

# **Gordon Institute of Business Science**

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## **The influence of leadership style on innovation**

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### **Abstract**

Innovation is an important aspect of organisational survival and competitiveness. It has been found that leadership has a profound influence on innovation outcomes. However, the innovation process is complex and leading in a complex, dynamic and adaptive environment makes it even more so. Thus, the efficacy of three leadership styles, authentic leadership, complexity leadership and contextual intelligence were tested and compared on exploitive and exploratory innovation, within the South African context. This research found that complexity leadership and contextual intelligence both grounded in non-Newtonian paradigms had the greatest positive influence on exploitive and exploratory innovation outcomes.

### **Keywords**

Innovation, Authentic Leadership, Complexity Leadership, Contextual Intelligence

## **Declaration**

I declare that this research project is my own work. Submitted in partial fulfilment of the requirements for the degree of Master in Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

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## Contents

<b>List of Tables</b> .....	<b>vii</b>
<b>List of Figures</b> .....	<b>ix</b>
<b>Chapter 1: Research Problem and Purpose</b> .....	<b>1</b>
1.1 Introduction .....	1
1.2 Research Questions .....	2
1.3 Research Motivation .....	2
1.3.1 South Africa and Innovation .....	2
1.3.2 Private Sector Innovation .....	3
1.3.3 Business Environment and Innovation .....	4
1.3.4 Leadership and Innovation .....	5
1.4 Research Objectives .....	6
1.5 Scope.....	7
<b>Chapter 2: Literature Review</b> .....	<b>8</b>
2.1 Introduction .....	8
2.2 Knowledge Workers.....	10
2.3 Innovation .....	11
2.3.1 Creativity .....	13
2.3.2 Innovation Implementation .....	14
2.3.3 Difficulties to innovation.....	14
2.4 Leadership .....	16
2.4.1 Transactional leadership .....	17
2.4.2 Transformational leadership.....	18
2.4.3 Authentic Leadership.....	19
2.4.3.2 Mechanism .....	20
2.4.4 Complexity leadership .....	24
2.4.5 Difficulties with complexity leadership .....	32
2.5 Contextual Intelligence.....	32
2.5.1 Definition .....	33
2.5.2 Mechanism .....	33
2.5.3 Contextual Intelligence and Innovation .....	34
2.5.4 Difficulties .....	34
2.6 Summary.....	34
<b>Chapter 3: Research Hypothesis</b> .....	<b>36</b>
3.1 Introduction .....	36
3.2 Research Question 1 – Leadership .....	36
3.2.1 Hypothesis 1 A .....	36

3.2.2	Hypothesis 1 B .....	36
3.2.3	Hypothesis 1 C .....	36
3.3	Research Question 2 – Innovation .....	36
3.3.1	Hypothesis 2 .....	37
3.4	Research Question 3 – The effect of leadership on Innovation .....	37
3.4.1	Hypothesis 3A .....	37
3.4.2	Hypothesis 3B .....	37
3.4.3	Hypothesis 3C .....	38
3.4.4	Hypothesis 3D .....	38
3.4.5	Hypothesis 3E .....	38
3.4.6	Hypothesis 3F .....	38
<b>Chapter 4: Research Methodology .....</b>		<b>40</b>
4.1	Introduction .....	40
4.2	Research Design and Methodology .....	40
4.3	Population .....	42
4.4	Sample Size and Sampling Technique .....	42
4.5	Unit of Analysis .....	43
4.6	Measurement Instrument .....	43
4.6.1	Innovation .....	44
4.6.2	Complexity Leadership .....	44
4.6.3	Authentic Leadership .....	44
4.6.4	Contextual intelligence .....	44
4.7	Data Collection and Analysis .....	44
4.7.1	Data analysis .....	45
4.8	Measurement Validity and Reliability .....	46
4.8.1	Validity of the study .....	46
4.8.2	Reliability of the study .....	47
4.9	Limitations of the Study .....	47
<b>Chapter 5: Findings of the Study .....</b>		<b>49</b>
5.1	Introduction .....	49
5.2	Biographic Profile and Control Variables .....	49
5.2.1	Biographic Profile .....	49
5.2.2	Control Variables .....	50
5.3	Factor Analysis .....	51
5.3.1	Construct Reliability and Validity .....	53
5.4	Complexity Leadership .....	54
5.4.1	Descriptive statistics .....	55

5.4.2	Construct Validity and Reliability .....	55
5.4.3	Level of Complexity Leadership in South African Organisations.....	55
5.5	Contextual Intelligence.....	56
5.5.1	Descriptive statistics.....	56
5.5.2	Construct Validity and Reliability .....	57
5.5.3	Level of Contextual Intelligence in South African Organisations.....	57
5.6	Authentic Leadership .....	57
5.6.1	Descriptive Statistics .....	58
5.6.2	Construct Validity and Reliability .....	58
5.6.3	Level of Authentic Leadership in South African Organisations .....	58
5.7	Leadership Descriptive Statistics .....	59
5.8	Innovation .....	60
5.8.1	Descriptive statistics.....	60
5.8.2	Construct Validity and Reliability .....	60
5.8.3	Level of innovation .....	61
5.9	Effect of Leadership on Innovation .....	62
5.9.1	Effect of Leadership on Exploratory Innovation.....	62
5.9.2	Effect of Leadership on Exploratory Innovation.....	70
5.9.3	Effect of Leadership on New Markets .....	78
5.9.4	Comparison of Leadership Style and Type of Innovation Pursued .....	85
5.10	Summary.....	86
<b>Chapter 6: Discussion of Results .....</b>		<b>87</b>
6.1	Introduction .....	87
6.2	Biographical Profile and Control Variables .....	87
6.3	Types of Leadership Employed in South African Organisations.....	88
6.3.1	Authentic Leadership.....	89
6.4	Types of Innovation Pursued by South African Organisations.....	90
6.4.1	Exploratory Innovation.....	91
6.5	The Influence of Leadership Style on Innovation Outcomes in South African Organisations .....	92
6.5.1	Complexity Leadership and Innovation .....	93
6.5.2	Authentic Leadership and Innovation .....	95
6.5.3	Contextual Intelligence and Innovation .....	96
6.5.4	Leadership Comparison .....	98
6.6	Summary.....	100
<b>Chapter 7: Conclusion .....</b>		<b>101</b>
7.1	Principle Findings.....	101

7.2	Implications for Management.....	101
7.2.1	Context.....	102
7.2.2	Formally Appointed Leaders versus Leadership.....	102
7.2.3	Empowerment.....	103
7.2.4	Feedback.....	103
7.2.5	Network development.....	104
7.2.6	Organisational Structure.....	104
7.2.7	Tension.....	104
7.2.8	Market Innovation.....	105
7.3	Limitations of the Research.....	105
7.4	Suggestions for Future Research.....	106
	<b>References.....</b>	<b>107</b>
	<b>Appendix A: KMO and Bartlett’s Test Results.....</b>	<b>113</b>
	<b>Appendix B: Extracted Variance, Loading and Eigenvalues.....</b>	<b>114</b>
	<b>Appendix C: Rotated Component Matrixes.....</b>	<b>116</b>
	<b>Appendix D: Descriptive Statistics.....</b>	<b>119</b>

## List of Tables

Table 4-1: Key differences between qualitative and quantitative approaches .....	41
Table 4-2: Five Point Likert Scale .....	43
Table 5-1: Biographic profile of the participants .....	49
Table 5-2: Control variables .....	51
Table 5-3: Summary KMO and Bartlett's Test Results .....	51
Table 5-4: Summarised Extracted Variance, Loading and Eigenvalues .....	52
Table 5-5: Reliability of the constructs of the study .....	53
Table 5-6: Dimensions of Complexity Leadership Factors .....	55
Table 5-7: One sample t-test for Complexity Leadership .....	56
Table 5-8: Dimensions of Contextual Intelligence .....	57
Table 5-9: One-sample t-test for Contextual Intelligence .....	57
Table 5-10: Dimensions of Authentic Leadership .....	58
Table 5-11: One sample t-test for Authentic Leadership .....	59
Table 5-12: Leadership Descriptive Statistics .....	59
Table 5-13: Dimensions of Innovation in South African Organisations .....	60
Table 5-14: One sample t-test for Innovation .....	61
Table 5-15: Innovation Descriptive Statistics .....	61
Table 5-16: Pearson Correlation for Complexity Leadership and Exploitive Innovation ..	63
Table 5-17: Linear regression model of Complexity Leadership and Exploitive Innovation .....	65
Table 5-18: Pearson correlation for Authentic Leadership and Exploitive Innovation .....	66
Table 5-19: Linear regression model of Authentic Leadership and Exploitive Innovation ..	67
Table 5-20: Pearson correlation for Contextual Intelligence and Exploitive Innovation ....	68
Table 5-21: Linear regression model of Contextual Intelligence and Exploratory Innovation .....	69
Table 5-22: Hierarchical regression analysis: Impact of control variables on leadership and Exploitive Innovation .....	70
Table 5-23: Pearson correlation for Complexity Leadership and New Products/Services	72
Table 5-24: Linear regression model of Complexity Leadership and the creation of New Products/Services .....	72
Table 5-25: Pearson correlation for Authentic Leadership dimensions and New Products/Services .....	74
Table 5-26: Linear regression model of Authentic Leadership and New Products/Services .....	74
Table 5-27: Pearson correlation for Contextual Intelligence and New Products/Services	76

Table 5-28: Linear regression model of Contextual Intelligence and New Products/Services .....	77
Table 5-29: Hierarchical regression analysis: Impact of control variables on the creation of New Products/Services .....	77
Table 5-30: Pearson correlation for Complexity Leadership dimensions and New Markets .....	79
Table 5-31: Linear regression model of Complexity Leadership and New Markets .....	80
Table 5-32: Pearson correlation for Authentic Leadership dimensions and New Markets .....	81
Table 5-33: Linear regression model of Authentic Leadership and New Markets .....	82
Table 5-34: Linear regression model of Contextual Intelligence and New Markets .....	84
Table 5-35: Hierarchical regression analysis: Impact of control variables on entering New Markets.....	84
Table 6-1: Pearson's Correlation for Complexity Leadership Dimensions and Innovation .....	93
Table 6-2: Linear Regression Results for Complexity Leadership Dimensions and Innovation.....	94
Table 6-3: Pearson's Correlation for Authentic Leadership Dimensions and Innovation ..	95
Table 6-4: Linear Regression Results for Authentic Leadership Dimensions and Innovation.....	96
Table 6-5: Pearson's Correlation for Contextual Intelligence and Innovation.....	97
Table 6-6: Linear Regression Results for Contextual Intelligence and Innovation.....	97
Table 6-7: Comparison of Predictive Power of the Leadership Styles .....	99



## List of Figures

Figure 5-1: Scatter plots of Complexity Leadership and Exploratory Innovation.....	62
Figure 5-2: Scatter plots of Authentic Leadership and Exploitive Innovation .....	66
Figure 5-3: Scatter plots of Contextual Intelligence and Exploitive Innovation.....	68
Figure 5-4: Scatter plots of Complexity Leadership and New Products/Services .....	71
Figure 5-5: Scatter plots of Authentic Leadership and New Products/Services .....	73
Figure 5-6: A scatter plot of Contextual Intelligence and New Products/Services .....	76
Figure 5-7: Scatter plots of Complexity Leadership and New Markets .....	79
Figure 5-8: Scatter plots of Authentic Leadership and New Markets .....	81
Figure 5-9: A Scatter plot of Contextual Intelligence and New Markets .....	83
Figure 5-10: R-square comparison for Leadership style with different types of innovations .....	85

## Chapter 1: Research Problem and Purpose

Oke et al. (2009) to conclude that due to the commoditization of knowledge, leading through innovation appears to be the only way in which U.S. and western corporations can gain a sustainable competitive advantage.

### 1.1 Introduction

The recent World Bank report, the 10<sup>th</sup> South Africa Economic Update (The World Bank, 2017a) indicated that in recent years two of the main drivers of the South African economy, being high commodity prices and foreign direct investments have decreased significantly. During this same time South Africa's productivity has also lagged developed economies, as well as its Brics (Brazil, Russia, India, China and South Africa) counterparts.

It is therefore unsurprising that the South African economy has been under strain. During the period between 2008 and 2015, 4 out of 5 South Africans experienced poverty, be it either temporary or permanently. Peak unemployment of 27.7% was reached in 2017, and between 2011 and 2016, an additional 3 million South Africans joined the ranks of the 30.4 million living on less than US\$2.90 per day, (The World Bank, 2017a).

Innovation is said to be the single most important component of a country's long term economic growth, (Rosenberg, 2004). The World Bank (2017a), asserts that South Africa's reliance on a traditional commodity based economic model did not reduce poverty or inequality. They argue that innovation is the key to improving the lives of millions of poor and in unlocking South Africa's economic potential.

Another critical factor highlighted as a contributor to the deterioration of the South African economy was insufficient research and development efforts conducted by the private sector. Research and development expenditure, often used as a proxy for the identification of innovation efforts, decreased approximately 40% since 2009, (The World Bank, 2017a). In low skills based countries such as South Africa, labour unions often fear that productivity improvements such as automation would result in job losses. However, World Bank (2017a) estimates suggest that adapting to foreign technologies and turning private research and development into a more powerful driver of corporate profitability is likely to be a job creator.

Innovation is change. However, people and organisations are averse to change. So much so that Porter (1990, p.74) concluded that "*change is an unnatural act, particularly in suc-*

*cessful companies; powerful forces are at work to avoid it at all cost*". Unsurprisingly various subsequent studies have found that leaders are an essential element in the promotion of organisational innovation (Denti & Hemlin, 2012), with some even going as far as to propose that it is one of the most important predictors of innovation, (Rosing, Frese, & Bausch, 2011).

However, according to Denti and Hemlin (2012), what is even more important is to understand when leadership is effective i.e. under which circumstances (at the individual, team or organisational levels) and through which mechanisms and processes leadership influences innovation outcomes.

## **1.2 Research Questions**

**RQ1:** Are the leadership styles, authentic leadership, complexity leadership and contextual intelligence, theorised to be advantageous to the outcome of innovation activities practiced in South Africa?

**RQ2:** Do South African organisations innovate?

**RQ3:** Which leadership style is most advantageous to innovation outcomes in South African organisations?

This study aims to investigate the correlation between three leadership styles, authentic leadership, complexity leadership and contextual intelligence and exploratory and exploitive innovation.

## **1.3 Research Motivation**

### **1.3.1 South Africa and Innovation**

Rosenberg (2004), asserts that innovation is the single most important component of long term economic growth. He argues that, fundamentally there are only two ways of increasing a nation's economic output. Firstly, by increasing inputs into productive processes (be they capital or labour), or secondly, by implementing new ways to get more done with fewer inputs. Rosenberg (2004), further argues that approximately 85% of economic growth of the United States and European countries during the last century has been attributable to the implementation of innovations based on technological advances.

The World Bank (2017b) goes further to explain that, low total factor productivity resulting in insufficient economic growth is steering South Africa into a vicious circle of insufficient collectible tax revenue. This could increase the risk of public debt distress, which plays an important role in the rating of a nation's sovereign risk. According to the World Bank (2017b), a low sovereign risk rating or a ratings downgrade, as experienced in April 2017 (Laing, 2017), reduces investor appetite for South Africa as an investment destination, where investments are required to support economic growth. In so doing one of the main drivers of the economy is diminished even further.

Through innovation, economic participation could be increased. This occurs through the availability of better and cheaper, goods and services in most notably health care, transportation and access to government. Other mechanisms through which innovation could increase economic participation and reduce poverty are through job and enterprise creation, (The World Bank, 2017b).

### **1.3.2 Private Sector Innovation**

According to Uppenberg (2009) various macroeconomic studies have found that social rates of return and productivity growth are strongly related to private firm research and development. These returns are typically found to be higher than the private firm's own return from research and development. The mechanism through which this occurs is knowledge spill overs.

The World Bank (2017a, p. 29) agrees with this assessment and stated that *"the private sector can be a powerful player in addressing the needs of the poor by developing affordable products and services, and creating opportunities for the unemployed. Sometimes these efforts come from the large incumbent firms, but more often than not they are the creation of social entrepreneurs."*

However, innovation is not only important to national competitiveness (Porter, 1990), but also to business for the sustainability of long term profits, (Kim & Mauborgne, 2004). Global surveys of CEOs by auditing and business consulting firms PWC and KPMG indicate that CEOs view innovation as very important to the future prosperity of their businesses. In the PWC 2017 annual CEO survey, an annual survey that aims to inform and stimulate debate on the challenges businesses face, 1 379 CEOs were surveyed globally and of those approximately 25% identified innovation as their top priority for the year, (PricewaterhouseCoopers, 2017). Of the 1 268 CEOs surveyed globally by KPMG in a

similar survey in 2016, approximately 20% identified innovation as their top strategic priority for the following three years, (KPMG, 2016).

### **1.3.3 Business Environment and Innovation**

According to Tetenbaum & Laurence (2011) much of leadership theory is based in the context of the Newtonian paradigm, which promises a predictable, law abiding universe. However, today the business environment is characterised by a greater range of choice, more demanding customers, greater opportunities and fewer constraints, (Osborn, Hunt, & Jauch, 2002). Volatility, uncertainty, complexity and ambiguity (VUCA) are the descriptors of today's business environment, (Arena & Uhl-Bien, 2016), which are the polar opposite of Newtonian universe. Thus, it is argued that the old Newtonian paradigm of control and equilibrium is no longer valid and that the business environment has transitioned to a new paradigm of chaos and disruption, (Tetenbaum & Laurence, 2011).

Tetenbaum & Laurence (2011) argue that although, in response to the new paradigm, organisations have started overhauling the organisational structure, leadership styles and practices have changed minimally from the old top-down control model. Said changes to organisational structures include employing diverse project teams using advanced knowledge management and building innovative cultures. Thus, although the top down leadership style was desirable in the hierarchically structured organisations of yesteryear, its usefulness in today's VUCA world is questionable. This is due to advances in technology and information sharing increasing the pace of change, thereby blurring the lines of cause and effect, which in turn reduces predictability and in so doing makes problems much more complex. Thus, the new paradigm that has emerged is no longer one of an ordered world, but rather one in which chaos reigns.

Rosing et al. (2011) describe the innovation process as follows. Innovation comprises out of two main components namely creativity and implementation. Notwithstanding that different skills and behaviours are required when being creative and when implementing creative ideas, what makes the innovation process complex is that creativity and implementation does not proceed in an orderly linear fashion and therefore cannot be split into separate stage. They argue that the requirement to generate and implement ideas alternate in an ever-changing throughout. Thus, the innovation process is characterised as being full of paradoxes and tensions.

#### 1.3.4 Leadership and Innovation

Denti and Hemlin (2012) argue that leaders are responsible constructing the organisational context which could aid or hinder innovation. Leader behaviours could encourage intrinsic motivation, facilitating problem solving and foster a positive team climate. Further leaders manage the strategic objectives of the firm, assign responsibilities, grant autonomy and allocate resources. Thus, leaders are influential players in leading and managing the complex, paradoxical, innovation process in a chaotic, ever changing world, where the lines of cause and effect have been blurred.

Three popular leadership theories to be investigated in this research will be authentic leadership, complexity leadership and contextual intelligence. *Authentic leadership focuses on the positive rather than flaws or deficits. It promotes employee trust, resulting in higher emotional safety, thus allowing for greater confidence to propose unconventional ideas*, (Černe, Jaklič, & Škerlavaj, 2013, p.5). *Authentic leadership* is a genuine leadership, where moral leaders make decisions based on their core values, resulting in a trusting relationship between leader and follower (Avolio & Gardner, 2005). Authentic leaders can be transformational or transactional and could or could not be an advocate of innovation, (Černe et al., 2013).

As discussed Newtonian leadership theories and organisational structures of old, were designed for a world of manual work. In today's VUCA business environment, leadership theorists are questioning traditional models. 21<sup>st</sup> century management theories emphasise decentralization and co-evolutionary ecologies of firms and other stakeholders in the firm's network, (Osborn et al., 2002). One of the constructs being questioned is that of leadership. Within leadership research the assumption that *"the essence of leadership rests within the character or the characteristic behaviours of effective supervisors"*, (Lichtenstein et al., 2006, p. 2), is being questioned.

Complexity leadership aims to address these shortcomings by viewing organisations as complex adaptive systems in which relationships are defined not by hierarchy, but by interactions between heterogeneous agents. It views leadership as adaptive and a product of interactions within the system, with different leaders in different situations, (Lichtenstein et al., 2006). In this theory, the corporate elite are tasked with creating environments that foster network development and information sharing. Social capital creates competitive advantage based on the way individuals are connected to one another, with group cohesion and brokerage as particular importance, (Arena & Uhl-Bien, 2016). Literature indi-

cates that complexity leadership a highly effective form of leadership when pursuing innovation, but most companies continue with the traditional hieratical leadership structure.

#### 1.4 Research Objectives

Using quantitative data, the research objectives are to determine whether there is a correlation between the leadership style employed in South African organisations and how innovative the firm is, as well as determining whether exploratory or exploitive innovation are pursued by said firm.

This study also aims to add to the body of knowledge by:

- Testing the rigour of Newtonian and non-Newtonian leadership models in the South African context. According to Osborn et al. (2002) there is the need to extensively test new leadership models with more datasets.
- Černe et al. (2013) indicates that although they have found a correlation between authentic leadership and innovation, they had used a limited sample and to be able to enhance the generalisability of their study more data is required in different contexts.

They also content that authentic leadership studies have mainly been conducted in the US. As authentic leadership is grounded in morality, there is a need to test the theory in different cultures and contexts as what is moral/ethical in one culture might not be in others. This has relevance in South Africa, where in 2017 the public and private sector were rocked by state capture allegations and private sector improprieties.

- Complexity leadership is a new construct, with firms still mostly being bureaucratic, (Mendes, Gomes, Marques-Quinteiro, Lind, & Curral, 2016), thus it would be enlightening to determine whether this leadership style is employed in South Africa.
- Leadership styles and innovation are to be directly compared with one another, something the author could not find in literature.

## 1.5 Scope

The scope of this research is limited to South African organisations. Innovation and leadership styles are to be investigated, without considering moderators or mediators which might influence both innovation and leadership.



## Chapter 2: Literature Review

### 2.1 Introduction

Innovation is essential, not only for national economic growth (Uppenberg, 2009), but also the sustainable long term growth of corporate profits, (Kim & Mauborgne, 2004). In the early nineties Porter (1990) took the macro view, that from a national competitiveness perspective, innovation is key to achieving national prosperity or as he termed it, national competitiveness. He asserts that a nation's prosperity is not inherited, but rather created and that a nations' competitiveness depends on the capability of its industry to continuously upgrade and innovate. This has relevance to South Africa as it is a country where many people face a daily struggle with poverty (The World Bank, 2017a). Since South Africa's wealth cannot be inherited, prosperity will have to be created by its people.

Innovation is complex with different skill sets required throughout the process. However, what makes the process more complex is that throughout different phases are often not clearly distinguish or separable, are iterative in nature and do not proceed in an orderly linear fashion, (Rosing et al., 2011). Today's business environment has been classified as a VUCA (volatile, uncertain, complex and ambiguous) world, (Kutz & Bamford-Wade, 2013). Thus, innovation is essential to wealth creation, but it is a complex process, which takes place in a complex, changing environment, making it difficult to lead and manage efficiently. Especially in a country such as South Africa where input resources are scarce and wastage not affordable.

Innovation and adaption are a result of pressure on the system (Arena & Uhl-Bien, 2016). Adaptive pressures compromise of four components namely, the need for a new solution, new relationships, conflicting perspectives and interdependence. Accordingly, innovation takes place in the spaces between different systems or networks and includes many role-players. In South Africa these pressures abound, which could be viewed as a catalyst for South African companies to innovate, if the right human resources are available.

Innovation is change. According to Porter (1990) a leader is required to overcome the natural discomfort most people have with change. He asserted that leadership should believe in change and be able to energise their organisations to innovate continuously. Crossan and Apaydin (2010) indicate that the role of leadership is crucial in all levels of the organisation to spearhead the process, as well as in maintaining momentum until the desired outcome is achieved. Denti and Hemlin (2012) indicate that leaders are responsible for creating the organisational context in which innovation is to take place, hence their

importance to innovation. Černe, et al. (2013) argue that it is the intrinsic motivational and cultural influences of leadership which most influences innovation. Thus, leadership plays a vital part and must fulfil various roles in the process.

Mumford, Scott, Baddis and Strange (2002) indicate that leaders of innovation efforts should possess substantial technical, professional and creative skills. As such, the hallmark of firms that can manage different types of innovative activities successfully is unique leadership capabilities. Oke, Munshi, and Walumbwa, (2009) assert that leading innovation remains one of the most challenging aspects for contemporary leaders. This suggests that not anybody can lead innovation efforts. Leading innovation efforts require individuals who possess varied skillsets such as technical expertise, motivator, communicator, team builder, etc.

In this study the importance of leadership to the innovation process is not in question. However, which leadership behaviours improve the chances of successful innovation outcomes are. According to Tetenbaum and Laurence (2011), numerous traditional leadership theories abound. These are based on Newtonian principles of things working according to a predictable, stable, linear pattern, or a world in equilibrium. Each of these theories also has many dimensions. All these options make it difficult for a leader to know how and under which circumstances to implement which theory.

However, Newtonian leadership theories are also being challenged as inadequate, overly simplistic and not applicable to today's dynamic, knowledge driven economy. Tetenbaum and Laurence (2011) argue that traditional theories of leadership are overly simplistic and suffer from a sole focus on either, the leader, the follower or the context and do not account for interactions or the outcome of interactions between them. To address these shortcomings Kutz and Bamford-Wade (2013) argue the benefits of non-Newtonian leadership styles such as complexity leadership. Non-Newtonian theories of leadership are organic, based on systems and interaction.

The goal of this literature survey is to review literature about the complex nature of innovation, as well as three popular leadership styles and how they relate to the innovation process. Leadership styles to be investigated are authentic leadership, a Newtonian leadership theory based on positive psychology that creates an atmosphere of trust and clear communication, (Černe et al., 2013), all essential to innovation. Complexity leadership, a non-Newtonian leadership theory, which advances agent interaction, knowledge sharing and network development (Uhl-Bien & Marion, 2008) also thought to be a necessity for

successful innovation. Complexity leadership view leadership as emergent from the system, a behaviour and response of everyone in the organisation and not just the domain of the corporate elite, (Kutz & Bamford-Wade, 2013). The last leadership theory to be investigated is contextual intelligence, which integrates Non-Newtonian perspectives with traditional leadership competencies that addresses the-leader-follower-content nexus, (Kutz & Bamford-Wade, 2013).

The goal of the study is get an indication of which leadership style, if any, is most beneficial to innovation outcomes in South Africa. Leaders can be formally anointed or emerge from the group. The purpose of this research is to investigate the influence of formally appointed leaders.

## **2.2 Knowledge Workers**

In their summary of previous research Powell and Snellman (2004) note that economists have long been discussing the shift in developed economies from being based on tangible goods to becoming information based. They call this shift a transitioning to a knowledge economy and illustrate by way of example of the production of a car. In the economies of the past a car was the product of metal fabrication by people, whereas today it is fast becoming more the product of a smart machine that uses technology to integrate, safety, emissions, entertainment and performance.

