. The research demonstrates the reliability of the variables derived from the summated scales.

Table 4.4: Reliability Statistics of individual items

Reliability Statistics			
Constructs	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
EOCA: Competitive Aggressiveness	0.710	0.723	2
EOPR: Proactiveness	0.819	0.822	4
EORT: Risk-taking	0.853	0.853	2
EOAU: Autonomy	0.68	0.701	3
EOIN: Innovativeness	0.874	0.877	5
TOITC: Technological orientation	0.847	0.853	6
BPGR: Business performance	0.911	0.911	4

Table 4.5 shows the Cronbach's alpha based on standardised items. Within the table, it shows that for entrepreneurial orientation construct as an independent variable, EOCA: Competitive Aggressiveness has a Cronbach's Alpha of **0.723** based on two items within the Likert scale. This indicates that the same is reliable and internally consistent. EOPR: Proactiveness has a Cronbach's Alpha of **0.822** based on four items within the Likert scale. This indicates that the same is reliable and internally consistent. EORT: Risk-taking has a Cronbach's Alpha of **0.853** based on two items within the Likert scale. This indicates that the same is reliable and internally consistent. EOAU: Autonomy has a Cronbach's Alpha of **0.701** based on three items within the Likert scale. This indicates that the same is reliable and internally consistent. EOIN: Innovativeness has a Cronbach's Alpha of **0.877** based on six items within the Likert scale. This indicates that the same is reliable and internally consistent.

Table 4.1 shows the Cronbach's Alpha based on standardised items. Within the table, it shows that for technological orientation construct as the moderating variable, TOITC: Technological orientation has a Cronbach's Alpha of **0.853** based on six items within the Likert scale. This indicates that the same is reliable and internally consistent.

Table 4.1 shows the Cronbach's alpha based on standardised items. Within the table, it shows that for business performance construct as the dependent variable, BPGR: Business performance has a Cronbach's Alpha of **0.911** based on four items within the Likert scale. This indicates that the same is reliable and internally consistent.

Table 4.5: Reliability Statistics of total scales combines

Reliability Statistics for total scales combined		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.943	.949	30

Table 4.5 shows the reliability or internal consistency of the measurement instrument was assessed using the Cronbach's Alpha coefficient since the items in the instrument were measured on a Likert Scale. The number of items which were subjected to measurement of reliability was a total of 30 before the explanatory factor analysis. Based on 30 items the calculated Cronbach's Alpha coefficient was **0.943** which was within the recommended range. As shown by the table, the collected responses were to be considered reliable and consistent.

4.4 Exploratory factor analysis of the scales

Explanatory factor analysis as a data reduction procedure was used to select the most relevant items that explain the effect of innovation in automatic identification technology on new venture sustainability in South Africa. The above reliability was calculated before the explanatory analysis, and therefore, the selected items through the explanatory factor analysis need also to be tested for internal consistency. The adequacy of the sample also needs to be investigated before running the actual procedure of explanatory factor analysis

using the Kaiser-Meyer-Olkin Measure of Sampling Adequacy and its corresponding Bartlett's Test of Sphericity as shown below in Table 4.3.

Table 4.6: Kaiser-Meyer-Olkin and Bartletts test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		**.926**
Bartlett's Test of Sphericity	Approx. Chi-Square	4694.718
	df	325
	Sig.	**.000**

The results shown above in Table 4.3 approves the application of the explanatory factor analysis procedure as the calculated KMO value (**0.926**) falls into the marvellous category that is greater than 0.90. The corresponding Bartlett's test addressed towards the KMO verified the sample size used was extracted from a normal population which investigates the equality of variances. The estimated in the form of chi-square and the calculated value was **4694.718** with a corresponding significant value which is less than 0.05 (standard measure). In general, the sample was derived from a normal population, and it was adequate according to the KMO test, and therefore it was necessary to apply the explanatory factor analysis.

The results of the explanatory factor analysis are presented in the table below. Principal Axis Factoring was used as an extraction method and Promax with Kaiser Normalization as a rotation method. The results were presented in the form of a pattern matrix.

Only three factors were computed for item selection which converged after five iterations. To better select item loadings 0.40 was used as a rule of thumb, the selection of only three items was chosen since at least 3 item loadings are required per each factor. Item with poor loadings or that failed to meet the required standard were dropped from the analysis. Only four items failed to qualify. It was also noted that most of the items loaded in factor one as compared to factor two and three. In the following statistical analysis procedures,

items with poor loadings were no longer relevant, and therefore they were eliminated. The selected items were used to address the hypothesised statements of the study.

Table 4.7: EFA Pattern Matrix

Pattern Matrix	1 (Factor)	2 (Factor)	3 (Factor)
EOCA2			0.584
EOCA3	0.579		
EOPR1	0.584		
EOPR2	0.517		
EOPR3	0.775		
EOPR4	0.865		
EORT1			0.816
EORT2			0.723
EOAU1	0.459		
EOAU2	0.421		
EOAU3			0.598
EOIN1	0.579		
EOIN2	0.667		
EOIN3	0.778		
EOIN4	0.833		
EOIN5	0.922		
TOITC1	0.915		
TOITC2	0.709		
TOITC3	0.554		
TOITC4	0.66		
TOITC5	0.511		
TOITC6			0.413
BPGR1		0.92	
BPGR2		0.973	
BPGR3		0.761	
BPGR4		0.714	
Extraction Method: Principal Axis Factoring.			
Rotation Method: Promax with Kaiser Normalization.			
a Rotation converged in 5 iterations.			

Table 4.8: Overall Reliability after EFA analysis

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.937	.943	**26**

After the explanatory factor analysis reliability was verified if it remained in the excellent category. Out of 30 items, 26 qualified and were tested for reliability. The Cronbach's Alpha coefficient was not affected by the data reduction approach as it remained excellent, although it decreased from **0.943** to **.937** based on 26 items.

4.4.1 General Descriptive Statistics based on aggregated scores

The major constructs of the study were compressed to single variables by calculating the aggregated scores of their items. The computed descriptive statistics were the mean, variance, skewness and kurtosis. The highest mean was recorded under the technological orientation as it was measured by several items as compared to others. Risk-taking and Competitive Aggressiveness had means in the same range with **8.838** and **9.5282** respectively. Statistical variance gave a measure of how the data distributed itself about the mean or expected, and much of variability was also recorded under the technological orientation items as it was varying with its corresponding calculated means. The measures of distribution were also calculated (Skewedness and Kurtosis). All the variables were negatively skewed with similar standard errors.

Table 4.9: General Descriptive Statistics based on aggregated scores

Descriptive Statistics	**N**	**Mean**	**Std. Dev**	**Variance**	**Skewness**		**Kurtosis**	
	Stats	**Stats**	**Statistic**	**Statistic**	**Stats**	**Std. Err**	**Stats**	**Std. Err**
EORT: Risk-taking	284	8.838	3.39119	11.5	-0.289	0.145	-1.111	0.288
EOPR: Proactiveness	284	21.8521	4.27739	18.296	-1.272	0.145	1.707	0.288
EOIN: Innovativeness	284	28.0211	5.10659	26.077	-1.371	0.145	2.234	0.288
EOCA: Competitive aggressiveness	284	9.5282	2.45437	6.024	-0.016	0.145	-0.791	0.288
EOAU: Autonomy	284	15.9613	3.43469	11.797	-1.149	0.145	1.729	0.288
TOITC: Technological orientation	284	33.3873	5.98685	35.842	-0.986	0.145	0.939	0.288
BPGR: Business Performance	284	21.8908	4.85391	23.56	-1.144	0.145	1.254	0.288

The Pearson correlation coefficient measures the strength and direction of a linear relationship between two variables. This helped to generalise all the mentioned hypotheses of the study as the correlation matrix was computed based on all the variables in the data set. The dependent variable was considered to be business performance throughout the study. As shown in the table below business performance is significantly correlated to risk-taking (**0.423****) as its corresponding significant value is less than the standard measure of 0.05. It was also noted that business performance was also significantly linearly related to Proactiveness performance, Innovativeness, Competitive Aggressiveness, Autonomy, and Technological Orientation with the following Pearson correlations (**0.423****, **0.464****, **0.558****, **0.283****, **0.444**** and **0.592**** respectively). In general, all the suggested constructs of the study proved to be very much related to business performance.

Table 4.10: Correlation Matrix of constructs

Correlations		Risk-taking	Proactiveness	Innovativeness	Competitive Aggressiveness	Autonomy	Technological Orientation
Risk-taking	Pearson Correlation						
	Sig. (2-tailed)						
Proactiveness	Pearson Correlation	**.451****					
	Sig. (2-tailed)	0.000					
Innovativeness	Pearson Correlation	**.449****	**.774****				
	Sig. (2-tailed)	0.000	0.000				
Competitive Aggressiveness	Pearson Correlation	**.308****	**.344****	**.273****			
	Sig. (2-tailed)	0.000	0.000	0.000			
Autonomy	Pearson Correlation	**.435****	**.485****	**.589****	**.360****		
	Sig. (2-tailed)	0.000	0.000	0.000	0.000		
Technological Orientation	Pearson Correlation	**.515****	**.712****	**.786****	**.317****	**.575****	
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	
Business Performance	Pearson Correlation	**.423****	**.464****	**.558****	**.283****	**.444****	**.592****
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000

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

The established relationships were further investigated by the linear regression analysis. The procedure followed the structure of the hypothesis framework that is it addressed each hypothesised statement.

4.5 Results pertaining to hypothesis 1

4.5.1 H1a: Risk-taking isolated as a construct within the auto ID Sector has no effect on business performance

The analysis of variance table below investigated the statistical significance of risk-taking in the business performance environment. The alternative hypothesis suggested that risk-taking isolated as a construct within the auto ID sector has no effect on firm performance. As the calculated significant value is less than 0.05 (0.00 <0.05) and approximately equal to zero the alternative hypothesis is rejected in favour of the null hypothesis. There was enough evidence to prove that risk-taking is statistically significant in the business performance environment.

Table 4.11: Analysis of variance table risk-taking - business performance

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1193.639	1	1193.639	61.492	.000[b]
	Residual	5473.977	282	19.411		
	Total	6667.616	283			

a. Dependent Variable: Business Performance

b. Predictors: (Constant), Risk-taking

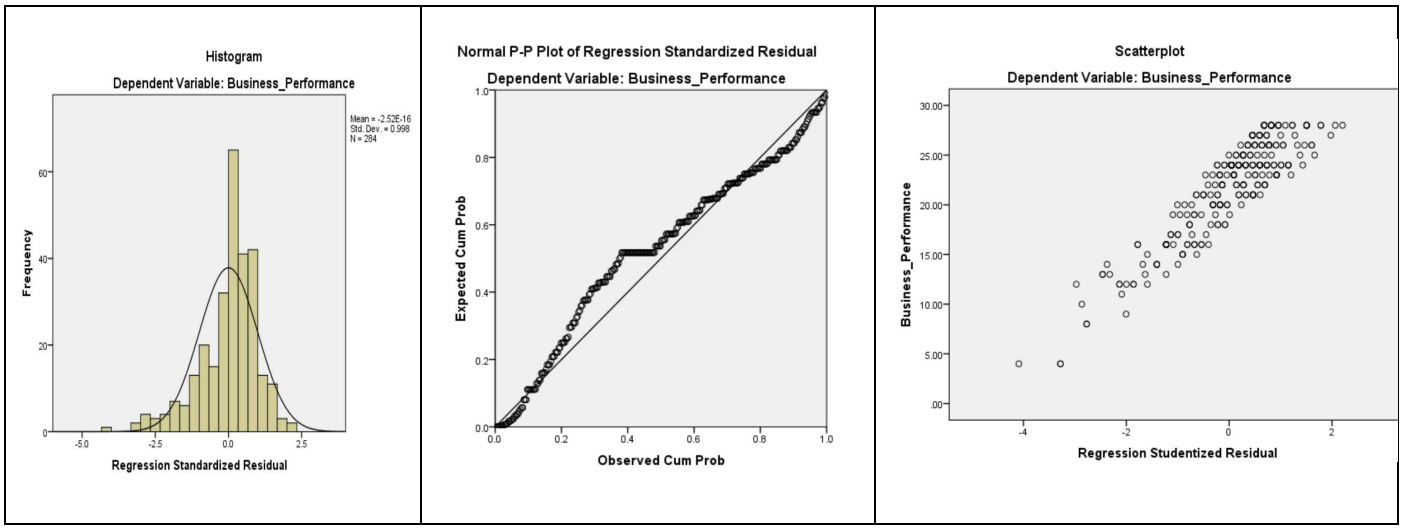
Model coefficient is shown in the table below. The dependent variable was the business performance, and risk-taking was considered as the independent variable. Estimated coefficients of both the constant and risk-taking were positive with probability values corresponding to the t-values less than 0.05. The relationship between risk-taking and business performance can be summarized by $\boldsymbol{business\ performannce = 16.538 + 0.606\ X\ risk\ taking}$.