This has given rise to the need for specialised workers with different skillsets from those of the past. Pyöriä (2005) adds that as technology develops, requirements of workers become more complex and specialised. Added to this is the increased requirement for coordination, communication and information flows between agents when navigating larger, more diverse production chains. He termed the worker required to navigate this knowledge economy as the knowledgeable or knowledge worker.

Pyöriä (2005) concedes that there are numerous definitions for the knowledge worker. For the purposes of this study the researcher will not be using the definition of knowledge workers being workers who generate new knowledge, (Drucker, 1999; Turriago-Hoyos, Thoene, & Arjoon, 2016). Rather in keeping with the discussion above knowledge workers will be defined as workers with a high level of education and skills, who are fluent in the use of information technology (Pyöriä, 2005). Or more succinctly as workers who generate economic benefit with their brains instead of their hands, basically all white collar workers (Yao & Fan, 2015).

Though South Africa is a developing and not a developed economy, it forms part of the greater global economy where South African organisations must compete against international counterparts. Thus, latest knowledge and technological advances must be used to be competitive and compete against other knowledge workers. Accordingly, the researcher found it pertinent to investigate the influence leadership's influence on the outcome of innovation as implemented by knowledge workers in South African organisations.

### **2.3 Innovation**

Černe et al. (2013, p. 11) define innovation, *“as the creation and implementation of a new idea in a specific social context with the purpose of delivering commercial benefits”*. Thus, the innovation process requires the creativity to come up with new ideas, as well as the means to implement them. There is no doubt that the South African social context differs from that of developed countries, where these innovation and leadership theories were created. Thus, it is important that theories be validated in the local context before being implemented.

To this Denti and Hemlin (2012) adds that innovation is not only associated with new products (be they services or goods), processes, marketing methods, organisational methods, workplace organisation or external relations, but also includes when old ones have been significantly improved. According to Porter (1990) innovation often involves ideas that aren't new, but are old ideas that have not been vigorously pursued and that innovators are often outsiders from a different industry or a different country. This is still relevant in the global economy where what works in other countries or companies can be incorporated and tweaked to meet local needs.

According to Oke et al. (2009), in general innovation is categorised either as the exploration of new possibilities or the exploitation of old certainties. Capabilities required to be successful in one category differ completely from the capabilities to be successful in the other. Tushman & O'Reilly (1996) suggested that organisations can achieve ambidexterity by simultaneously pursuing both exploration and exploitation, only if these activities are structurally segregated from each other, but integrated at the very top level of management. Thus, top-level managers or leaders have different and dissimilar activities when fostering exploration (radical innovation outcomes) or when enhancing exploitation (incremental innovation outcomes). This increases the difficulty of leadership's task and re-

quires that this study investigates the influence of leadership style on both types of innovation in South African organisations.

Oke et al. (2009) further argue that, innovations are the result of strategic responses from organisations to effectively compete in the market place. In the corporate setting, having the requisite technological or research and development capabilities and other complementary assets such as marketing and distribution are merely enablers of innovation and that the right type of leadership is what is of paramount importance. Accordingly, to be efficient these diverse activities require differing leadership activities and skills. Arena and Uhl-Bien (2016), asserts that innovation is as much a social phenomenon within systems as it is a technological one.

Group innovation is determined by four groups of factors these are, task characteristics, group knowledge and skills, group diversity, integration of group processes and external demands (West, 2002). Successful innovation principles include customer co-creation and cluster theory. Customer co-creation has recently been suggested to be a major source of competitive advantage for firms, where customers actively engage in the firm's innovation process and in so doing takeover some of the activities traditionally performed by a firm's employees, (Mahr, Lievens, & Blazevic, 2014). This increase the complexity of the innovation process and the difficulty in leading it, as leaders not only have to manage their "own" people within the organisation, but also networks of stakeholders outside of the organisational structures over whom they have little control and who have different motives and goals.

Thusly, as innovation is not a serendipitous event, (Kanter, 1988). It can be viewed as a process that can be planned for, managed and is influenced by social interactions. Certain types of innovation flourish in certain environments and struggles in others all of which are guided and influenced by leadership.

Traditionally Newtonian theories of leadership have accounted for the command and control function of leadership, as described by Oke et al. above. Non-Newtonian theories of leadership view this process as too complex to be managed by a single individual and thus argue that top leadership's role is the creation of the right environment or fit systems (Uhl-Bien & Marion, 2008) for innovation to flourish in. The argument can be made that given the complexity of the innovation process it is essentially too complex for a leadership style based on in the Newtonian paradigm.

Complexity leadership aims to empower agents to interact and connect freely within and between systems. In so doing leadership becomes an emergent process with different local, leaders as dictated by the situation. Contextual intelligence argues for a hybrid approach between the two, rooted in context, with context referring to the nature of interactions and interdependencies among and between agents, political alliances, organisations, social context and private context, (Kutz & Bamford-Wade, 2013).

### **2.3.1 Creativity**

Creativity is synonymous with innovation and is the single most important determinant thereof (Amabile, 1998). Oke et al. (2009) argue that the focus of competition is creativity, imagination and innovation, here they refer to the creativity economy. They argue further, that though creativity is typically associated with exploratory activities, it is also to a lesser extent required for exploitation. Creativity is an individual phenomenon and is largely a product of the imagination, (Černe et al., 2013).

As mentioned creativity is the first step in the innovation process. According to Černe et al. (2013), creativity is a complex and ambiguous construct, but can be most succinctly defined as both an outcome and a process resulting in the generation of new, potentially useful ideas within a specific social construct. Roberts (2007) argues idea generation requires, loose managerial control, pursuing parallel and diverse approaches, fostering contentiousness and stimulating a variety of inputs. Creativity requires trust, which is associated with loose managerial control. Thus, one would expect the first step in the innovation process to flourish under a leadership style which empowers agents.

Oke et al. (2009) argue that it may be difficult, even impossible for a leader make their followers more creative, however by providing the appropriate stimuli (culture, environment, etc.), a leader may positively influence the creativity of their followers. Actions influenced by leadership, which are beneficial to creativity include, the ability to take risks, deviation from the status quo and opportunities to use and apply different skills. Černe et al. (2013) summarise creativity literature as indicative that, higher levels of team leader self-confidence and consequent independence, as perceived by team members, also result in increased creative behaviours. Thereby advocating the power of leader as role model

Thus, though creativity, the most important determinant of innovation, is largely an inherent talent of followers, it is heavily influence by leadership behaviours. Accordingly, it is ex-

pected that if authentic leadership, complexity leadership or contextual intelligence is beneficial to innovation that it should provide the appropriate stimuli as for creative environments, no matter the type of innovation pursued.

### **2.3.2 Innovation Implementation**

Porter (1990, p.74) initially described the bulk of the innovation process as, “*mundane and incremental, depending more on cumulation of small insights and advances than on a single, major technological breakthrough*”. Oke et al. (2009), state that during product development, creative input from diverse sources, a tolerance for ambiguity and scope for unstructured communication is required. Whereas, later when conducting prototyping, manufacturing or distribution, formal processes, incentives and coordination across organisational units are required for efficient and timely commercialisation. Černe et al. (2013) agree that in contrast to the effort to be creative, innovation implementation is at least to some extent externally stimulated, thus requiring stimulation and incentives, hence the importance of leaders. Thus, though very important creativity does not play a major role in the bulk of the innovation process.

According to Roberts (2007), typical managerial issues involved with implementation activities include the coordination of a number of professional staff members with diverse backgrounds (e.g. engineering and accounting) to stay within budget and schedule when implementing a project. Alternately tasks when in production include, producing a predefined technical output for large volume manufacturing, reliability and cost competitiveness to name a few. Here effective managerial practices involve tight control to eliminate duplication, strong financial criteria for resource use and an adherence to plans, indicating a possible preference for command and control styles of leadership for the bulk of the innovation process.

### **2.3.3 Difficulties to innovation**

Innovation is change and is associated by the fear that there is much to lose (Porter, 1990). Added to change aversion, there is also the inherent tension between the different types of innovation be they exploratory or exploitive. Continuous acts of innovation, including both new technologies and ways of doing things, is required for a sustained competitive advantage, achieved when competitors are slow to respond, (Porter, 1990).

Kuah (2002) asserts that “*competitive advantage involves managing the entire value system, encompassing the value chains of the firm, suppliers, channels and buyers* “. Almost



any advantage can eventually be imitated, thus without persistent continual innovation, the competitive advantage will eventually be lost. Thus, there is often a natural aversion to innovation, but continuous innovation is required and requires input from many diverse and related systems.

Innovation is associated with change and the unknown. The internal organisational environment operates like an immune system to isolate and expel “hostile” individuals who challenge the current status quo, thusly for it to succeed usually requires pressure, necessity and even adversity, (Porter, 1990). According to Černe et al. (2013), because innovation implementation is engaged in changing that status quo it is bound to encounter resistance, conflict and requiring motivation and sustained effort. Thus, it would seem a motivational leadership style would be required to overcome this natural resistance and sustain organisational effort.

According to Sergio, Augusto, Gomes, Oliveira, Bagno, Lara and Uchôa (2015), Innovation is a process, the exact steps of which differ according to application. Traditionally the innovation process was predefined as a sequence of phased events. These were idea generation, idea selection, idea development and lastly product launch. However, new research suggests that the most appropriate innovation path is more complex than that and that there are several appropriate innovation paths depending on the circumstances.

Popular activities derived from this meta model include: organisational frameworks, the idea development funnel (large amount of ideas selectively progressed as they mature), the innovation portfolio, sequenced stage gate product development, the innovation value chain, innovation pentathlon, rapid prototyping, etc. However, new research argues that there is no single innovation management approach for all innovation cases and that many companies successfully employ alternate innovation processes, (Sergio et al., 2015). Thus, not only does the workforce have a natural resistance to change, but there are, as it were also many ways to skin the cat, making it difficult to know when to use which model.

Complexity and uncertainty in technology, markets, developmental levels, marketing and organisational dynamics (company size, etc.) make employing the traditional innovation model troublesome. Demand push and market pull often make for iterative approaches between various role players in which the sequence is not fixed or linear, (Sergio et al., 2015).



This study aims to investigate whether an authentic leadership style rooted in positive psychology, complexity leadership which aims to create a “fit” system with freely interacting agents or a hybrid between the two would be most beneficial in these complex, uncertain processes.

## 2.4 Leadership

In academic literature effective leadership is promoted as pivotal in the Darwinian struggle of organisations in the extremely competitive global economy, (Ford & Harding, 2011). Oke et al. (2009) attest that it is not the building of an innovative organisation, but rather the processes in which leadership affects innovation activities such as exploration and exploitation which are the ultimate determinants of innovation. They view leadership as a social process *“that takes place in a group context in which the leader influences his or her followers’ behaviors so that desired organizational goals are met”*, (Oke et al., 2009, p.68). Thus by definition a leader requires followers, (Ford & Harding, 2011). Oke et al. (2009) view a leader’s role as ranging from transformational (by influencing behaviours) to transactional (by organising the appropriate organisational context). Since leadership is a social process, leadership styles that are efficient in one country or organisation does not necessarily guarantee efficacy in another. Hence the need to test developed theories in different context.

Commonly the unit of analysis in traditional leadership theories is the leader, the leader and follower, the leader and group, etc. (Avolio, Walumbwa, & Weber, 2009). Leadership is defined as the direct and indirect influence people in positions of authority exercise to maintain or alter existing system dynamics, (Osborn & Marion, 2009). Causal mechanisms linking leadership to outcomes typically emphasised include rewards, values and other socially psychologically related issues, (Osborn et al., 2002). Often no distinction between leaders and leadership is made. Authentic leadership focusses on the formally appointed leader, whereas complexity leadership focusses on creating the right environment for efficient leadership to emerge

Oke et al. (2009), argues that a transformational leadership style is more likely to encourage creativity, for example, a leader who provides intellectual stimulation to followers encourages them to re-examine old assumptions. During the latter, implementation stages a leader’s role may involve the management of processes and system, as well as political support to transform the idea into reality, here a transactional form of leadership may be more appropriate.

However, Oke et al. (2009) also stress the importance of organisational context as the foundation upon which exploratory and exploitive activities are built. They argue that generally transformational leadership favours exploratory innovation. However, when perusing exploratory activities as part of a collaborative effort with other firms, interfirm networking may be enhanced by transactional leadership styles. In the same way, transactional leadership is generally thought to enhance exploitive innovation activities, but in certain instances e.g. repositioning an existing product in a new market, transformational leadership is thought to be the more efficient style to implement.

Thus, Oke et al. (2009) argue, that the effect of leadership style on the type of innovation pursued is moderated by the organisational context. Examples of moderators influencing transformational leadership include firm culture, risk aversion, appetite for innovation. The design of formal systems, processes and structures to guide development efforts, rewards and incentives are examples of moderators that influence transactional leadership.

Denti and Hemlin (2012) agree that leaders are responsible constructing the organisational context which could favour innovation when encouraging intrinsic motivation, facilitating problem solving and fostering a positive team climate. They also explain that in a top-down structure, leaders manage the strategic objectives of the firm, assign responsibilities and grant autonomy, as well as allocate resources. Thus, what is important to understand is when leadership is effective i.e. under which circumstances (at the individual, team or organisational levels) and through which mechanisms and processes leadership influences these outcomes. Authentic, as well as complexity leadership can be either transformational or transactional.

#### **2.4.1 Transactional leadership**

According to Timothy A. Judge and Piccolo (2004) transactional leaders are task oriented and guide followers to pursue outcomes for established goals by clarifying role and task requirements. They focus on the proper exchange of resources for follower effort. Thus, followers get something they want in exchange for something the leader wants. Dimensions of transactional leadership include active management by exception and passive management by exception. Active management by exception involves intervention of anticipated problems whereas passive leaders wait for follower behaviour to manifest before taking action (Timothy A. Judge & Piccolo, 2004). This leadership style has been shown to be efficient when exercised in contexts characterised with limited outcomes and

role clarity, where leaders have positions of authority and power (Osborn et al., 2002). This is the most common type of leadership and not correlated with effective leadership in dynamic environments or successful innovation.

#### **2.4.2 Transformational leadership**

Transformational leaders offer their followers a purpose that transcends short-term goals and rewards. The four dimensions of transformational leadership are charisma (the leader behaving in an admirable way e.g. displaying conviction), inspirational motivation (articulating a compelling vision of the future), intellectual stimulation, and individualized consideration (attending to follower needs and concerns), (Timothy A. Judge & Piccolo, 2004).

According to Osborn and Marion (2009, p.94) a key aspect of successful transformational leadership is *“changing and shaping the values, beliefs and attitudes of followers, to motivate them to perform beyond organisational expectations towards ends specified by the leader”*. Transformational leaders encourage followers to place the need of the organisation above their personal desires and develop trust and commitment between co-workers, as well as facilitating organisational learning, (Marion & Uhl-Bien, 2001). Authentic leadership was born out of transformational leadership, as it was argued for leaders to be truly transformational they would be moral, (Walumbwa, Avolio, Gardner, Wernsing, & Peterson, 2008).

Thus, transformational leadership is an active form of leadership which utilises emotive, value laden appeals to evoke unusual effort from distant subordinates. These appeals include a guiding vision of a desired future state for the company, as well as the value statements emphasizing what is important to the company, (Osborn et al., 2002). Part of the success of transformational leadership is argued to be that increases follower self-efficacy and social identification, as well as concordance between work and social lives, which represents a facilitating leadership style (Bono & Judge, 2003).

However, Osborn et al. (2002) refers to innovation, due to technological and environmental change, with planned outcomes as taking place in a context of dynamic equilibrium. This context is responsive to shifting plans and top-down strategizing by leaders. Thusly articulating a vision also entails controlling the vision which is thought to be beneficial for exploitive innovation, but not necessarily for Exploratory innovation. Here they argue strongly for vision to be an emergent phenomenon. They argue the efficacy of an emergent vision from a fit system for which formally appointed leadership is responsible. Most

companies are still bureaucratic; thus, the concept of an emergent vision is not one many of the corporate elite would be comfortable with. Indeed, one of the main tenants of leadership in the Newtonian framework is the creation of a guiding vision.

It is argued that the leader's articulated vision could inhibit creative people from forming and pursuing their own creative ideals and visions and thusly be dysfunctional for exploratory innovation, instead diverting subordinate attention to exploitive innovation, (Osborn et al., 2002). Even charismatic leadership has elements of command and control, thereby inhibiting the fitness of the system and the organisations' capacity to innovate, (Marion & Uhl-Bien, 2001). A study on the influence of leadership style on the performance of innovation seeking alliances confirmed this by finding that transformational leadership by sponsoring executives was dysfunctional to alliance innovation (exploratory innovation), but contributed positively to the strategic contribution provided to the sponsoring firm (exploitive innovation), (Osborn & Marion, 2009).

### **2.4.3 Authentic Leadership**

Avolio and Gardner (2005) argue that organisations throughout the world, be they public or private, face varying and unique stressors such as ethical breaches, terrorism and disease to name a few. This compounded with a business environment which is constantly evolving as new challenges, market demands, competition and new technologies emerge calls for a renewed focus on "genuine" leadership. A genuine leadership should be moral and have leaders who make decisions based on their core values.

This genuine leadership should focus on restoring confidence, hope and optimism displaying resilience, rapidly bouncing back from a catastrophe, helping people in their search for meaning and connection by fostering self-awareness and genuinely relating to all stakeholders. Thus, authentic leadership, a leadership construct underlying all positive forms of leadership was developed, (Avolio & Gardner, 2005). When considering news headlines, during 2017, of the corruption of high profile political and business leaders, it would become apparent that moral/ethical leadership is sorely lacking in South Africa. This leads to the question of whether this type of leadership is widely practiced in South Africa, and if not whether the business community is poorer of as a result.

#### **2.4.3.1 Definition**

Authentic leadership is defined as, *"a process that draws from both positive psychological capacities and a highly developed organisational context, which result in both greater self-*

*awareness and self-regulated positive behaviours on the part of leaders and associates, fostering positive self-development*”, (Avolio et al., 2009, p.424). Walumbwa, Avolio, Gardner, Wernsing and Peterson (2008) indicate that two important assumptions underlie the definition of authentic leadership. Firstly, it is assumed that an authentic relationship, which is both interactive and reflecting, develops between leader and followers. Secondly, that authentic leader and followership can be developed. Thus, authenticity is at the heart of the authentic leadership construct which precludes any priori leadership style-based behavioural traits. Accordingly authentic leaders can be transformational, transactional or any third type, (Černe et al., 2013). The characteristic of the inauthentic leader would be narcissistic self-interest, who would treat followers as a means to an end, (Ford & Harding, 2011).

It is argued that for a leader to be truly authentic, authenticity must be self-ascribed. However, when using empirical data to compare innovation at a team level and creativity at an individual level Černe et al. (2013) indicate that creativity and innovation is positively influenced by a leader’s perceived authenticity. In their study the leader’s self-ascribed authentic leadership was not significant. Thus, what is most important for an authentic leader is that they be perceived to be authentic.

Avolio et al. (2009) indicate that there is broad agreement in literature that there are four unique components to authentic leadership. These are balanced processing, defined as objectively analysing relevant data before making decisions. An internalised moral perspective used to guide and regulate ones’ behaviour. Relational transparency by presenting one’s authentic self through openly sharing information and feelings as and when appropriate. And lastly the self-awareness to know and demonstrate one’s strength and weakness and how one makes sense of the world. All these should be beneficial to leading the innovation process as transparency and morality results in trust and resonance with followers required for creativity, and balanced processing and self-awareness to better decision making required for implementation.

#### **2.4.3.2 Mechanism**

As discussed authentic leadership can be transformational or transactional. Although these are completely different leadership styles, Oke et al. (2009), argue that they should be seen as complementary rather than as polar opposites and that both are required for efficient organisational performance. Thus, leaders should be able to be both

Černe et al. (2013), contend that authentic leadership should be a suitable leadership style when pursuing innovation and creativity. They come to this conclusion by summarising previous research as follows. Authentic leadership focusses on the positive rather than flaws or deficits. It promotes employee trust, resulting in higher emotional safety, thus allowing for greater confidence to propose unconventional ideas. Ford and Harding (2011) add that by drawing upon positive psychology the intention of authentic leadership is the formation of certain forms of happiness, well-being and goodness which is claimed to lead to increased performance (Ford & Harding, 2011).

Avolio and Gardner (2005) explain that authentic leaders are able to spread common cognitive and behaviour patterns through all members of an organisation. This is achieved during the relational developmental process of positive modelling, where positive psychological capital is built in employees. Černe et al. (2013) add that the development of a high-quality relationship with followers influences them to engage in higher levels of creative performance.

According to Avolio and Gardner (2005) positive modelling, where the authentic relationship between follower and leader leads to followers personally identifying with and emulating leader behaviour is a process unique to authentic leadership. Thus, if the leader is pro innovation, followers who are naturally averse to change, should model the leader's behaviour if an authentic relationship was present.

#### **2.4.3.2.1 Balance Processing**

According to Černe et al. (2013) authentic leaders with high levels of self-regulation are more tolerant of ambiguity and accordingly open to change, thus they are less likely to be put off by alternate views or off by potentially risky ideas. They argue that therefore authentic leaders are good at getting team members to build on one another's ideas, as well as at combining ideas from multiple group members and implementing them within as a group outcome, all beneficial to innovation outcomes.

#### **2.4.3.2.2 Morality**

According to Avolio & Gardner (2005) authentic leaders are ethical leaders whose actions are consistent with their beliefs. They go further to state that authentic leaders are true to themselves and make difficult decisions based on their core values. Thus, the actions of such leaders are in accordance with their espoused values and principles. The link between morality and innovation is not clear except that it goes to reason that employees

would prefer to work for a moral organisation, with moral leaders. Resulting in happier employees and high-quality relationships between leader and followers, leading higher motivation, trust and satisfaction of employees

#### **2.4.3.2.3 Transparency**

Walumbwa et al. (2008) explain the benefits of presenting one's true self to others. They argue that this demonstration of openness leads to relational transparency which leads to a closer relationship between leader and follower which in turn leads to a greater exchange of knowledge and information. Černe et al. (2013) add that greater relational transparency increased the likelihood that followers perceive leaders to be supportive of their novel ideas. In so doing, the perception of support for creativity and innovation is established.

#### **2.4.3.2.4 Self-Awareness**

Avolio and Gardner (2005) contend that through the process of self-awareness authentic leaders learn to accept their identity, fundamental values, motives and goals and so by knowing themselves their self-confidence grows. Such leaders are more independent, which is modelled by followers, thereby increasing creative behaviour. Thus, the authentic leader leads by example or role modelling, followers internalise the leader's espoused values and beliefs and their conception of what constitutes their actual and possible selves are expected to develop over time. It goes to reason that an independent leader is more likely to question the status quo and explore, which is beneficial to innovation.

#### **2.4.3.3 Authentic leadership and motivation**

Černe et al. (2013) argue that authentic leadership should be positively related to creativity and innovation. They come to this conclusion by postulating that employees who are confident, hopeful, optimistic, resilient, able to overcome setbacks and who find meaning in their work are less afraid and would be more inclined to try new things.

According to Walumbwa et al. (2008), authentic leaders improve their followers' positive psychological capital; their self-esteem, hope, trust and optimism. Ilies, Morgeson, and Nahrgang (2005) contend more hopeful, optimistic and confident employees would be more likely to experiment more often without fear of failure and rejection. These positive emotions are thought to enable flexible and creative thinking. They also argue that the followers of authentic leaders are resilient and overcome obstacles more easily. Resilient



employees who aren't afraid to experiment even when highly novel ideas might fail are bound to be more creative.

According to Ilies et al. (2005) authentic leadership is related to intrinsic motivation. To this Walumbwa et al. (2008) add that the influence of authentic leadership encourages and empowers employees (or authentic followers) to take the initiative for their own development. According to Černe et al. (2013) this process is not about transforming the followers to the leader's desires as would be the case with transformational leadership, but rather about a more engaged positive development of the follower because of the leader's role modelling.

The study of Černe et al. (2013) indicated that the perception of support for innovation was a significant mediator to creativity and innovation. Amabile, Schatzel, Moneta and Kramer (2004) contend that leader support for innovation should be both emotional and instrumental. Examples of instrumental support include facilitating the process; ensuring employees have the prerequisite skills and expertise, political support, etc. Černe et al. (2013) further argue that employees' perception of support is also improved through the authentic leadership component of relational transparency. Authentic leaders are not consistently more supportive of innovation, this is in line with the definition of authentic leadership which precludes any priori biases or leadership style behavioural traits, (Černe et al., 2013).

#### **2.4.3.4 True self**

In their critique, Ford and Harding (2011) contend that the authentic leadership model presumes that when authentic leaders and followers look inward they see core organisational values. This they assert leads to the expectation that employees will internalise core organisational values and in so doing achieve the high self-clarity and autonomy associated with authenticity. They go further to state that emoting human beings are very different from that agglomeration of individuals, technology and infrastructure known as an organisation and that the authentic leadership construct is unable to distinguish between the self and the organisation. They argue that sacrificing subjectivity to that of the collective is inauthentic.

Ford and Harding (2011) also argue that the authentic leadership model refuses to acknowledge the imperfection of individuals. They continue that despite its focus of searching for one's true self it privileges the organisation or team over the individual,



which could have a harmful impact to those subjected to it be they leader or follower. In this model of self-knowledge there is no room to reveal anything which is not positive.

Ford & Harding (2011) assert that leaders and followers are not allowed to differentiate from the organisation and need to identify themselves in term of the collective, thus the authentic leader is charged with the merger of like self-beings and making others like self. The authentic leader is so absorbed by the organisation that he lacks subjectivity. One potential consequence is individuals suffering from anxiety bound up in their search for belonging. They suggest that failing to recognise the outside other (the follower) is likely to become a repudiated threatening object other. Accordingly, there is little possibility of agency in the authentic leadership model. The individual who became an authentic leader is one who caused acute distress in those working with him/her and who suffered such stress themselves.

Thus, Ford and Harding (2011) contend that though there are many benefits to the authentic leadership construct, in reality it is not possible to be a truly authentic leader. They predict that the fallout trying to implement this implementable construct could have negative consequences not only to organisational performance, but also to innovation. This raises the question that if this leadership construct is implemented in South Africa, a country where the principles of Ubuntu are espoused by high profile leaders, what the influence on innovation would be.

#### **2.4.4 Complexity leadership**

Mendes, Gomes, Marques-Quinteiro, Lind, and Curral (2016) indicate that there are plenty of empirical evidence indicating a positive relationship between organisational leadership and innovation. In organisations leadership is often regarded as a physiological trait (e.g. authentic leadership), a relationship (transactional leadership) or as being self-orientated (e.g. self-leadership) or collective orientated (shared-leadership), (Avolio et al., 2009).

However, Mendes et al. (2016) argue that the leader centric perspective offers limited understanding of the dynamics of leadership in the organisational setting. Osborn and Marion (2009) add that leadership based in the Newtonian paradigm is less effective in dynamically changing environments. This is because top-down decision making, and controlled, formalized communication and the execution of determined goals do not lend themselves to these types of complex adaptive systems.

In especially the Western mind set, leaders are often assumed to have the innate ability to arrive at correct and rational decisions, control social outcomes and to plan for different futures, (Lichtenstein et al., 2006). This view of leadership views leaders as having super-human abilities and is rooted in the Newtonian paradigm of equilibrium, stability and order. The Newtonian paradigm, rooted in physics is structured, in equilibrium and has predictable futures, (Lichtenstein et al., 2006).

Accordingly, a new mind set which recognises that social processes are too complex to be planned in streams of events or too attributed to a single individual or group is emerging. Lichtenstein et al. (2006, p.2) contend that there is “*a growing realization that effective leadership does not necessarily reside within the leader’s symbolic, motivational, or charismatic actions*”, (Lichtenstein et al., 2006, p.2).

Marion and Uhl-Bien (2001) summarises Newtonian leadership theories as conceptualising leadership as a the direct, unidirectional, interpersonal influence (mostly top down) between a specific person or group and followers. Thus, not only is leadership heavily invested in the characteristics of the leader, but also in the emotions of followers, often ignoring the human agency completely. System dynamics in which all this exchange takes place is also largely ignored.

Social groupings as found in the business environment are too dynamic, unstable and unpredictable to be described with mechanistic, linear Newtonian models, (Marion & Uhl-Bien, 2001). These models often fail to recognise the interconnectivity between different systems in the larger ecosystem. There is also the notion that in order to achieve the leader’s objectives leader act exogenously on the organisation or system, (Lichtenstein et al., 2006).

Thus, it is not only the nature of earlier leadership theories, but also its applicability in today’s VUCA world that is increasingly being questioned. To address these shortcomings, some leadership theorists have turned non-Newtonian (dynamic and iterative, unanticipated and formative) theories of leadership.

Complexity science (based in the non-Newtonian paradigm) views organisations as complex adaptive systems composed of heterogeneous agents, who interact and mutually affect one another. In so doing novel behaviour is generated for the system as a whole (Marion & Uhl-Bien, 2001). The unit of analysis in complexity leadership is the complex adaptive system (CAS), (Avolio et al., 2009). According to Mendes et al. (2016) complex

adaptive systems cannot be predicted by standard linear equations. In living systems, with numerous variables, the whole is more than the sum of its parts making it unpredictable, (Marion & Uhl-Bien, 2001). Resultant behaviours can only be understood as an emergent aftermath of the sum of many interactions embedded within the system.

Complex adaptive systems are unpredictable, interactive systems resulting from emergent structures produced by micro and macro dynamic forces. According to Marion and Uhl-Bien (2001) micro dynamic forces are bottom-up forces produced by the interaction of individual agents working together. Lichtenstein et al. (2006) describes organisations as complex, adaptive systems in which relationships are not defined by hierarchy, but rather the interactions between heterogeneous agents. Human agency and randomness in the environment make these forces unpredictable. As people work together they iteratively influence each other and common understandings emerge.

This leads to macro dynamic forces as different groupings interact with one another. Linkages created by these interactions evolve into larger and larger aggregates. These linkages are driven by needs and compromise between different agencies, non-linearity, bottom-up coordination and associations within the aggregates until it eventually develops into the complex adaptive system, (Marion & Uhl-Bien, 2001).

Thus, at a micro level complexity theory explains the interaction within systems and at a macro level the emergence of structures and behaviour that emerge unbidden from these interactions. These behaviours are self-generative rather than the product of outside forces. According to Marion and Uhl-Bien (2001, p.396) *“from a practical, human systems perspective, persistently interacting social networks create order, innovation, and fitness, but they ultimately elude control and prediction”*.

#### **2.4.4.1 Definition**

Complexity leadership theory is framed around the dynamic ability of adaptive systems, (Kutz & Bamford-Wade, 2013). Tetenbaum & Laurence (2011) describe that, whereas the Newtonian paradigm was based on physics, chaos theory has emerged from the field of biology and is modelled on nature. Accordingly, complexity theory, which is based on chaos theory, focusses on network formation and the feedback loops between and within networks. It is argued, that due to business organisations being made up of people, it is also a highly complex system with non-linear feedback loops.

According to Mendes et al. (2016) complexity leadership, views leadership as a shared, emergent process where individuals and teams interact and learn from each other to produce novel ideas and adapt within complex adaptive systems (CAS). Complexity leadership can be enacted through any interaction in an organisation. Thus, leadership changes to suit the needs of the situation or challenges in which it operates. Leadership is not considered to be restricted to a specific person or group, (Avolio et al., 2009). This suggests a form of “distributed” leadership in an interactive dynamic, within which any member will participate as leader or a follower at different times and for different purposes, (Lichtenstein et al., 2006).

According to Mendes et al. (2016) the productive well-being of one agent or the aggregate should dependent on the productive well-being of others. They should also experience adaptive tension, because without such pressures there is no initiative to change. However, complexity theory contends that due to randomness and human agency, both within and outside of the organisation, neither predictable futures, nor the control of those futures by deliberate interventions are possible, (Marion & Uhl-Bien, 2001).

Leadership effectiveness depends on being able to foster conditions (referred to as fit systems) that enable productive futures without trying to control the end goal, (Marion & Uhl-Bien, 2001). Here, the leader is not motivating followers to follow his/her wishes but rather cultivating environments where different agents can interact productively and undirected in order to generate outcomes that benefit the system to create uncontrolled futures, (Lichtenstein et al., 2006).

Individuals act as leaders when they mobilise others to seize opportunities and address issues. As the situation changes different people may act as leaders by leveraging the skill and experience required in that specific instance. In so doing leadership becomes a descriptive term of social forces at play amongst actors. This process may or may not include a formal leader and thus differs from the traditional leadership models of agent rule following, (Lichtenstein et al., 2006). In so doing emphasis is redirected away from the individual as leader to leadership as an organisational phenomenon, emerging in the interactive spaces between people and ideas, (Lichtenstein et al., 2006)

According to Lichtenstein et al. (2006), in complexity leadership theory the role of the formal appointed leader instead focusses on creating organisational conditions that enable effective, but largely unspecified, future adaptive states. Formal leaders are not in full con-

trol of organisational dynamics. Co-workers are empowered to collectively learn and implement new solutions, (Mendes et al., 2016).

#### **2.4.4.2 Mechanism**

The mechanism through which complexity leadership emerges in the system is agent interactions. It can occur anywhere in the system, and as the situation changes different individuals may contribute to the emergence of leadership, (Uhl-Bien & Marion, 2008). As agent actions resonate with one another, through sharing common interests, knowledge and/or goals, their history of interaction and sharing of worldviews a common understanding is created. Also as agents struggle with interdependency and constraints, which spread across the system generating emergent learnings are generated resulting in new capabilities, innovations and adaptability, (Lichtenstein et al., 2006).

Lichtenstein & Plowman (2009) explained that, four sequential steps are necessary to explain the emergence of leadership. Sequentially these are disequilibrium, amplifying actions, recombination/self-organization and stabilizing feedback. Thus, in complex adaptive systems, as agents interact and exchange information between them, every exchange is presented as a new possibility to learn and innovate. As agents interact and share information they learn from each other. Thereby the boundaries of the system are pushed toward newer dynamic states requiring new responses from agents operating within the system, (Mendes et al., 2016)

Positive feedback (keep doing what you are doing, grow and interact) results in a system in unstable equilibrium. Whereas negative feedback (stop doing what you are doing), results in a system in stable equilibrium. Scientists have found that it is in the uncomfortable, paradoxical, boundary conditions between stable and unstable equilibrium, where creativity thrives, (Tetenbaum & Laurence, 2011). Thus, it is argued that innovation, of which creativity is a major component, should flourish when guided with a non-Newtonian leadership style.

Mendes et al. (2016), explains that in complexity leadership theory, actual leadership is achieved through the interaction of an administrative function, an adaptive function and an enabling function. The administrative function includes typical, formal managerial activities common to the top down approach, such as coordinating and planning tasks. As it is informal, emergent, complex and dynamic the adaptive function is the opposite of the ad-

ministrative function and emerges from interactions between agents over conflicts, ideas or preferences as they strive to mitigate tensions and find common ground.

Lastly the enabling function acts as a bridge between the administrative and adaptive functions. Mendes et al. (2016) describe the enabling function as creating conditions where the interactive dynamics of adaptive leadership can emerge and integrate with the administrative function. Osborne et al. (2002) describes this enabling function of the formal leader as being responsible for patterning of attention and network development. It is this enabling function which is responsible for creating the organisational conditions which result in “fit” organisations.

#### **2.4.4.2.1 Patterning of Attention**

Patterning of attention is defined as the process on identifying information that is relevant and important in reaching organisational goals, exercised by the corporate elite (Osborn et al., 2002). Osborne et al. (2002) further argue that though long-term behaviour of systems at a macro level are unpredictable, short term behaviour at the micro level are predictable. This is due to bounded choice, when agents interact they and are free to follow, slightly alter or ignore the institutional arrangement.

Thus, in most instances agent actions are bounded by institutional arrangements. Local, micro level interactions promote novel behaviour which has system wide implications at the macro level. This is due to actions having the consequences and feedback loops. Marion and Uhl-Bien, 2001 (2001) describe complex systems as sufficiently dynamic to risk unpredictable change. However, it experiences numerous small changes frequently and predictably resulting in a system that is dynamically stable and experiences major change infrequently. This results in a level of predictability in which corporate elites can operate.

#### **2.4.4.2.2 Network Development**

Network development is the establishment of direct and indirect influence patterns. Marion and Uhl-Bien (2001) add that a leader’s relationship orientated behaviour should enable effective networks rather than only motivating enhanced effort. Network development includes the choice of the network (informational), membership to the network, inside activities in the network, as well as linkages to other networks, (Osborn et al., 2002). Complex leaders avoid solving problems, rather letting subordinates solve their own problems. To this extent they will also not only build networks, but they will also help catalyse network

building, through the delegation and empowerment of subordinates, (Marion & Uhl-Bien, 2001)

It is important to ensure that bureaucracy and organisational structure do not create barriers to connectivity between agents, (Arena & Uhl-Bien, 2016). Group cohesion is described as how connected individuals within the group are with one another. Clusters between different groups are considered highly cohesive when they have many redundant connections within the system. The benefits of cohesive groups are that individuals can quickly share information and typically demonstrate higher levels of trust than less cohesive groups, (Arena & Uhl-Bien, 2016).

Brokerage represents the bridge connections from one cluster to another cluster. For bridge connections individuals, being in a broker role has three specific competitive advantages: wider access to diverse information, early access to new information and control over the diffusion on information. High performers tend to be uniquely positioned as brokers in the organisational network, (Arena & Uhl-Bien, 2016). Brokerage across clusters spark emergence of novel ideas by leveraging the capabilities of local agents through knowledge and idea sharing. Local benefits created in the entrepreneurial context, then diffuses into the operational system when the network approaches a sponsor and gains endorsement. In so doing, the products of the entrepreneurial system are integrated into the formal operational system.

In so doing, complexity science offers a holistic view of system interaction. Accordingly complexity leadership views leadership as more than just interpersonal influence but as providing linkages to emergent structures within and among organizations, (Marion & Uhl-Bien, 2001). Due to the complex, unpredictable, dynamic nature of organisational systems, complex leadership involves influencing networks and system formation in ways that permit innovation and dissemination of innovations so critical for “fitness” of the firm. On a local level, leaders cultivate largely undirected interactions by agents, enabling correlation as agents work through conflicting constraints that would confound a top-down approach.

#### **2.4.4.3 Complexity Leadership and Innovation**

Mendes et al. (2016), state that innovation occurs when events fill the open spaces between members and this leads to the creation of new knowledge as ideas emerge and clash with member preferences. According to Arena and Uhl-Bein (2016) organisations



have two primary systems that operate in tension with one another. These are the operational system, driving formality and standardisation for business performance and the entrepreneurial system striving for innovation, learning and growth. They contend that the widespread belief is that leaders should reduce the conflict experienced between these two systems, but that it is this dynamic conflict which is responsible for innovation within an organisation. They go further to state that *“it is in the tension that occurs between the operational system pushing for administrative efficiency (e.g., schedule, budget, results), and the entrepreneurial system pushing for creativity, learning and growth, that innovation and adaptability are enabled”*, (Arena & Uhl-Bien, 2016, p.24).

Thus adaptability, which enhances performance and innovation, occurs in the everyday interactions of agents, acting in response to pressures and opportunities in the local context. Through systems interaction, local phenomena link up with one another creating emergent phenomena. Their research indicates that adaptive organisations are very good at enabling and embracing this interface between the operational and entrepreneurial system known as the adaptive space.

According to Arena and Uhl-Bien (2016, p.24) *“in this way, novel ideas are more readily introduced, more openly shared and more effectively integrated into formal processes. All of this is essential to scaling and creating value in organizations. Adaptive space, therefore, is essential in helping organizations become and remain adaptive. It helps address the most pressing problem facing organizations today: the need to overcome the overwhelming bias in organizations for the operational system to stifle out the creative energy of the entrepreneurial system, thereby limiting bold innovations and inhibiting adaptive capacity”*.

Leaders' focus should shift from driving and managing outcomes to creating adaptive spaces where emergence can happen. According to Marion and Uhl-Bien (2001) effective organisational change has its own dynamic, that cannot simply follow strategic shifts and that is longer and subtler than can be managed by any single leader. This process is generated by the insights of many agents attempting to improve the whole accumulating over long periods. Thus innovation emerges when members work through issues they have to solve rather than from the vision of the leader, (Mendes et al., 2016).



#### **2.4.5 Difficulties with complexity leadership**

Organisational design and structure has been found to be a major impediment to complexity leadership, (Uhl-Bien & Marion, 2008). As most of the organisational structures of firms are bureaucratic, the adaptive function of complexity leadership is suppressed, (Mendes et al., 2016). Hierarchical leadership structures tend to hamper dissemination of information and knowledge, this occurs due to an impediment to open communication across organisational levels when formalised central decision making occurs, (Mendes et al., 2016).

#### **2.5 Contextual Intelligence**

Leadership does not occur in a vacuum, but is heavily influenced by context. Context refers to the set of constraints and choices available to the leader, (Osborn & Marion, 2009). Context is the reference to the nature of interactions and interdependencies among and between agents, political alliances, organisations, social context and private contexts. Thus, effective leadership means different things in different settings and depends on a wide variety of environmental and organisational influences, (Osborn et al., 2002). Environmental influences include culture/climate, conditions and time (position in the life cycle). Organisational influences include organisational goals, composition, processes and structure.

According to Kutz and Bamford-Wade (2013), for organisations to survive and thrive within complex adaptive systems, they have to embrace reading and making sense of the dynamics and changes that effect their ability to work and learn effectively. This involves developing and identifying processes for reading, noticing and making sense of the context in its full complexity and wholeness.

Leadership is a social process which moves from an individualistic ideal to a collective ideal, thus to understand leadership correctly it must be understood within the context it takes place, (Kutz & Bamford-Wade, 2013). Non-Newtonian paradigms influence contextual intelligence by placing a higher priority on present, than past events and anticipated futures. It also impacts who are leaders are, where leadership takes place and how it is measured, (Kutz & Bamford-Wade, 2013).

Kutz and Bamford-Wade (2013) explain that contextual intelligence is the awareness of the interactions between agents, as well as movement among agents, which ultimately informs behaviour in a socially complex environment. This environment is considered in

terms of an unpredictable future, but where tradition, precedent and history matter. Leadership does not only take place in a specific context, but the two influence each other reciprocally. Thus, the dynamic nature of contexts is important. Regarding context, large context has sub contexts (thus internal shifting in the variables and factors which make up the context) and different contexts influence one another, like planets they can align, collide and influence each other with gravitational pulls. The values, behaviours etc. that thrive in one context would not necessarily transition successfully to another one.

### **2.5.1 Definition**

Contextual intelligence in a model developed by Kutz and Bamford-Wade (2013) which aims to integrate the non-Newtonian perspective with traditional leadership competencies in a leader-follower-content interconnected relationship. According to Kutz and Bamford-Wade (2013, p.20), *“Simply stated, contextual intelligence is the ability to interpret and appropriately react to changing surroundings... [and] is a skill that separates many leaders from non-leaders... [and] depends on the correct assessment of people.”* Thus, context should determine the leader’s actions and not their background.

### **2.5.2 Mechanism**

Contextual intelligence is thought to enhance non-Newtonian based paradigms by incorporating principles of tacit knowledge, synchronicity and time orientation, (Kutz & Bamford-Wade, 2013). Tacit knowledge is thought of as intuition or wisdom and is often associated with expert behaviour. It is what is known to be true, but difficult to explain how it was learned. It is the ability to compare similarities between different situations. The simplest and most abundant source of tacit knowledge is trial and error experiences, however this only actualises when actions are analysed in light of outcomes (Kutz & Bamford-Wade, 2013).

Kutz and Bamford-Wade (2013) explain that time orientation is how a leader frames the past, present and future when making decisions. They argue that all three, time frames should be considered simultaneously when making decision. This results in the formula of Insight (Present) being equal to Hindsight (Past) plus Foresight (Future). Contextual intelligence offers a background to actions taken or to be taken during the different time frames.

Kutz and Bamford-Wade (2013) contend that contextual intelligence is a model that can be learned by any person. It is framed around the integration of several factors including a

grasp of non-Newtonian frameworks, synchronicity and double loop learning, tacit based knowledge and proper time orientation. Together with the implementation of the twelve contextually intelligent behaviours, the aforementioned leads to contextual intelligence. The twelve behaviours should be practiced simultaneously and are, future mindedness, being an influencer, being mission minded, being a communitarian, cultural sensitivity, being able to apply multicultural leadership, context diagnoses, being a change agent, intentional leadership, a critical thinker, a consensus builder and being future minded (again).

### **2.5.3 Contextual Intelligence and Innovation**

Synchronicity, the concept of two simultaneous events that are not causally related, resulting in a meaningful connection it thought to be an abundant source of innovation, (Kutz & Bamford-Wade, 2013). As identified by Drucker (1998), incongruity, changes in perception and new knowledge are all sources of innovation. Mendes et al. (2016) indicate the often innovation activities are carried out as a response to uncertainty and demands of the context. Thus, ability to work in this uncomfortable space and make meaningful connections between seemingly unrelated, synchronous events can be a great source of innovation within organisations. Kutz and Bamford-Wade (2013) have identified the symbiotic relationship between tacit knowledge and synchronicity, as a differentiator of leadership able to rapidly respond in complex adaptive systems.

### **2.5.4 Difficulties**

Kutz and Bamford-Wade (2013) have reported that there four obstacles to contextually intelligent behaviours. These are the pace of change, failure to embrace complexity, learned behaviour, and inappropriate orientation to time. They argue that these obstacles can be overcome by viewing the environment according to the non-Newtonian framework, a proper time orientation and the ability to reframe past experiences.

## **2.6 Summary**

In conclusion, this research is to be a study of leadership, but as leadership does not happen in a vacuum context needs to be accounted for as well. The organisational context characterising today's business environment is dynamic equilibrium and edge of chaos. Literature suggest that organisations should be viewed as complex adaptive systems. Thus, both organisations and the environments they operate in are in a constant state of change where inputs result in non-linear outputs. Innovation is critical for organisational

survival and it takes effort to overcome organisational entropy. Innovation can be characterised as exploitive (incremental improvements to existing products or processes, strategically exploited) or exploratory (entirely new products).

The leadership styles to be investigated range from top-down to bottom-up. Top-down approaches rely on leader to control, plan and structure innovation interventions. Bottom-up approaches see leadership as fluid. In bottom-up approaches there is a distinction between formally appointed leaders and leadership and leadership is dictated by circumstances. Here the corporate elite are charged with creating and maintaining an environment conducive to innovation. These environments include open, flat networks between different stakeholders where information flows freely.

## **Chapter 3: Research Hypothesis**

### **3.1 Introduction**

This chapter introduces the Research Hypotheses and Objectives of the study. From the existing literature in review, it is evident that innovation is a very complex process. Desired outcomes could either be exploratory or exploitive in nature, each benefitting from different leadership behaviours. This study aims to understand the relationship between the leadership style employed and innovation outcomes in South African organisations.

### **3.2 Research Question 1 – Leadership**

**RQ 1:** Are the leadership styles, authentic leadership, complexity leadership and contextual intelligence, theorised to be advantageous to the outcome of innovation activities practiced in South Africa?

The objective of this research question is to determine whether the leadership styles to be investigated are being implemented in South African organisations.

As there are several leadership styles to be investigated, this research question had several sub-hypotheses:

#### **3.2.1 Hypothesis 1 A**

**H<sub>01A</sub>:** There are low levels of Complexity Leadership in South African organisations

**H<sub>A1A</sub>:** There are not low levels of Complexity Leadership in South African organisations

#### **3.2.2 Hypothesis 1 B**

**H<sub>01B</sub>:** There are low levels of Contextual Intelligence in South African organisations

**H<sub>A1B</sub>:** There are not low levels of Contextual Intelligence in South African organisations

#### **3.2.3 Hypothesis 1 C**

**H<sub>01C</sub>:** There are low levels of Authentic Leadership in South African organisations

**H<sub>A1C</sub>:** There are not low levels of Authentic Leadership in South African organisations

### **3.3 Research Question 2 – Innovation**

**RQ 2:** Do South African companies innovate?

This research question aims to understand how prevalent innovation is in South African organisations.

### 3.3.1 Hypothesis 2

**H<sub>02</sub>**: There are low levels of Innovation in South African organisations

**H<sub>A2</sub>**: There are not low levels of Innovation in South African organisations

### 3.4 Research Question 3 – The effect of leadership on Innovation

**RQ 3**: Which leadership style is most advantageous to innovation outcomes in South African organisations?

This research question aims to understand the relationship between leadership as independent variable and innovation the dependant variable. As there were several leadership styles and types of innovations to be investigated, this hypothesis had several sub-hypotheses:

#### 3.4.1 Hypothesis 3A

Hypothesis 3A tested the influence of complexity leadership on exploitive innovation and was stated as follows:

**H<sub>03A</sub>**: Complexity Leadership has no influence or a negative influence on exploitive innovation in South African organisations,  $r \leq 0$

**H<sub>A3A</sub>**: Complexity Leadership has a positive influence on exploitive innovation in South African organisations,  $r > 0$

#### 3.4.2 Hypothesis 3B

Hypothesis 3B tested the influence of authentic leadership on exploitive innovation and the hypothesis was stated as follows:

**H<sub>03B</sub>**: Authentic Leadership has no influence or a negative influence on exploitive innovation in South African organisations,  $r \leq 0$

**H<sub>A3B</sub>**: Authentic Leadership has a positive influence on exploitive innovation in South African organisations,  $r > 0$

### 3.4.3 Hypothesis 3C

Hypothesis 3C tested the influence of contextual intelligence on exploitive innovation and the hypothesis was stated as follows:

**H<sub>03C</sub>**: Contextual Intelligence has no influence or a negative influence on exploitive innovation in South African organisations,  $r \leq 0$

**H<sub>A3C</sub>**: Contextual Intelligence has a positive influence on exploitive innovation in South African organisations,  $r > 0$

### 3.4.4 Hypothesis 3D

Hypothesis 3D tested the influence of Complexity Leadership on exploratory innovation and the hypothesis was stated as follows:

**H<sub>03D</sub>**: Complexity Leadership has no influence or a negative influence on Exploratory Innovation in South African organisations,  $r \leq 0$

**H<sub>A3D</sub>**: Complexity Leadership has a positive influence on Exploratory Innovation in South African organisations,  $r > 0$

### 3.4.5 Hypothesis 3E

Hypothesis 3E tested the influence of Authentic Leadership on Exploratory Innovation and the hypothesis was stated as follows:

**H<sub>03E</sub>**: Authentic Leadership has no influence or a negative influence on Exploratory Innovation in South African organisations;  $r \leq 0$

**H<sub>A3E</sub>**: Authentic Leadership has a positive influence on exploratory innovation in South African organisations,  $r > 0$

### 3.4.6 Hypothesis 3F

Hypothesis 3F tested the influence of Contextual Intelligence on Exploratory Innovation and the hypothesis was stated as follows:

**H<sub>03F</sub>**: Contextual Intelligence has no influence or a negative influence on Exploratory Innovation in South African organisations,  $r \leq 0$

**H<sub>A3F</sub>**: Contextual Intelligence has a positive influence on Exploratory Innovation in South African organisations,  $r > 0$

The hypotheses that have been described above will be explored further in the chapters that follow. Chapter 4 details the research methodology that will be employed to uncover the objectives of this study.



## **Chapter 4: Research Methodology**

### **4.1 Introduction**

This chapter describes the research methodology and approach used in obtaining data and calculating results for the study. The study was set out to examine the causal relationship between different leadership styles and exploitive and exploratory innovation. To expand and defend the selected research methodology, a description of the population, unit of analysis, measurement instrument, data gathering and analysis processes, as well as the limitations of the study are given. Each sub-section has been motivated in the context of how it has been applied in the study. This research is classified as a deductive, quantitative research.

### **4.2 Research Design and Methodology**

Research is an investigative process aimed at creating new knowledge (Swanson & Holten, 2005). According to Greener (2008), the research approach is influenced by the following variables:

- Research topic
- Target audience
- Available time and resources
- Access, both to information and people
- Type of study

Apart from the research objective, the research design should also take note of ethical issues and social entities and will lead the approach in addressing the items listed above. Research may be qualitative, quantitative or combined in nature (Saunders & Lewis, 2012).

Qualitative research uses data collected through observations and the use of open-ended questions. It uses an inductive approach in generating theories. A research of this nature allows subjective perspectives of the subject at study, rather than the reality (Greener, 2008). Quantitative data tests objective theories by examining the relationship among variables, and gathering data using statistical procedures. Quantitative studies are associated with a deductive approach to testing a theory. Such approaches to research use a “number or fact” and provides an objective view or perspective of the subject being studied (Greener, 2008). Combined methods utilises a mixture of both qualitative and quantitative research to derive objective views and insights (Cresswell, 2009).

Greener (2008, p. 38), recommends that prior to selection of the desired research approach, the researcher should answer two questions, which helped identify the best approach to be used in this study. These questions were:

1. How do factors such as reliability, validity, research paradigms and multi-methods relate to the research?
2. If a mixed method is used, what reasons justify this choice

These two questions prompted the critical analysis of the approach to be used within this study. The researcher also studied the key differences, as shown in Table 4-1 below, between quantitative and qualitative research to further justify the research approach selected.

Table 4-1: Key differences between qualitative and quantitative approaches  
(Greener, 2008, p.80)

<b>Quantitative Research</b>	<b>Qualitative Research</b>
Numbers	Words
Point of view of researcher	Points of view of participants
Distant researcher	Close researcher
Theory testing	Theory emergent
Static	Process
Structured	Unstructured
Generalisation	Contextual understanding
Hard reliable data	Rich deep data
Macro	Micro
Behaviour	Meaning
Artificial settings	Natural settings

The objective of the study was to conduct a structured research that would provide hard, reliable data. The researcher sought to examine the probable relationships between independent and dependent variables (Cresswell, 2009), namely, leadership styles and innovation. Thus, this research is quantitative in nature.

Furthermore, a descriptive approach was used in investigating the influence of leadership style on innovative activities. This approach was chosen, firstly because there had been similar research done on the moderating role of environmental dynamism on strategic leadership for innovation (Jansen, Vera, & Crossan, 2009), and secondly because the

researcher tested theories and broad explanations that predicted the results from the relating variables (Cresswell, 2009). Additionally, since it provided direct relationship correlations between different styles of leadership and innovation, this study added a different dimension to existing studies which are mostly qualitative in nature, such as the one conducted by Osborn and Marion (2009).