Table 4.12: Regression estimated Coefficients risk-taking-business performance

Coefficients						
Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	16.538	.731		22.627	.000
	Risk-taking	.606	.077	.423	7.842	.000
a. Dependent Variable: Business Performance						

The major model assumption was assessed by the residual plot, observed cumulative probability plot and regression studentized residual plot. The regression standardised residual is approximately normal. Observed cumulative probability showed a perfect fit and well as the studentized residual plot.

Table 4.13: Regression Model Diagnostics risk-taking-Business performance



The major assumptions of the model were not violated as the residuals were approximately normal.

4.5.2 H1b: Proactiveness as an isolated construct within the auto ID sector has a positive effect on business performance

Proactiveness as an isolated construct showed a positive effect on firm performance; this was in agreement with the alternative hypothesis which suggested that Proactiveness as an isolated construct within the auto ID sector has a positive effect on firm performance. The significant value of the F measure was less than 0.05 (0.00<0.05). The null hypothesis is rejected in favour of the alternative hypothesis that is proactiveness had a positive influence on business performance.

Table 4.14: Analysis of variance table proactiveness-business performance

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1434.568	1	1434.568	77.306	.000[b]
	Residual	5233.048	282	18.557		
	Total	6667.616	283			
a. Dependent Variable: Business Performance						
b. Predictors: (Constant), Proactiveness performance						

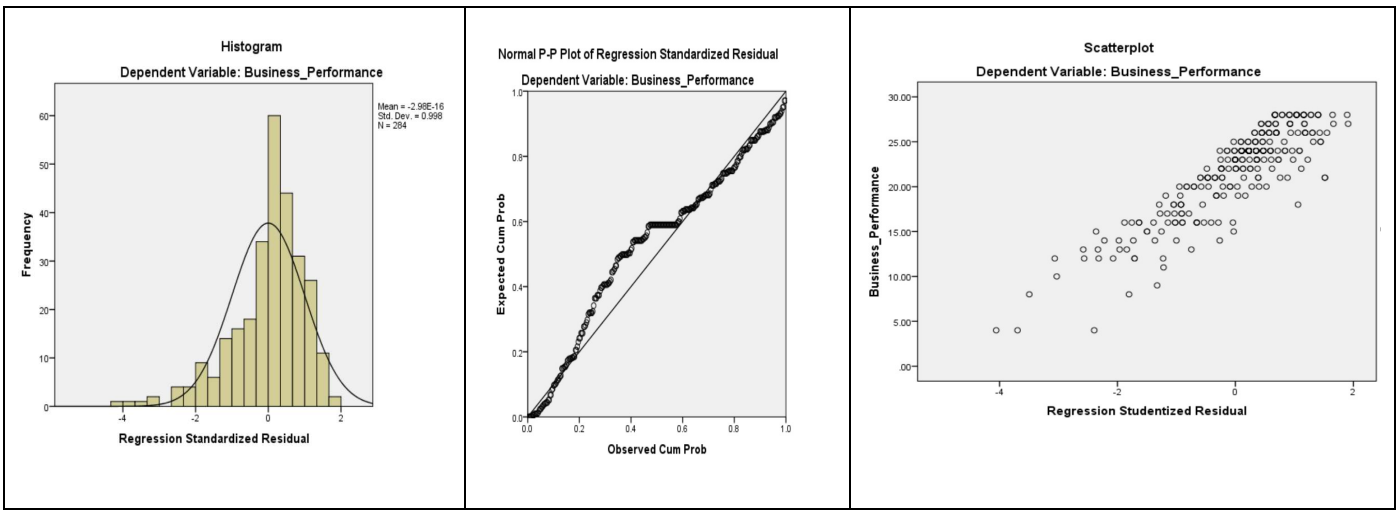
The linear model coefficients of the regression model are presented in the table below. Proactiveness performance was considered to be the independent variable evaluated against the business performance which was also considered to be the dependent variable. The constant of the model was significant and also the Proactiveness performance as they had the corresponding significant values to the t values which were less than 0.05. The linear relationship between proactiveness performance and business performance can be summarised by the model: $\boldsymbol{business\ performance = 10.38 + 0.526\ X\ Proactiveness}$

Table 4.15: Regression estimated Coefficients proactiveness – business performance

Coefficients						
Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	10.389	1.333		7.794	.000
	Proactiveness performance	.526	.060	.464	8.792	.000
a. Dependent Variable: Business Performance						

The regression diagnostic procedures approved that the model did not violate its underlying assumptions as the regression standardised residuals were approximately normally distributed with regression studentized residual following a perfect fit.

Table 4.16: Regression Model Diagnostics proactiveness – business performance



The major assumptions of the model were not violated as the residuals were approximately normal.

4.5.3 H1c: Innovativeness isolated as a construct within the auto ID sector has a significant effect on business performance.

The statistical relationship between innovativeness and business performance is explained by the analysis of variance table below. The significance of innovativeness on business performance was justified as the p-value of the F measure (**127.453**) was less than 0.05.

Table 4.17: Analysis of variance table innovativeness - business performance

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	2075.469	1	2075.469	127.453	.000[b]
	Residual	4592.148	282	16.284		
	Total	6667.616	283			
a. Dependent Variable: Business Performance						
b. Predictors: (Constant), Innovativeness						

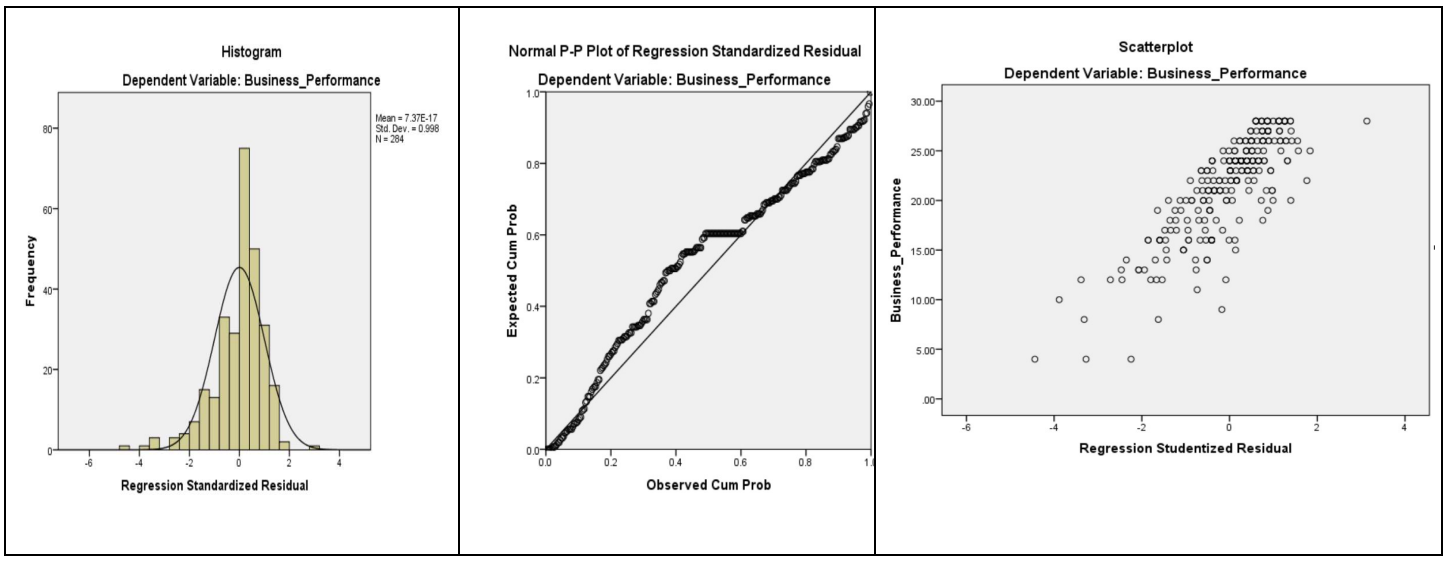
The p-value for each term tests the null hypothesis that the coefficient is equal to zero (no effect). A low p-value (< 0.05) indicates that the null hypothesis can be rejected. In other words, a predictor that has a low p-value is likely to be a meaningful addition to the model because changes in the predictor's value are related to changes in the response variable. As shown in the table below, the p-value of the predictor (innovativeness) was below 0.05 indicating that business performance environment depends on innovativeness. The relationship can be expressed statistically as follows: $\boldsymbol{business\ performance = 7.031 + 0.530\ x\ innovativeness.}$

Table 4.18: Regression Estimated Coefficients: innovativeness -business performance

Coefficients					
Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	7.031	1.338		5.255	.000
	Innovativeness	.530	.047	.558	11.290	.000
a. Dependent Variable: Business Performance						

The goodness of fit of the model was also investigated by the model diagnostic procedure. As indicated below, the regression standardised residuals are approximately normal which confirms the assumption of normality. The studentized residuals plotted against the business performance scatter plot showed a perfect fit.

Table 4.19: Regression model diagnostics innovativeness – business performance



The major assumptions of the model were not violated as the residuals were approximately normal.

4.5.4 H1d: Competitive aggressiveness isolated as a construct within the Auto ID sector has no effect on business performance

The alternative hypothesis assumes that Competitive aggressiveness isolated as a construct within the auto ID sector has no effect on firm performance. The hypothetical assumption was addressed using the analysis of variance with the results below. The F measure and its p-value suggested that there is a linear relationship between competitive aggressiveness and business performance, and this implied the rejection of the alternative hypothesis in favour of the null hypothesis, that is Competitive aggressiveness isolated as a construct within the auto ID sector has a positive effect on firm performance.

Table 4.20: Analysis of variance Table competitive aggressiveness - business performance.

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	535.401	1	535.401	24.621	.000[b]
	Residual	6132.215	282	21.745		
	Total	6667.616	283			

a. Dependent Variable: Business Performance

b. Predictors: (Constant), Competitive Aggressiveness

The model coefficients are presented in the table below; both the constant and the independent variable, competitive aggressiveness had positive coefficients. The P-value of the competitive aggressiveness was approximately equal to zero which suggested that it is very much relevant to have competitive aggressiveness in the business performance environment. The relationship can be summarised as follows: $\boldsymbol{business\ performance = 16.551 + 0.560\ X\ competitive\ agressiveness.}$

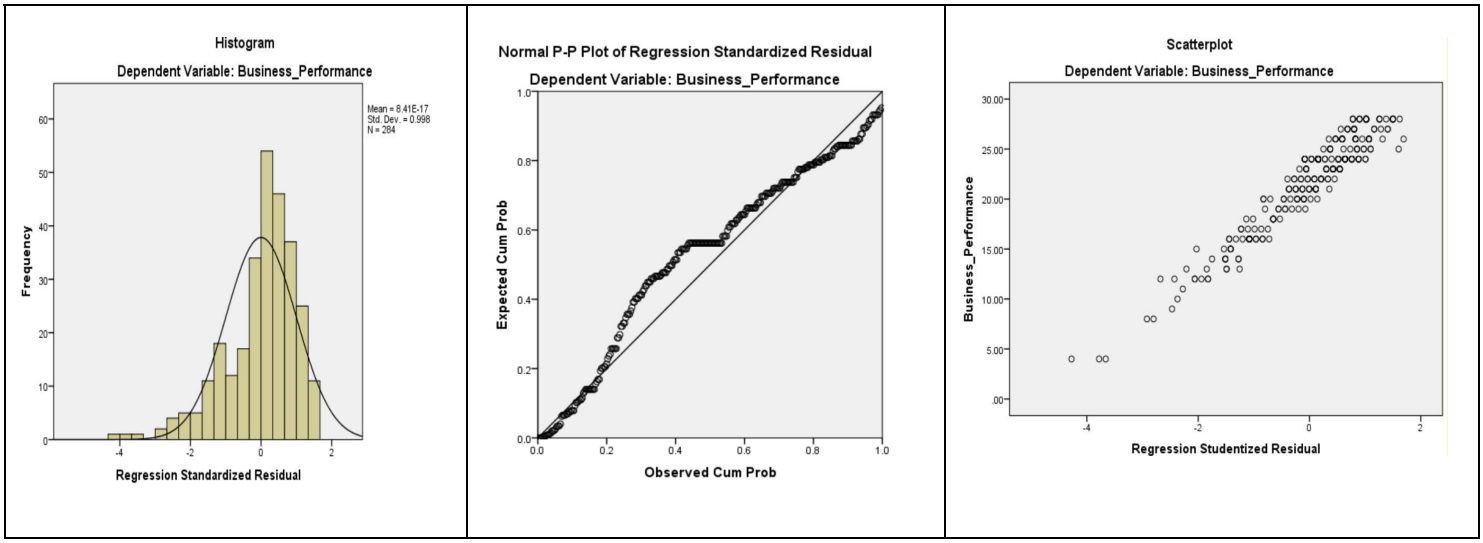
Table 4.21: Regression estimated Coefficients competitive aggressiveness – business performance

Coefficients					
Model	Unstandardised Coefficients		Standardised Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	16.551	1.111		14.896	.000
Competitive Aggressiveness	.560	.113	.283	4.962	.000

a. Dependent Variable: Business Performance

Model diagnostic plots showed a perfect fit of the model as the major assumptions were not violated as indicated by the regression standardised residuals which are approximately normal and its studentized residuals follow a defined pattern.