### **4.3 Population**

A population encompasses a group of entities from which information can be obtained (Babin, Carr, Griffin, & Zikmund, 2012). According to Creswell (2009) quantitative researchers sample from available lists and people. Hence the target population (a group of individuals with common defining characteristics) chosen for this research were knowledge workers who work for organisations in South Africa. For the purposes of this study a variation of Yao and Fan's (2015) definition of knowledge workers was used. Here knowledge workers refer to *"highly educated individuals that have been trained in one or more professions and combine significant levels of technical skill in problem identification and problem solving"*, (Scheepers, 2017).

This population was selected due to the availability of data collected for the 2017 full-time MBA, Organisational Transformation and Development syndicate assignments. The objective of that research was to investigate how leadership in South African organisations is creating the context to continually learn, adapt and innovate, (Scheepers, 2017). Due to the similarity of the research objectives it was decided that data collected for the syndicate assignments could be used as secondary data and fulfil the objectives of this research.

The chosen population was not differentiated based on industry as it was assumed that the nature of knowledge work, as defined above is similar across industries. However, control variables such as company size and nature of the organisation (bureaucratic or entrepreneurial) were considered when selecting the population.

### **4.4 Sample Size and Sampling Technique**

The sample is a sub group of the selected target population. These are the selected individuals which the researcher chooses from the target population, from whom data is collected, and results are generalised from (Cresswell, 2009). Sampling is a proven way of *"studying people and their activities, thoughts, attitudes, abilities, relationships"* (Greener, 2008, p.47). A cross-sectional sample was taken across many industries employing knowledge workers, as defined above.

Typical sampling methods include probability and non-probability sampling (Saunders & Lewis, 2012). As it was required that the sample meet certain criteria in order to participate in the study non-probability sampling was used (Saunders & Lewis, 2012). Furthermore, the study made use of secondary data, hence probability sampling could not be employed (Saunders & Lewis, 2012). Non-probability sampling allowed the calculation of descriptive statistics of samples.

According to Creswell (2009, p.145) there are, “*two popular approaches in non-probability sampling, namely, snowball sampling and convenience sampling*”. Snowball sampling was the preferred method as a lecturer supplied the questionnaires to the students who then forwarded it to people who they believed met the selection criteria as being knowledge workers. The sampled was obtained through this sampling technique. The sample size for this study was 302.

#### **4.5 Unit of Analysis**

The study involved finding the correlation between leadership styles and innovation. The unit of analysis for this study were individual knowledge workers (as defined in section 4.3) from a variety of industries.

#### **4.6 Measurement Instrument**

Saunders and Lewis (2012) defines a measurement instrument as a tool for research that is reliable and valid. The measurement instrument employed in this research was a questionnaire that was distributed electronically to the selected sample. The questionnaire made use of a Likert Scale to measure the responses obtained from the participants. Likert type scales are a popular tool in quantitative studies and are often used to make relative judgements about measures of attitude and behaviours, (Maeda, 2015). As can be seen from Table 4-2 a five-point Likert scale was utilised in this study with responses ranging from strongly agree to strongly disagree.

Table 4-2: Five Point Likert Scale

Strongly agree	Agree	Neutral	Disagree	Strongly disagree
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#### **4.6.1 Innovation**

The dependent variable was measured using two 7-item sets of questions. One set was used to determine exploratory innovation and the other exploitive innovation. These questionnaires were as per those used by Jansen et al. (2009) in their research.

#### **4.6.2 Complexity Leadership**

Complexity leadership was measured through the dimensions of patterning of attention, using a 6-item question set, developing networks also using another 6-item question set.

#### **4.6.3 Authentic Leadership**

Leader characteristics were measured using the using the 16-item Authentic Leadership Questionnaire. This type of questionnaire allowed the respondents to provide straight to the point answers. The questionnaire used was the Authentic Leadership Questionnaire (ALQ) developed and validated by Walumbwa et al. (2008). The AQL sets out to measure Authentic Leadership through the dimensions of transparency using a 5-item question set, morality/ethics using a 4-item set, balanced processing using a 3-item set and self-awareness using a 4-item set.

#### **4.6.4 Contextual intelligence**

Contextual intelligence was measured using a 7-item Contextual Intelligence Questionnaire.

### **4.7 Data Collection and Analysis**

As discussed in section 4.3, this study made use of secondary data that was collected previously on a core module MBA syndicate assignment (Scheepers, 2017). Secondary data is defined as “*data used for a research project that was originally intended for some other purpose*” (Saunders & Lewis, 2012, p.84). Secondary data may have been collected (Greener, 2008):

- By other researchers, during their academic studies
- From an organisation’s normal operations i.e., sales figures
- By institutions that collect data

The data used in this research was collected for the purposes of academic studies. The questionnaire was initially piloted by the 2017 full time MBA students as part of their syndicate assignments. According to the definition used in section 4.3, MBA students fit the

definition of knowledge workers and accordingly their professional networks would comprise of other knowledge workers in the form of colleagues, clients and service providers.

The MBA students were divided in to 7 syndicates and a total of 302 responses were obtained (though after validation the number decreased to 246). The questionnaires that were used to collect the data did not contain any sensitive or filter questions (Saunders & Lewis, 2012). Prior to collecting the data, the actual participants were provided with a consent letter which explained the purpose of the research, and how the data collected was to be used. The letter also affirmed to the respondents that information shared would be kept strictly confidential

Secondary data was provided to the researcher, for this study. The researcher analyzed the data to ensure that the data provided covered the exact population which the researcher chose to study.

#### **4.7.1 Data analysis**

The data was captured and summarised in Microsoft Excel before being imported to IBM Statistical Package for Social Science (SPSS) version 24. The data was then arranged, exhibited and deciphered. SPSS is the most commonly used tool for statistical test and analysis (Greener, 2008).

The data was prepared by coding and conducting missing data analysis, as well as analysis for extreme outliers. All the data was found to be within an acceptable range of 5% (Schafer, 1999). After the missing data analysis, normality and outlier analysis were conducted to determine whether parametric or non-parametric instruments were to be used for inferential statistical analysis. The data was found to be normal, with no major outliers. Skewness and kurtosis confirmed the normality with all the values within  $\pm 2$  (George & Mallery, 2003).

Descriptive statistics were conducted to understand the spread and central tendency of the data. For the spread of data, frequency, percentage frequency and standard deviation were employed while mean and median were utilised for central tendency. To test for the hypotheses, inferential statistics were conducted.

Before this was done, an exploratory factor analysis using principal component analysis (PCA) with varimax rotation was employed to determine construct validity. These factors

were subjected to reliability testing to confirm their internal consistence reliability. Differences between leadership style and innovation outcomes were investigated by a one sample t-test, where “3” was the test value for Likert scale response. Pearson correlation ( $r$ ) was used to test relationships, with Pallant (2010) guidelines used to determine the strength of the relationship.

Linear regression analysis was conducted to understand how much was explained by the relationships for all those relationships which were statistically significant. Control variables on these relationships were investigated using hierarchal regression. A p-value of 0.05 was used as the cut-off for significance or the maximum level that is acceptable (Greener, 2008). If the p-value was found to be less than 0.05, the null hypothesis was rejected. If the p-value was higher than 0.05, it could not be concluded whether or not a significant difference existed (Stern, 2016).

## **4.8 Measurement Validity and Reliability**

### **4.8.1 Validity of the study**

The researcher ensured measurement validity and reliability of the study. Validity refers to the appropriateness and accuracy of the research, i.e., “*it is the degree to which the researcher has measured what he has set out to measure*” (Kumar, 2011, p.166). In this study face, content, and construct validity was conducted (Kumar, 2011).

#### **4.8.1.1 Face and content validity**

The researcher ensured that there was a logical link between research hypotheses and objectives of the study. This was done during the formulation of the hypothesis in Chapter 3, by ensuring that there was a substantial link between hypotheses and existing peer-reviewed literature, (Greener, 2008). After the literature review, a conceptual framework was developed that linked the objectives of the study with the developed hypotheses.

#### **4.8.1.2 Construct validity**

Construct validity was conducted on complexity leadership, authentic leadership, contextual intelligence and innovation, by the establishment that the contribution of each construct to the total variance was relatively high, (Kumar, 2011). Tests conducted to determine construct validity, included the Kaiser-Meyer-Olkin (KMO) and Bartlett’s test for sampling accuracy, as well as the determination of eigenvalues. The KMO test determines the suitability of collected data for factor analysis (a variable reduction technique), and is a

measure of the proportion of variables that might have common variance (Hair, Black, Babin, Anderson, & Tatham, 2006). KMO values between 0.8 and 1 indicate that adequate sampling has taken place. The Bartlett's Test of Sphericity tests for homogeneity of variance and accordingly relates to the significance of the study, thus indicating validity and suitability of the responses. Generally values of below 0.05 is acceptable for the Bartlett's test, (Hair et al., 2006).

A factor is made up of a set of observed variables with similar response patterns that are associated with a "hidden" variable not directly measured, (Hair et al., 2006). Factor loadings larger than 0.4 was deemed significant, (Pallant, 2010). The eigenvalue of a factor represents the amount of variance of the variables accounted for by the factor. This is a key concept of factor analysis, where multiple observed variables have similar patterns of responses all associated with that latent variable. The lower the eigenvalue, the less that factor contributes to the explanation of variances in the variables, (Norris & Lecavalier, 2010). Generally, it is desirable for eigenvalues to be larger than 1.

#### **4.8.2 Reliability of the study**

Reliability refers to "*consistency or reliability over time*" (Greener, 2008, p.37). Kumar (2011) stated that the reliability of the study may be affected by several factors, such as the wording of questions, physical settings, interviewer's mood and nature of interaction among others. For the purposes of this study, reliability was ensured by the study being conducted and delivered in a transparent manner, such that any future research conducted will produce the same results. The questionnaire was also constructed in a manner where there is no ambiguity and meanings were not lost in translation, i.e., questions were straight forward and easy to understand. The guidelines of George and Mallery (2003) was used to assess the reliability of the developed constructs, with a Cronbach's alpha coefficient  $\geq 0.7$  deemed as acceptable.

#### **4.9 Limitations of the Study**

The limitations of this study included the following:

- Since quantitative research questionnaires are organised in a closed ended questioning technique, there was limited data accessible from the respondent.
- The samples were selected based on the judgement and network of MBA students and could be biased as human judgement varies between observers.



- Due to the time constraints associated with this research project a cross-sectional sample was taken. In order to empirically establish causal claims a longitudinal study is required, (Jansen et al., 2009).
- The presentation of the data was also largely dependent on the purpose of the original research (Greener, 2008). However, due to the similarities between the research objectives this was not deemed as an issue for this research.

## Chapter 5: Findings of the Study

### 5.1 Introduction

The hypotheses to be tested in this study were presented in Chapter 3. Research Design and Methodology for data collection and hypothesis testing were discussed in Chapter 4. This chapter will present the findings of the study. Findings are to be discussed and compared to literature in Chapter 6.

### 5.2 Biographic Profile and Control Variables

The questionnaire had ten questions that profiled the respondents in this study. Six questions were for the determination of personal characteristics (age, gender, highest level of education, race group of the participants, tenure in the organisation and the discipline of the participants) and four were control variables (level of management, size of organisation, age of organisation and whether the participants could describe the organisation as bureaucratic or entrepreneurial). The personal characteristics profiles are presented in Table 5-1.

#### 5.2.1 Biographic Profile

Table 5-1: Biographic profile of the participants

	Profile	Frequency (n)	Percentage frequency (%)
Age	20-30	89	36.2
	31-40	92	37.4
	41-50	45	18.3
	51-60	20	8.1
	Total	246	100
Gender	Male	120	49
	Female	125	51
	Total	245	100
Highest level of education	Matric	11	4.5
	Diploma	15	6.1
	Undergraduate Degree	68	27.8
	Postgraduate Degree	151	61.6
	Total	245	100
Race group	Asian	3	1.2
	Black	63	25.6
	Coloured	5	2
	Indian	25	10.2
	White	148	60.2
	Other	2	0.8
	Total	246	100

Profile		Frequency (n)	Percentage frequency (%)
Tenure	0-2 years	71	28.9
	3-5 years	77	31.3
	6-10 years	62	25.2
	11-15 years or more	36	14.6
	Total	246	100
Discipline	Finance	60	24.4
	Human Resources	8	3.3
	Information Technology	12	4.9
	Marketing	17	6.9
	Operations	24	9.8
	Projects	23	9.3
	Research and Development	15	6.1
	Sales	9	3.7
	Other	78	31.7
	Total	246	100

At 37.4% (n=92) of the sample, the highest number of respondents were aged 31-40 years, followed closely by those aged between 20-30 at 36.2% (n=89). 51.0% (n=125) of the respondents were female and 49.0% (n=120) were male. 61.6% (n=151) of the sample indicated that they had a postgraduate degree as their highest level of education achieved, followed by 27.8% (n=68) of those indicating that they had undergraduate degree. Ethnically, most of the sample was white at 60.2% (n=148) of the sample, followed by black respondents at 25.6% (n=63). 31.3% (n=77) of the respondents indicated that they had been at the organisation for 3-5 years, 28.9% (n=71) for 0-2 years, 25.2% (n=62) for 6-10 years and 14.6% (n=36) for 11-15 years or more. Most of the respondents, 31.7% (n=78), indicated that they worked in the other discipline category, followed by those that they worked in finance with 24.4% (n=60).

### 5.2.2 Control Variables

Control variables are presented in Table 5-2. At 33.1% (n=81) of the respondents, the largest group comprised of middle managers. They were followed by staff and senior managers at 22.4% (n = 55) and 18.4% (n = 45), respectively. 32.9% (n =81) of the respondents indicated that the size of the organisation they worked for was larger than 1000 employees, while 28.0% (n=69) indicated that their organisation was sized at 1-50 employees. 82.9% (n=203) of the sample indicated that their organisations were older than 10 years, followed by 8.2% (n=20) indicating that their organisations were between 5 and 10 years old. Half of the participants described their organisation as bureaucratic while the other half described their organisation as being entrepreneurial.

Table 5-2: Control variables

Control variables		Frequency (n)	Percentage frequency (%)
Level of management (MLev)	Staff	55	22.4
	Supervisor	11	4.5
	Middle Manager	81	33.1
	Senior Manager	45	18.4
	Executive	34	13.9
	Other	19	7.8
	Total	245	100
Size of organisation (SOrg)	1-50 employees	69	28
	50-100	20	8.1
	100-200	18	7.3
	200-500	33	13.4
	500-1000	25	10.2
	More than 1000	81	32.9
	Total	246	100
Age of organisation (AOrg)	Less than one year	3	1.2
	Between 1 year and 3 years	9	3.7
	Between 3 and 5 years	10	4.1
	Between 5 and 10 years	20	8.2
	Older than 10 years	203	82.9
	Total	245	100
Bureaucratic or Entrepreneurial (TOrg)	Bureaucratic	123	50
	Entrepreneurial	123	50
	Total	246	100

### 5.3 Factor Analysis

As discussed in Chapter 4, factor analysis was conducted on the data obtained from the questionnaires. A summary of results for the KMO and Bartlett's Test of Sphericity are presented in Table 5-3. Individual KMO and Bartlett's test results for the independent and dependent variables as summarised in Table 5-3, are attached in Appendix A.

Table 5-3: Summary KMO and Bartlett's Test Results

Variable	KMO	Bartlett's Test
Innovation	0.890	.000
Complexity Leadership	0.935	.000
Authentic Leadership	0.955	.000
Contextual Intelligence	0.906	.000

The KMO coefficients for Innovation, Complexity Leadership, Authentic Leadership and Contextual Intelligence are 0.890, 0.935, 0.955 and 0.906 respectively. This indicates that adequate sampling has taken place for all variables tested. With a p-value <0.000 Bart-

lett's Test of Sphericity was significant for all variables, confirming suitability of factor analysis, (Hair et al., 2006).

Table 5-4 summarises extracted variance, loading and eigenvalues for the dependant and independent variables. Individual, detailed results of those summarised are attached in Appendix B. The analysis extracted three factors from 13 questions in the innovation question set. The responses to Q12\_10 "We introduce improved, but existing products and services for our local market", were excluded because they were highly non-normal and had large outliers. The total variance was approximately 62.5%, with all factors having a factor loading more than 0.4 and Eigenvalues more than one. Factor one had the highest variance with 43.4% followed by factor two with % variance of 11.0% and eigenvalues of 5.6 and 1.4 respectively. The rotated component matrix indicating the statements that constituted the factors, are attached in Appendix C.

Table 5-4: Summarised Extracted Variance, Loading and Eigenvalues

Total Variance Explained							
Description	Component	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
		Total	% of Variance	Cumil. %	Total	% of Variance	Cumil. %
Innovation	Factor 1	5.640	43.383	43.383	3.157	24.282	24.282
	Factor 2	1.435	11.042	54.425	2.896	22.280	46.563
	Factor 3	1.405	8.041	62.466	2.067	15.903	62.466
Complexity Leadership	Factor 1	7.321	61.009	61.009	5.087	42.392	42.392
	Factor 2	1.085	9.039	70.048	3.319	27.657	70.048
Authentic Leadership	Factor 1	9.855	61.593	61.593	7.086	44.285	44.285
	Factor 2	1.092	6.824	68.418	3.861	24.132	68.418
Contextual Intelligence	Factor 1	4.570	65.292	65.292	4.570	65.292	65.292

The analysis extracted two factors, from the 12 questions in the two 6-item set Complexity Leadership questionnaire. The total variance was 70.0%, with all having a factor loading more than 0.4 and eigenvalues of more than 1. Factor 1 had the highest %variance of 61.0% and the Eigenvalue was 7.3.

Two factors were extracted from the 16 questions in the Authentic Leadership questionnaire. Three questions with high non-normal and large outlier values were excluded. Table 5-4 indicates a total variance of 68.4%, with all having a factor loading more than 0.4 and

Eigenvalues more than one. Factor one had the highest % variance of 61.6% with an eigenvalue of 9.9.

The analysis extracted one factor from 7-item question set. A total variance of 65.3%, with a factor loading of more than 0.4 and an eigenvalue of more than one was calculated. As the 7-item question set yielded only one factor no rotated matrix could be developed for this latent construct.

### 5.3.1 Construct Reliability and Validity

As discussed above, factor analysis yielded factors explaining much of the variance of the dependant and independent variables. In some case, generated factors differed from the factors expected from the questionnaires sent out. The rotated component matrix indicating the questions that constituted the generated factors, are attached in Appendix C. New generated factors for each variable is presented in Table 5-5.

As presented in the rotated component matrix in Appendix C the factors generated for Exploitive Innovation was made up of responses to questions Q12\_8 to Q12\_14 which corresponded to the exploitive innovation question set. Q12\_1 to Q12\_7 corresponded to exploratory innovation. Interestingly distinction was made between two types of exploratory innovation. The distinction was between exploratory innovation regarding new products and services, as opposed to logistics, new distribution channels and new markets. Thus, originally it was expected that innovation would have two factors or dimensions, namely exploratory and exploitive whereas, as indicated in Table 5-5, results indicated three factors or dimensions to innovation. Due to the distinction made between two types of exploratory innovation, hypothesis developed in Chapter 3 dealing with exploratory innovation had to be updated to reflect this development.

Table 5-5: Reliability of the constructs of the study

Variable or Construct	Factor no.	SPSS Coding Symbol	Factor/Dimension Description	Number of Questions	Cronbach alpha coefficient ( $\alpha$ )
Innovation	1	Eprln	Exploitive	6	0.831
	2	Eplln1	New Products/Services	4	0.828
	3	Eplln2	New Markets	3	0.749
Complexity leadership	1	ComL1	Patterning of Attention	9	0.934
	2	ComL2	Developing New	3	0.866

Variable or Construct	Factor no.	SPSS Coding Symbol	Factor/Dimension Description	Number of Questions	Cronbach alpha coefficient ( $\alpha$ )
			Networks		
Authentic leadership	1	AuthL1	Transparency	4	0.959
	1	AuthL2	Authentic Consciousness	12	0.793
Contextual intelligence	1	CIntel	Contextual Intelligence	7	0.909

As expected the Complexity Leadership construct had two factors or dimensions namely Patterning of Attention and Developing Networks. However, interestingly Q13\_19, Q13\_23 and Q13\_24, which relates to creating linkages, embracing diversity and gathering feedback from external stakeholders, which forms part of the Developing Networks question set was incorporated into the Patterning of Attention factor.

Factor analysis of Authentic Leadership yielded the greatest surprise. The questionnaire divided Authentic Leadership into four distinct question sets. These were related to Transparency, Morality/Ethics, Balanced Processing and Self-Awareness. As presented in the rotated component matrix in Appendix C, Transparency was the only generated factor which maintained some resemblance to the question set, all other questions collapsed in a single factor, labelled for the purposes of this study as Authentic Consciousness. As expected factor analysis of Contextual Intelligence resulted in a single factor.

Reliability results are also presented in Table 5-5. These factors were subjected to internal reliability consistency using the Cronbach Alpha coefficient. For complexity leadership these were 0.934 and 0.866 for Patterning of Attention and Developing New Networks respectively. The two factors of authentic leadership were 0.959 and 0.793 for Transparency and Authentic Consciousness respectively. The Contextual Intelligence only yielded one factor with a Cronbach Alpha of 0.909. The three factors of innovation had a Cronbach Alpha of 0.831, 0.828 and 0.749 for Exploitive Innovation, New Products/Services and New Markets, respectively. Based on guidance by George and Mallery (2003), the Cronbach Alpha coefficient of all factors were deemed acceptable.

#### 5.4 Complexity Leadership

Complexity Leadership in this study was investigated with the following hypothesis:

**H<sub>01A</sub>:** There are low levels of Complexity Leadership in South African organisations

**H<sub>A1A</sub>**: There are not low levels of Complexity Leadership in South African organisations

### 5.4.1 Descriptive statistics

Twelve questions were utilised to understand the complexity leadership within South African organisations. Descriptive statistical results for this construct are attached in Appendix D. The majority median variables were 14. Mean variables did not have much difference between them and ranged between 12.97 and 13.57. The highest mean was 13.57 (SD=1.223) for Q13\_4 “Facilitates dialog and discussion to help employees share knowledge in developing a shared understanding of issues”. Q13\_24 and Q13\_16 had the same mean variables, mean=13.41.

The lowest variable was mean= 12.97 (SD=1.34) for Q13\_20 “Has political skill of sizing up group politics for the benefit of the department or business unit.”, followed by mean=13.2 (SD=1.345) for Q13\_19 “Creates linkages between entities inside the organisation and with outside stakeholders.” Skewness ranged from -0.43 to -0.551 with standard error for skewness of 0.156. Kurtosis ranged from -0.75 to -1.223, with a standard error of 0.310.

### 5.4.2 Construct Validity and Reliability

Construct validity was discussed in section 5.3.1, other relevant data is presented in Table 5-6. The two extracted factors had a total variance of 70.05%. Patterning of Attention (factor 1) had the highest variance of 61.0%, whereas Developing New Networks (factor 2) had a variance of 9.034%. All factor loadings were above 0.4.

Table 5-6: Dimensions of Complexity Leadership Factors

Factors	No of items	Factor loading	% Variance	Cronbach alpha (α)
Patterning of Attention	9	0.568-0.864	61.009	0.934
Developing New Networks	3	0.722-0.901	9.034	0.866

### 5.4.3 Level of Complexity Leadership in South African Organisations

To test the level of complexity leadership, a one sample t-test was used. As presented in Table 5-7 a one sample t-test was conducted for both Patterning of Attention and Developing New Networks. The mean score for Patterning of Attention was 120.44 (SD=9.442), Developing New Networks had a mean score of 39.68 (SD=3.493).



Table 5-7: One sample t-test for Complexity Leadership

One-Sample Test						
	Test Value = 3					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Patterning of Attention	193.481	241	.000	117.4463	116.2505	118.642
Developing New Networks	164.055	243	.000	36.68443	36.244	37.1249

*Patterning of Attention: n=242, Mean=120.44 (SD=9.442); Developing New Net-works: n=244, Mean=39.68 (SD=3.493)*

The test shows that there was a statistical significance, with  $t(241) = 193.481$ ,  $p < .05$  and  $t(243) = 164.055$ ,  $p < .05$  for Patterning of Attention and Developing New Networks, respectively. It can thus be concluded that the null hypothesis is rejected and the alternative hypothesis, which stated that there are not low levels of complexity leadership in South African organisations, is accepted.

## 5.5 Contextual Intelligence

Levels of contextual intelligence in this study were investigated with the following hypothesis:

**H<sub>01B</sub>**: There are low levels of Contextual Intelligence in South African organisations

**H<sub>A1B</sub>**: There are not low levels of Contextual Intelligence in South African organisations

### 5.5.1 Descriptive statistics

Seven questions were utilised to understand the contextual Intelligence within South African organisations. Descriptive statistical results for this construct is attached in Appendix D. Variables had median values of 14 and 13. Mean values did not have much difference between them, ranging between 13.84 (SD= 1.268) for Q13\_30 “Has a forward-looking mentality - sense of direction for where the organisation is going in the future” and 13.1 (SD= 1.369) for Q13\_28 “Adapts his/her communication to different ethnic cultures in the organisation”.

The highest mean was 13.84 (SD= 1.268), followed by mean= 13.62 (SD= 1.296) for Q13\_31 “Provide opportunities for diverse employees to interact in a non-discriminatory

manner". Skewness ranged from -0.208 to -0.898 with standard error for skewness of 0.156. Kurtosis ranged from -0.313 to -1.206, with a standard error of 0.31.

### 5.5.2 Construct Validity and Reliability

Construct validity was discussed in section 5.3.1, other relevant data is presented in Table 5-8. During the factor analysis only one dimension with a % variance of 65.3% was extracted and its reliability was excellent with Cronbach alpha of 0.909.

Table 5-8: Dimensions of Contextual Intelligence

Factors	No of items	% Variance	Cronbach alpha ( $\alpha$ )
Contextual intelligence	7	65.292	.909

### 5.5.3 Level of Contextual Intelligence in South African Organisations

As presented in Table 5-9 a one sample t-test for Contextual Intelligence was conducted. The mean score was 80.636. The test shows that there was a statistical significance, with  $t(241) = 201.383$  and  $p < .05$ .

Table 5-9: One-sample t-test for Contextual Intelligence

One-Sample Test						
	Test Value = 3					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Contextual Intelligence	201.383	241	0.000	77.6364	76.877	78.396

*Contextual Intelligence: n= 242, Mean=80.636, SD=5.997*

Thus, the null hypothesis was rejected, and the alternative hypothesis was accepted, which stated that there were not low levels of contextual intelligence in South African organisations.

## 5.6 Authentic Leadership

Levels of Authentic Leadership in this study were investigated with the following hypothesis:

**H<sub>01c</sub>:** There are low levels of Authentic Leadership in South African organisations

**H<sub>A1C</sub>**: There are not low levels of Authentic Leadership in South African organisations

### 5.6.1 Descriptive Statistics

Sixteen questions were utilised to understand Authentic Leadership within South African organisations. Descriptive statistical results for this construct are attached in Appendix D. Authentic Leadership data presented variables with median values of 3 and 4. Q15\_31 “Knows when it is time to re-evaluate his or her position on important issues” had a median of 3.5. The means of variables were similar and ranged between 3.09 and 3.89. The highest mean is shown to be 3.89 (SD=1.161) Q15\_17 “Says exactly what he or she means”, followed a mean of 3.84 (SD=1.185) for Q15\_20 “Tells you the hard truth.” Q15\_18 and Q15\_21 both had mean values of 3.34.