Table 4.22: Regression model diagnostics competitive aggressiveness – business performance



The major assumptions of the model were not violated as the residuals were approximately normal.

4.5.6 H1e: Autonomy isolated as a construct within the auto ID sector has no effect on business performance.

The hypothesis looking at Autonomy isolated as a construct within the auto ID sector having no effect on firm performance was investigated by the analysis of variance table with the results showing below. The suggested hypothesis was rejected as the results of the analysis of variance indicated a perfect linear relationship between autonomy and business performance. This was evidenced by the F-measure corresponding p-value which was less than 0.05.

Table 4.23: Analysis of variance table autonomy – business performance

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	1315.644	1	1315.644	69.322	.000[b]
	Residual	5351.972	282	18.979		
	Total	6667.616	283			
a. Dependent Variable: Business Performance						
b. Predictors: (Constant), Autonomy						

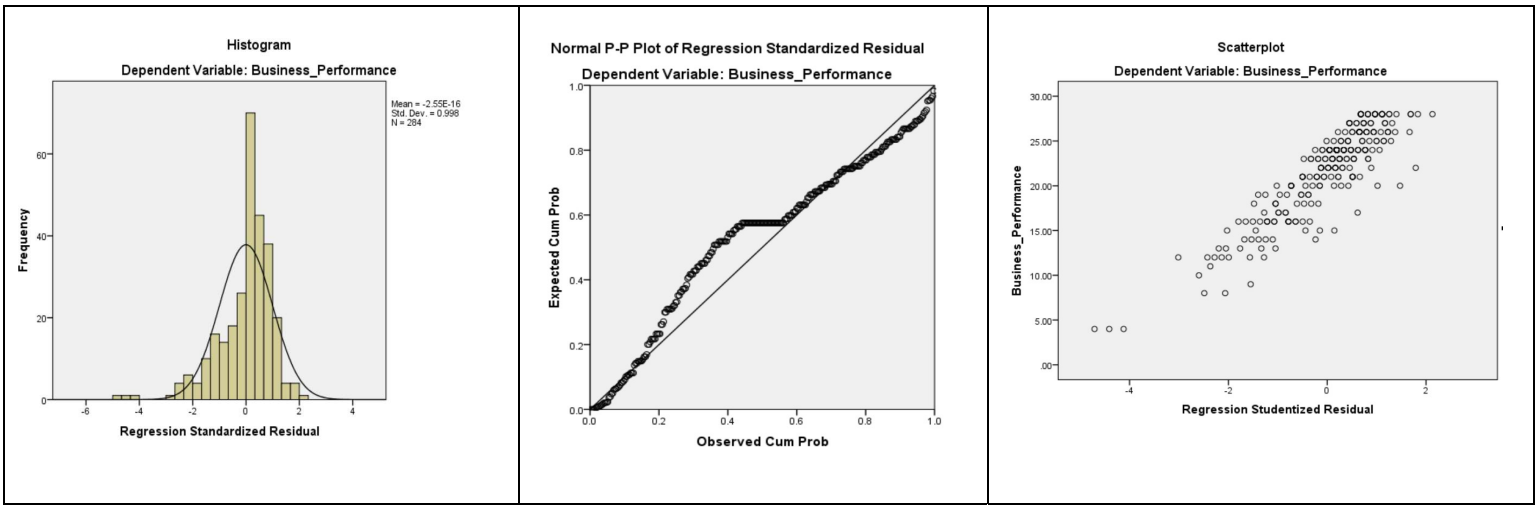
The linear regression model coefficients were estimated and presented in the table below. Both the constant and autonomy estimated coefficients were positive with p-values which are less than the standard measure 0.05. The linear relationship can be summarised by the equation $\boldsymbol{business\ performance = 11.871 + 0.628\ X\ Autonomy}$**.** In general, in the business performance environment autonomy plays an important role.

Table 4.24: Regression estimated coefficients autonomy – business performance

Coefficients					
Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	11.871	1.231		9.644	.000
	Autonomy	.628	.075	.444	8.326	.000
a. Dependent Variable: Business Performance						

Based on the model diagnostic results, the linear relationship between autonomy and business performance can be best described by a linear regression model. The assumption of normality was not violated as the standardised residuals are approximately normally distributed with regression studentized residuals scatter plot which showed a perfect trend.

Table 4.25: Regression model diagnostics autonomy – business performance



The major assumptions of the model were not violated as the residuals were approximately normal.

4.5.7 Combined summary model of Hypothesis 1 entrepreneurial orientation on business performance

Most of the hypotheses focused on the individual constructs of the study. The hypothetical statements were summarised in the form of a multiple linear regression model taking into consideration business performance as a response variable, and all the other constructs namely autonomy, competitive aggressiveness, risk-taking, proactiveness performance and innovativeness were treated as independent variables. The overall analysis of variance table showed that business performance could be best described by the suggested constructs as the overall F-measure was significant at 0.05 and therefore the relationship is important.

Table 4.26: Full Model analysis of variance table entrepreneurial orientation – business performance

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
	Regressio	2431.184	5	486.237	31.907	.000[b]
	Residual	4236.432	278	15.239		
	Total	6667.616	283			

a. Dependent Variable: Business Performance
b. Predictors: (Constant), Autonomy, competitive Aggressiveness, Risk-taking, Proactiveness performance, Innovativeness

The coefficients of the full model were estimated and presented in the table below. Most of the estimated coefficients were positive. Risk-taking and innovativeness proved to be highly significant in the business performance environment as compared to the other constructs (proactiveness, competitive aggressiveness and autonomy) which had p-values greater than the standard measure 0.05. The relationship can be summarised as follows:

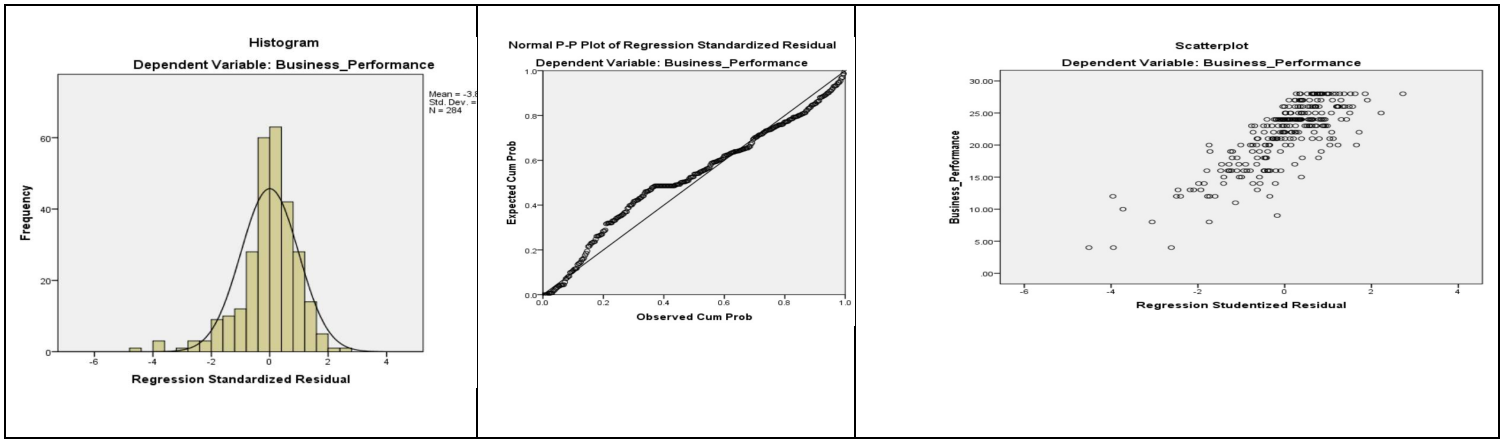
$$\boldsymbol{business\ performance = 5.207 + 0.249 * risk\ taking + 0.375\ X\ innovativeness + 0.166 * competitive\ aggressiveness + 0.150 * autonomy}$$

Table 4.27: Full model estimated coefficients entrepreneurial orientation – business performance

Coefficients					
Model	Unstandardised Coefficients		Standardised Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	5.207	1.465		3.554	.000
Risk-taking	.249	.081	.174	3.082	**.002**
Proactiveness performance	.000	.089	.000	-.004	.997
Innovativeness	.375	.078	.395	4.788	**.000**
competitive Aggressiveness	.166	.105	.084	1.586	.114
Autonomy	.150	.088	.106	1.703	.090
a. Dependent Variable: Business Performance					

Overall model diagnostics suggested a perfect linear relationship as the major underlying assumptions were not violated.

Table 4.28: Full Model Regression model diagnostics entrepreneurial orientation – business performance



4.6 Results pertaining to Hypothesis 2 Technological orientation Moderated Models

4.6.1 H2a: Innovativeness moderated by TO has a positive effect on business performance.

From the linear regression model which focuses on the positive effect of innovativeness on business performance, it was established that the two are significantly related. The mentioned hypothesis was seeking to establish the effect of innovativeness if moderated by technological orientation to business performance. The results were presented in the form of the base model (un-moderated model) and the moderated model. The statistics of interest that were used as the basis of decision making are significance level, p-value, R-Squared and change in R-squared value. The base model with innovativeness as the independent variable had a **31.1%** r-squared change with a significant F-change. The moderated model shows an improvement in terms of the change in r-squared value (**37.2%**). Innovativeness moderated by technological orientation increased the overall effect on the business performance environment with an r-squared increment of **6%**. The output is in favour of the hypothesised statement.

Table 4.29: Innovativeness moderated by technological orientation table

	Base Model		**Moderated Model**		
	(Constant)	Innovativeness	(Constant)	Innovativeness	Technological Orientation
Coefficients (B)	7.031	0.53	4.578	0.231	0.325
Std. Error	1.338	0.047	1.362	0.073	**0.062**
Sig.	0.000	**0.000**	0.001	0.002	**0.000**
R	.558a			**.610a**	
R square	**0.311**		**0.372**		
Adjusted R Square	**0.309**		**0.368**		
R Square Change	**0.311**		**0.372**		
Sig. F Change	**0.000**		**0.000**		

4.6.2 H2b: Proactiveness moderated by TO has a positive effect on business performance

The influence of proactiveness if moderated by technological orientation to business performance as the dependent variable was also investigated and the results are presented in the table below. The base model considered the relationship of proactiveness to business performance in the absence of technological orientation. The base model recorded an R-square value of **0.215** (**21.5%**) which was similar to the F-change. As compared to the moderated model by technological orientation the R-squared value improved from **0.212** to **0.35**. The R-square change improves from **21.5** to **35.4%**, which implies that if technological orientation is used to moderate proactiveness, the business performance improves significantly as the moderated model explained many variations in business performance as compared to the base model.

Table 4.30: Proactiveness moderated by technological orientation table

	Base Model		**Moderated Model**		
	(Constant)	Proactiveness performance	(Constant)	Proactiveness performance	Technological Orientation
Coefficients (B)	10.389	0.526	5.399	0.098	0.43
Std. Error	1.333	0.06	1.372	0.077	0.055
Sig.	0.000	0.000	0.000	0.206	0.000
R	**.558a**		**.595a**		
R Square	**0.215**		**0.354**		
Adjusted R Square	**0.212**		**0.349**		
R Square Change	**0.215**		**0.354**		
Sig. F Change	**0.000**		**0.000**		
Durbin-Watson	**1.762**		**1.703**		

4.6.3 H2c: Risk-taking moderated by technological orientation has a negative effect on business performance.

The hypotheses assumed a negative impact to business performance if risk-taking is moderated by technological orientation. There was a significant increase in terms of the adjusted R-Squared from **0.176** of the base models to **0.365** of the moderated models. The computed Durbin-Watson value of the two models is approximately equal to 2 which suggest that there is no autocorrelation in both models.

The stated hypothesis was not supported by the output. In fact, if risk-taking is moderated by technological orientation there is a significant improvement in the business performance environment.

Table 4.31: Risk-taking moderated by technological orientation table

	Base Model		**Moderated Model**		
	(Constant)	Risk-taking	(Constant)	Risk-taking	Technological Orientation
Coefficients (B)	16.538	0.606	6.084	0.231	0.412
Std. Error	0.731	0.077	1.305	0.079	0.045
Sig.	0.000	0.000	0.000	0.004	0.000
R	**.423a**		**.608a**		
R Square	**0.215**		**0.354**		
Adjusted R Square	**0.176**		**0.365**		
R Square Change	**0.179**		**0.369**		
Sig. F Change	**0.000**		**0.000**		
Durbin-Watson	**1.728**		**1.73**		

4.6.4 H2d: Competitive aggressiveness moderated by technological orientation has a positive effect on business performance.

Competitive aggressiveness also took the same trend as the other constructs as it suggested a positive influence on business performance if moderated by technological orientation. There was a significant improvement in all the major statistic especially the R-square change improved from **0.08** to **0.36** if technological orientation is included as a moderating variable.

It is true that competitive aggressiveness moderated by the technological orientation brings about a positive effect on business performance.

Table 4.32: Competitive aggressiveness moderated by technological orientation table

	Base Model		**Moderated Model**		
	(Constant)	Competitive Aggressiveness	(Constant)	Competitive Aggressiveness	Technological Orientation
Coefficients (B)	16.551	0.56	4.788	0.21	0.452
Std. Error	1.111	0.113	1.41	0.1	0.041
Sig.	0.000	0.000	0.001	0.036	0.000
R	**.283a**		**.600a**		
R Square	**0.08**		**0.36**		
Adjusted R Square	**0.077**		**0.356**		
R Square Change	**0.08**		**0.36**		
Sig. F Change	**0.000**		**0.000**		
Durbin-Watson	**1.741**		**1.709**		

4.6.5 H2e: Autonomy moderated by technological orientation has a positive effect on business performance.

Autonomy moderated by technological orientation did not violate the trend of other constructs as it showed a lot of significant improvements to business performance. The base model which was focusing on autonomy only showed R-squared change of **0.197** and if moderated by technological orientation, the value improved to **0.366**.

The results provided enough evidence to the hypothesis, and the overall conclusion was that autonomy, if moderated by technological orientation overall, increased the effect on business performance.

Table 4.33: Autonomy moderated by technological orientation table

	Base Model		**Moderated Model**		
	(Constant)	Autonomy	(Constant)	Autonomy	Technological Orientation
Coefficients (B)	11.871	0.628	4.794	0.219	0.407
Std. Error	1.231	0.075	1.368	0.082	0.047
Sig.	0.000	0.000	0.001	0.008	0.000
R	**.444a**		**.605a**		
R Square	**0.197**		**0.366**		
Adjusted R Square	**0.194**		**0.362**		
R Square Change	**0.197**		**0.366**		
Sig. F Change	**0.000**		**0.000**		
Durbin-Watson	**1.814**		**1.734**		

4.7 Results Summary

This chapter presented the empirical analysis of the data collection. Measurement scales for entrepreneurial orientation, technological orientation and business performance were thoroughly tested for internal consistency which showed that internal consistency using Cronbach's Alpha was in fact reliable. The measurement scales were then further tested using an exploratory factor analysis which showed that the scales loaded under three factors. Further analysis was conducted on the linear regression analysis. The chapter closed off with the moderated variable namely, technological orientation, which analysed against each independent variable dimension which showed the effect the moderated variable had on business performance. This was analysed and presented in depth to identify hypotheses H2 conceptual framework and validity.

5. DISCUSSION OF THE RESULTS

5.1 Introduction

This chapter identifies the relationship between entrepreneurial orientation, and specifically, the dimensions of entrepreneurial orientation and the influential effect it has on business performance. Secondly, the chapter examines the moderating effect that technological orientation has on the entrepreneurial dimensions and business performance. The findings will be based on the empirical study initiated in Chapter Four that looked at statistically analysing the results from the survey. The chapter is broken into a brief discussion on existing demographics and why the researcher chose to not gather any demographic information. This will be followed by discussions pertaining to the entrepreneurial orientation scale and its dimensions with in-depth discussions on descriptive statistics, reliability testing, explanatory factor analysis and testing of the hypotheses. And finally, the chapter discusses in-depth findings on the moderating variable being technological orientation and its effect on entrepreneurial orientation dimensions and business success.

5.2 Descriptive Analysis

Data gathered and interpreted for empirical analysis where all captured using the Qualtrics survey software. The duration of the questionnaire was open for anonymous links received through a dedicated database articulated over the past decade by DC Industrial Scanning Systems (Pty) Ltd, a leading distributor of automatic identification hardware and software throughout Southern Africa.

The target population was made up of professionals from a middle and senior position as determined by DC Industrial database with current experience within the automatic identification industry and experience within the retail supply chain. However, no further demographic information has been captured and analysed for this research paper. A total of 1600 potential respondents were sent the anonymous link, of which 341 respondents completed the survey as per Qualtrics during the open survey period. After data clean-up, a total of 11 respondents chose to exit/ not proceed. A total of 50 respondents had incomplete survey results and were removed. Once sorted and eliminated, a final number

of 284 respondents' results were analysed through SPSS IBM statistical software. The total sample of respondents was adequate for the purpose of the research.

5.3 Discussion pertaining to the dependent variable – business performance

The data gathered from the survey show the results for the business performance of automatic identification firms, business performance is the dependent (outcome) variable. Previous research suggests that business performance is multidimensional to which different dimensions were used through indirect questions to determine the perception of financial and non-financial performance. Business performance was regarded as the dependent variable in the study, evaluated against several independent variables. The researcher was interested in assessing the influence of the independent variables on business performance.

5.3.1 Reliability testing on the business performance scale

The business performance items were measured on a Likert-scale to measure the internal consistency Cronbach's Alpha coefficient. The calculated alpha coefficient was **0.911** based on four items. As a rule of thumb, the higher the alpha coefficient, the more the items have shared covariance and probably measure the same underlying concept. The calculated reliability statistic of business performance items shows evidence of internal consistency, and there was assurance of reliability. This is in line with previous research which identified business performance measures that recorded strong correlations of around **0.731** (Bengesi & Le Roux, 2012); **0.88** (Venter, 2014) and **0.90** (Othman & Zakaria, 2012), thus indicating that the items successfully measured the underlying concept. The results indicate that the instrument used in this study to measure perceived business performance have acceptable reliability.

5.3.2 Explanatory Factor Analysis of business performance scale

Explanatory factor analysis as a data reduction approach was applied to all the construct items of the study. The selection criteria were based on the computed three factors. The cut-off point was 0.40, which means that only the items with factor loadings greater than or equal to that number were selected. For business performance, four items were justified.

Extraction Method: Principal Axis Factoring was the method used with Promax as a rotation approach which converged after five iterations. The application of explanatory factor analysis was only possible after running the KMO and Battlet's test. **BPGR1**, **BPGR2**, **BPGR3** and **BPGR4** were the selected items with the following loadings (**0.92**, **0.9**, **0.73**, **0.761** and **0.714** respectively). Business performance as a dependent variable was computed from the aggregated scores of the justified items by explanatory factor analysis.

5.4 Discussion pertaining to independent variable – entrepreneurial orientation Hypothesis1

5.4.1 Entrepreneurial orientation scale

A majority of the data gathered was to determine the perceptions of industry professionals about the dimensions that make up entrepreneurial orientation. The entrepreneurial orientation scale was broken up into the following subscales used to represent the EO dimensions namely; a) risk-taking, primarily made up of three questions; b) competitive aggressiveness which was made up of three questions; c) innovativeness which was made up of five questions; d) proactiveness which was made up of five questions and d) autonomy which was made up of four questions. Of these questions, a majority of respondents had an inclination between response perceptions of "agreed" and "strongly agreed". This can be seen in detail in Table 4.1 reliability statistics presented in Chapter Four. This indicated a strongly positive feeling towards entrepreneurial orientation, as EO is an important variable in SMEs in emerging economies. Such environments are characterised by new emerging opportunities resulting from free movement of capital, goods and technologies. This allows entrepreneurs to exploit opportunities with the minimum boundary restriction. SMEs in this formerly protected environment often lack EO to recognise or seize opportunities presented (Bengesi et al., 2012).

Understanding the relationship between variables, however, will not give a clear understanding about the extent to which the independent variable accounts for the dependent (outcome variable) as the different multi-dimensionality of entrepreneurial orientation constructs vary among firm operations and industry. Therefore, it is extremely important to emphasise the use of individual dimensions of EO to study business

performance in emerging economies, which show that each EO dimension accounts for a different variance in business performance (Lumkpin & Dess, 1996). The higher the degree of variance accounted for in the outcome variable by a predictor, the higher the value of the predictor (Bengesi et al., 2012).

The following section describes the findings per hypotheses associated with H1 entrepreneurial orientation.

Table 5.1: Summary of Hypothesis 1 results

Hypothesis on H1: Entrepreneurial orientation on business		Result
H1a	Risk-taking isolated as a construct within the auto ID sector has no effect on business performance.	Rejected
H1b	Proactiveness as an isolated construct within the auto ID sector has a positive effect on business performance.	Accepted
H1c	Innovativeness isolated as a construct within the auto ID sector has a significant effect on business performance.	Accepted
H1d	Competitive aggressiveness isolated as a construct within the auto ID sector has no effect on business performance.	Rejected
H1e	Autonomy isolated as a construct within the auto ID sector has no effect on business performance.	Rejected

5.4.2 Discussions pertaining to Hypothesis 1a (H1a)

H1a: ***Risk-taking within the auto ID sector has no effect on business performance***

5.4.2.1 Reliability Testing of Hypothesis 1a

After running the explanatory factor analysis of EORT, the reliability of risk-taking items was computed. Reliability was assessed on two important items selected from the pattern matrix. The two items of risk-taking recorded a Cronbach's Alpha coefficient of **0.853** based on unstandardised items and **0.853** based on standardised items. The calculated reliability statistics of risk-taking gave an assurance of internal consistency in the collected

information. Since the items showed a high degree of reliability, risk-taking was well represented by the two items.

5.4.2.2 Explanatory Factor analysis Hypothesis 1a

Explanatory factor analysis approved only two out of three items that were suggested to measure reliability. The recorded beta loading that was as follows; EORT1 (**0.816**) and EORT2 (**0.723**). Risk-taking as an independent variable was computed from the aggregated scores of the two items for correlation and regression analysis.

5.4.2.3 Testing of Hypothesis 1a

The assumed research hypothesis was stated as “risk-taking isolated as a construct within the auto ID sector has no effect on business performance” versus the null hypothesis which assumed an effect on business performance. In an attempt to address the hypothetical statement correlation, regression analysis was computed. Business performance was used as a dependent variable. From the correlation analysis, there was enough evidence that business performance is positively correlated to risk-taking with a **Pearson correlation value of .423**** which was significant at 0.05. Linear regression analysis was also used to verify the extent of the relationship between business performance and risk-taking, considering business performance as a dependent variable and risk-taking as an independent variable. The F-value statistic (**61.492**) from the analysis of variance table was significant telling more about the relationship of the two variables which describes the best fit of the model and indicating that the value is significant, and the model can be used in decision making. The estimated coefficients had t-value of **22.627** which showed some positive significance and justified indicating that the constant is significant. The model: **business performance = 16.538 + 0.606 x risk-taking** was suggested to explain the relationship better. The assumed hypothesis was rejected in favour of the null hypothesis, and the conclusion was that risk-taking isolated as a construct within the auto ID Sector has an effect on business performance. This indicated that in business performance environment risk-taking plays an important role and should not be neglected.

These results are in line with previous studies Bengesi et al., (2012); Deepaku, (2016); Khalili et al. (2013) & Venter (2014) which found that entrepreneurs as well as small to medium-sized firms operate in risk environments in many emerging economies.

In situations where firms take calculated risks through information assessment and market opportunities, it is also necessary for firms to take risks in resource investment and knowledge accumulation in order to better understand potential risks, and make faster and more opportune decisions (Bengesi, 2012). The literature and findings are well documented and associated with risk-taking and business performance, as argued by Tang and Murphy (2012) which state that in a high-risk business environment, few people are willing to attempt new initiatives. While those that are capable or willing to attempt new initiatives are likely to improve business performance and thus would expect a positive relationship between risk-taking and business performance (Hajizadeh & Zali, 2016).

5.4.3 Discussions pertaining to Hypothesis 1b (H1b)

H1b: ***Proactiveness within the auto ID sector has a positive effect on firm performance.***

5.4.2.1 Reliability Testing of Hypothesis 1b

After running the explanatory factor analysis of EOPR, the reliability of proactiveness items was computed. Reliability was assessed on four important items selected from the pattern matrix. The four items of proactiveness recorded a Cronbach's Alpha coefficient of **0.819** based on unstandardised items and **0.822** based on standardised items. The calculated reliability statistics of proactiveness gave an assurance of internal consistency in the collected information. Since the items showed a high degree of reliability, proactiveness was well represented by the four items within the scale and confirming reliability.

5.4.2.2 Explanatory Factor analysis Hypothesis 1b

Explanatory factor analysis approved all four of the items that were suggested to measure reliability. The recorded beta loading that were as follows; EOPR1 (**0.584**); EOPR2 (**0.517**); EOPR3 (**0.775**) and EOPR4 **(0.865).** Proactiveness as an independent variable was computed from the aggregated scores of the four items for correlation and regression analysis.