Q15\_30 “Accurately describes how others view his or her capabilities”, was the variable with the lowest mean of 3.09 (SD=1.299) followed by Q\_15\_26 “Solicits views that challenge his or her deeply held positions” with a mean of 3.24 (SD=1.231). Skewness ranged from -0.49 to -0.921 with standard error for skewness of 0.156, while kurtosis ranged from -0.023 to -0.993, with a standard error of 0.31.

### 5.6.2 Construct Validity and Reliability

Construct validity was discussed in section 5.3.1. Other relevant data is presented in Table 5-10. Two Factors or dimensions were extracted with a total variance of 70.05%. Transparency (factor 1) had the highest variance with 61.593%. Authentic Consciousness (factor 2) had a variance of 6.824%. Factor loading was above 0.4 for both. Both these factors were subjected to internal reliability consistency using Cronbach Alpha coefficient and were confirmed as reliable based on the guidelines of George and Mallery (2003).

Table 5-10: Dimensions of Authentic Leadership

Factors	No of items	Factor loading	% Variance	Cronbach alpha (α)
Transparency	12	0.613 - 0.826	61.593	.959
Authentic Consciousness	4	0.607 - 0.819	6.824	.793

### 5.6.3 Level of Authentic Leadership in South African Organisations

A one sample t-test was used to test the level of Authentic Leadership in South African organisations. Results are presented in Table 5-11, the means for Patterning of Attention

(factor 1) and Developing New Networks (factor 2) were 41.04 (SD =12.607) and 14.87 (SD= 3.608) respectively.

Table 5-11: One sample t-test for Authentic Leadership

One-Sample Test						
	Test Value = 3					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Patterning of Attention	46.357	235	.000	38.04237	36.4256	39.6591
Developing New Networks	51.073	240	.000	11.87137	11.4135	12.3293

*Patterning of Attention: n=236, Mean=41.04, SD=12.607; Developing New Networks: Mean=14.87, SD=3.608*

The test indicates that there was a statistical significance, with  $t(235) = 46.357$ ,  $p < .05$  and  $t(240) = 51.073$ ,  $p < .05$ , respectively for the two factors. This resulted in the rejection of the null hypothesis and acceptance alternative hypothesis that there are not low levels of Authentic Leadership in South African organisations.

## 5.7 Leadership Descriptive Statistics

As presented in Table 5-12 below, the most frequent leadership style encountered in South African organisations as reported by the respondents was Contextual Intelligence with a mean score of 80.6, followed closely by Complexity Leadership with a mean of 80.1. Authentic Leadership, with a mean of 27.9 was the least prevalent of the leadership styles investigated.

Table 5-12: Leadership Descriptive Statistics

Leadership Style	N	Minimum	Maximum	Mean	Std. Deviation
Contextual Intelligence	242	66.0	90.0	80.636	5.9972
Authentic Leadership	234	9.00	40.00	27.8868	7.76692
Complexity Leadership	240	66.00	90.00	80.0854	6.05674

## 5.8 Innovation

Innovation in this study was investigated with the following hypothesis:

**H<sub>02</sub>:** There are low levels of Innovation in South African organisations

**H<sub>A2</sub>:** There are not low levels of Innovation in South African organisations

### 5.8.1 Descriptive statistics

Fourteen questions were utilised to understand Innovation within the South African organisations. Descriptive statistical results for this construct are attached in Appendix D. Most of the questions had a median 44. Means were similar ranging between 43.25 and 43.96. The highest mean is 43.96 (SD=1.025) for Q12\_9 “We regularly implement small adaptations to existing products and services”, followed by Q12\_14 with a mean of 43.91 (SD=1.242) “Lowering costs of internal processes is an important objective”. The means of Q12\_3 and Q12\_7 were the same at 43.79. The mean was 43.25 (SD=1.232) for Q12\_6 “Our organization regularly uses new distribution channels”, followed by Q12\_4 “We commercialise products and services that are completely new to our organisation” with a mean of 43.42 (SD=1.239). Skewness ranged from -0.31 to -1.22 with standard error for skewness of 0.155, while kurtosis ranged from -0.85 to 0.416, with standard error 0.309.

### 5.8.2 Construct Validity and Reliability

Construct validity was discussed in section 5.3.1. Other relevant data is presented in Table 5-13. The 3 factors or dimensions that were extracted had a total variance of 62.5%. Exploitive (factor 1) had the highest variance of 43.4%, followed by New Products/Services (factor 2) with a variance of 11.0% and lastly New Markets (factor 3) with a variance of 8.0%. All factor loadings were above 0.4. These factors were subjected to internal reliability consistency using Cronbach Alpha coefficient and were confirmed as reliable based on the guidelines of George and Mallery (2003).

Table 5-13: Dimensions of Innovation in South African Organisations

Factors	No of items	Factor loading	% Variance	Cronbach alpha (α)
Exploitive	6	0.540-0.771	43.383	0.831
New Products/Services	4	0.722-0.785	11.042	0.828
New Markets	3	0.706-0.805	8.041	0.749

### 5.8.3 Level of innovation

As presented in Table 5-14, a one sample t-test was conducted for the three factors or dimensions of effective innovation. The mean score for Exploitive innovation was 43.82 (SD =0.814). Thus, it was higher than the neither agree nor disagree value of '43'. The same was found for New Products/Services with a mean score of 43.65 (SD= 0.992) and New Markets with a mean score of 43.58 (SD=0.968).

Table 5-14: One sample t-test for Innovation

One-Sample Test						
	Test Value = 3					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Exploitive	783.419	243	.000	40.82445	40.7218	40.9271
New Products/Services	642.806	245	.000	40.64634	40.5218	40.7709
New Markets	656.536	244	.000	40.58367	40.4619	40.7054

*Exploitive: n = 244 Mean = 43.82 (SD = 0.814); New Products/Services: n = 246 Mean = 43.65 (SD =0.992); New Markets: Mean = 43.58 (SD=0.968)*

The test shows that there was a statistical significance, with  $t(243) = 783.419$ ,  $p < .05$ ,  $t(245) = 642.806$ ,  $p < .05$  and  $t(244) = 656.536$  for Exploitive, New Products/Services and New Markets, respectively. It can thus be concluded that the null hypothesis is rejected, and the alternative hypothesis accepted which stated that there are not low levels of innovation in South African organisations.

Table 5-15 indicates that all three innovation types were equally prevalent in the sample tested, with mean scores of 43.8, 43.6 and 43.6 for exploitive innovation, new products/services and new markets respectively.

Table 5-15: Innovation Descriptive Statistics

Type of Innovation	N	Minimum	Maximum	Mean	Std. Deviation
Exploitive innovation	244	41.00	45.00	43.8245	.81399
New Products/Services	246	41.00	45.00	43.6463	.99177
New Markets	245	41.00	45.00	43.5837	.96755

## 5.9 Effect of Leadership on Innovation

The effect of Leadership Style on Innovation is to be investigated as stated by hypothesis 3A to 3F, discussed in Chapter 3.

### 5.9.1 Effect of Leadership on Exploratory Innovation

There were three types of leadership whose influence was evaluated for exploratory innovation, these being complex leadership, authentic leadership and contextual intelligence.

#### 5.9.1.1 Complexity Leadership

Hypothesis 3A tested the influence of Complex Leadership on Exploitive Innovation was stated as follows:

**H<sub>03A</sub>**: Complexity Leadership has no influence or a negative influence on exploitive innovation in South African organisations,  $r \leq 0$

**H<sub>A3A</sub>**: Complexity Leadership has a positive influence on exploitive innovation in South African organisation,  $r > 0$

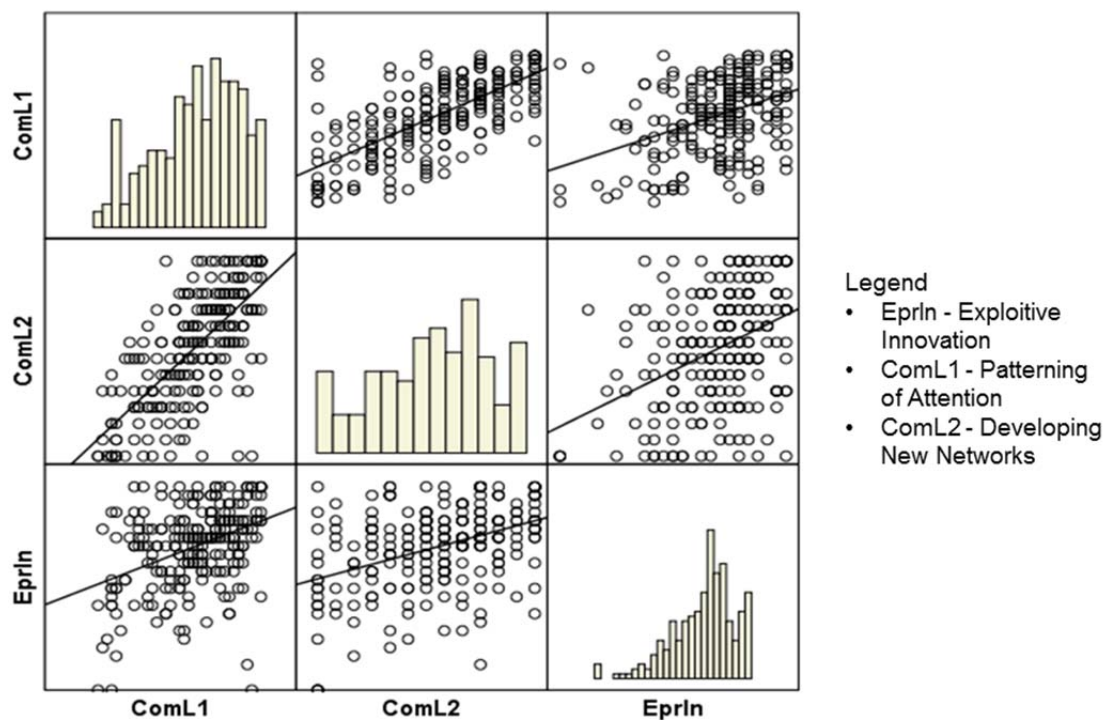


Figure 5-1: Scatter plots of Complexity Leadership and Exploratory Innovation



Scatter plots are presented in

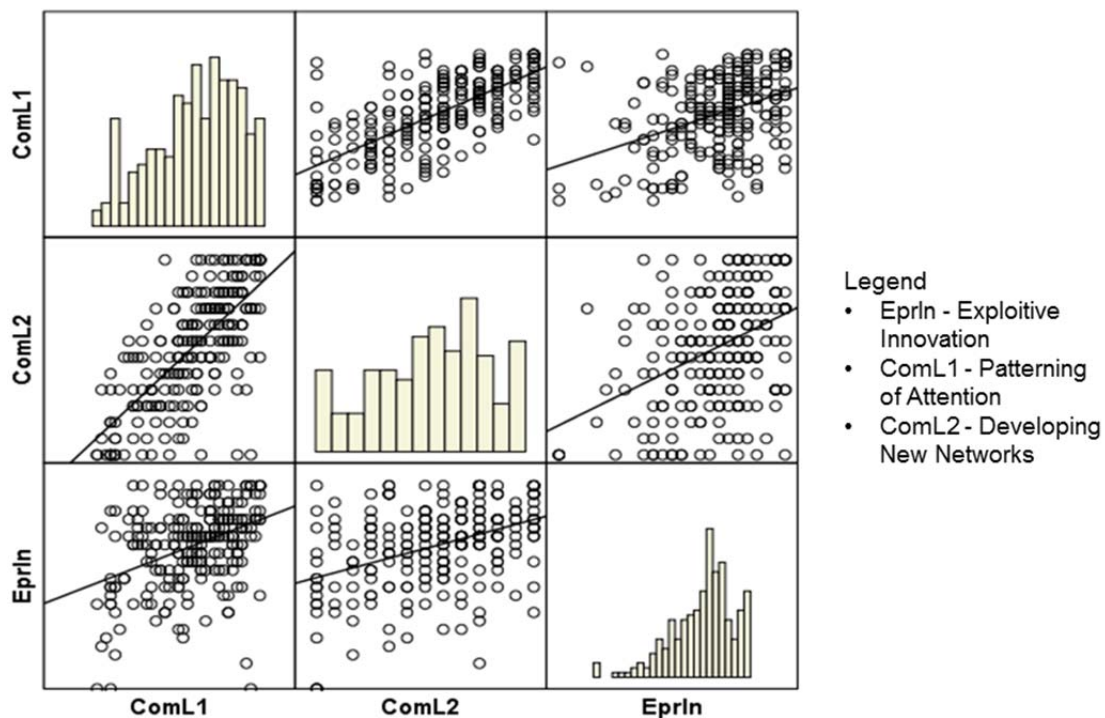


Figure 5-1 to visually depict possible relationships between dimensions of Complexity Leadership and Exploitive Innovation. Evidence of positive relationships is present.

A Pearson correlation ( $r$ ) was conducted to understand the significance, direction and strength of these relationships. Pallant's (2010) guidelines were used to determine the strength of the relationships (None:  $r = 0 - 0.09$ , small:  $0.10 - 0.29$ , medium:  $0.30 - 0.49$ , strong  $\geq 0.50$ ).

Table 5-16 presents the Pearson correlation coefficient results for Complexity Leadership dimensions (Patterning of Attention and Developing New Networks) and Exploitive Innovation. The results indicate that there was a significant, medium strength, positive relationship between Complexity Leadership and Exploitive Innovation. Patterning of Attention and Exploitive Innovation, had a Pearson's correlation of  $r(240) = 0.396$ ,  $p < .01$  and Developing New Networks and Exploitive Innovation, had a Pearson's correlation of  $r(242) = 0.404$ ,  $p < .01$ .

Table 5-16: Pearson Correlation for Complexity Leadership and Exploitive Innovation

		Exploitive Innovation
Patterning of Attention	Pearson Correlation	.396**
	Sig. (2-tailed)	0.000
	N	240



		Exploitive Innovation
Developing New Networks	Pearson Correlation	.404**
	Sig. (2-tailed)	0.000
	N	242

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

A linear regression analysis was conducted on the factors of Complexity Leadership and Exploitive Innovation. Results are presented in Table 5-17 and indicate significance. Model summary indicates an R-square of 0.187 and an adjusted R-square of 0.181. Specifically, the results ( $R^2 = .187$ ;  $p < .01$ ) suggest that for the sample, Complexity Leadership explains 18.7% of Exploitive Innovation outcomes. Accordingly, it is concluded that Complexity Leadership has a positive influence on Exploitive Innovation outcomes in the South African organisations.

Table 5-17: Linear regression model of Complexity Leadership and Exploitive Innovation

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.433 <sup>a</sup>	0,187	0,181	0,74134		
a. Predictors: (Constant), Developing New Networks, Patterning of Attention						
ANOVA <sup>a</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	29,795	2	14,898	27,107	.000 <sup>b</sup>
	Residual	129,151	235	0,550		
	Total	158,946	237			
a. Dependent Variable: Exploitive Innovation						
b. Predictors: (Constant), Developing New Networks, Patterning of Attention						
Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	39,192	0,640		61,274	0,000
	Patterning of Attention	0,019	0,007	0,220	2,641	0,009
	Developing New Networks	0,058	0,020	0,248	2,983	0,003
a. Dependent Variable: Exploitive Innovation						

### 5.9.1.2 Authentic Leadership

Hypothesis 3B tested the influence of Authentic Leadership on Exploitive Innovation and was stated as follows:

**H<sub>03B</sub>**: Authentic Leadership has no influence or a negative influence on exploitive innovation in South African organisations,  $r \leq 0$

**H<sub>03B</sub>**: Authentic Leadership has a positive influence on exploitive innovation in South African organisation,  $r > 0$

Scatter plots are presented in Figure 5-2 to visually depict possible relationships between dimensions of Authentic Leadership and Exploitive Innovation. Evidence of positive relationships is present.

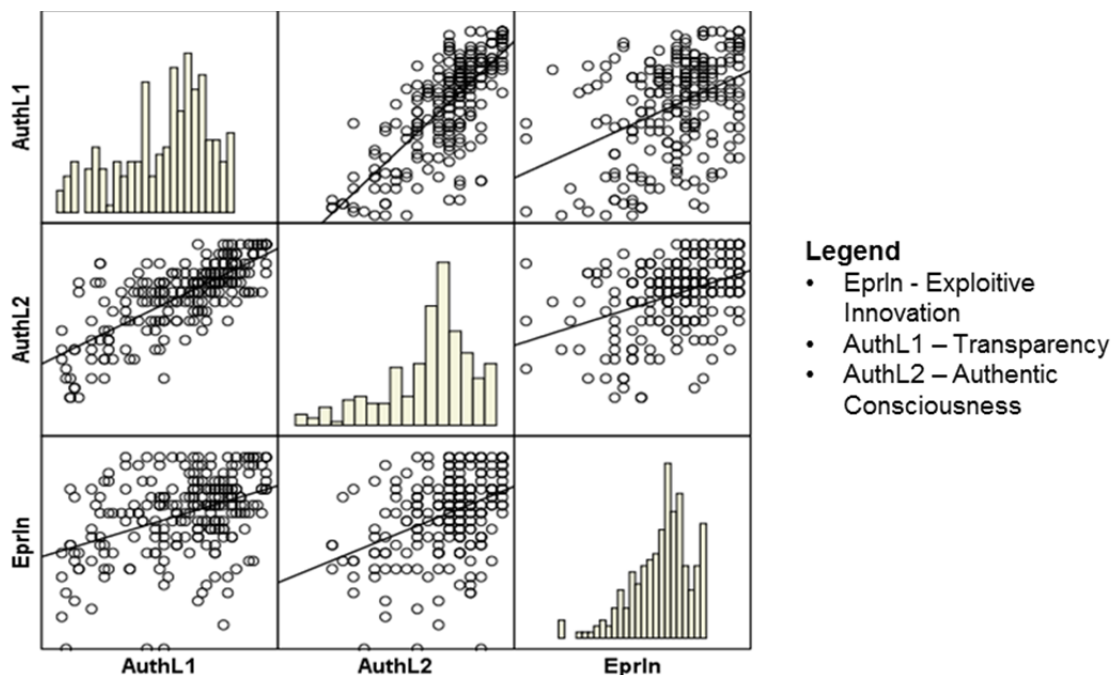


Figure 5-2: Scatter plots of Authentic Leadership and Exploitive Innovation

Table 5-18 presents the Pearson correlation results for Authentic Leadership (Transparency and Authentic Consciousness) dimensions and Exploitive Innovation. The results indicate that there was a significant, medium strength, positive relationship between Authentic Leadership and Exploitive innovation. Transparency and Exploitive Innovation had a Pearson’s correlation of  $r(235) = 0.414$  and Authentic Consciousness and Exploitive Innovation had a Pearson’s correlation of  $r(239) = 0.390$ ,  $p < .0$ .

Table 5-18: Pearson correlation for Authentic Leadership and Exploitive Innovation

		Exploitive Innovation
Transparency	Pearson Correlation	.414**
	Sig. (2-tailed)	0.000
	N	235
Authentic Consciousness	Pearson Correlation	.390**
	Sig. (2-tailed)	0.000
	N	239

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

Linear regression analysis was conducted for Authentic Leadership dimensions and Exploitive Innovation. Results presented in Table 5-19 indicate significance. Model summary indicates an R-square of 0.187 and an adjusted R-square of 0.180. Specifically, the re-

sults ( $R^2 = .187$ ;  $p < .01$ ) suggest that for the sample, Authentic Leadership explains 18.7% of Exploitive Innovation outcomes. Accordingly, it is concluded that Authentic Leadership has a positive influence on Exploitive Innovation outcomes in the South African organisations.

Table 5-19: Linear regression model of Authentic Leadership and Exploitive Innovation

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.432 <sup>a</sup>	0,187	0,180	0,74481		
a. Predictors: (Constant), Authentic Consciousness, Transparency						
ANOVA <sup>a</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	29,291	2	14,645	26,400	.000 <sup>b</sup>
	Residual	127,591	230	0,555		
	Total	156,882	232			
a. Dependent Variable: Exploitive Innovation						
b. Predictors: (Constant), Authentic Consciousness, Transparency						
Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	42,448	0,206		206,252	0,000
	Transparency	0,016	0,006	0,252	2,787	0,006
	Authentic Consciousness	0,047	0,021	0,209	2,308	0,022
a. Dependent Variable: Exploitive Innovation						

### 5.9.1.3 Contextual Intelligence

Hypothesis 3C tested the influence of contextual intelligence on exploitive innovation was stated as follows:

**H<sub>03c</sub>**: Contextual Intelligence has no influence or a negative influence on exploitive innovation in South African organisations,  $r \leq 0$

**H<sub>A3C</sub>**: Contextual Intelligence has a positive influence on exploitive innovation in South African organisation,  $r > 0$

Scatter plots are presented in Figure 5-3 to visually depict possible relationships between dimensions of Contextual Intelligence and Exploitive Innovation. Evidence of positive relationships is present.

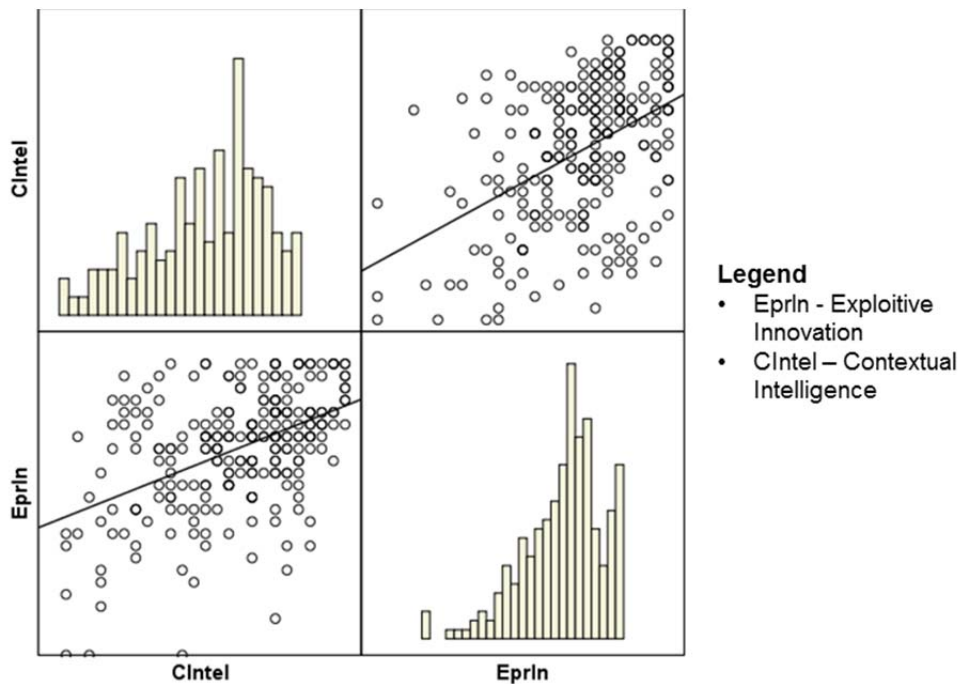


Figure 5-3: Scatter plots of Contextual Intelligence and Exploitive Innovation

Table 5-20 presents the Pearson correlation results for Contextual Intelligence and Exploitive Innovation. With a Pearson’s correlation of  $r(240) = 0.465$ ,  $p < .01$ , results indicate that there was a significant, medium strength, positive relationship between Contextual Intelligence and Exploitive innovation.

Table 5-20: Pearson correlation for Contextual Intelligence and Exploitive Innovation

		Exploitive Innovation
Contextual Intelligence	Pearson Correlation	.465**
	Sig. (2-tailed)	0.000
	N	240

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

Linear regression analysis was conducted for Contextual Intelligence and Exploitive Innovation. Results presented in Table 5-21 indicate significance. Model summary indicates an

R-square of 0.217 and an adjusted R-square of 0.213. Specifically, the results ( $R^2 = .217$ ;  $p < .01$ ) suggest that for the sample, Contextual Intelligence explains 21.8% of Exploitive Innovation outcomes. Accordingly, it is concluded that Authentic Leadership has a positive influence on Exploitive Innovation outcomes in the South African organisations

Table 5-21: Linear regression model of Contextual Intelligence and Exploratory Innovation

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.465 <sup>a</sup>	0,217	0,213	0,72588		
a. Predictors: (Constant), Contextual Intelligence						
ANOVA <sup>a</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	34,672	1	34,672	65,804	.000 <sup>b</sup>
	Residual	125,402	238	0,527		
	Total	160,074	239			
a. Dependent Variable: Exploitive Innovation						
b. Predictors: (Constant), Contextual Intelligence						
Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	38,714	0,632		61,256	0,000
	Contextual Intelligence	0,063	0,008	0,465	8,112	0,000
a. Dependent Variable: Exploitive Innovation						

#### 5.9.1.4 Summary

In summary, Complexity Leadership, Authentic Leadership and Contextual Intelligence all have a positive influence on Exploitive Innovation. A five-step regression involves the inclusion of: (1) four control variables aspect of the respondents. These were Level of management (MLev), Size of organisation (SOrg), age of organisation (AOrg) and type of organisation (TOrg), see Table 5-22. The level of management and type of organisation influences the relationship between leadership and Exploitive Innovation. The model includes (2) MLev, (3) MLev and SOrg (4) MLev\*SOrg\*AOrg (5) MLev\*SOrg\*AOrg\*TOrg.

Table 5-22: Hierarchical regression analysis: Impact of control variables on leadership and Exploitive Innovation

	Standardized Beta (Model 1)	Standardized Beta (Model 2)	Standardized Beta (Model 3)	Standardized Beta (Model 4)	Standardized Beta (Model 5)
Leadership	<b>0.460**</b>	<b>0.432**</b>	<b>0.432 **</b>	<b>0.437**</b>	<b>0.384**</b>
Leadership * MLev		0.136*	0.151*	0.135 *	0.093
Leadership * MLev*SOrg			0.071	.069	0.112
Leadership * MLev*SOrg*AOrg				-0.029	-0.029
Leadership * MLev*SOrg*AOrg*TOrg					0.187*
R <sup>2</sup>	0.211	0.226	0.231	0.231	0.257
Adjusted R <sup>2</sup>	0.208	0.219	0.220	0.217	0.240
R Square Change	0.211	0.018	0.005	0.001	0.027
F Change	<b>60.788**</b>	<b>5.177*</b>	1.402	0.207	<b>7.933*</b>

\*\* p < .01; \* p < .05

There was no control variable in first model, in the second model level of management (MLev) was added in to the equation, R<sup>2</sup> increased from 0,211 to 0,226. From the third to fifth model, leadership ( $\beta = 0,384$ ;  $p < 0,01$ ) and type of organisation (TOrg) ( $\beta = 0,187$ ;  $p < 0,05$ ) were found to be positively related to exploratory innovation. These results reject the null hypothesis and support the alternative hypothesis which indicated that the control variables, level of management, as well as type of organisation influenced relationship between leadership and Exploitive Innovation.

## 5.9.2 Effect of Leadership on Exploratory Innovation

As discussed in section 5.3, factor analysis of the data resulted in a distinction between two types of Exploratory Innovation, namely New Products/Services and New Markets. Accordingly, hypothesis 3D to 3F of research question 3, which relates to the influence of Leadership on Exploratory Innovation outcomes in South African organisations, will be amended in this section.

### 5.9.2.1 Effect of Complexity Leadership on New Products/Services

Hypothesis 3D will be amended, resulting in 3Di relating to New Products/Services and 3Dii relating to New Markets.

Hypothesis 3Di tested the influence of Complexity Leadership on New Products/Services and was stated as follows:

$H_{03Di}$ : Complexity Leadership has no influence or a negative influence on the creation of New Products/Services in South African organisations,  $r \leq 0$

$H_{A3Di}$ : Complexity Leadership has a positive influence on the creation of New Products/Services in South African organisations,  $r > 0$

Scatter plots are presented in Figure 5-4 to visually depict possible relationships between dimensions of Complexity Leadership and the creation of New Products/Services. Evidence of positive relationships is present.

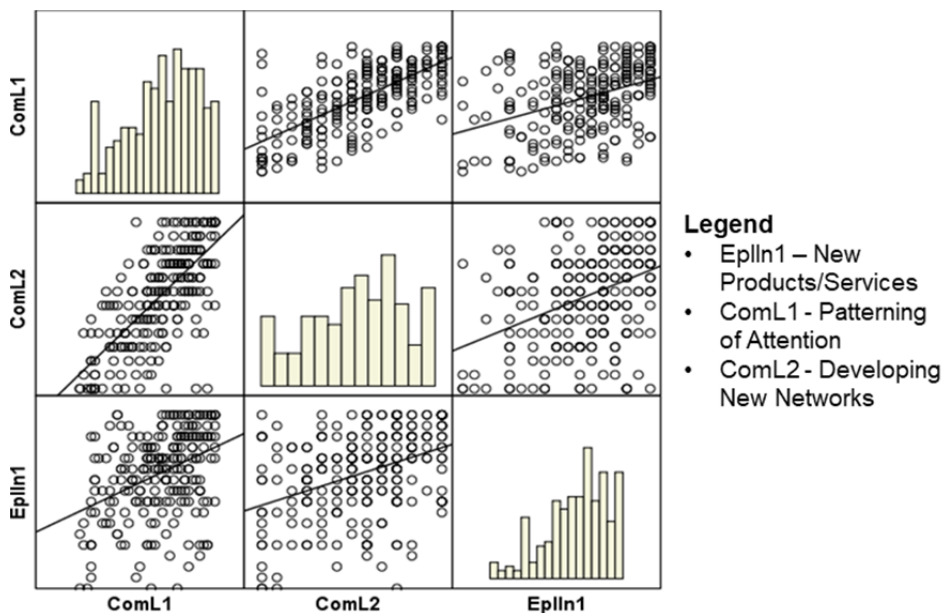


Figure 5-4: Scatter plots of Complexity Leadership and New Products/Services

Table 5-23 presents the Pearson correlation coefficients results for Complexity Leadership dimensions (Patterning of Attention and Developing New Networks) and the creation of New products/Services. The results indicate that there was a significant, medium strength, positive relationship between Complexity Leadership and the creation of New products/Services. Patterning of Attention and the creation of New Products/Services had a Pearson's correlation of  $r(242) = 0.381$ ,  $p < .01$  and Developing New Networks and the creation of New Products/Services, had a Pearson's correlation of  $r(244) = 0.385$ ,  $p < .01$ .



Table 5-23: Pearson correlation for Complexity Leadership and New Products/Services

		New Products/Services
Patterning of Attention	Pearson Correlation	246
	Sig. (2-tailed)	.381**
	N	0.000
Developing New Networks	Pearson Correlation	242
	Sig. (2-tailed)	.385**
	N	0.000

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

A linear regression analysis was conducted on the factors of Complexity Leadership and the creation of New Products/Services. Results are presented in Table 5-24 and indicate significance. Model summary indicates an R-square of 0.178 and an adjusted R-square of 0.171. Specifically, the results ( $R^2 = .171$   $p < .01$ ) suggest that for the sample, Complexity Leadership explains 17.1% of the creation of New Products/Services. Accordingly, it is concluded that Complexity Leadership has a positive influence on the creation of New Products/Services in South African organisations.

Table 5-24: Linear regression model of Complexity Leadership and the creation of New Products/Services

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.422 <sup>a</sup>	0,178	0,171	0,89780		
a. Predictors: (Constant), Developing New Networks, Patterning of Attention						
ANOVA <sup>a</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	41,468	2	20,734	25,723	.000 <sup>b</sup>
	Residual	191,032	237	0,806		
	Total	232,500	239			
a. Dependent Variable: New Products/Services						
b. Predictors: (Constant), Developing New Networks, Patterning of Attention						
Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std.	Beta		

		Error				
1	(Constant)	38,200	0,771		49,550	0,000
	Patterning of Attention	0,024	0,009	0,227	2,724	0,007
	Developing New Networks	0,065	0,024	0,230	2,762	0,006
a. Dependent Variable: EpIn1						

### 5.9.2.2 Effect of Authentic Leadership on New Products/Services

Hypothesis 3E will be amended into 3Ei relating to New Products/Services and 3Eii relating to New Markets.

Hypothesis 3Ei tested the influence of Authentic Leadership on New Products/Services and was stated as follows:

**H<sub>03Ei</sub>**: Authentic Leadership has no influence or a negative influence on the creation of New Products/Services in South African organisations;  $r \leq 0$

**H<sub>A3Ei</sub>**: Authentic Leadership has a positive influence on the creation of New Products/Services in South African organisations,  $r > 0$

Scatter plots are presented in Figure 5-5 to visually depict possible relationships between dimensions of Authentic Leadership and the creation of New Products/Services. Evidence of positive relationships is present.

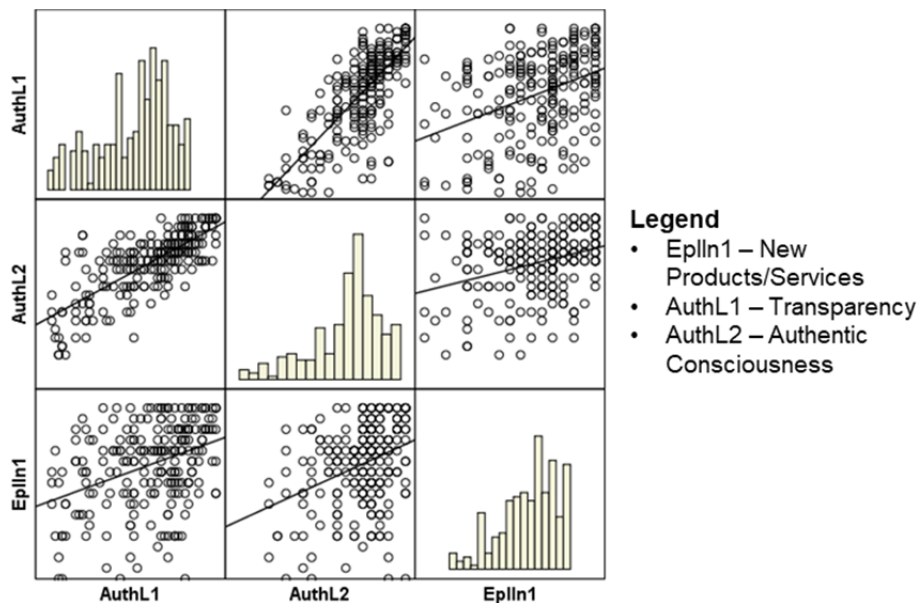


Figure 5-5: Scatter plots of Authentic Leadership and New Products/Services

Table 5-25 presents the Pearson correlation results for Authentic Leadership (Transparency and Authentic Consciousness) dimensions and the creation of New Products/Services. The results indicate that there was a significant, medium strength, positive relationship between Authentic Leadership and the creation of New Products/Services. Transparency and the creation of New Products/Services had a Pearson's correlation of  $r(236) = 0.376$ ,  $p < .01$  and Authentic Consciousness and the creation of New Products/Services had a Pearson's correlation of  $r(241) = 0.328$ ,  $p < .01$ .

Table 5-25: Pearson correlation for Authentic Leadership dimensions and New Products/Services

		New Products/Services
Transparency	Pearson Correlation	.376**
	Sig. (2-tailed)	0.000
	N	236
Authentic Consciousness	Pearson Correlation	.328**
	Sig. (2-tailed)	0.000
	N	241

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

Linear regression analysis was conducted for Authentic Leadership dimensions and the creation of New Products/Services. Results presented in Table 5-26 indicate significance. Model summary indicates an R-square of 0.148 and an adjusted R-square of 0.140. Specifically, the results ( $R^2 = .148$ ;  $p < .01$ ) suggest that for the sample, Authentic Leadership explains 14.7% of the creation of New Products/Services. Accordingly, it is concluded that Authentic Leadership has a positive influence on the creation of New Products/Services in the South African organisations.

Table 5-26: Linear regression model of Authentic Leadership and New Products/Services

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.384 <sup>a</sup>	0,148	0,140	0,91105		
a. Predictors: (Constant), Authentic Consciousness, Transparency						
ANOVA <sup>a</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	33,182	2	16,591	19,989	.000 <sup>b</sup>

	Residual	191,734	231	0,830		
	Total	224,916	233			
a. Dependent Variable: New Products/Services						
b. Predictors: (Constant), Authentic Consciousness, Transparency						
<b>Coefficients<sup>a</sup></b>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	42,272	0,251		168,193	0,000
	Transparency	0,021	0,007	0,275	2,974	0,003
	Authentic Consciousness	0,035	0,025	0,131	1,416	0,158
a. Dependent Variable: Products/Services						

### 5.9.2.3 Effect of Contextual Intelligence on New Products/Services

Hypothesis 3F will be amended resulting in hypothesis 3Fi relating to New Products/Services and 3Fii relating to New Markets.

Hypothesis 3Fi tested the influence of Contextual Intelligence on New Products/Services and was stated as follows:

**H<sub>03Fi</sub>**: Contextual Intelligence has no influence or a negative influence on the creation of New Products/Services in South African organisations,  $r \leq 0$

**H<sub>A3Fi</sub>**: Contextual Intelligence has a positive influence on the creation of New Products/Services in South African organisations,  $r > 0$

Scatter plots are presented in Figure 5-6 to visually depict possible relationships between dimensions of Contextual Intelligence and the creation of New Products/Services. Evidence of positive relationships is present.

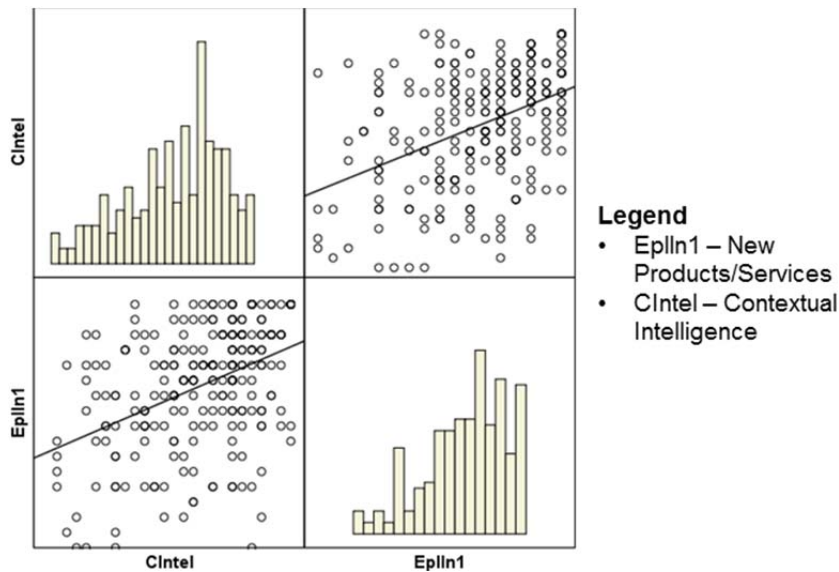


Figure 5-6: A scatter plot of Contextual Intelligence and New Products/Services

Table 5-27 presents the Pearson correlation results for Contextual Intelligence and the creation of New Products/Services. The results indicate that there was a significant, medium strength, positive relationship between Contextual Intelligence and the creation of New Products/Services. The Pearson’s correlation was  $r(242) = 0.419, p < .01$ .

Table 5-27: Pearson correlation for Contextual Intelligence and New Products/Services

		New Products/Services
Transparency	Pearson Correlation	.419**
	Sig. (2-tailed)	0.000
	N	242

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

Linear regression analysis was conducted for Contextual Intelligence and the creation of New Products/Services. Results presented in Table 5-28 indicate significance. Model summary indicates an R-square of 0.176 and an adjusted R-square of 0.172. Specifically, the results ( $R^2 = .176; p < .01$ ) suggest that for the sample, Contextual Intelligence explains 17.6% of the creation of New Products/Services. Accordingly, it is concluded that Contextual Intelligence has a positive influence on the creation of New Products/Services in the South African organisations.

Table 5-28: Linear regression model of Contextual Intelligence and New Products/Services

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.419 <sup>a</sup>	0,176	0,172	0,90337		
a. Predictors: (Constant), Contextual Intelligence						
ANOVA <sup>a</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	41,734	1	41,734	51,139	.000 <sup>b</sup>
	Residual	195,859	240	0,816		
	Total	237,593	241			
a. Dependent Variable: New Products/Services						
b. Predictors: (Constant), Contextual Intelligence						
Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	38,058	0,785		48,508	0,000
	Contextual Intelligence	0,069	0,010	0,419	7,151	0,000
a. Dependent Variable: New Products/Services						

#### 5.9.2.4 Summary – New Products/Services

It can thus be concluded that Leadership positive influence the creation of New Products/Services. A five-step regression involves the inclusion of four control variables of the respondents. Similarly, to exploitive innovation, control variables, level of management ( $\beta = 0,122$ ;  $p < 0,05$ ) and type of organisation: Bureaucratic or Entrepreneurial ( $\beta = 0,243$ ;  $p < 0,01$ ) has a positive influence on the relationship between Leadership and the creation of New Products/Services.

Table 5-29: Hierarchical regression analysis: Impact of control variables on the creation of New Products/Services

	Standardized Beta (Model 1)	Standardized Beta (Model 2)	Standardized Beta (Model 3)	Standardized Beta (Model 4)	Standardized Beta (Model 5)
Leadership	<b>0.438**</b>	<b>0.418**</b>	<b>0.419**</b>	<b>0.416*</b>	0.345**

Leadership * MLev		0.115	0.122*	0.120	0.067
Leadership * MLev*SOrg			0.032	0.047	0.105
Leadership * MLev*SOrg*AOrg				-0.040	-0.039
Leadership * MLev*SOrg*AOrg*TOrg					0.243**
R <sup>2</sup>	0.192	0.204	0.205	0.207	0.252
Adjusted R <sup>2</sup>	0.188	0.197	0.195	0.192	0.235
R Square Change	0.192	0.013	0.001	0.001	0.045
F Change	<b>53.535**</b>	3.654	0.274	0.370	<b>13.330**</b>

### 5.9.3 Effect of Leadership on New Markets

#### 5.9.3.1 Effect of Complexity Leadership on New Markets

Hypothesis 3D will be amended, resulting in 3Di relating to New Products/Services and 3Dii relating to New Markets.

Hypothesis 3Dii tested the influence of Complexity Leadership on entering New Markets and was stated as follows:

**H<sub>03Dii</sub>**: Complexity Leadership has no influence or a negative influence on entering New Markets in South African organisations,  $r \leq 0$

**H<sub>A3Dii</sub>**: Complexity Leadership has a positive influence on entering New Markets in South African organisations,  $r > 0$

Scatter plots are presented in Figure 5-7 to visually depict possible relationships between dimensions of Complexity Leadership and the entering New Markets. Evidence of positive relationships is present.

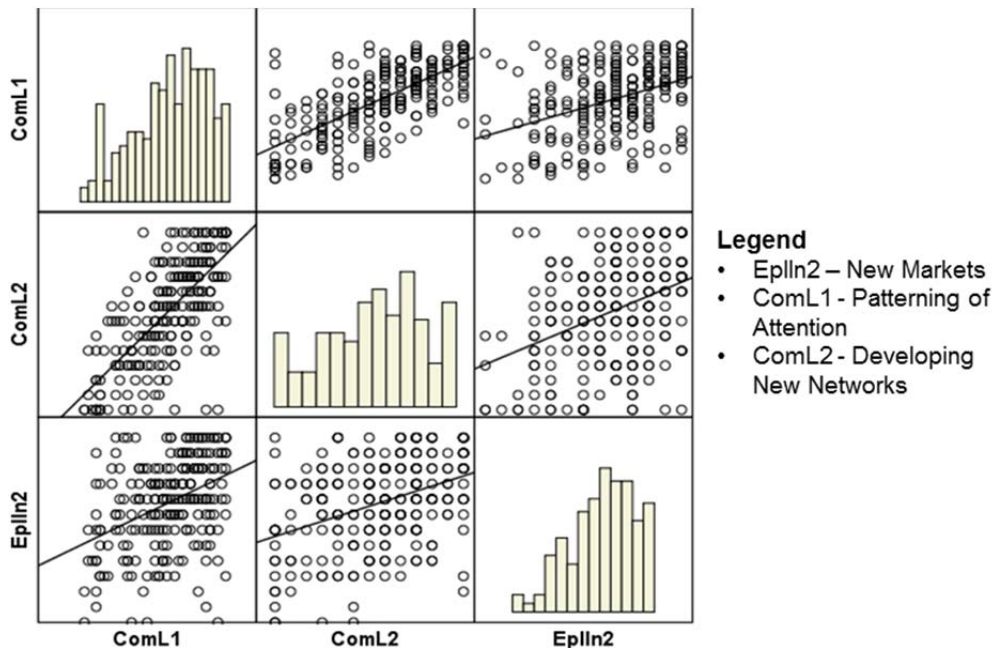


Figure 5-7: Scatter plots of Complexity Leadership and New Markets

Table 5-30 presents the Pearson correlation coefficients results for Complexity Leadership dimensions (Patterning of Attention and Developing New Networks) and entering New Markets. The results indicate that there was a significant, medium strength, positive relationship between Complexity Leadership and entering New Markets. Patterning of Attention and entering New Markets had a Pearson’s correlation of  $r(241) = 0.388, p < .01$  and Developing New Networks and entering New Markets, had a Pearson’s correlation of  $r(243) = 0.385, p < .01$ .

Table 5-30: Pearson correlation for Complexity Leadership dimensions and New Markets

		New Markets
Patterning of Attention	Pearson Correlation	.388**
	Sig. (2-tailed)	0.000
	N	241
Developing New Networks	Pearson Correlation	.385**
	Sig. (2-tailed)	0.000
	N	243

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

A linear regression analysis was conducted on the factors of Complexity Leadership and entering of New Markets. Results are presented in Table 5-31 and indicate significance. Model summary indicates an R-square of 0.180 and an adjusted R-square of 0.174. Specifically, the results ( $R^2 = .180, p < .01$ ) suggest that for the sample, Complexity Leadership



explains 18.0% of entering New Markets. Accordingly, it is concluded that Complexity Leadership has a positive influence on New Markets South African organisations.

Table 5-31: Linear regression model of Complexity Leadership and New Markets

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.425 <sup>a</sup>	0,180	0,174	0,88682		
a. Predictors: (Constant), Developing New Networks, Patterning of Attention						
ANOVA <sup>a</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	40,879	2	20,439	25,989	.000 <sup>b</sup>
	Residual	185,604	236	0,786		
	Total	226,483	238			
a. Dependent Variable: New Markets						
b. Predictors: (Constant), Developing New Networks, Patterning of Attention						
Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	38,146	0,764		49,961	0,000
	Patterning of Attention	0,025	0,009	0,239	2,865	0,005
	Developing New Networks	0,062	0,023	0,221	2,653	0,009
a. Dependent Variable: New Markets						

### 5.9.3.2 Effect of Authentic Leadership on New Markets

Hypothesis 3E will be amended, resulting in 3Ei relating to New Products/Services and 3Eii relating to New Markets.

Hypothesis 3Eii tested the influence of Authentic Leadership on entering New Markets and was stated as follows:

**H<sub>03Eii</sub>**: Authentic Leadership has no influence or a negative influence on entering New Markets in South African organisations,  $r \leq 0$

**H<sub>A3Eii</sub>**: Authentic Leadership has a positive influence on entering New Markets in South African organisations,  $r > 0$

Scatter plots are presented in Figure 5-7 to visually depict possible relationships between dimensions of Complexity Leadership and the entering New Markets. Evidence of positive relationships is present.

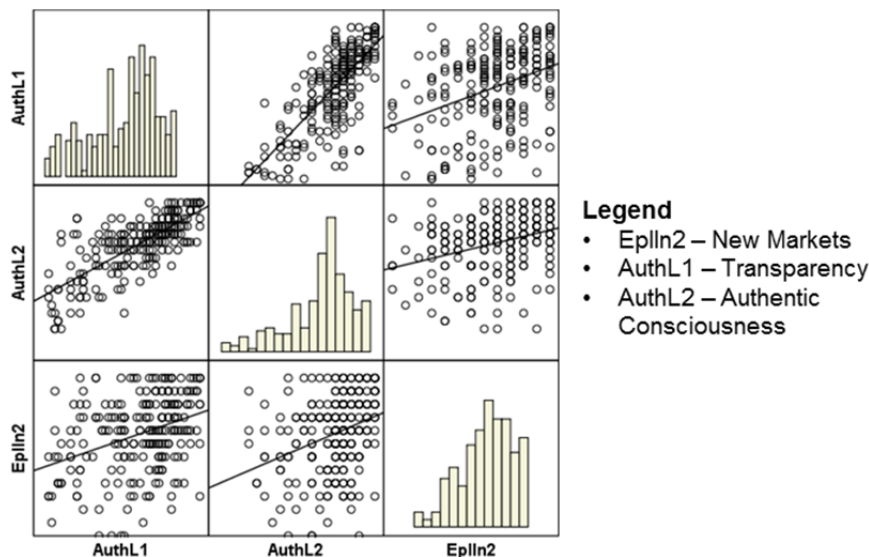


Figure 5-8: Scatter plots of Authentic Leadership and New Markets

Table 5-32 presents the Pearson correlation results for Authentic Leadership (Transparency and Authentic Consciousness) dimensions and entering New Markets. The results indicate that there was a significant, medium strength, positive relationship between Authentic Leadership and entering New Markets. Transparency and entering New Markets had a Pearson’s correlation of  $r(235) = 0.363, p < .01$  and Authentic Consciousness and the entering of New Markets had a Pearson’s correlation of  $r(241) = 0.310, p < .01$ .

Table 5-32: Pearson correlation for Authentic Leadership dimensions and New Markets

		New Markets
Transparency	Pearson Correlation	.363**
	Sig. (2-tailed)	0.000
	N	235
Authentic Consciousness	Pearson Correlation	.310**
	Sig. (2-tailed)	0.000
	N	241

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

Linear regression analysis was conducted for Authentic Leadership dimensions and entering of New Markets. Results presented in Table 5-33 indicate significance. Model summary indicates an R-square of 0.134 and an adjusted R-square of 0.127. Specifically, the results ( $R^2 = .134$ ;  $p < .01$ ) suggest that for the sample, Authentic Leadership explains 13.4% of New Markets innovations. Accordingly, it is concluded that Authentic Leadership has a positive influence on entering New Markets in the South African organisations.

Table 5-33: Linear regression model of Authentic Leadership and New Markets

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.366 <sup>a</sup>	0,134	0,127	0,90942		
a. Predictors: (Constant), Authentic Consciousness, Transparency						
ANOVA <sup>a</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	29,631	2	14,816	17,914	.000 <sup>b</sup>
	Residual	191,049	231	0,827		
	Total	220,680	233			
a. Dependent Variable: New Markets						
b. Predictors: (Constant), Authentic Consciousness, Transparency						
Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	42,264	0,251		168,463	0,000
	Transparency	0,021	0,007	0,270	2,888	0,004
	Authentic Consciousness	0,031	0,025	0,118	1,259	0,209
a. Dependent Variable: New Markets						

### 5.9.3.3 Effect of Authentic Leadership on New Markets

Hypothesis 3F will be amended, resulting in 3Fi relating to New Products/Services and 3Fii relating to New Markets.

Hypothesis 3Fii tested the influence of Contextual Intelligence on entering New Markets and was stated as follows:

**H<sub>03Fii</sub>**: Contextual Intelligence has no influence or a negative influence on entering New Markets in South African organisations,  $r \leq 0$

**H<sub>A3Fii</sub>**: Contextual Intelligence has a positive influence on entering New Markets in South African organisations,  $r > 0$

Scatter plots are presented in Figure 5-9 to visually depict possible relationships between Contextual Intelligence and entering New Markets. Evidence of positive relationships is present.

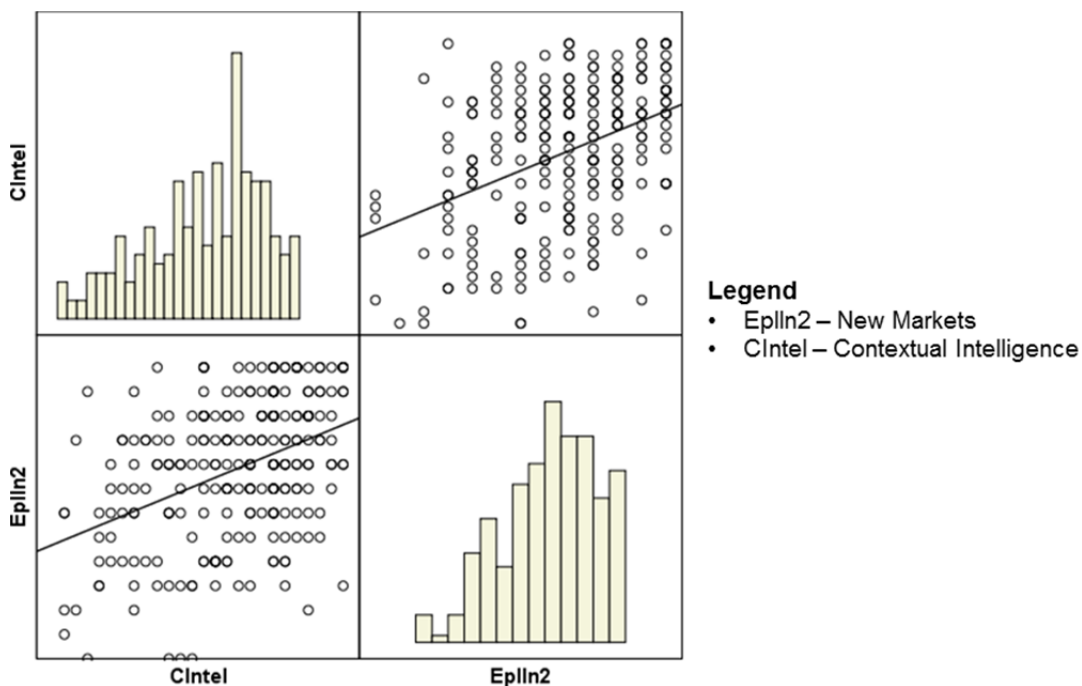


Figure 5-9: A Scatter plot of Contextual Intelligence and New Markets

Linear regression analysis was conducted for Contextual Intelligence and entering New Markets. Results presented in Table 5-34 indicate significance. Model summary indicates an R-square of 0.169 and an adjusted R-square of 0.165. Specifically, the results ( $R^2 = .169$ ;  $p < .01$ ) suggest that for the sample, Contextual Intelligence explains 16.9% of the New Market innovation. Accordingly, it is concluded that Contextual Intelligence has a positive influence on entering New Markets in South African organisations.

Table 5-34: Linear regression model of Contextual Intelligence and New Markets

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.411 <sup>a</sup>	0,169	0,165	0,88056		
a. Predictors: (Constant), Contextual Intelligence						
ANOVA <sup>a</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	37,657	1	37,657	48,566	.000 <sup>b</sup>
	Residual	185,318	239	0,775		
	Total	222,976	240			
a. Dependent Variable: New Markets						
b. Predictors: (Constant), Contextual Intelligence						
Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	38,280	0,765		50,052	0,000
	Contextual Intelligence	0,066	0,009	0,411	6,969	0,000
a. Dependent Variable: New Markets						

#### 5.9.3.4 Summary – New Markets

As presented in Table 5-35, the control variables, leadership and organisational type have an influence on New Markets. A five-step regression involves the inclusion of four control variables aspects of the respondents. Similarly, to Exploitive Innovation, control variables, type of organisation: Bureaucratic or Entrepreneurial ( $\beta = 0,230$ ;  $p < 0,01$ ) has a positive influence on the relationship between Leadership and New Markets.

Table 5-35: Hierarchical regression analysis: Impact of control variables on entering New Markets

	Standardized Beta (Model 1)	Standardized Beta (Model 2)	Standardized Beta (Model 3)	Standardized Beta (Model 4)	Standardized Beta (Model 5)
Leadership	<b>0.425**</b>	<b>0.404**</b>	<b>0.406**</b>	<b>0.400**</b>	<b>0.333**</b>
Leadership * MLev		0.120	-0.128*	0.124*	0.073
Leadership * MLev*SOrg			0.040	0.066	0.120
Leadership * MLev*SOrg*AOrg				-0.069	-0.068

Leadership * MLev*SOrg*AOrg*TOrg					0.230*
R <sup>2</sup>	0.180	0.194	0.196	0.200	0.240
Adjusted R <sup>2</sup>	0.177	0.187	0.185	0.185	0.223
R Square Change	0.180	0.014	0.002	0.004	0.040
F Change	<b>49.738**</b>	3.875	0.419	1.093	<b>11.756*</b>

#### 5.9.4 Comparison of Leadership Style and Type of Innovation Pursued

Figure 5-10 presents the R-square comparison for different Leadership Styles with different types of Innovation. These results show that Contextual Intelligence is the better predictor of exploitive than Complexity and Authentic Leadership. Complexity leadership was the best predictor of exploratory innovation (both new products/ services, as well as market innovation). Authentic Leadership was the weakest predictor of innovation in all categories.

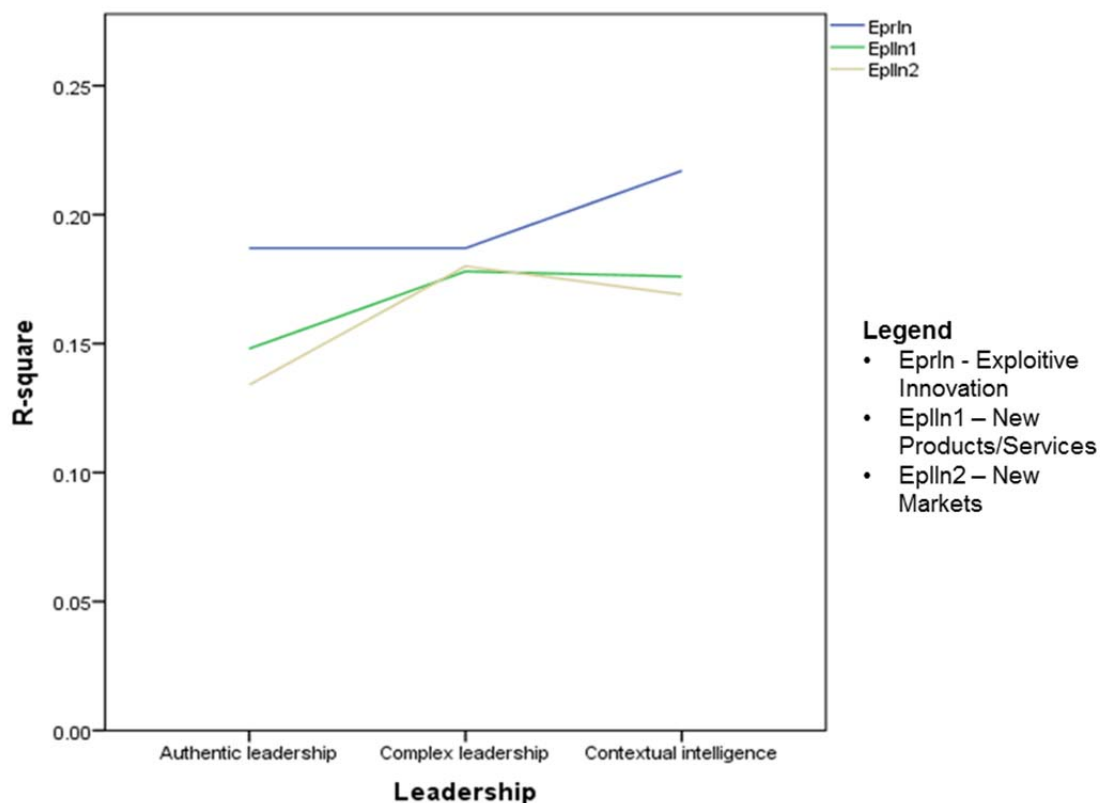


Figure 5-10: R-square comparison for Leadership style with different types of innovations

### **5.10 Summary**

A total of 246 participants took part in this study. Findings indicate that the leadership styles investigated, as well as Exploitive and Exploratory innovation were present in the South African organisations investigated. Furthermore, a positive relationship was found between leadership and innovation. The findings indicate that the control variables level of management and type of organisation influence the relationship between leadership and innovation. In Chapter 6, these findings are discussed and compared with the literature and then conclusions are made in Chapter 7.

## **Chapter 6: Discussion of Results**

### **6.1 Introduction**

This study attempts to expand the leadership and innovation body of knowledge, by discovering whether, in South African organisations and as reported by knowledge workers, there are pronounced differences to innovation outcomes under the direction of different leadership styles.

In Chapter 1 the research questions were stated. Chapter 2 reviewed literature the researcher deemed relevant in responding to the research questions. In Chapter 3 hypotheses were developed to with which to evaluate the research questions. Data presented and analysed in Chapter 5 will now be discussed and compared to literature. No previous study which attempts to directly compare innovation outcomes across the leadership styles investigated could be found by the researcher.

In summary data suggested that a statistically significant relationship between all leadership styles investigated and innovation outcomes existed. Contextual intelligence was found to have the greatest predictive power for exploitive and complexity leadership for both of the exploratory innovations in South African organisations. Authentic leadership had the least predictive power for all innovation outcomes. Differences in innovation outcomes when subjected to different leadership styles were minimal. Results will be discussed in greater detail in the subsequent sections of this chapter.

### **6.2 Biographical Profile and Control Variables**

The researcher was satisfied with the composition of the data received from the questionnaires. Though, 4.5% of respondents indicated that their highest level of education was matric, and this does not fit the definition used for knowledge workers, it is only a small percentage of the total sample. It was reasoned in some outlier cases it might be possible to be a highly skilled knowledge worker without a tertiary education. Thus, it was decided not to exclude these data points from the sample and to trust the judgement of the MBA students who sent out the questionnaires.

The researcher was satisfied that the representation of tenure, gender and race was representative of the knowledge worker population. 72% of the respondents worked for organisation of more than 50 employees, with 83% of the organisations being older than 10 years, indicating established organisations and suggesting some form of formal hierar-



chical leadership structure. As presented in Table 5-2 there was an even representation of staff members at different levels within these organisations and an equal split between bureaucratic and entrepreneurial organisations. Accordingly, the researcher was satisfied that results would not be biased. The only minor concern regarding the representativeness of data was around the disciplines of the respondents. Approximately a quarter of the sample worked in finance and the researcher did not know the composition of the “other” category.

### **6.3 Types of Leadership Employed in South African Organisations**

**RQ1:** Are the leadership styles, authentic leadership, complexity leadership and contextual intelligence, theorised to be advantageous to the outcome of innovation activities practiced in South Africa?

This research question was tested by hypothesis 1A to C. The null hypotheses, that there are low levels of the leadership styles in question in South African organisations, were rejected and the alternative hypotheses accepted. Thus, it is accepted that authentic leadership, complexity leadership and contextual intelligence are practiced in South African organisations and that it would be possible to investigate the influence of these leadership styles on innovation outcomes from the sample obtained.

The leadership descriptive statistics presented in Table 5-12 indicate that contextual intelligence and complexity leadership were the most prevalent of leadership styles investigated during this study. The prevalence of contextual intelligence and complexity leadership was approximately equal, with authentic leadership having a much lower representation. Thus, it is inferred that authentic leadership is not practiced to the same extent as contextual intelligence and complexity leadership in South African organisations.

Confirmatory factor analysis and one-sample t-tests conducted in Chapter 5 revealed that authentic leadership and complexity intelligence both had 2 dimensions, whereas contextual intelligence only had a single dimension. For complexity leadership the dimensions of patterning of attention and network development was as expected from literature, (Osborn et al., 2002). From literature and the Authentic Leadership Questionnaire it was expected that authentic leadership would be a construct with four dimensions, namely balanced processing, morality, transparency and self-awareness, (Walumbwa et al., 2008). However, analysis resulted in all dimensions apart from transparency being combined into a single dimension, dubbed “authentic consciousness”.

### **6.3.1 Authentic Leadership**

The low prevalence of authentic leadership in South Africa was an interesting and unexpected result. Though the prevalence of authentic leadership was not included in the scope of the study, because it was such a large outlier, the researcher decided it would be prudent to comment. Although, as discussed previously, an authentic leader can be either transformational or transactional (Černe et al., 2013), authentic leadership was born out of the transformational leadership construct (Walumbwa et al., 2008). This was because it was argued for a leader to be truly transformational they would be moral.

South Africa is part of sub Saharan Africa, which is generally thought to be made up of countries with collectivist cultures (Muchiri, 2011). Furthermore, previous research has found that transformational leadership readily manifests itself in collectivist cultures (Muchiri, 2011). Thus, it would be reasonable expected that authentic leadership would manifest in South African organisations.

However Muchiri (2011), also indicated that societies in Sub-Saharan Africa revolve around family and immediate community, leading to tight networks of interrelationships. This leads to the creation of in-groups which he argues eventually leads to neopatrimonialism. Neopatrimonialism is defined as personal rulership based on loyalty, where followers do not require belief in the leader's qualifications and skills. Here leaders often personalise authority and concentrate personalised power. Accordingly the leader's prerogative obscures the authority of laws. Leaders also acquire unwarranted and discretionary control over resources.

When the above is compared with the characteristics of the inauthentic leader (the opposite of the authentic leader) which is narcissistic self-interest, who would treat followers as a means to an end, (Ford & Harding, 2011), as well as considering that authenticity is as perceived by followers (Černe et al., 2013), the low prevalence of authentic leadership in South African organisations should not be surprising.

#### **6.3.1.1 Confirmatory Factor Analysis**

Though aware that morality and ethics mean different things in different cultures, when the literature review of Chapter 2 was initially conducted the researcher also did not consider the lack of maturity of the Authentic Leadership Questionnaire (ALQ) developed by Walumbwa et al. (2008) as a pertinent issue that could affect results. This was due to the

successful use and confirmatory factor analysis of the dimensions of the questionnaire in studies investigating Authentic Leadership in China and America (Walumbwa et al., 2008), Portugal and Brazil (Cervo, Mónico, dos Santos, & Hutz, 2016), as well as Pakistan (Bakari & Hunjra, 2017). However, factor analysis results presented in section 5.3 of Chapter 5 highlighted that for this study there was overlap between the dimensions of the Authentic Leadership Questionnaire.

Revisiting literature revealed that though Authentic Leadership is defined as a multidimensional construct, with distinct dimensions of self-awareness, relational transparency, balanced processing and an internalized moral perspective, these dimensions are still in the process of being tested empirically, (Levesque-Côté, Fernet, Austin, & Morin, 2017). In research by Levesque-Côté et al. (2017) specific reference is made that especially the Authentic Leadership Questionnaire (used in this research) has not been convincingly demonstrated to capture and predict the four dimensions of the Authentic Leadership construct.

In their research Levesque-Côté et al. (2017) concluded that during their analysis the Authentic Leadership Questionnaire was not able to adequately capture the multiple dimensions of Authentic Leadership. Their analysis suggested a large overlap between Authentic Leadership Questionnaire factors or an improper representation of the dimensions by the questions selected to identify them.

As presented in section 5.3 in Chapter 5 factor overlap was also experienced in this research as transparency was the only dimension to retain its distinctiveness. Confirmatory factor analysis combined the other dimensions self-awareness, balanced processing and an internalised moral perspective into a single factor. In their research on Authentic Leadership in South African public health care Stander, De Beer, and Stander (2015) also found that Authentic Leadership was perceived as an overarching leadership style rather than one comprising of four constructs, thereby increasing the researcher's confidence in the results obtained for this study.

#### **6.4 Types of Innovation Pursued by South African Organisations**

**RQ2:** Do South African organisations innovate?

This research question was tested by hypothesis 2. The null hypothesis that there are low levels of innovation in South African organisations was rejected and the alternative hy-

potheses accepted. Thus, it is accepted that South African organisations innovate and that it would be possible to investigate the influence of leadership style on innovation outcomes from the sample obtained.

Confirmatory factor analysis and one-sample t-test conducted in Chapter 5 revealed three types of innovation were pursued by respondents South African organisations. The innovation descriptive statistics presented in Table 5-15 indicate that the 3 types of innovation, exploitive, new products/services and new markets were equally presented in the sample. Thus, it was possible to investigate the influence of leadership style, on three types of innovation.

## **6.4.1 Exploratory Innovation**

### **6.4.1.1 Confirmatory Factor Analysis**

When the literature review of Chapter 2 was initially conducted the researcher was not aware that it was necessary or even possible to make a distinction between different types of exploratory innovation. However, factor analysis results presented in section 5.3 of Chapter 5 highlighted the error of this ignorance. Revisiting literature revealed the concept of Market Innovation.

Kjellberg, Azimont and Reid (2015) indicate that in 1934 J.A. Schumpeter identified that a distinction between the market and technological dimensions of the innovation process should be made. However, research has remained largely technology focussed, and the market dimension of innovation was typically reduced to a question of supply and demand. They further explain that the driving force behind market innovation is for innovators to ensure that they receive innovative rents for their innovative endeavours. When viewed in light of the Černe et al. (2013) definition of innovation, which requires commercial benefit for a new idea to be considered an innovation, it becomes clear that market innovation is a critical part of the innovation process. Markets are described as on-going, with locations and interfaces which are neither stationary or arbitrary, (Kjellberg et al., 2015).

Market innovation is defined as *“improving the mix of target markets and how these are served”*, (Kjellberg et al., 2015, p.5). This includes the identification of the most favourable markets, as well as how current and potential customers prefer to purchase in these markets. As markets are not stable, market innovation is not only concerned with identifying

new markets, but also how existing market are changing or can be changed to the benefit of the organisation, (Kjellberg et al., 2015).

Dimensions to market innovation include, market structure, market micro structure, market behaviour and market agents, (Kjellberg et al., 2015). Market structure focusses on the traditional structural arrangement of markets, such as barriers to entry, product differentiation, as well as how agents are inter connected. Market micro structure is concerned with the specific arrangements put into place in regards with modes of exchange, etc. Market behaviour seek to identify and explain behavioural variance across markets e.g. how market behaviour can be influenced using incentives. Market agents include all change agents be they, regulators, customers and other market participants, (Kjellberg et al., 2015).

Kjellberg, Azimont and Reid (2015) summarise that market innovation comprises of the change of existing market structures, introducing new market devices (e.g. algorithms, business models, retail interiors, etc.), changing market behaviour (new platforms) and the reconstitution of market agents. Thus, market innovation can be described as changes in the way business is done. Interestingly they continue that market innovators require change and instability to capture new opportunities, but that opportunities are captured by stabilizing efforts that produce economic rents. Stabilising efforts include, establishing a bounded network of buyers, seller and products/services, as well as configuring the network in a way that channels interaction to agents within the network. Thus, market innovation is a balancing act between seeking instability in the market and stabilizing it.

International organisations often consider South Africa as a gate way into Africa for their products and services. Thus, the concept that market innovation plays a noticeable role in the innovation basket within South African organisations isn't surprising.

## **6.5 The Influence of Leadership Style on Innovation Outcomes in South African Organisations**

**RQ3:** Which leadership style is most advantageous to innovation outcomes in South African organisations?

The goal of this research was to investigate research question 3 and to determine whether it is possible to ascertain if one of the three leadership styles investigated was more efficient in achieving innovation outcomes in South African organisations than others. After it

was ascertained that, the leadership styles investigated, and innovation were present in South African organisations it was possible to test for a causal influence. This was done by testing Hypothesis 3A to F.

### 6.5.1 Complexity Leadership and Innovation

The causal influence of complexity leadership on exploitive innovation was tested by hypothesis 3A, on new products/services by hypothesis 3Di and market innovation by hypothesis 3Dii. In all three cases the null hypothesis that complexity leadership does not influence innovation was rejected and the alternative that it does was accepted.

Scatter plots and Pearson's correlations were used to determine the direction of influence and strength of relationship between innovation outcomes or dependant variables and the dimensions of the leadership constructs tested or independent variables. Linear regression was conducted to determine how much of the variance in innovation outcomes could be explained by leadership style. Table 6-1 indicates that there were medium strength relationships between Patterning of Attention, as well as Network Development for all types of innovation.

Table 6-1: Pearson's Correlation for Complexity Leadership Dimensions and Innovation

Dimension	Pearson's Correlation		
	Exploitive Innovation	New Products/ Services	Market Innovation
Patterning of Attention	0.396	0.381	0.388
Network Development	0.404	0.385	0.385

The differences between R squared values presented in Table 6-2, were not deemed large enough to be material. Accordingly, complexity leadership could explain between 18 to 19% in the variance of all innovation outcomes, regardless of the innovation type pursued. When regarding the coefficients for the linear regression equation also presented in Table 6-2, network development had the greatest influence on the innovation outcome regardless of type. The differences between network development coefficients of the different types of innovation are also regarded as negligible. Thus, it would appear as if the network development dimension had the greatest influence on innovation outcomes for the complexity leadership construct.

According to Kuah (2002) innovation and competitive advantage requires managing the entire value system, thus chains of firms, suppliers, distribution channels and buyers.

Complexity leadership focusses on creating fit systems, by patterning of agent attention and network development, with innovation happening in the events between spaces between agents, (Mendes et al., 2016). Exploitive innovation, the creation of entirely new products, as well as market innovation require people of diverse backgrounds with differing goals and intentions to share information and work together, with complexity leadership creating fit environments for novel ideas to be more rapidly shared and effectively integrated, (Arena & Uhl-Bien, 2016). Thus, it is not surprising that complexity leadership was equally effective in pursuing both types of innovation.

Table 6-2: Linear Regression Results for Complexity Leadership Dimensions and Innovation

Linear Regression	Exploitive Innovation	New Products/ Services	Market Innovation
Complexity Leadership R <sup>2</sup>	0.187	0.178	0.180
Patterning of Attention Coefficient	0.019	0.024	0.025
Network Development Coefficient	0.058	0.065	0.062

Literature did not distinguish between which of the dimensions of complexity leadership were more important. Complexity leadership is concerned with empowering agents and creating fit organisations, without trying to control the end goal, with leadership viewed as an emergent result of agent interaction and feedback, (Lichtenstein et al., 2006).

Patterning of attention was defined as the process of identifying relevant information in reaching organisational goals, often exercised by corporate elites, (Osborn et al., 2002). Though important, the researcher believes once empowered and part of a team where there are open channels of communication and feedback, it should be relatively easy for a knowledge worker (professional, educated, etc.) to determine which information is relevant and which is not. Especially, when information is shared freely, and cognisance is taken of that micro level behaviours are predictable as agents are bounded by the institutional arrangement (Osborn et al., 2002). Thus, the assistance from the formally appointed leader may not be needed as much.

However, setting up teams and creating networks within and outside the organisation, as well as setting up feedback loops is much more difficult to accomplish and accordingly there would be a greater need for assistance from a formally appointed leader and their influence or lack thereof may be more acutely experienced by followers.

### 6.5.2 Authentic Leadership and Innovation

The causal influence of authentic leadership on exploitive innovation was tested by hypothesis 3B, on new products/services by hypothesis 3Ei and market innovation by hypothesis 3Eii. In all three cases the null hypothesis that authentic leadership does not influence innovation was rejected and the alternative that it does was accepted.

Scatter plots and Pearson's correlations were used to determine the direction of influence and strength of relationship between innovation outcomes or dependant variables and the dimensions of the leadership constructs tested or independent variables. Linear regression was conducted to determine how much of the variance in innovation outcomes could be explained by leadership style. Table 6-3 indicates that there were medium strength relationships between transparency, as well as authentic consciousness for all types of innovation.

Table 6-3: Pearson's Correlation for Authentic Leadership Dimensions and Innovation

Dimension	Pearson's Correlation		
	Exploitive Innovation	New Products/ Services	Market Innovation
Transparency	0.414	0.376	0.393
Authentic Consciousness	0.390	0.328	0.310

As presented in Table 6-4 the R squared value for the regression equation of authentic leadership and exploitive innovation was 0.187, whereas the R squared values for new products/services and market innovation were 0.148 and 0.134 respectively. Thus, authentic leadership has marginally more predictive power for exploitive innovation outcomes than for new products/services and market innovation.

Literature indicated that authentic leadership promotes trust, emotional safety (Černe et al., 2013), and certain forms of happiness, well-being and goodness, which is claimed to increase performance, (Ford & Harding, 2011). The researcher associated these conditions with creativity and feelings of emotional safety, thus confidence to propose unconventional ideas. Though creativity is associated with all types of innovation, it is most associated with exploratory innovation, in this case the creation of new products/services.

Thus, the greater predictive power of authentic leadership for exploitive innovation outcomes was unexpected. The difference in predictive power for authentic leadership when



pursuing exploitive compared to when pursuing new products/services and market was 0.04 and 0.05 respectively. These differences are not deemed as very large. Exploratory is more complex than exploitive innovation, thus the researcher is led to agree with the proponents of non-Newtonian leadership theories that a VUCA world may be too complex for a single formally appointed leader to manage.

One possible explanation for the larger predictive power of authentic leadership when pursuing exploitive innovation could be, that authentic leadership is a leader-follower phenomenon. According to Oke et al. (2009) top down organisational structures tend to favour exploitive innovation. As authentic leadership is a leader centric leadership theory it is generally associated with a top down structure. Thus, it could be argued that it would be more efficient in settings where a leader interacts with followers than where a leader interacts with other agents in internal and external networks. It could be argued that exploitive innovation is more of an in-house occurrence than the development of new products/services of market innovation, hence authentic leadership being slightly more effective.

Table 6-4: Linear Regression Results for Authentic Leadership Dimensions and Innovation

Linear Regression	Exploitive Innovation	New Products/ Services	Market Innovation
Authentic Leadership R <sup>2</sup>	0.187	0.148	0.134
Transparency Coefficient	0.016	0.021	0.021
Authentic Consciousness Coefficient	0.047	0.035	0.031

The researcher was not surprised that, the new combined, authentic consciousness dimension had a larger coefficient than transparency. This is due to the authentic consciousness dimension being a combination of other dimensions rather than having to stand on its own merit.

### 6.5.3 Contextual Intelligence and Innovation

The causal influence of contextual intelligence on exploitive innovation was tested by hypothesis 3C, on new products/services by hypothesis 3Fi and market innovation by hypothesis 3Fii. In all three cases the null hypothesis that contextual intelligence does not influence innovation was rejected and the alternative that it does was accepted.

Scatter plots and Pearson's correlations were used to determine the direction of influence and strength of relationship between innovation outcomes or dependant variables and the dimensions of the leadership constructs tested or independent variables. Linear regression was conducted to determine how much of the variance in innovation outcomes could be explained by leadership style. Table 6-5 indicates that there were medium strength relationships between contextual intelligence for all types of innovation.

Table 6-5: Pearson's Correlation for Contextual Intelligence and Innovation

Dimension	Pearson's Correlation		
	Exploitive Innovation	New Products/ Services	Market Innovation
Contextual Intelligence	0.465	0.419	0.421

As presented in Table 6-6 the R squared value for the regression equation of authentic leadership and exploitive innovation was 0.217, whereas the R squared values for new products/services and market innovation were 0.176 and 0.169 respectively. Thus, contextual intelligence has marginally more predictive power for exploitive innovation outcomes than for new products/services and market innovation. The difference in predictive power for contextual intelligence when pursuing exploitive compared to when pursuing new products/services and market was 0.04 and 0.05 respectively. These differences are not deemed as very large.

As contextual intelligence was defined as the ability to interpret changes in the surrounding and react accordingly (Kutz & Bamford-Wade, 2013), the researcher did not have any expectations as to for which type of innovation it would have more predictive power. However, contextual intelligence also has an element of leader centricity, thus it is not surprising that it is more efficient in the arena where the leader has greater control.

Table 6-6: Linear Regression Results for Contextual Intelligence and Innovation

Linear Regression	Exploitive Innovation	New Products/ Services	Market Innovation
Contextual Intelligence R <sup>2</sup>	0.217	0.176	0.169
Contextual Intelligence Coefficient	0.063	0.035	0.066

#### 6.5.4 Leadership Comparison

As discussed in Chapter 1, organisational leadership views innovation as a priority in achieving organisational objectives, (KPMG, 2016; PricewaterhouseCoopers, 2017). Accordingly, leaders attempt to improve the innovative capacity of their organisations. Results analysed in Chapter 5 agree with literature that leadership has a profound influence on innovation outcomes, (Ford & Harding, 2011; Oke et al., 2009; Osborn & Marion, 2009). This is because leaders not only intrinsically motivate workers to be more innovative, but also control the resources and administrative procedures to incentivise innovative behaviours. Data collected and analysed in this research indicated a positive relationship authentic leadership, complexity leadership and contextual intelligence and all innovative outcomes. A comparison of the predictive power of the leadership constructs for the different types of innovation outcomes is presented in Table 6-7. Differences between the leadership constructs were not very pronounced, but were still as expected from literature.

Linear regression indicated that all the leadership styles were better at predicting exploitive than exploratory innovation. The researcher attributes this to the exploitive innovation process having less unknowns and being less complex than the exploratory innovation process. Though very similar between new products/services and market innovation, the leadership constructs had the least predictive power when pursuing market innovation. Contextual intelligence had the greatest predictive power ( $R^2 = 0.217$ ) when pursuing exploitive innovation. Contextual intelligence had approximately 0.03 more predictive power than the other constructs when pursuing exploitive innovation.

Complexity leadership had the greatest predictive power ( $R^2 = 0.178$  and  $R^2 = 0.180$ ) when pursuing both types of exploratory innovation (new products and services, as well as market innovation). The predictive power for contextual intelligence and complexity leadership was approximately equal when pursuing new products/services. Thus, unsurprisingly both forms of leadership rooted in the non-Newtonian paradigms of complex adaptive systems fared better at exploratory endeavours. These results agree with Osborn and Marion (2009) that Newtonian leadership theories are less effective in dynamically changing, complex environments. This is because top-down decision making, and controlled, formalized communication and the execution of determined goals do not lend themselves to these types of complex adaptive systems.

Complexity leadership fared marginally better than contextual intelligence at predicting new product/services outcomes. The researcher attributes this to organisational structure and formally appointed leaders. The researcher has not uncovered many organisations in

the formal sector, employing knowledge workers, where agents are truly empowered and where vision and leadership are allowed to be an emergent even. Especially vision is often viewed as the domain of the corporate elite. Thus, even though it is believed that bottom-up coordination would be very if not the most conducive to the creation of new product and services, the researcher does not know of many organisations where complexity leadership is truly implemented. This leads the researcher to question whether there would have been a greater difference between results if data was obtained from organisations that truly employ complexity leadership.

Contextual intelligence had approximately 0.03 more predictive power than authentic leadership when pursuing new products/services. The predictive power for complexity leadership was approximately 0.01 more than for contextual intelligence when pursuing market innovation. Contextual intelligence had approximately 0.05 more predictive power than authentic leadership when pursuing market innovation.

Table 6-7: Comparison of Predictive Power of the Leadership Styles

R squared	Exploitive Innovation	New Products/ Services	Market Innovation
Contextual Intelligence	0.217	0.176	0.169
Complexity Leadership	0.187	0.178	0.180
Authentic Intelligence	0.187	0.148	0.134

Results also seem to agree with the following statement, “*a growing realization that effective leadership does not necessarily reside within the leader’s symbolic, motivational, or charismatic actions*”, (Lichtenstein et al., 2006, p.2). Authentic leadership was the only leadership style investigated, which was explicitly focussed on intrinsic motivation, (Walumbwa et al., 2008). Complexity leadership largely focussed on patterning of attention and network development (Osborn et al., 2002), with this research indicating the greater influence of network development. Contextual intelligence is defined as “*Simply stated, contextual intelligence is the ability to interpret and appropriately react to changing surroundings... [and] depends on the correct assessment of people*”, (Kutz & Bamford-Wade, 2013, p.20).

Authentic leadership also had the least predictive power for all leadership constructs investigated. Thus, it would appear, that generally there is greater efficacy in empowering agents, assisting with network development and knowing when to use the which people, than focussing on intrinsic motivation and creating a happy, moral work force.

As summarised by Kjellberg, Azimont and Reid (2015) market innovation comprises of the change of existing market structures, introducing new market devices (e.g. algorithms, business models, retail interiors, etc.), changing market behaviour (new platforms) and the reconstitution of market agents. Thus, it is clear that network development plays a critical role in market innovation and accordingly it is no surprise that complexity leadership had the greatest predictive power for this innovation outcome.

## **6.6 Summary**

In this chapter the research question was answered. Though the differences between innovation outcomes when under the influence of different leadership styles was not very pronounced, contextual intelligence had the greatest predictive power for exploitive innovation and complexity leadership for exploratory (both new products/services and new markets). In Chapter 7, conclusion will be made and implications to management and limitations of the research discussed.

## **Chapter 7: Conclusion**

In this Chapter the researcher will make conclusions about the findings discussed in Chapter 6 and discuss the implications for management, the limitations of the study and make suggestions for future research.

### **7.1 Principle Findings**

The analysis of Chapter 6 revealed the following:

- The Authentic Leadership Questionnaire predicts that authentic leadership is a four-dimension construct, with dimensions balanced processing, morality, transparency and self-awareness. In the South African context, authentic leadership dimensions differed from the Authentic Leadership Questionnaire. Dimensions revealed by the analysis were, transparency and a combination of the other three dimensions dubbed authentic consciousness.
- In the South African context exploratory innovation had two dimensions. The first dimension was the creation of new products and services. The second dimension was revealed to be market innovation.
- Differences in innovation outcomes when subjected to different leadership styles were minimal. That being said analysis revealed:
  - There was a positive relationship between authentic leadership and both exploitive and exploratory (both new products/services and market innovation) innovation.
  - There was a positive relationship between complexity leadership and both exploitive and exploratory (both new products/services and market innovation) innovation.
  - There was a positive relationship between contextual intelligence and both exploitive and exploratory (both new products/services and market innovation) innovation.
  - Contextual intelligence was found to have the greatest predictive power for exploitive and complexity leadership for both of the exploratory innovations in South African organisations. Authentic leadership had the least predictive power for all innovation outcomes.

### **7.2 Implications for Management**

The Implications of this research for management of South African organisations will be discussed in the subsequent sections. Leadership constructs based in the Non-Newtonian

paradigm had greater efficacy than those based in the Newtonian paradigm. Accordingly, most of the implications for management involve network creation, information flow and empowering agents within the organisation.

### **7.2.1 Context**

Effective leadership means different things in different settings and depends on a wide variety of environmental and organisational influences, (Osborn et al., 2002). Simply stated contextual intelligence is the ability to interpret and react to changes in the operating environment. Lichtenstein et al. (2006) describes organisations as complex, adaptive systems in which relationships are not defined by hierarchy, but rather the interactions between heterogeneous agents. Thus, this ability depends on the correct assessment of people, (Kutz & Bamford-Wade, 2013). Analysis of data from this study indicated that contextually intelligent actions from leaders were more efficient in all innovation outcomes than a leader's symbolic, motivational, or charismatic actions.

According to Kutz and Bamford-Wade (2013), contextual intelligence is a skill that can be learned by any person. They outline this skillset as the integration of several factors including a grasp of non-Newtonian frameworks, synchronicity and double loop learning, tacit based knowledge and proper time orientation. Twelve contextually intelligent behaviour to be implemented are, future mindedness, being an influencer, being mission minded, being a communitarian, cultural sensitivity, being able to apply multicultural leadership, context diagnoses, being a change agent, intentional leadership, a critical thinker, a consensus builder and being future minded (again). When used together this leads to contextual intelligence.

### **7.2.2 Formally Appointed Leaders versus Leadership**

In complexity leadership, actual leadership is achieved through the interaction of an administrative function, an adaptive function and an enabling function, (Mendes et al., 2016). The administrative function includes typical, formal managerial activities common to the top down approach, such as coordinating and planning tasks and typically has formally appointed managers. The adaptive function emerges from interactions between agents over conflicts, ideas or preferences as they strive to mitigate tensions and find common ground, this is where leadership emerges. The enabling function of formally appointed leaders includes creating conditions for “fit” environments enabling efficient interactions and operation of the adaptive function.

Thus, in the complexity leadership construct formally appointed leaders are administrators and enablers. Leadership is an emergent construct. According to Lichtenstein et al. (2006) this suggests a form of “distributed” leadership in an interactive dynamic, within which any member will participate as leader or a follower at different times and for different purposes. The enabling function of leadership involves patterning of attention and network development.

Formally appointed leader’s effectiveness depends on being able to foster conditions that enable productive futures without trying to control the end goal, (Marion & Uhl-Bien, 2001). Here, the leader is not motivating followers to follow his/her wishes but rather cultivating environments where different agents can interact productively and undirected. However, the researcher cannot see many organisations going to this extreme and would thusly advocate empowering workers as much as is possible and creating open two-way channels of communication. In order for leadership to be an emergent construct in the adaptive function with the most suitable leader emerging as and when required, the researcher would also recommend flat teams.

### **7.2.3 Empowerment**

Workers should be empowered to collectively learn and implement new solutions, (Mendes et al., 2016). Leaders’ focus should shift from driving and managing outcomes to creating adaptive spaces where emergence can happen, but for this to happen followers must be given as much autonomy as is possible and be empowered to take action. Thus, a leader should not micro manage.

According to Marion and Uhl-Bien (2001) effective organisational change has its own dynamic, that cannot simply follow strategic shifts and that is longer and subtler than can be managed by any single leader.

Leaders should not solve the problems faced by agents but rather empower them to solve their own problems. This is because as agents struggle with interdependency and constraints, new capabilities, innovations and adaptability are created which eventually spread across the system generating emergent learnings (Lichtenstein et al., 2006)

### **7.2.4 Feedback**

Empowered workers require feedback in order to ascertain that actions taken are beneficial to organisational performance. This is not only feedback from formally appointed



leaders, but more importantly from other stakeholders within the value chain. These include colleagues, clients, suppliers, interest groups, etc. Leaders should enable timely feedback in order for followers to take corrective actions as quickly as possible.

### **7.2.5 Network development**

The mechanism through which complexity leadership emerges in the system is agent interactions, which requires integrated networks and open communication. According to Marion and Uhl-Bien (2001) a leader's relationship orientated behaviour should enable effective networks rather than only motivating enhanced effort. Network development includes the choice of the network (informational), membership to the network, inside activities in the network, as well as linkages to other networks, (Osborn et al., 2002).

Complex leaders should avoid solving problems, rather letting subordinates solve their own problems. To this extent they will also not only build networks, but they will also help catalyse network building, through the delegation and empowerment of subordinates, (Marion & Uhl-Bien, 2001)

### **7.2.6 Organisational Structure**

Organisational design and structure has been found to be a major impediment to complexity leadership, (Uhl-Bien & Marion, 2008). As most of the organisational structures of firms are bureaucratic, the adaptive function of complexity leadership is suppressed, (Mendes et al., 2016). Hierarchical leadership structures tend to hamper dissemination of information and knowledge, this occurs due to an impediment to open communication across organisational levels when formalised central decision making occurs, (Mendes et al., 2016). Thus it is important to ensure that bureaucracy and organisational structure do not create barriers to connectivity between agents, (Arena & Uhl-Bien, 2016). Group cohesion is described as how connected individuals within the group are with one another. Clusters between different groups are considered highly cohesive when they have many redundant connections within the system. The benefits of cohesive groups are that individuals can quickly share information and typically demonstrate higher levels of trust than less cohesive groups, (Arena & Uhl-Bien, 2016).

### **7.2.7 Tension**

According to Arena and Uhl-Bein (2016) organisations have two primary systems that operate in tension with one another. These are the operational system, driving formality

and standardisation for business performance and the entrepreneurial system striving for innovation, learning and growth. They contend that the widespread belief is that leaders should reduce the conflict experienced between these two systems, but that it is this dynamic conflict which is responsible for innovation within an organisation. Thus, locally agents act in response to pressures and opportunities, this tension forces them to solve problems and come up with novel solutions. Through systems interaction, local phenomena link up with one another creating emergent phenomena.

### **7.2.8 Market Innovation**

Market innovation is defined as *“improving the mix of target markets and how these are served”*, (Kjellberg et al., 2015, p.5). Markets are not stable, thus market innovation includes how existing market are changing or can be changed to the benefit of the organisation, (Kjellberg et al., 2015). Thus, market innovation can be described as changes in the way business is done.

Kjellberg, Azimont and Reid (2015) state continue that market innovators require change and instability to capture new opportunities, but that opportunities are captured by stabilizing efforts that produce economic rents. Stabilising efforts include, establishing a bounded network of buyers, seller and products/services, as well as configuring the network in a way that channels interaction to agents within the network. Thus, market innovation is a balancing act between seeking instability in the market and stabilizing it.

### **7.3 Limitations of the Research**

The limitations of this research included the following:

- Since quantitative research questionnaires are organised in a closed ended questioning technique, there was constrained data accessible from the respondent.
- The samples were selected based on the judgement and network of MBA students, hence could be biased as human judgement varies between observers. As was observed in Chapter five, 4.5% of the sample indicated that their highest level of qualification was matric, which does not fit the definition of knowledge workers.
- MBA students distributed the questionnaires to their networks, this could result in biased data. Greater heterogeneity would have resulted in greater certainty that data was unbiased.
- Due to the time constraints associated with this research project a cross-sectional sample was taken. In order to empirically establish causal claims a longitudinal study is required, (Jansen et al., 2009).

- No differentiation was made between industries, as it was assumed that knowledge work would be similar across industries. Richer information would have been obtained if the distinction was made.

#### **7.4 Suggestions for Future Research**

Suggestions for future research include the following:

- A separate study aimed solely at verifying the Authentic Leadership Questionnaire in the South African context.
- This study was broad and aimed at identifying whether one of the leadership constructs investigated had a greater influence on innovation outcomes than the others. It is suggested that future research be more in depth, focussing on a single construct to determine the exact mechanisms in which the different types of innovation are influenced.
- A revalidation of the study focussing solely on specific industries in order to determine, whether that context would affect innovation.
- A revalidation of the study focussing on the mediating influence of control variables shown to influence the leadership innovation relationship.

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## Appendix A: KMO and Bartlett's Test Results

### KMO and Bartlett's Test Results for Innovation

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.890
Bartlett's Test of Sphericity	Approx. Chi-Square	1330.268
	df	78
	Sig.	.000

### KMO and Bartlett's Test Results for Complexity Leadership

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.935
Bartlett's Test of Sphericity	Approx. Chi-Square	2121.896
	df	66
	Sig.	.000

### KMO and Bartlett's Test Results for Authentic Leadership

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.955
Bartlett's Test of Sphericity	Approx. Chi-Square	3026.697
	df	120
	Sig.	.000

### KMO and Bartlett's Test Results for Contextual Intelligence

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.906
Bartlett's Test of Sphericity	Approx. Chi-Square	1022.139
	df	21
	Sig.	.000

## Appendix B: Extracted Variance, Loading and Eigenvalues

### Extracted Variance, Loading and Eigenvalues of Innovation

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumul. %	Total	% of Variance	Cumul. %	Total	% of Variance	Cumul. %
1	5.640	43.383	43.383	5.640	43.383	43.383	3.157	24.282	24.282
2	1.435	11.042	54.425	1.435	11.042	54.425	2.896	22.280	46.563
3	1.045	8.041	62.466	1.045	8.041	62.466	2.067	15.903	62.466
4	.857	6.594	69.061						
5	.693	5.333	74.394						
6	.541	4.160	78.554						
7	.527	4.050	82.604						
8	.486	3.739	86.343						
9	.441	3.389	89.732						
10	.417	3.205	92.937						
11	.336	2.582	95.519						
12	.300	2.304	97.824						
13	.283	2.176	100.000						

Extraction Method: Principal Component Analysis.

### Extracted Variance, Loading and Eigenvalues of Complexity Leadership

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumul. %	Total	% of Variance	Cumul. %	Total	% of Variance	Cumul. %
1	7.321	61.009	61.009	7.321	61.009	61.009	5.087	42.392	42.392
2	1.085	9.039	70.048	1.085	9.039	70.048	3.319	27.657	70.048
3	.643	5.355	75.403						
4	.564	4.700	80.103						
5	.470	3.918	84.021						
6	.404	3.363	87.384						
7	.357	2.977	90.360						
8	.305	2.543	92.904						
9	.253	2.108	95.012						
10	.238	1.985	96.997						
11	.191	1.591	98.588						
12	.169	1.412	100.000						

Extraction Method: Principal Component Analysis.

### Extracted Variance, Loading and Eigenvalues of Authentic Leadership

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumul. %	Total	% of Variance	Cumul. %	Total	% of Variance	Cumul. %
1	9.855	61.593	61.593	9.855	61.593	61.593	7.086	44.285	44.285
2	1.092	6.824	68.418	1.092	6.824	68.418	3.861	24.132	68.418
3	.711	4.442	72.860						
4	.599	3.744	76.603						
5	.526	3.287	79.890						
6	.497	3.107	82.996						
7	.464	2.897	85.894						
8	.364	2.278	88.172						
9	.343	2.147	90.318						
10	.292	1.824	92.142						
11	.250	1.564	93.706						
12	.236	1.475	95.181						
13	.223	1.393	96.574						
14	.201	1.254	97.828						
15	.189	1.183	99.011						
16	.158	.989	100.000						

Extraction Method: Principal Component Analysis.

### Extracted Variance, Loading and Eigenvalues of Contextual Intelligence

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumul. %	Total	% of Variance	Cumul. %	Total	% of Variance	Cumul. %
1	4.570	65.292	65.292	4.570	65.292	65.292	4.570	65.292	65.292
2	.692	9.881	75.173						
3	.497	7.099	82.272						
4	.405	5.784	88.056						
5	.328	4.686	92.742						
6	.295	4.215	96.957						
7	.213	3.043	100.000						

Extraction Method: Principal Component Analysis.

## Appendix C: Rotated Component Matrixes

### Rotated Component Matrix of Innovation

Questions		Factor		
		1	2	3
We improve our provision's efficiency of products and services	Q12_11	0.771	0.273	0.181
We frequently refine the provision of existing products and services	Q12_8	0.723	0.290	0.145
Lowering costs of internal processes is an important objective	Q12_14	0.704	-0.085	0.135
We regularly implement small adaptations to existing products and services	Q12_9	0.672	0.415	0.096
We increase economies of scales or cost advantages due to scale/ size of operation in existing markets	Q12_12	0.639	0.197	0.221
Our organization expands services for existing clients	Q12_13	0.540	0.262	0.376
We experiment with new products and services in our local market	Q12_3	0.217	0.785	0.136
We commercialize products and services that are completely new to our organisation	Q12_4	0.162	0.766	0.133
We invent new products and services	Q12_1	0.180	0.764	0.209
Our organization accepts demands that go beyond existing products and services	Q12_2	0.167	0.722	0.266
Our organization regularly uses new distribution channels	Q12_6	0.039	0.272	0.805
We regularly search for and approach new clients in new markets	Q12_7	0.403	0.100	0.707
We frequently utilize new opportunities in new markets	Q12_5	0.309	0.244	0.706

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

### Rotated Component Matrix of Complexity Leadership

Questions		Factor	
		1	2
Connects employees with a broad variety of potential information sources such as those people with relevant information	Q13_6	0.864	0.230
Initiates discussions on what is important, not what to do and how to do it	Q13_5	0.844	0.252
Connects employees with a broad variety of potential information sources such as those people with relevant information	Q13_16	0.826	0.290
Facilitates dialog and discussion to help employees share knowledge in developing a shared understanding of issues	Q13_4	0.818	0.269
Encourages employees to raise difficult and challenging questions that others may perceive as a threat to the status quo	Q13_18	0.693	0.454
Creates linkages between entities inside the organisation and with outside stakeholders	Q13_19	0.662	0.409
Tells stories to illustrate important learning points	Q13_17	0.631	0.349
Embraces diversity by having diverse people and views as part of the network	Q13_23	0.589	0.513
Gathers feedback information from external stakeholders such as suppliers and customers to improve the organisation	Q13_24	0.568	0.502

Questions		Factor	
		1	2
Displays political savvy in understanding the interests of the other players in organisational networks	Q13_21	0.248	0.901
Has political skill of sizing up group politics for the benefit of the department or business unit	Q13_20	0.247	0.839
Builds networks across internal organisational boundaries/ silos or functions	Q13_22	0.409	0.722

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

### Rotated Component Matrix of Authentic Leadership

Questions		Factor	
		1	2
Listens carefully to different points of view before coming to conclusions	Q15_28	0.826	0.291
Shows he or she understands how specific actions impact others	Q15_32	0.815	0.306
Knows when it is time to reevaluate his or her position on important issues	Q15_31	0.815	0.286
Accurately describes how others view his or her capabilities	Q15_30	0.810	0.237
Seeks feedback to improve interactions with others	Q15_29	0.802	0.223
Encourages everyone to speak their mind	Q15_19	0.761	0.400
Solicits views that challenge his or her deeply held positions	Q15_26	0.731	0.320
Admits mistakes when they are made	Q15_18	0.709	0.407
Analyzes relevant data before coming to a decision	Q15_27	0.697	0.383
Asks you to take positions that support your core values	Q15_24	0.650	0.508
Makes difficult decisions based on high standards of ethical conduct	Q15_25	0.633	0.534
Demonstrates beliefs that are consistent with actions	Q15_22	0.613	0.600
Displays emotions exactly in line with feelings	Q15_21	0.091	0.819
Tells you the hard truth	Q15_20	0.322	0.720
Says exactly what he or she means	Q15_17	0.402	0.677
Makes decisions based on his or her core values	Q15_23	0.446	0.607

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

### Variables for Contextual Intelligence

Questions	
Gathers intelligence from what is happening in the context like which threats and opportunities are developing	Q13_25
Demonstrates being in tune with the organisational and external environment or context	Q13_26

Questions	
Frames our change projects in ways that appeal or speaks to the interest of particular stakeholders	Q13_27
Adapts his/her communication to different ethnic cultures in the organisation	Q13_28
Investigates relevant contextual variables that are or might influence the organisation	Q13_29
Has a forward-looking mentality - sense of direction for where the organisation is going in the future	Q13_30
Provide opportunities for diverse employees to interact in a non-discriminatory manner	Q13_31

## Appendix D: Descriptive Statistics

### Complexity Leadership

Variable		<i>n</i>	Mean	Median	Std. Deviation	Skewness	Kurtosis
Facilitates dialog and discussion to help employees share knowledge in developing a shared understanding of issues	Q13_4	246	13.57	14	1.223	-0.61	-0.551
Initiates discussions on what is important, not what to do and how to do it	Q13_5	246	13.48	14	1.299	-0.55	-0.834
Connects employees with a broad variety of potential information sources such as those people with relevant information	Q13_6	246	13.44	14	1.21	-0.532	-0.599
Injects ideas and information into the system for it to process to create energy for change	Q13_16	245	13.41	14	1.243	-0.543	-0.628
Tells stories to illustrate important learning points	Q13_17	246	13.18	13	1.367	-0.231	-1.113
Encourages employees to raise difficult and challenging questions that others may perceive as a threat to the status quo	Q13_18	245	13.26	14	1.422	-0.306	-1.223
Creates linkages between entities inside the organisation and with outside stakeholders	Q13_19	245	13.2	13	1.345	-0.258	-1.128
Has political skill of sizing up group politics for the benefit of the department or business unit	Q13_20	246	12.97	13	1.34	-0.074	-1.183
Displays political savvy in understanding the interests of the other players in organisational networks	Q13_21	245	13.28	13	1.298	-0.347	-0.963
Builds networks across internal organisational boundaries/ silos or functions	Q13_22	245	13.43	14	1.303	-0.51	-0.84
Embraces diversity by having diverse people and views as part of the network	Q13_23	245	13.51	14	1.342	-0.551	-0.874
Gathers feedback information from external stakeholders such as suppliers and customers to improve the organisation	Q13_24	245	13.41	14	1.234	-0.43	-0.75

*Std. Error of skewness = 0.156; Std. Error of kurtosis = 0.310*

### Contextual Intelligence

Variable		<i>n</i>	Mean	Median	Std. Deviation	Skewness	Kurtosis
Gathers intelligence from what is happening in the context like which threats and opportunities are developing	Q13_25	245	13.56	14	1.184	-0.488	-0.745
Demonstrates being in tune with the organisational and external environment or context	Q13_26	243	13.59	14	1.241	-0.603	-0.61
Frames our change projects in ways that appeal or speaks to the interest of stakeholders	Q13_27	246	13.32	14	1.174	-0.418	-0.732
Adapts his/her communication to different ethnic cultures in the organisation	Q13_28	244	13.1	13	1.369	-0.208	-1.206



Variable		<i>n</i>	Mean	Median	Std. Deviation	Skewness	Kurtosis
Investigates relevant contextual variables that are or might influence the organisation	Q13_29	246	13.27	13	1.179	-0.399	-0.678
Has a forward-looking mentality - sense of direction for where the organisation is going in the future	Q13_30	245	13.84	14	1.268	-0.898	-0.313
Provide opportunities for diverse employees to interact in a non-discriminatory manner	Q13_31	245	13.62	14	1.296	-0.703	-0.605

Std. Error of skewness = 0.156; Std. Error of kurtosis = 0.31

## Authentic Leadership

Variable		<i>n</i>	Mean	Median	Std. Deviation	Skewness	Kurtosis
Says exactly what he or she means	Q15_17	246	3.89	4	1.161	-0.921	-0.023
Admits mistakes when they are made	Q15_18	244	3.34	4	1.325	-0.413	-0.993
Encourages everyone to speak their mind	Q15_19	245	3.49	4	1.336	-0.585	-0.78
Tells you the hard truth	Q15_20	245	3.84	4	1.185	-0.894	-0.11
Displays emotions exactly in line with feelings	Q15_21	245	3.34	3	1.137	-0.349	-0.529
Demonstrates beliefs that are consistent with actions	Q15_22	244	3.58	4	1.189	-0.745	-0.21
Makes decisions based on his or her core values	Q15_23	243	3.82	4	1.09	-0.841	0.158
Asks you to take positions that support your core values	Q15_24	246	3.62	4	1.239	-0.731	-0.383
Makes difficult decisions based on high standards of ethical conduct	Q15_25	244	3.74	4	1.223	-0.821	-0.241
Solicits views that challenge his or her deeply held positions	Q15_26	246	3.24	3	1.231	-0.435	-0.763
Analyses relevant data before coming to a decision	Q15_27	245	3.82	4	1.147	-0.852	-0.092
Listens carefully to different points of view before coming to conclusions	Q15_28	245	3.47	4	1.23	-0.479	-0.729
Seeks feedback to improve interactions with others	Q15_29	245	3.32	4	1.314	-0.43	-0.928
Accurately describes how others view his or her capabilities	Q15_30	245	3.09	3	1.299	-0.213	-1.018
Knows when it is time to re-evaluate his or her position on important issues	Q15_31	244	3.25	3.5	1.25	-0.382	-0.883
Shows he or she understands how specific actions impact others	Q15_32	246	3.35	4	1.31	-0.49	-0.861

## Innovation

Variable		<i>n</i>	Mean	Median	Std. Deviation	Skewness	Kurtosis
We invent new products and services	Q12_1	246	43.67	44	1.26	-0.78	-0.433
Our organization accepts demands that go beyond existing products and services	Q12_2	246	43.71	44	1.197	-0.84	-0.138
We experiment with new products and services in our local market	Q12_3	246	43.79	44	1.186	-1.01	0.259
We commercialize products and services that are completely new to our organisation	Q12_4	246	43.42	44	1.239	-0.48	-0.735
We frequently utilize new opportunities in new markets	Q12_5	246	43.7	44	1.146	-0.72	-0.284
Our organization regularly uses new distribution channels	Q12_6	245	43.25	43	1.232	-0.31	-0.85
We regularly search for and ap-	Q12_7	246	43.79	44	1.175	-0.7	-0.468

Variable		<i>n</i>	Mean	Median	Std. Deviation	Skewness	Kurtosis
proach new clients in new markets							
We frequently refine the provision of existing products and services	Q12_8	246	43.8	44	1.104	-0.91	0.261
We regularly implement small adaptations to existing products and services	Q12_9	246	43.96	44	1.025	-1.22	1.319
We introduce improved, but existing products and services for our local market	Q12_10	245	43.9	44	1.106	-0.97	0.289
We improve our provision's efficiency of products and services	Q12_11	245	43.82	44	1.053	-0.94	0.416
We increase economies of scales or cost advantages due to scale/ size of operation in existing markets	Q12_12	246	43.58	44	1.178	-0.51	-0.533
Our organization expands services for existing clients	Q12_13	245	43.85	44	1.053	-0.79	0.001
Lowering costs of internal processes is an important objective	Q12_14	246	43.91	44	1.242	-1.1	0.248

*Std. Error of Skewness = 0.155; Std. Error of Kurtosis = 0.309*