5.4.2.3 Testing of Hypothesis 1b

The assumed research hypothesis was stated as “proactiveness within the auto ID sector has a positive effect on business performance” versus the null hypothesis which assumed an effect on business performance. In an attempt to address the hypothetical statement, correlation and regression analysis were computed. Business performance was used as a dependent variable. From the correlation analysis, there was enough evidence that business performance is positively correlated to proactiveness with a **Pearson correlation value of .464**** which was significant at 0.05. Linear regression analysis was also used to verify the extent of the relationship between business performance and proactiveness, considering business performance as a dependent variable and proactiveness as an independent variable. The F-value statistic of **77.306** from the analysis of variance table was significant telling more about the relationship of the two variables which describes the best fit of the model and indicating that the value is significant, and the model can be used for decision making. The estimated coefficients had t-value of **7.794** (constant) / **8.792** (variable) which showed some positive significance and justified indicating that the constant is significant. The model: **business performance = 10.38 + 0.526 x proactiveness** was suggested to explain the relationship better. The assumed hypothesis was approved in favour of the hypothesis, and the conclusion was that proactiveness isolated as a construct within the auto ID sector has a positive effect on business performance. This indicated that in respect to business performance, proactiveness plays an important, positive role and should not be neglected.

The results of the EFA are in line and confirm previous studies that identify proactiveness as a significantly positive influencer for business performance, which can be confirmed in previous research studies (Bengesi et al. 2012; Deepaku, 2016; Khalili et al. 2013 & Venter, 2014). The scale for proactiveness tends to be correlated with disruptive innovation as leading to proactiveness in identifying opportunities by business; it is this behaviour associated to proactiveness that benefits firms into being strategic (Dess et al., 1996).

5.4.4 Discussions pertaining to Hypothesis 1c (H1c)

H1c: ***Innovativeness within the auto ID sector has a significant effect on business performance.***

5.4.2.1 Reliability Testing of Hypothesis 1c

After running the explanatory factor analysis of EOIN, the reliability of innovativeness items was computed. Reliability was assessed on five important items selected from the pattern matrix. The five items of innovativeness recorded the Cronbach's Alpha coefficient of **0.874** based on unstandardized items and **0.877** based on standardised items. The calculated reliability statistics of innovativeness gave an assurance of internal consistency in the collected information. Since the items showed a high degree of reliability innovativeness was well represented by the five items.

5.4.2.2 Explanatory Factor analysis Hypothesis 1c

Explanatory factor analysis approved five of the six items that were suggested to measure reliability. The recorded beta loading that were as follows; **EOIN1 (0.579); EOIN2 (0.667); EOIN3 (0.778); EOIN4 (0.833)** and **EOIN5 (0.922).** Innovativeness as an independent variable was computed from the aggregated scores of the five items for correlation and regression analysis. The scale was compiled from a number of different studies which showed significantly reliable scales. The results of the EFA are in line with and confirm previous studies that identify innovativeness as a significantly positive influencer for business performance, as identified by Bengesi et al. (2012); Boussouara & Deadkins (2018); Deepaku (2016); Hamschmidt, Sharma & Starik (2008); Khalili et al. (2013) and Venter (2014).

5.4.2.3 Testing of Hypothesis 1c

The assumed research hypothesis was stated as "innovativeness within the auto ID sector" has a significant effect on business performance versus the null hypothesis which assumed no effect on business performance. In an attempt to address the hypothetical statement, correlation and regression analysis were computed. Business performance was used as a dependent variable. From the correlation analysis, there was enough evidence that business performance is positively and significantly correlated to

innovativeness with a **Pearson correlation value of .558**** which was significant at 0.05. Linear regression analysis was also used to verify the extent of the relationship between business performance and innovativeness, considering business performance as a dependent variable and innovativeness as an independent variable. The F-value statistic of **127.453** from the analysis of variance table was significant telling more about the relationship of the two variables which describes the best fit of the model and indicating that the value is significant, and the model can be used for decision making. The estimated coefficients had t-value of **5.255** (constant) / **11.920** (variable) which showed some positive significance and justified indicating that the constant is significant. The model: **business performance = 7.031 + 0.530 x innovativeness** was suggested to explain the relationship better. The assumed hypothesis was approved in favour of the hypothesis, and the conclusion was that innovativeness within the Auto ID sector has a significant effect on business performance. This indicated that in a business performance environment, innovativeness plays an important, positive role and should not be neglected. Schumpeter (1942) highlighted the necessity of innovation in the entrepreneurial process, in which innovation is a process of creative destruction. The mechanism for creative destruction is first triggered by the entrepreneur, enacting innovation within the concept of an entrepreneurial orientation as a necessary business performance success factor (Dess et al., 1996).

5.4.5 Discussions pertaining to Hypothesis 1d (H1d)

H1d: ***Competitive aggressiveness within the Auto ID sector has no effect on firm performance.***

5.4.2.1 Reliability Testing of Hypothesis 1d

After running the explanatory factor analysis of EOIN, the reliability of competitive aggressiveness items was computed. Reliability was assessed on two important items selected from the pattern matrix. The two items of competitive aggressiveness recorded a Cronbach's Alpha coefficient of **0.710** based on unstandardised items and **0.723** based on standardised items. The calculated reliability statistics of competitive aggressiveness gave an assurance of internal consistency in the collected information. Since the items showed a high degree of reliability competitive aggressiveness was well represented by the two items.

5.4.2.2 Explanatory Factor analysis Hypothesis 1d

Explanatory factor analysis approved two of the three items that were suggested to measure reliability. The recorded beta loading was as follows; EOCA2 (**0.584**) and EOCA3 (**0.0.579**). Competitive aggressiveness as an independent variable was computed from the aggregated scores of the two items for correlation and regression analysis. The results of the EFA are in line with and confirm previous studies that identify competitive aggressiveness is an influence for business performance (Bengesi et al., 2012; Boussouara & Deadkins, 2018; Deepaku, 2016; Hamschmidt, Sharma & Starik, 2008; Khalili et al., 2013 & Venter, 2014). It is said that competitive aggressiveness emulates a firm's effort to outperform its competition which does have an effect on business performance (Deepabu, 2016).

5.4.2.3 Testing of Hypothesis 1d

The assumed research hypothesis was stated as "competitive aggressiveness within the Auto ID sector has no effect on business performance" versus the null hypothesis which assumed it has an effect on business performance. In an attempt to address the hypothetical statement correlation and regression analysis was computed. Business performance was used as a dependent variable. From the correlation analysis, there was enough evidence that business performance is positively correlated to competitive aggressiveness with a **Pearson correlation value of .283**** which was significant at 0.05. Linear regression analysis was also used to verify the extent of the relationship between business performance and competitive aggressiveness, considering business performance as a dependent variable and competitive aggressiveness as an independent variable. The F-value statistic of **24.621** from the analysis of variance table was significant telling more about the relationship of the two variables which describes the best fit of the model and indicating that the value is significant, and the model can be used for decision making. The estimated coefficients had t-value of **14.896** (constant) / **4.962** (variable) which showed some positive significance and justified indicating that the constant is significant. The model: **business performance = 16.551 + 0.560 x competitive aggressiveness** was suggested to explain the relationship better. The assumed hypothesis was rejected, and the conclusion was that competitive aggressiveness isolated as a construct within the auto ID Sector has a positive effect on business performance.

Based on the findings, it can be concluded that entrepreneurial EO competitive aggressiveness can lead to improvement of business performance as the two are positively correlated, this indicated that in business performance environment competitive aggressiveness plays a positive role and should not be neglected.

The results of the statistics are in line with previous studies (Deepababu et al., 2016 & Bengesi et al., 2012). Competitive aggressiveness is the driver to face intensely acute competition by rivals. It is the firm's strategic response to competition in an effort to protect its competitive market position (Dess et al., 1996).

5.4.6 Discussions pertaining to Hypothesis 1e (H1e)

H1e: ***Autonomy within the Auto ID sector has no effect on firm performance.***

5.4.2.1 Reliability Testing of Hypothesis 1e

After running the explanatory factor analysis of EOAU, the reliability of autonomy items was computed. Reliability was assessed on three important items selected from the pattern matrix. The three items of autonomy recorded the Cronbach's Alpha coefficient of **0.680** based on unstandardized items and **0.701** based on standardised items. The calculated reliability statistics of autonomy gave an assurance of internal consistency in the collected information. Since the items showed a high degree of reliability autonomy was well represented by the three items.

5.4.2.2 Explanatory Factor analysis Hypothesis 1e

Explanatory factor analysis approved three of the four items that were suggested to measure reliability. The recorded beta loading that were as follows; EOAU1 (**0.450**); EOAU2 (**0.421**) and EOAU3 (**0.598**). Autonomy as an independent variable was computed from the aggregated scores of the three items for correlation and regression analysis.

The results of the EFA are in line with and confirm previous studies that identify autonomy is an influence on business performance, this can be confirmed in previous research studies (Bengesi et al., 2012; Boussouara & Deadkins, 2018; Deepaku, 2016; Hamschmidt, Sharma & Starik, 2008; Khalili et al., 2013 & Venter, 2014).

5.4.2.3 Testing of Hypothesis 1e

The assumed research hypothesis was stated as “autonomy within the Auto ID sector has no effect on business performance” versus the null hypothesis which assumed it has an effect on business performance. In an attempt to address the hypothetical statement correlation and regression analysis was computed. Business performance was used as a dependent variable. From the correlation analysis, there was enough evidence to indicate that business performance is positively correlated to autonomy with a **Pearson correlation value of .444**,** which was significant at 0.05. Linear regression analysis was also used to verify the extent of the relationship between business performance and autonomy, considering business performance as a dependent variable and autonomy as an independent variable. The F-value statistic of **69.322** from the analysis of variance table was significant telling more about the relationship of the two variables which describes the best fit of the model and indicating that the value is significant, and the model can be used for decision making. The estimated coefficients had t-value of **9.644** (constant) / **8.326** (variable) which showed some positive significance and justified indicating that the constant is significant. The model: **business performance = 11.871 + 0.628 x autonomy** was suggested to explain the relationship better. The hypothesis was rejected; the conclusion was autonomy isolated as a construct within the Auto ID sector has a positive effect on business performance as there was a correlation between business performance and autonomy. This indicated that in business performance environment autonomy plays a positive role and should not be neglected in future research studies.

The results obtained from this study support the findings of researchers such as Hosman, Hughes, Kraus and Rigtering (2012), who identified autonomy as described as a voluntary work discretion and that a firm with various levels of autonomy would be expected to perform better. It is therefore important to consider autonomy as an essential component of entrepreneurial orientation (Dess et al., 1996).

5.5 Discussion pertaining to Hypothesis 2 – technological orientation scale

Hypothesis two focused on technological orientation as a moderating factor on risking taking, proactiveness, innovativeness, competitive aggressiveness and autonomy in relation to business performance.

Technological orientation was measured by six items approved by the explanatory factor analysis. The selected items registered excellent reliability of 0.847 based on six items. The factor loadings of the selected items were as follows TOITC1 (**0.915**); TOITC2 (**0.709**); TOITC3 (**0.554**); TOITC4 (**0.66**); TOITC5 (**0.511**) and TOITC6 (**0.413**) as the cut-off point was **0.40**. The correlation analysis indicated a positive relationship between technological orientation and business performance.

Table 5.2: Summary of Hypothesis 2 results

Hypothesis on H2: Entrepreneurial orientation on business performance moderated by Technological orientation		**Result**
H2a	Innovativeness moderated by TO has a positive effect on business performance.	Accepted
H2b	Proactiveness moderated by TO has a positive effect on business performance.	Accepted
H2c	Risk-taking moderated by TO has a negative effect on business performance.	Rejected
H2d	Competitive aggressiveness moderated by TO has a positive effect on business performance.	Accepted
H2e	Autonomy moderated by TO has a positive effect on business performance.	Accepted

The results of the technological orientation scale are in line with previous research studies such as Karami, Karami & Razedeh (2016) who identified TO as a main component of firm competitiveness, which leads to superior performance. The results from this study, however, were not aligned with findings from Al-Henzab, Masadeh, Obiedat & Tarhini (2017) who found that there was no significant relationship between technology orientation on business performance. However (Fazel, Khalili & Nejadhussein (2013) found that entrepreneurial orientation moderated by innovation or technology creates competency that leads to improved business performance.

5.5.1 Discussions pertaining to Hypothesis 2a (H2a)

H2a: Innovativeness moderated by TO has a positive effect on business performance.

The hypothesis assumed that if innovativeness is moderated by technological orientation, there is a positive effect on business performance. In assessing the hypothesis H2a, base and moderated models were analysed, the base model was used as the basis of comparison as it excludes the technological orientation aspect, the moderated model took into consideration the moderating variable. Major statistics were compared such as the R-squared change which improved from **0.311/ 31,1%** (base) to **0.372 / 37.2%** (moderated), Adjusted R-squared improved from **0.309/ 30.9%** (base) to **0.368/ 36.8%** (moderated) and the F-values being positive. This indicates that innovativeness moderated (influenced) by technological orientation has a positive effect on business performance, which confirms the hypothesis.

The findings were aligned with previous studies by Fazel et al. (2013); Al-Ansari et al. (2018) & Al-Henzab et al. (2017), who showed that due to technological advancement and the shortening life cycle of products, firms are forced to enhance their innovativeness in order to compete.

5.5.2 Discussions pertaining to Hypothesis 2b (H2b)

H2b: Proactiveness moderated by TO has a positive effect on business performance

The hypothesis assumed that if proactiveness is moderated by technological orientation there is a positive effect on business performance. In assessing the hypothesis H2b, base and moderated models were analyses from Table 4.29; the base model was used as the basis of comparison as it excludes the technological orientation aspect. The moderated model took into consideration the moderating variable. Major statistics were compared such as the R-squared change which improved from **0.215 / 21.5%** (base) to **0.354/ 35.4%** (moderated), Adjusted R-squared improved from **0.212 / 21.5%** (base) which improved to **0.349/ 34.9%** (moderated) and the F-values being positive. This indicates that proactiveness moderated (influenced) by technological orientation has a significantly positive effect on business performance which confirms the hypothesis.

The findings of this study are in line with previous studies. This result is consistent with the results obtained by Fazel et al. (2013); Al-Ansari et al. (2018) & Al-Henzab et al. (2017). Proactiveness can be seen as a future view where firms attempt to create new products or services or improve existing ones, anticipate changes and opportunities. This is further improved by technological influence as was described in the effectuation and performance study that identified effectuation as a means-driven process and the technological choices a firm must choose to improve business performance (Heydenrych & Urban, 2015).

5.5.3 Discussions pertaining to Hypothesis 2c (H2c)

H2c: Risk-taking moderated by TO has a negative effect on business performance.

The hypothesis assumed that if risk-taking is moderated by technological orientation there is a negative effect on business performance. In assessing the hypothesis H2c base and moderated models were analysed presented on Table 4.30, the base model was used as the basis of comparison as it excludes the technological orientation aspect, the moderated model took into consideration the moderating variable. Major statistics were compared such as the R-squared change which improved from **0.179/ 17.9%** (base) to **0.365/ 36.5%** (moderated), adjusted R-squared improved from **0.176 / 17.6%** (base) which improved to **0.369/ 36.9%** (moderated), Durban-Watson which improved from **1.728** to **1.73** and the F-values being positive. This indicates that risk-taking moderated (influenced) by technological orientation has a positive effect on business performance which rejects the hypothesis that assumed there would be a negative effect.

The findings of this study are in line with previous studies. This result is consistent with the results obtained by Fazel et al. (2013); Al-Ansari et al. (2018) & Al-Henzab et al. (2017). The findings are attributed to the fact that technological orientation encourages risk-taking which involves improved processes, new idea generation and more technologically advanced operations ultimately leading to increased business performance (al-Ansari et al., 2017).

5.5.4 Discussions pertaining to Hypothesis 2d (H2d)

H2d: Competitive aggressiveness moderated by TO has a positive effect on business performance.

The hypothesis assumed that if competitive aggressiveness is moderated by technological orientation, there is a positive effect on business performance. In assessing the hypothesis H2d base and moderated models were analysed presented in Table 4.31, the base model was used as the basis of comparison as it excludes the technological orientation aspect, the moderated model took into consideration the moderating variable. Major statistics were compared such as the R-squared change which improved from **0.08/ 8%** (base) to **0.36/ 3.6%** (moderated), Adjusted R Squared improved from **0.077 / 7.7%** (base) which improved to **0.356/ 35.6%** (moderated), and the F-values being positive. This indicates that competitive aggressiveness moderated (influenced) by technological orientation has a positive effect on business performance which approves the hypothesis.

The findings of this study are in line with previous studies. This result is consistent with the results obtained by Fazel et al. (2013); Al-Ansari et al. (2018) & Al-Henzab et al. (2017). Competitive aggressiveness refers to a firm's tendency to challenge its competitors in achieving or improving the position. Technological influence on strategy, business operations and infrastructure have a positive relationship with business performance. When identifying competitive alertness to business performance and achieve technology innovativeness (Compos, 2017).

5.5.5 Discussions pertaining to Hypothesis 2e (H2e)

H2e: Autonomy moderated by TO has a positive effect on business performance.

The hypothesis assumed that if autonomy is moderated by technological orientation, there is a positive effect on business performance. In assessing the hypothesis for H2e, base and moderated models were analysed in Table 4.32, the base model was used as the basis of comparison as it excludes the technological orientation aspect, the moderated model took into consideration the moderating variable. Major statistics were compared such as the R-squared change which improved from 0.197/ 19.7% (base) to 0.366/ 36.6% (moderated), Adjusted R-squared improved from 0.194/ 19.4% (base) which improved to

0.362/ 36.2% (moderated), and the F-values being positive. This indicates that autonomy moderated (influenced) by technological orientation has a positive effect on business performance which accepts the hypothesis.

The findings in this study show that autonomy, work discretion, learning and capabilities were all positively enhanced by the influence of technology according to Karami et al. (2016). Autonomy which refers to the independent actions undertaking to bring about new ventures requires free action in making decisions and free pursuit of opportunities. Autonomy is therefore aligned with other studies that technology can greatly improve the current limitations associated with autonomy in communication, timing, creativity and non-limited access to information (Campos, 2017). This study showed that autonomy had a positive impact on technology utilisation, by providing employees with more autonomy in their work may lead to more innovative decisions and has been proved that having autonomy to some extent is needed to make the right and timely decisions (Khalili et al., 2013).

5.6 Conclusion

This chapter juxtaposed the findings of the study and deductions on the conceptual framework. Chapter 5 highlighted the entrepreneurial orientation scale (H1) results and were successfully interpreted through each of the entrepreneurial orientation dimensions, namely; innovativeness, proactiveness, risk-taking, competitive aggressiveness and autonomy and the relationship each variance has with business performance which supported studies by Deepabaku (2012) and Hosman (2012) who had similar findings that posed the same significant relationship within results to business performance from each dimension.

Lastly, an in-depth discussion was concluded based on Hypothesis 2, which identified technological orientation as a moderator to each entrepreneurial dimension and business performance. The study results were aligned to similar studies in the field, such as Al-Ansari (2016) & Fazel (2013), who found that technological orientation had a significantly positive influence on business performance.

6 CONCLUSION, IMPLICATIONS AND RECOMMENDATIONS

6.1 Introduction

The chapter discusses the conclusions and recommendations of the research as a result of the findings in relation to the literature review and previous study findings. A brief discussion is expressed to testing of the hypotheses as being rejected or accepted by the findings. Several recommendations and suggestions are expressed to academics, scholars, practitioners and policy makers.

6.2 Conclusions of the study

6.2.1 Summary of the main objective, hypothesis and main findings

The primary objective was to determine the effect of the dimensions of entrepreneurial orientation dimensions on business performance, and how technology orientation as a moderator increased the influence of entrepreneurial orientation on business performance. The survey was completed by a total of 284 respondents from Southern Africa with experience within the retail supply chain of which was distributed through email and WhatsApp network, and the data captured on Qualtrics survey software. A reliability analysis was run on business performance, entrepreneurial orientation and its dimensions and technological orientation. The scales were tested using the Cronbach's Alpha coefficient which resulted in the scales being acceptable. Exploratory factor analysis was then run on the measurement scales accurately. Multiple regression analysis was run to test the relationships which identified that all scales had a positive significant relationship.

6.2.2 Testing the relationship between EO dimensions and business performance (H1a, H1b, H1c, H1d, H1e)

The study findings from the regression analysis resulted in accepting that innovativeness and proactiveness hypothesis had a positively significant effect on business performance. These results were aligned with previous studies by Bengesi et al. (2012); Boussouara & Deadkins (2018); Deepaku (2016); Hamschmidt, Sharma & Starik, (2008); Khalili et al. (2013) and Venter (2014) as well as the researcher's assumption. Based on the findings,

it is concluded that EO innovativeness and EO proactiveness as isolated variances can lead to improved business performance.

The study also found that competitive advantage, autonomy and risk-taking as isolated entrepreneurial dimensions also positively influence business performance. This led to H1a, H1d & H1e being rejected as those hypotheses assumed there would be no effect.

In conclusion, the study found that EO has a positive effect on business performance. Entrepreneurial orientation is a construct which is intended to measure the extent to which a firm is entrepreneurial, EO has the combined presence of innovativeness, proactiveness, autonomy, competitive aggressiveness and risk-taking which have the variances across variable measurements. This study shows a positive relationship between EO dimensions and business performance, and that there has there is a notion that EO can lead to improved business performance (Deepabau, 2016).

6.2.3 Testing the relationship between EO dimensions and business performance moderated by technological orientation (H2a, H2b, H2c, H2d, H2e)

The study findings from the moderated analysis resulted in accepting that innovativeness (H2a), proactiveness (H2b), competitive aggressiveness (H2d) and autonomy (H2e) moderated by technological orientation had a positively significant effect on business performance. These results were aligned with previous studies and to the researcher's original assumptions. Based on the findings, it is concluded that EO innovativeness, proactiveness, competitive aggressiveness and autonomy as individual dimensions of EO can significantly and positively effect business performance. It can also be concluded that EO dimensions influenced by technological orientation (moderating variable) have a significantly greater and positive effect business performance.

The study findings, however, rejected the Hypothesis H2C that sought to prove that risk-taking would have a negative effect moderated by technological orientation on business performance. The results showed that risk-taking had a significant increase as described by the adjusted R-square which means that if risk-taking is moderated by technological orientation there is a significant improvement in business performance.

In conclusion, the research shows that industry and market turbulence and change affect new technology ventures and their ability to sustain performance objectives. It is therefore imperative for new technology ventures to combine resources and IT competencies and contingency variables through careful decision-making to achieve optimal performance. Industry turbulence refers to a business environmental component relating to customers and their new product needs and preferences which change over time as seen through the diffusion process and product life cycles. As products become easily imitated or substituted, so do their features and price change - the industry can go through stability where preferences or needs are predictable versus times of market or paradigm shifts (Mahmood et al., 2016). Globalization and the rapid expansion of the internet are reducing the learning curve of competitors and consumers, and with increased access of information, preferences and understanding of needs, technology can lead to business function improvements and ability to compete are enhanced. The opposite also holds true that with so much technological change, markets are changing rapidly and in different ways. The retail supply chain is becoming differentiated through the supply chain which makes it difficult for new technology ventures to identify adequate market opportunities or signals (Cavallo, 2016).

Overall, most of the researchers have been able to find a positive EO-performance relationship that gets stronger over time, and many moderating factors have been found to strengthen the relationship (Deepabu et al., 2016).

6.3 Implications and recommendations

6.3.1 Implication for academics and further teachings

Entrepreneurial orientation construct, the EO dimensions, technological orientation and business performance, are well documented, and there are a number of in-depth articles to many of the constructs. It was a challenge to find articles that specially identified a relationship moderated by technological orientation. There is also a need to better understand technological orientation for the Southern African population, specifically around entrepreneurship and retail supply chain. The study aimed at addressing this by

identifying if there was a relationship between technological orientation, EO dimensions and business performance.

It is important to consider the impact that the research can have on further teachings. It can be considered relevant for the lecturer to adopt EO to enhance students' perceptions in identifying the importance of performance within the business. By understanding the EO dimensions, moderated by technology, the lecturer can further confirm the idea of innovativeness and proactiveness which are contributing more to student perception of innovation and idea generation and how technology is required to better identify opportunities, improve operations throughout functions and what technology requirements are relevant throughout the job market (Hayat & Riaz, 2011).

The findings can also directly improve the performance of lecturers in teaching. Higher education students are more likely to appreciate how knowledge is being applied, this would initiate a proactiveness in the lecturers' jobs, by utilising technology and communication which can have a direct improvement on their performance. The lecturer/teacher exhibits knowledge in the respective subject - they comply with the time specification employed to them, as well as the lecturer/ teacher's utilization of communication style which may be vivid and understandable by the students. For future studies, the researcher may be more interested in that proactiveness can be a good predictor of the perceived performance of the lecturers/ teacher rather than the lecturer/ teacher innovativeness. Therefore, for future studies, this will be interesting to look at technology teaching in a new way (Hayat et al., 2011).

The researcher also looked for the role of entrepreneurship education in the influence of entrepreneurial orientation on nonfinancial business performance. To accomplish the purpose of this study, the researcher carried out a survey targeting nascent entrepreneurs and new technology ventures with experience in the retail supply chain. The results of this study were as follows. First, among the respondents of entrepreneurial orientation, it was clear that innovativeness and progressiveness affected nonfinancial business performance in a significant way. Second, risk-taking, autonomy and competitive aggressiveness hypothesis was rejected and showed a significant influence on nonfinancial business performance. Thirdly, technology as a moderating influence on entrepreneurial dimensions had a significant influence across all five EO dimensions on

business performance (Cho & Lee, 2011). Entrepreneurial education can reap the importance of financial business performance indicators greatly, should the dimensions be articulated correctly.

6.3.2 Implications for practitioners

The present study highlights the importance of entrepreneurial orientation within the business to ultimately improve non-financial performance. It is also extremely important to ensure the organisation is technologically orientated to better improve business performance. The blind pursuit of entrepreneurial orientation dimensions is not an effective way to create an advantage. Under turbulent market conditions, technological orientation seems to be an important way of creating superior performance (Hosman et al., 2012).

The Internet of Things (IOT) and Industry 4.0 mindsets and competencies are transforming cross-functional and omnidirectional supply chains by establishing improved connectivity, visibility of information through all assets and inventory and enhanced operations as well as synergy amongst people, processes and equipment, through networks, smart devices, sensors and infrastructure systems. By allowing collaboration amongst these points, enhanced data analytics, scalable computing, mobility & connectivity with operators' understanding of events improves decision-making. Visualisation of data analytics, scalable computing and mobility are establishing phenomena for a future need based on collaborative intelligence transformed into actionable, real-time and insightful information (Sneed, 2015). This supports the connection of globalisation in operations to the enterprise and extended business systems, allowing for better collaboration, faster problem-solving and improved innovation which can lead to less strain on resources allowing more focus on the industry needs and ultimately improving business performance. Equipment and devices become intelligent assets capable of reporting on an enormous amount of business information which leads to better, faster more calculated business decisions aiding in improved quality and assist in meeting consumer requests more accurately and cost-effectively, ultimately increasing productivity. This has implications on the workforce as rapid advancements in technology require more competency to operate and understand and is cumbersome for third parties to manage or have the necessary resources to manage versus the total long-run costs for Retail supply chain to retain said workforce (Rockwell Automation, 2016).

Within this perspective of entrepreneurship collaboration, it is crucial to absorb beneficial competencies held by others to increase a firm's level of knowledge and improve its innovative potential. This requires co-operation and collaboration among many parties. On the one hand, collaboration inside the organisation among employees and teams who share information and efforts is conceptualised as collective entrepreneurship. On the other hand, firms are also considered entrepreneurial if they show themselves to be innovative and pro-active by forming cooperative relationships with external partners. This capability is referred to as "collaborative entrepreneurship" (Franco & Hasse, 2013).

The relationship between EO and business performance on new technology venture business sustainability can be expressed in that EO by firms require a responsive behaviour to the retail supply chain market environment rather than adaptive market behaviours. New technology ventures engaging in proactive behaviour seek to create compatibility within the retail supply chain environment, through improving the functions of the internal organisation and improving strategic fit, technological innovation, IT competence and information technology proactiveness towards the business environment.

6.3.2.1 Implications in practice (economic and commercial impact)

Nonfinancial business performance is said to have a significant relationship with long-term goals and growth potential. Recent findings show that innovative proactiveness affects nonfinancial business performance. Thus, entrepreneurs should look for ways to promote their innovative proactiveness (Cho & Lee, 2011). This is in line with the findings of the research, which shows that emerging economies are changing from industrial society to entrepreneurial society in such that the generational change from pre-existing paradigms of labour consciousness and change management to one of knowledge acquisition. As unemployment, especially amongst the youth is a critical social issue globally but also severely throughout Southern Africa, it is important to increase the number of entrepreneurs and improve the success rate, but this will not immediately or simply improve the economy. Creating more businesses and hiring more people can provide a social safety net for society, and this is why all OECD countries have placed great emphasis on entrepreneurship (OECD, 1996). Entrepreneurship is one of the key elements that will lead to a successful business performance under highly uncertain

business conditions. The purpose of this research is to examine the relationship between entrepreneurial orientation and business performance and how non-financial business performance can be improved with the use of technology (Cho & Lee, 2011). Technology and technology orientation improves new processes, services, markets, products and how businesses organise; it is the entrepreneur who must identify opportunities in order to exploit new technology. To date, research does not clearly explain why entrepreneurs discover these technological opportunities; this leads to a number of conceptual problems in entrepreneurship literature as opportunity recognition is a function of the distribution of information in society (Shane, 2000). Perhaps there needs to be a more guided focus on how the EO dimensions help identify opportunities and to what extent technology specifically aids in financial performance and non-financial performance alike.

6.3.2.2 Implications and influence on South African public policy

The Department of Science and Technology (DST) aims to increase socio-economic development in South Africa through research and innovation which ultimately is aimed at increasing the well-being of all South Africans through a ten-year innovation plan. This plan aims to transform the science, technology and innovation system and expanding human and financial resources to better enhance the effort (Government of South Africa, 2019). The white paper on Science, Technology and Innovation (STI) aims to build on the future of South Africa as an emerging economy with a focus on biotechnology, nanotechnology, advanced manufacturing. More importantly to this research study ICT research and innovation, the intent is to prepare against the current, and future risks and opportunities brought about by rapid global technological advancement and other global challenges. However, it is evident that in South Africa and throughout Southern Africa, the skills base is not expanding fast enough to drive economic growth and create jobs. This also includes enabling a majority of society to be better prepared for development in emerging economies linked to the next industrial revolution, exploit new sources of economic growth through green energies, improve quality of life through better sustainable health and education and safeguard current and future generations against job loss due to automation of technology (ITWeb, 2018). The research study through its findings can contribute to an understanding of technologies influence on entrepreneurs, especially new technology ventures. Government through incentives can begin to target firms that teach the relative skillsets in identifying opportunities and capitalising on them through the use

of technology. It is a general understanding that decreasing the costs of production and operations, creating new revenue streams and increasing customer satisfaction through the use of technology can increase efficiency, success and profit. Each of these paths requires in-depth knowledge as a unique form of information (Microsoft Corporation, 2018).

A working paper on the state of science and technology in South Africa identifies that R&D has declined more rapidly with capital expenditure also steadily declining as South Africa's focus on technology research and entrepreneurship is miss-orientated with a focus on radical innovations and national importance. As described by the paper, there are four sectors of science and technology which must manage performance of technology orientation, its influence on entrepreneurship and ultimately its improved performance, namely; government (27%), tertiary education (24.8%), business enterprises (46.6%) and non-profit (1.6%) (Kaplan, 1995). The research may aid in the process of examining the current system and policies when developing a comprehensive technology policy for which the science council become more responsive to the needs and abilities of SMME's or new technology ventures that they command with limited resources and funding. Technology is a significant influencer in all levels of an economy, it is, therefore, important to enhance incentives (and pressure) on grants, teaching and relief for firms to innovate, with a major focus on making all areas of society to be more competitive and rely more on developing their capabilities as opposed to passive reliance on imported technologies (Kaplan, 1995).

There has been a major push from the DTI on being proudly South African to job creation, but there is a big divide between these capabilities. The economy influencers such as labour unions, strikes and the push against job loss to technology automation and a non-human workforce, it is therefore imperative that government link R&D and productivity gains to total productivity gains (the output for a given input of labour and capital) with response to the total stock of R&D from domestic and foreign sources. This would be beneficial to the creation of employment as the concerning thought is that a country that lags behind in innovation typically reduces jobs creation to countries that are more competitive and technically advanced positively affecting the economy (NACI, 2017).

6.4 Implications and Recommendations

There were a number of limitations for this research study which can easily be avoided if the correct preparation is done. It was extremely difficult to gain access to a total population sample of firms operating within the Southern Africa retail supply chain because of privacy and costly data sources. As a result, random sampling was used from a 3rd party database. It is suggested that future researchers undertake other probability sampling techniques in order to obtain a sample that is larger and more diverse to increase the generalisability of results.

Limiting the number of questions resulted in a lack of demographics. As mentioned in the earlier chapters, the questionnaire was reduced from 100 items to 30. The increased number of items may have given more in-depth findings to the study. Important demographics may be positioned within a company, education level and country would possibly raise some interesting results. Another limitation is the unit of analysis referring to the perceptions of top management personnel. There is a need to understand the role of individuals in the strategic actions of the firm and how they affect innovation performance. By using multiple respondents (from different functional units or management levels) in each firm, a clearer picture could be developed from inside the firm.

6.5 Suggestions for future research

It is important to note that clear objectives are required to ensure the correct constructs are relating to each other. The researcher suggests identifying the specific aspects of the moderating variable (technological orientation) and the dependent variable (business performance). It is also suggested for further research to explore the relationship between strategic & technological orientation and business performance using other variations of technological aspects. The research study was focused on how the predictor variable (EO dimensions) and the moderating variable (TO) influenced non-financial business performance. The study shows that to better answer the question referring to the model that has a positive effect on EO? Some factors such as industry, and type of organization (public or private) need to be considered as mediating factors. The results of the study showed the dimensions of EO returned positive results with a significant relationship to business performance. However, there was a variance in the strength of the relationship.

It has been suggested in other research studies as to whether treat EO as unidimensional or a multi-dimensional construct in order to see the variance in the findings, many researchers believe a multidimensional model approach would yield more interesting findings (Hosman et al., 2002). It is also recommended by the researcher to determine how EO dimensions vary during specific technical industry shifts and to better understand the findings specifically to a development stage or during an economic crisis or paradigm shift of major technological use. Throughout the study, a great deal of theory expressed the importance of EO and technology during a company development stage. It is suggested by the researcher to try identifying company financial attributes, technical capabilities during development stages and or market turbulence.

It is important to identify the correct EO measurement scales as there are several predefined models which operate with more efficacy and distinction. There are four EO measurement models that can be considered namely a) Alternative first-order reflective EO scale which corresponds to Millers (1983) composite view of EO; b) Covin/ Miller and Slevin EO Scale; 3) Type II second-order formative scale (i.e. reflective first order, formative second order) and finally the Hughes and Morgan (2007) EO Scale (Covin et al., 2011).

For the purpose of this study, the research as mentioned in Chapter 3 chose the Hughes and Morgan (2007) scale according to Lumpkin, and Dess (1996, p137) identified EO dimensions as independent of each other. On this observation, empirical research has often investigated the individual sub-dimensions comprising the EO domain. It is suggested to clearly understand which EO measurement to choose to better identify your objectives and correlate your hypothesis.

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H1. ENTREPRENEURIAL ORIENTATION – EO DIMENSIONS

The following statements ask about your thoughts and feelings in various situations. For each statement indicate how well it describes you.

Please indicate your agreement with each of the following statements:

Response Scale:
1=strongly disagree
2=disagree
3= somewhat disagree
4=neither agree nor disagree
5=somewhat agree
6=agree
7=strongly agree

EOCA	**COMPETITIVE AGGRESSIVENESS**	
EOCA1	Firm makes no special effort to take business from competitors	
EOCA2	In response to competitor's actions, the firm is very aggressive	
EOCA3	Firm offers products/services to customers in a different way from competitors	
EOPR	**PROACTIVENESS**	
EOPR1	Our business is very often the first to introduce new products/services.	
EOPR2	Our business typically initiates actions that competitors respond to.	
EOPR3	Our business continuously seeks out new products/services.	
EOPR4	Our business continuously monitors market trends and identifies future needs of customers.	
EORT	**RISK-TAKING**	
EORT1	Firm likes to take big financial risks	
EORT2	Firm believes that higher financial risks are worth taking for higher rewards	
EORT3	Firm pursues new business ideas while well aware that some will fail	
EOAU	**AUTONOMY**	
EOAU1	My employees have enough autonomy in their job to do their work without continual supervision.	
EOAU2	My business allows me and my employees to be creative and try different methods to do our job.	
EOAU3	Employees in our business are allowed to make decisions without going through elaborate justification and approval procedures.	
EOAU4	Employees in our business are encouraged to manage their own work and have flexibility to resolve problems.	
EOIN	**INNOVATIVNESS**	
EOIN1	Our business regularly introduces new services/products/processes.	
EOIN2	Our business places a strong emphasis on new and innovative products/services.	
EOIN3	Our business is continually pursuing new opportunities.	
EOIN4	Our business places a strong emphasis on continuous improvement in products/service delivery.	
EOIN5	Our business has a widely held belief that innovation is an absolute necessity for the business‟ future.	

H2. TECHNOLOGICAL ORIENTATION – IT COMPETENCE & CHANGE

The following statements ask about your thoughts and feelings in various situations. For each statement indicate how well it describes you.
Please indicate your agreement with each of the following statements:

Response Scale:
1=strongly disagree
2=disagree
3= somewhat disagree
4=neither agree nor disagree
5=somewhat agree
6=agree
7=strongly agree

TOITC1	Our company recognizes how customers can benefit from new technologies	
TOITC2	Technology has improved our competitive position, productivity & Performance	
TOITC3	Technology has dramatically increased our sales & profitability	
TOITC4	We are very knowledgeable about new computer-based innovations	
TOITC5	Our firm allocates resources for investments in latest technologies and future forecasted technological changes	
TOITC6	In light of the new knowledge, employees do not resist to change	

H3. BUSINESS PERFORMANCE – FINANCIAL

The following statements ask about your thoughts and feelings in various situations. For each statement indicate how well it describes you.
Please indicate your agreement with each of the following statements:

Response Scale:
1=strongly disagree
2=disagree
3= somewhat disagree
4=neither agree nor disagree
5=somewhat agree
6=agree
7=strongly agree

BPGR1	Our business has experienced growth in turnover over the past few years.	
BPGR2	Our business has experienced growth in profit over the past few years.	
BPGR3	Our business has experienced growth in market share over the past few years. The competitive position of our business has improved over the past few years.	
BPGR4	The competitive position of our business has improved over the past few years.	
BPGR5	During difficult economic periods, investments in research and development/innovative projects continue and no significant financial cuts are made.	

APPENDEXURE B: CONSISTENCY MATRIX

The effect of innovation in automatic identification technology on new venture sustainability within Southern Africa

Aim of Research	Literature Review	Hypotheses	R/ Questions	Variables	Source of data	Data Type	Analysis
Identify how new Entrepreneurial Orientation (EO) effects Business performance of New Technology Ventures	DeepaBabu & Manalel, 2016	**H1a:** Risk-taking isolated as a construct within the auto ID sector has no effect on business performance	To Identify if Risk-taking isolated as a construct within the auto ID sector has no effect on business performance	**IV:** EO Risk-taking **DV:** Business Performance	EORT1 EORT2 EORT3	Nominal	Descriptive Statistics; Linear Regression; Correlation; Validity & Reliability
	Coleman, 2013; DeepaBabu et al., 2016	**H1b:** Proactiveness as an isolated construct within the auto ID sector has a positive effect on business performance	To Identify if Proactiveness as an isolated construct within the auto ID sector has a positive effect on business performance	**IV:** EO Proactiveness **DV:** Business Performance	EOPR1 EOPR2 EOPR3 EOPR4	Nominal	Descriptive Statistics; Linear Regression; Correlation; Validity & Reliability
	Allen et al., 2007; Altalib et al., 2015; Deepabaku et al., 2016; Dess & Lumpkin, 2005; Joshi, 2009; Karlin, 2017; Kamaruddeen, Koutakis, 2018; Siebrecht, 2017; Yusof & Said, 2010;,	**H1c:** Innovativeness isolated as a construct within the auto ID sector has a significant effect on business performance.	To Identify if Innovativenes s isolated as a construct within the auto ID sector has a significant effect on business performance.	**IV:** EO Innovativeness **DV:** Business Performance	EOIN1 EOIN2 EOIN3 EOIN4 EOIN5	Nominal	Descriptive Statistics; Linear Regression; Correlation; Validity & Reliability
	Bradfield et al., 2004; Brief, 2017; Bryne, 2015; Cuervo-Cazurra, 2011; Deepabaku et al., 2016; Harrison & O'Neil, 2017; Hess, 2017; Kaku, 2017; Pontius, 2018; Porter, 1998; Siebrecht, 2017; Sneed, 2015;	**H1d:** Competitive aggressiveness isolated as a construct within the auto ID sector has no effect on business performance	To identify if Competitive aggressivenes s isolated as a construct within the auto ID sector has no effect on business performance	**IV:** EO Competitive Aggressiveness **DV:** Business Performance	EOCA1 EOCA2 EOCA3	Nominal	Descriptive Statistics; Linear Regression; Correlation; Validity & Reliability
	Coleman, 2013; Deepabaku et al., 2016;	**H1e:** Autonomy isolated as a construct within the auto ID sector has no effect on	To identify if Autonomy isolated as a construct within the AutoID Sector	**IV:** EO Autonomy	EOAU1 EOAU2 EOAU3 EOAU4	Nominal	Descriptive Statistics; Linear Regression; Correlation;

		business performance	has no effect on firm performance	**DV:** Business Performance			Validity & Reliability
Identify how new Entrepreneurial Orientation (EO) effects Technological Orientation (IT Competence) of New Technology Ventures	Abernathy & Utterback; 1978; Altalib, Al-Ansari & Sardoh, 2015; California Academic, 2018; Heydenrych & Urban, 2015; Mahmood & Pratono, 2015; Pantono, 2014; Roja & Naste, 2014; Schumpeter, 1983; Smith, 2010; Tomkins, 2018; Urban, 2016;	**H2a:** Innovativeness moderated by TO has a positive effect on business performance.	To Identify if Innovativeness moderated by TO has a positive effect on business performance.	**IV:** EO Innovativeness **MV**: TO **DV:** Business Performance	TOITC1 TOITC2 TOITC3 TOITC4 TOITC5 TOITC1 TOITC1 6	Nominal	Descriptive Statistics; Linear Regression; Correlation; Validity & Reliability
	Altalib et al., 2015; Joshi, 2009; Kinoshita, 2000; Smith, 2010;	**H2b:** Proactiveness moderated by TO has a positive effect on business performance	To Identify if Proactiveness moderated by TO has a positive effect on business performance	**IV:** EO Proactiveness **MV**: TO **DV:** Business Performance	TOITC1 TOITC2 TOITC3 TOITC4 TOITC5 TOITC1 TOITC1 6	Nominal	Descriptive Statistics; Linear Regression; Correlation; Validity & Reliability
	Altalibet al., 2015; Bradfield, Burt, Cairns, Wright & Van Heijden, 2004; Bryne, 2015; Carvalho, De Almeida & Filho, 2018; Cox, 2018; Erasmus, Rothmann & Eden, 2015; Mahmood et al., 2016; SDC, 2018;	**H2c:** Risk-taking moderated by TO has a negative effect on business performance. **H2d:** Competitive Aggressiveness moderated by TO has a positive effect on business performance. **H2e:** Autonomy moderated by TO has a positive effect on business performance.	To identify if Risk-taking moderated by TO has a negative effect on business performance.; Competitive Aggressiveness moderated by TO has a positive effect on business performance; Autonomy moderated by TO has a positive effect on business performance.	**IV:** EO Risk-taking; EO Competitive Aggressiveness; EO Autonomy **MV**: TO **DV:** Business Performance	TOITC1 TOITC2 TOITC3 TOITC4 TOITC5 TOITC1 TOITC1 6	Nominal	Descriptive Statistics; Linear Regression; Correlation; Validity & Reliability

Participant Information Sheet

Study title: **The effect of innovation in automatic identification technology on new venture sustainability in Southern Africa**

Locality:**GAUTENG**

Ethics committee ref.: T.B.D

Lead investigator: **CHRISTOPHER DARLINGTON**

Contact phone number: 0721808084

You are invited to take part in a study on **The effect of innovation in automatic identification technology on new venture sustainability within Southern Africa**

Whether or not you take part is your choice. If you don't want to take part, you don't have to give a reason, and it won't affect the care you receive. If you do want to take part now, but change your mind later, you can pull out of the study at any time.

This Participant Information Sheet will help you decide if you'd like to take part. It sets out why we are doing the study, what your participation would involve, what the benefits and risks to you might be, and what would happen after the study ends. We will go through this information with you and answer any questions you may have. You do not have to decide today whether or not you will participate in this study. Before you decide you may want to talk about the study with other people, such as family, friends, or colleagues. Feel free to do this.

If you agree to take part in this study, you will be asked to sign the Consent Form on the last page of this document. You will be given a copy of both the Participant Information Sheet and the Consent Form to keep.

This document is 127 pages long, including the Consent Form. Please make sure you have read and understood all the pages.

WHAT IS THE PURPOSE OF THE STUDY?

The research proposed will follow a mixed study with focus on both a qualitative & quantitative approach to methodology, it will explore theories and specify factors that

identify existing & current New Technology Venture (NTV) firms who have successfully or unsuccessfully implemented automatic identification solutions within the Retail Supply Chain.

Due to the high failure rate of NTV's, it is important to identify what are the main factors leading to the ventures success or failure. It is evident in current literature that broad factors on New Technology Venture do not give much insight, often controversial, fragmented and lead to contradictory relationships between factors. It is important that the research be designed & expressed in a way that will determine the degree to which there is empirical evidence identifying the spillover effect or intellectual property cannibalism by the Retail Supply Chain on nascent entrepreneurial efforts.

The study will be directed to New Technology Ventures with less than 10 employees throughout the Southern African countries. Targeting these firms will be difficult in articulating but will be possible through industry specific contacts and availability to large database specific firms in offering solutions to this sector.

WHAT WILL MY PARTICIPATION IN THE STUDY INVOLVE?

- You as a potential participant have been randomly selected should you wish to complete the form to answer a set of broad questions pertaining to your experience with new auto ID technology within the Retail supply chain to gain insight into the possible factors, potential & failures and perceptions or attitudes you may have experience in order to answer the above research question
- the time involved in participation is estimated to be roughly 2minutes of your time, and you may answer the questionnaire at your own discretion & leisure to be returned before March 2019
- There are approximately 3 categories of questionnaires that are designed to specifically collect certain data from Auto ID technology, to retail Store – supply chain undertaking and products & experience pertaining to Entrepreneurial Orientation, technological Orientation and Perceived Business performance.

WHAT ARE THE POSSIBLE BENEFITS AND RISKS OF THIS STUDY?

- There are no physical or mental risks, of study participation, including any risks to the health of a participant's family member(s), as it is only an explorative study to retrieve an understanding of the Retail Supply chain Environment.
- There is also no direct benefits to participation in the study, the information can be made available should you wish once completed with Wits Business School, but it is merely for academic purposes

— The Research ensures that all information is based on broad questions, your participation is anonymous to all parties and does not request any specific personal or company confidential information. As the researcher is it my responsibility to ensure that ethics and peace of mind is provided to participants during the study

WHO PAYS FOR THE STUDY?

— participant will not incur any costs
— There will be no re-imbursements or incentives to participate

WHAT ARE MY RIGHTS?

— the voluntary nature of participation, including that they are free to decline to participate, or to withdraw from the research at any practicable time, without experiencing any disadvantage
— that participants have the right to access information about them collected as part of the study
— that participants will be told of any new information about adverse or beneficial effects related to the study that becomes available during the study that may have an impact on their health
— what provision will be made for the privacy and confidentiality of individuals

WHAT HAPPENS AFTER THE STUDY OR IF I CHANGE MY MIND?

— You have the right to not participate and/or not answer all questions that may in some way affect your comfortability in answers the questionnaire

WHO DO I CONTACT FOR MORE INFORMATION OR IF I HAVE CONCERNS?

If you have any questions, concerns or complaints about the study at any stage, you can contact:

Christopher Darlington, Student & Wits Business School

0721808084
chris@dciscanning.co.za

If you want to talk to someone who isn't involved with the study, you can contact an independent health and disability advocate on:

Phone: t.b.d
Fax: t.b.d
Email: t.b.d@wits.ac.za

Consent Form

Your letterhead

If you need an INTERPRETER, please tell us.

Please tick to indicate you consent to the following *(Add or delete as appropriate)*

I have read, or have had read to me in my first language, and I understand the Participant Information Sheet.	Yes ☐	No ☐
I have been given sufficient time to consider whether or not to participate in this study.	Yes ☐	No ☐
I have had the opportunity to use a legal representative, whanau/ family support or a friend to help me ask questions and understand the study.	Yes ☐	No ☐
I am satisfied with the answers I have been given regarding the study and I have a copy of this consent form and information sheet.	Yes ☐	No ☐
I understand that taking part in this study is voluntary (my choice) and that I may withdraw from the study at any time without this affecting my medical care.	Yes ☐	No ☐
I consent to the research staff collecting and processing my information, including information about my health.	Yes ☐	No ☐
If I decide to withdraw from the study, I agree that the information collected about me up to the point when I withdraw may continue to be processed.	Yes ☐	No ☐
I consent to my GP or current provider being informed about my participation in the study and of any significant abnormal results obtained during the study.	Yes ☐	No ☐
I understand that there may be risks associated with the treatment in the event of myself or my partner becoming pregnant. I undertake to inform my partner of the risks and to take responsibility for the prevention of pregnancy.	Yes ☐	No ☐
I agree to my (type of tissue) samples being sent overseas and I am aware that these samples will be disposed of using established guidelines for discarding biohazard waste.	Yes ☐	No ☐
I agree to an approved auditor appointed by the New Zealand Health and Disability Ethic Committees, or any relevant regulatory authority or their approved representative reviewing my relevant medical	Yes ☐	No ☐

records for the sole purpose of checking the accuracy of the information recorded for the study.		
I understand that my participation in this study is confidential and that no material, which could identify me personally, will be used in any reports on this study.	Yes ☐	No ☐
I understand the compensation provisions in case of injury during the study.	Yes ☐	No ☐
I know who to contact if I have any questions about the study in general.	Yes ☐	No ☐
I understand my responsibilities as a study participant.	Yes ☐	No ☐
I wish to receive a summary of the results from the study.	Yes ☐	No ☐

Declaration by participant:

I hereby consent to take part in this study.

Participant's name:

Signature: Date:

Declaration by member of research team:

I have given a verbal explanation of the research project to the participant, and have answered the participant's questions about it.

I believe that the participant understands the study and has given informed consent to participate.

Researcher's name:

Signature: Date: