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THE EFFECT OF PROJECT TYPES AND PROJECT LIFE CYCLE PHASES ON LEADERSHIP STYLE

by

SUZAAN PRETORIUS

Submitted in partial fulfilment of the requirements for the degree

Philosophiae Doctor
(Project Management)

In the
Faculty of Engineering, Built Environment and Information Technology
University of Pretoria
Pretoria

2019

Declaration

I declare that the thesis, which I hereby submit for the degree Philosophiae Doctor (Project Management) at the University of Pretoria, is my own work and has not been previously submitted by me for a degree at another university.

I further declare that the publications included in the thesis

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Suzaan Pretorius

THE EFFECT OF PROJECT TYPES AND PROJECT LIFE CYCLE PHASES ON LEADERSHIP STYLE

by

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Degree:	PhD

Thesis summary

Leadership traditionally centred around the idea of a “person in charge” leading subordinates / team members (i.e. vertical leadership), however recent literature indicates that leadership may be shared in a team by assigning the leadership role to the person with the most appropriate knowledge, skills and abilities needed by the project at any specific time (i.e. shared leadership). Shared leadership does however, not substitute vertical leadership – the two concepts are extremes on a continuum and complement each other. Although the leadership responsibility formally rests with the project manager, it is regularly assumed by team members to lead temporarily in order to solve a technical or other issue, and then handed back to the project manager. A contemporary stream of literature defines this process as balanced

leadership. This thesis investigates how different project types and project life cycle phases may influence the choice of leadership style. It also confirms that an appropriate balance between vertical and shared leadership improves the likelihood of project management success. A new Leadership Style Model is proposed and the thesis contributes to answering the main research question:

How does the leadership style influence perceived project management success?

To answer the above over-arching question, three sub-questions were formulated and addressed in Chapters 3 to 6:

- *How do different project types (pace, complexity, novelty and technological uncertainty) influence the balance on the continuum between vertical and shared leadership?*
- *How do different project life-cycle phases (pre-execution, execution and post-execution) influence the balance between vertical and shared leadership?*
- *How does an appropriate balance between vertical and shared leadership influence the likelihood of perceived project management success?*

A web-based, self-administered questionnaire was distributed to people working on South African projects, and 313 complete responses were received. The collected data were analysed by applying hypothesis testing techniques and cross-tabulation.

The study confirms that an appropriate balance between vertical and shared leadership styles improves the likelihood of project management success. The more complex, and the higher the levels of technology employed, the more shared the leadership style should be. On the other hand, the higher paced projects require a more vertical leadership style. Respondents indicated that highly novel projects call for a more vertical leadership style – this contradicted the hypothesised leadership balance - possible reasons for this deviation are provided in Chapters 4 and 6.

A further finding of the study is that during the post-execution phase, the leadership style should move towards more shared leadership than in prior stages. However, respondents were uncertain of the influence of the other project phases (pre-execution and execution) on the appropriate balance of leadership style. Various reasons for this uncertainty are provided in Chapters 5 and 6.

The thesis presents a new perspective on the influence of project type and project life cycle phases on the appropriate balance between vertical and shared leadership. Furthermore, it gives insights into the influence of an appropriate balance of leadership on the likelihood of perceived project management success.

The Project Leadership Style (PLS) Model presented in this thesis, explains how the variables of project types and project life cycle phases relate to different leadership styles (vertical and shared leadership), and it also guides the practitioner to selecting appropriate leadership styles for specific project situations.

Keywords

Project leadership styles, vertical leadership, shared leadership, project types, project life cycle, project phases, balanced leadership.

Acknowledgements

I would first and foremost like to give thanks to God for undeserved grace.

I would like to thank the following individuals for their support during the completion of this work:

At the University of Pretoria:

Prof Herman Steyn for not only being my study leader, but also for being my mentor. He saw my potential and continuously lobbied for me. His inputs and guidance on this work are highly appreciated.

Dr Taryn Bond-Barnard for her meticulous eye for detail, her guidance and valued feedback on this work.

Prof Elma van der Lingen and all my other colleagues at the Graduate School of Technology Management for their support, encouragement and for providing me with the opportunity and financial support to publish my journal papers, and to present at the EURAM 2018 Doctoral Colloquium and local conferences.

I am also grateful to the National Research Foundation (NRF) for providing me with a bursary to pursue my PhD.

In my personal life:

My husband, Francois, who believed in me, encouraged and supported me.

My sons, Stian and Ruan, for their support and unconditional love.

My father-in-law, Sampie Pretorius, who paid my class fees in the first year of this study.

My late mother who instilled in me the discipline to work hard in order to reach my goals.

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List of Acronyms

BoKS	Bodies of Knowledge
IT	Information Technology
IPMA	International Project Management Association
JIEM	Journal of Industrial Engineering and Management
JMPM	Journal of Modern Project Management
NRF	National Research Foundation
OPM3	Organisational Project Management Maturity Model
PMBOK	Project Management Body of Knowledge
PMI	Project Management Institute
PM^3	Project Management Maturity Models
PLS-Model	Project Leadership Style Model
PRINCE	PRojects IN Controlled Environments
SA	South Africa
SAIIE	South African Institute for Industrial Engineering
SAJIE	South African Journal of Industrial Engineering
SPICE	Structure Process Organisational Improvement for Construction Enterprises

UK	United Kingdom
US	United States
US$	United States Dollar

Chapter 1

Introduction

1.1 Setting the scene

In recent years several companies transformed into more “projectised” structures and worldwide expenditure on projects amounts to billions of dollars (Williams, 2005). Organisations have to adapt to increasing demands for innovation, and an increase in the complexity and changing aspects of work confronts them on a daily basis (Fausing, Jeppesen, Jønsson, Lewandowski and Bligh, 2013). Today nearly every economic sector has progressed towards globalisation, deregulation and transparency (Thamhain, 2004a). As a result, companies are no longer seen as “machines” where managers at the top of the hierarchy direct and control processes. Instead of this way of working, organisations developed into dynamic systems of interrelated relationships and networks of influence (Fletcher and Käufer, 2003). In order to accommodate this shift, effective teamwork has become critical (Thamhain, 2004b). It has been estimated that globally more than 80% of companies with in excess of 100 employees depend on teams to complete run-of-the-mill work, as well as solving complex problems (Scott, Jiang, Wildman and Griffith 2018).

Knowledge work, involving a highly educated and skilled workforce, is increasingly becoming more team based. The reason being that it is becoming more difficult for any one person to be an expert on various aspects of the work that needs to be done (Pearce, 2004). With this shift in teamwork, and keeping in mind that effective team leadership is a significant factor in developing high-performance teams (Mathieu, Maynard, Rapp and Gilson, 2008; Scott *et al.*, 2018), the question arises if the traditional models and methodologies to leadership are still applicable (Pearce, 2004)?

Research on leadership in project management has increased dramatically in recent years. This is illustrated by the fact that in the year 2000 only 26 research papers used both terms ‘leadership’ and ‘project management’ in its titles, while in 2015 the number of such papers grew to 271 (Müller, Niklova, Sankaran, Hase, Zhu, Xu, Vaagaasar, and Drouin, 2016). Researchers such as Pearce (2004), Müller, Sankaran, Drouin, Niklova and Vagaasar (2015), Müller *et al* (2016), Müller, Packendorff and Sankaran (2017), Kocolowski (2010), and Scott-Young, Georgy and Grisinger (2019), to name only a few, explored the phenomenon of shared, horizontal and vertical leadership in projects.

This study builds on recent literature which, amongst others, investigates the project-related factors that influence leadership styles and their effect on perceived project management success, and on empirical studies done in various countries, to investigate balancing vertical and shared leadership in projects. Thus, while many researchers have studied project leadership, little has been published to date on appropriate balances in leadership styles, and how various project types and project life cycle phases may influence this balance.

To introduce the thesis, leadership, and especially balanced leadership, is discussed in Section 1.2. Based on this discussion it is proposed that project factors such as project type and project life cycle phases influence the appropriate balance in leadership styles. Project types will be discussed in Section 1.3, and project life cycle phases in Section 1.4. Section 1.5 will deliberate on project management success. Section 1.6 will develop the main research question of this study, after which it will be broken down into sub-questions and a Model will be proposed. In order to illustrate the coherence of this study, this section will also address how each of the chapters of this thesis relates to each sub-question. In the last section of this chapter, a discussion will be presented to show how this thesis is practically and scientifically relevant.

1.2 Leadership

The following definition for leadership was used in this study: “Leadership can be seen as the practice of influencing others to agree about how work should be done effectively, and the process of enabling individual and collective efforts to accomplish a shared objective” (Ensley, Hmieleski and Pearce, 2006). Traditionally leadership was seen as a formally appointed leader (the project manager) who is the main source of information, oversight and control for team members (Ensley *et al.*, 2006). This is a top-down approach where the team members simply follow the orders of the leader (Ensley *et al.*, 2006). This leadership model (i.e. *vertical leadership*) has been most prominent for many years (Conger and Pearce, 2003).

In recent years vertical leadership was scrutinised and both scholars and practitioners started to realise that leadership is an activity that can be shared among team members (Conger and Pearce, 2003). *Shared leadership* takes place when there is a supportive state of mutual influence where the leadership role emerges from individuals in the team (Müller, 2017) and it is characterised by collaborative decision-making and shared accountability for outcomes (Wood, 2005; Hoch and Dulebohn, 2013).

Shared leadership frequently supplements and enhances, but does not replace, vertical leadership (Hsu, Li and Sun, 2017). Projects seldom depend on only one or the other form of leadership and most of the time a combination of vertical and shared leadership is used (Müller *et al.*, 2016). There should be an *appropriate balance* where the leadership style has to be tailored based on specific circumstances (Zander and Butler, 2010). Chapter 2 will describe the continuum between vertical and shared leadership.

1.3 Project types

This study uses Shenhar's (2011, 2015) "Diamond of innovation" model. This model suggests a framework for analysing a project's specific setting and for selecting the appropriate management style. The model has four dimensions: *pace, complexity, novelty* and *technology*, and each has a different impact on project management (Shenhar, 2011). Each dimension is measured on a four-point scale. The "Diamond of innovation" model will be discussed in detail in Chapter 3.

1.4 Project life cycle phases

In this study, three project life cycle phases will be discussed namely: *pre-execution, execution,* and *post execution*. These phases were derived from generic life cycle phases in the *PMBOK® Guide* (PMI, 2017) and PRINCE2® methodology (Office of Government Commerce, 2009). Chapter 5 expand on the above phases.

1.5 Project management success

Nicholas and Steyn (2017) describe how three dimensions of projects namely cost, time and performance/quality (also known as the "iron triangle") could be utilised as indicators to determine project management success. Several authors however feel that the "iron triangle" on its own is inadequate, as other objective and subjective criteria should also be included in the measurement of project success (De Wit, 1988; Atkinson, 1999; Baccarini, 1999; Williams, 2005; Jha and Iyer, 2007; McClory, Read and Labib, 2017). In this study, the term *project management success* will be measured against the "iron triangle" This is done because it is more straightforward to measure and clarify. Project management success will be self-defined by the respondents.

1.6 Research goal and questions

This study aims to determine the following empirically:

- How four dimensions of project type namely *pace, complexity, novelty*, and *level of technology* as proposed by Shenhar (2003, 2011, 2015); Shenhar and Dvir (1996, 2007); and Shenhar, Dvir, Lechler and Poli (2002) influence the appropriate balance of leadership styles (details in Chapter 4);
- How project life cycle phases namely *pre-execution, execution* and *post-execution* influence the appropriate balance of leadership style (details in Chapter 5); and
- Whether an appropriate balance of leadership styles improves the likelihood of perceived project management success (details in Chapters 4, 5 and 6).

The main research question can therefore be stated:

How does the leadership style influence perceived project management success?

To answer the above over-arching question, Chapter 2 gives a theoretical overview of current trends in the literature pertaining to leadership – specifically vertical and shared leadership – and future opportunities for research. Chapter 3 presents a conceptual model of project-related factors that influence leadership styles (vertical and shared leadership), and the effect of an appropriate balance between the two leadership styles on the likelihood of project management success. This initial model is developed from nine propositions that are derived from literature (details in Chapter 3). 'Hypotheses' are tested instead of the 'propositions' suggested in Chapter 3, due to the fact that the data is empirically testable.

Chapters 4 to 6 address the following sub-questions:

1. *Chapter 4 answers sub-question 1 empirically: How do different project types (pace, complexity, novelty and technological uncertainty) influence the balance on the continuum between vertical and shared leadership?*
2. *Chapter 5 answers sub-question 2 empirically: How do different project life-cycle phases (pre-execution, execution and post-execution) influence the balance between vertical and shared leadership?*
3. *Chapters 4 and 5 both answer sub-question 3 empirically: How does an appropriate balance between vertical and shared leadership influence the likelihood of perceived project management success?*

Chapter 6: Combines sub-questions 1, 2 and 3 to put forward a model of how project types and life cycle phases influence the leadership style and perceived project management success.

The Model that is proposed in Chapter 6 can be seen in Figure 1.

Figure 2 maps the research questions to the chapters that follow with the main research question as the central point. Appendix 1 provides a more detailed mapping of the research for each chapter.

The last chapter, Chapter 7, is a concluding chapter that summarises the findings of the study and proposes an answer to the main research question. The implications of the findings, the limitations of the study, and recommendations for future research will be addressed in this concluding chapter.

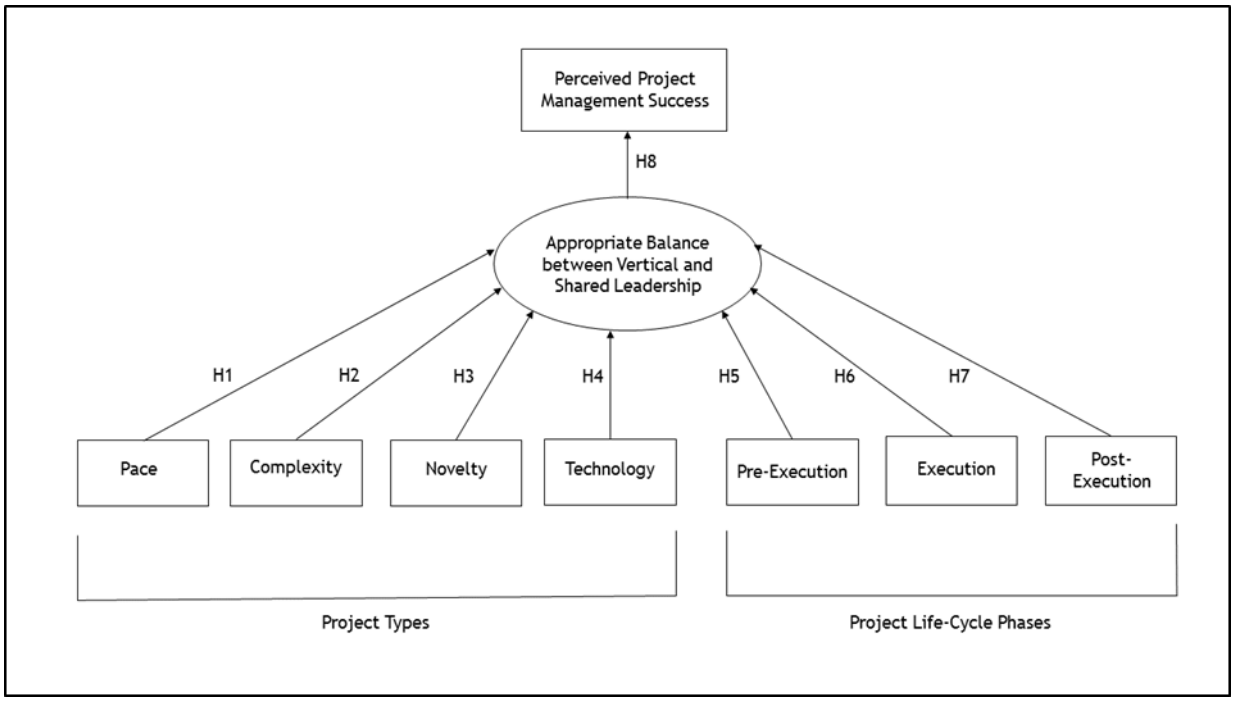

Figure 1: The Project Leadership Style (PLS) Model

1.7 Research contributions

At the end of each chapter, there is a description of how that specific chapter contributes to the research. However, the overall practical relevance of this study is to propose a model to guide the practitioner in selecting the appropriate balance of leadership styles for specific project situations. Practical recommendations are discussed in Chapter 7. As for the scientific relevance, this research presents a model that explains how different leadership styles (i.e. vertical and shared leadership) relate to the variables of project type and project phase. Implications for existing theory are also discussed in Chapter 7.

The main contribution of this study is to explain both theoretically and empirically how project types and life cycle phases influence the appropriate balance of leadership style, and how this balance in turn influences the likelihood of project

management success. Moreover, this study increases insight into the current situation in South Africa pertaining to the above.

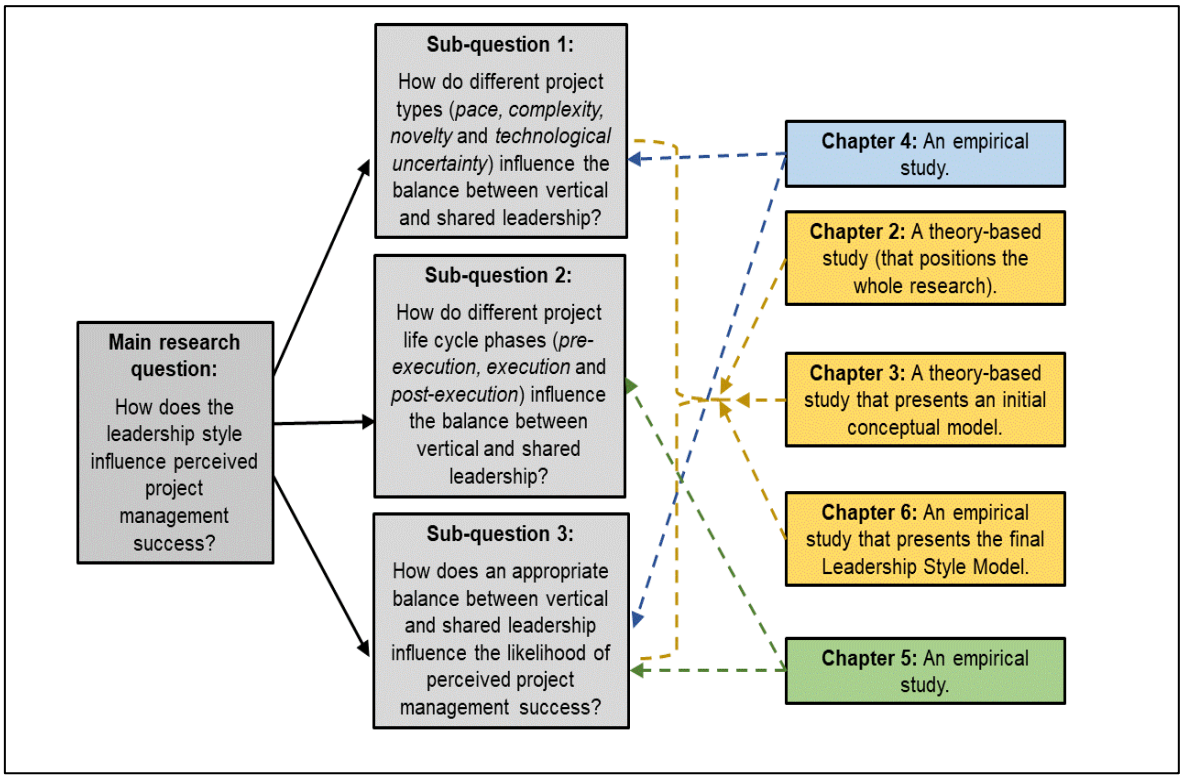

Figure 2: Coherence of the study: research questions and related chapters

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Chapter 2

Leadership styles in projects. Current trends and future opportunities[1]

Currently, many organisations experience challenges pertaining to uncertainty, fast-changing environments, globalisation and increasingly complex work tasks. In order to adapt to these challenges, a shift in leadership style may be needed. Traditionally, leadership was seen as a vertical relationship (top-down influence). For a number of decades this vertical leadership model has been the principal one in the leadership field but lately, shared and balanced leadership have gained importance, especially in project management literature. This theoretical study highlights some differences between leadership and management and explores current trends in leadership literature. It especially focusses on vertical, shared and balanced leadership in project management and identifies future opportunities for research.

2.1 Introduction

Over the past two decades, the general perception of an organisation as a "machine" where leaders at the top of the hierarchy direct and control processes, has changed (Fletcher and Käufer, 2003). In its place, the organisation can be seen as a dynamic system of interrelated relationships and networks of influence. In order to accommodate this paradigm shift of an organisation, a change in the concept of leadership has also taken place (Fletcher and Käufer, 2003).

[1] This chapter has been published in a slightly different format as Pretorius, S., Steyn, H. and Bond-Barnard, T.J. 2018. Leadership styles in projects. Current trends and future opportunities. *South African Journal of Industrial Engineering,* 29(3), pp. 160-171.

The increasing application of empowered teams, coupled with the flattening of organisational structures result in the need for a shift in the more traditional models of leadership (Pearce and Sims, 2002). Turner and Müller (2005) demonstrate that leadership is a critical success factor of projects. Müller *et al*., (Müller, Niklova, Sankaran, Hase, Zhu, Xu, Vaagaasar and Drouin, (2016) state that research on project leadership is becoming increasingly important for project management as a profession. Studies on balanced leadership are limited and not linked to a general framework which would allow scholars to theorise and practitioners to deliberately utilise it for the advantage of their projects (Müller, Sankaran, Drouin, Vaagaasar, Bekker and Jain, 2018).

Traditionally, leadership was perceived as a single individual (the formally appointed leader) leading a number of subordinates or followers. This relationship has been a vertical one of top-down influence which could also be called vertical leadership. For a number of decades this leadership model has been the principal one in the leadership field. Recently, however, researchers have challenged this notion (Pearce, and Conger, 2003). New models of leadership emerged and led to the so-called “post-heroic” or shared leadership approach. The intention of this innovative approach to leadership is to transform organisational practices, structures, and interdependencies. This evolving leadership model entails that effective leadership does not depend on individual, heroic leaders, but rather on leadership practices at different levels within the organisational hierarchy as it is a group-level phenomenon (Fletcher and Käufer, 2003; Müller *et al.,* 2016).

The objective of this study is to contribute to the body of knowledge in the field of leadership pertaining to project management. This study is intended for both scholars and practitioners as it aims to provide them with new insights into current trends in the literature pertaining to leadership, specifically vertical and shared leadership, and future opportunities for research.

2.1 Literature review

We start the literature review with a brief history of the development of leadership theory and terminology.

2.1.1 Leadership theories during the past decades

For more than a century, leadership has been a focus of academic introspection. Putting a definition to the term has proved to be challenging for researchers and practitioners alike and no consensus could be reached (Northouse, 2016). Barker (2001) says that everyone generally knows what leadership is, until asked to define it. The word “leadership” has different meanings for different people.

Modern leadership theories started to develop during the Industrial Revolution when mainly economists started paying attention to it (Crevani, Lindgren and Packendorff, 2007). The industrial-era leadership theories were based on the hierarchical outlook adopted by the early Christian Church, who believed that leadership was centralised in the person at the top of the hierarchy and the individual’s excellent qualities and abilities to manage his subordinates, as well as the activities of this person in relation to goal achievement (Barker, 2001).

Definitions of leadership have evolved constantly during the last decade (Northouse, 2016). Rost (1991) studied material written from 1900 to 1990 and found more than 200 different definitions for leadership. It became increasingly clear to scholars that it is probably impossible to devise one common definition of leadership, due to such factors as growing global influences and generational differences. Leadership may continue to mean different things to different people (Northouse, 2016).

Despite the diverse number of ways in which leadership has been conceptualised, there are certain components that most frequently are central to the phenomenon. They are the following (Northouse, 2016):

- Leadership is a process i.e. a transactional occurrence that takes place between the leaders and the followers. “The leader affects and is affected by followers”. Leadership is not limited to a designated leader, but is available to everyone.
- Leadership encompasses influence i.e. how the leader affects followers. It is a continuous social process (Barker, 2001).
- Leadership takes place in groups i.e. a leader influences a group of individuals who have a common purpose.
- Leadership involves common goals i.e. leaders and followers have a mutual purpose.
- Leadership is not the property of the project manager, but instead a property of the project itself (Clarke, 2012).
- Leadership is both an individual and an institutional trait (Kocolowski, 2010).

2.2.2 Leadership approaches, theories and styles

A number of leadership approaches, theories and styles have featured in literature in the past couple of decades. All of the approaches, theories and styles have their strengths, weaknesses and criticisms, which will not be covered in this study due to scope limitations. The approaches, theories and styles briefly include, but are not limited, to the following:

2.2.2.1 Trait approach

This methodology is built on the theory that people are born with certain traits that make them great leaders. The instinctive leadership talents of great social, political and military leaders (e.g. Abraham Lincoln, Mohandas Gandhi and Napoleon Bonaparte) were identified and utilised to determine the specific traits that separated leaders from followers (Northouse, 2016).

2.2.2.2 Skills approach

Leadership skills are those abilities that can be acquired and developed through practice and training. These leadership skills can be further divided into technical skills and human skills. Skills include problem-solving skills, social judgement skills, and knowledge (Stentz, Plano Clark and Matkin, 2012).

2.2.2.3 Behavioural approach

In this approach, it is believed that leaders are responsible for shaping an environment that would empower followers to realise specific tasks. In other words, leaders can manage their subordinates' behaviour through staging antecedents and consequences of behaviour. There is a dynamic, mutual interaction between the leader, follower and the environment. Environmental factors include technology, organisational structure, type of task and the size of the organisation (Mosley, 1998).

2.2.2.4 Situational approach

Hersey and Blanchard developed this approach in 1969 and it focuses on the principle that different situations demand different kinds of leadership. Leadership comprises of both a directive and a supportive dimension and each has to be applied in a particular situation. The core of the situational approach requires that leaders

match their style (directive or supportive) to the competence and commitment of the followers (Northouse, 2016).

2.2.2.5 Psychodynamic approach

This model uses one principal central concept, namely personality, which is defined as a constant pattern of thinking, feeling, and acting toward the environment, which also includes other people. This approach therefore concentrates on personalities of leaders and subordinates (Stentz *et al.*, 2012).

2.2.2.6 Path-goal theory

According to this theory, effective leaders influence their followers' motivation, ability to perform well and satisfaction. This theory focusses mainly on how the leader affects his/her followers' perception of their work and personal goals and paths to goal realisation. The leader's behaviour should increase subordinate goal achievement and illuminate the paths to these goals (House, 1975).

2.2.2.7 Leader-member exchange theory

This theory focusses on the relationship between leader and follower. The leaders develop individualised relationships with each of their subordinates and leadership becomes apparent when leaders and followers are able to establish real interactions that result in reciprocal and incremental influence (Liden and Graen, 1980; Avolio, Walumbwa and Weber, 2009).

2.2.2.8 Strategic leadership

This type of leadership focusses on how executive leaders influence organisational performance, thus addressing the leadership occurrences at the upper levels of organisations (Dinh, Lord, Garnder, Meuser, Liden and Hu, 2014).

2.2.2.9 Transformational leadership

Avolio *et al*. (2009) define transformational leadership as “leader behaviours that transform and inspire followers to perform beyond expectations while transcending self-interest for the good of the organisation”. This type of leadership includes the four aspects namely idealised influence, inspirational motivation, intellectual motivation, and individualised attention (Stentz *et al.*, 2012). An example of transformational leadership in an organisation would be a manager who tries to change his/her company’s corporate values “to reflect a more humane standard of fairness and justice”. While doing this, both the manager and the subordinates may develop higher and stronger moral values (Northouse, 2016). This leadership type is primarily people-focused (Turner and Müller, 2005).

2.2.2.10 Transactional leadership

The bulk of leadership models can be categorised under transactional leadership. Transactional leadership centres on the interactions that occur between leaders and subordinates. It occurs when managers offer promotions or financial incentives to employees who exceed their goals (Northouse, 2016). This leadership type is largely task-focused (Turner and Müller, 2005).

2.2.2.11 Servant leadership

Servant leaders want to serve by ensuring that that the followers’ highest priority needs are being served. They place the good of their followers over their own self-interests and exhibit strong moral behaviour (Northouse, 2016). Servant leadership can be viewed as a trait or a behaviour (Stentz *et al.*, 2012).

2.2.2.12 Authentic leadership

Here the main emphasis is the leader's genuineness (authenticity/truthfulness). The leader is transparent and exhibits ethical behaviour that promotes openness in sharing information needed to make decisions, while taking followers' contributions in consideration. Authentic leadership is collectively viewed in three diverse conducts namely intrapersonal, developmental, and interpersonal (Avolio *et al.*, 2009; Stentz *et al.*, 2012). This leadership style centres around trust and is motivated by the well-being of the followers (Müller, Packendorff and Sankaran, 2017).

2.2.2.13 Charismatic leadership

This type of leadership arises in times of distress, uncertainty or extreme enthusiasm and exists in a range of social relationships. It is powered by emotion and the frantic commitment of followers. The charismatic leader can arise from outside of the formal organisational hierarchy and does not need to be an appointed leader. Charisma is seen as a talent that is innate to an individual. Charismatic leaders usually disappear suddenly once the inborn talents of the emergent leader are no longer needed or when they no longer exist (Milosevic and Bass, 2014).

2.2.2.14 Ethical leadership

Brown, Treviño and Harrison (2005) define ethical leadership as the "demonstration of normatively appropriate conduct through personal interactions and interpersonal relationships, and the promotion of such conduct to followers through two-way communication, reinforcement, and decision-making". Thus, the ethical leader displays traits such as uprightness, credibility, impartiality and care ("normatively appropriate conduct"). Ethical leaders define ethical standards, incentivise ethical behaviour and discipline those who do not adhere to the set principles

("reinforcement"). The leaders reflect on the ethical implications of their decisions, and make moral and just choices that can be witnessed and matched by others ("decision-making"). Brown and Treviño (2006) say that ethical leaders are commendable because they are reliable, open and sincere.

2.2.2.15 Laissez-faire

A laissez-faire leader typically circumvents making decisions, delegates responsibility, and does not enforce authority (Turner and Müller, 2005).

Pearce *et al*. (2014) are of the opinion that all of the above labels are "simply the proverbial old wine in new skins". They state that shared leadership incorporates all of these terms and that it provides a way to organise and make sense of them. They define shared leadership as a meta-theory of leadership, meaning that all leadership is shared leadership. It is just the degree that differs: sometimes leadership is shared completely, while at other times it is not shared at all. Zhu, Liao, Yam and Johnson (2018) say that almost any type of leadership can be shared and shared leadership is considered as "meta-level leadership". This study will use the above definition of Pearce and Wassenaar (2014) where shared leadership is seen as a form of leadership that encompasses all leadership styles, theories and approaches. Thus, leadership can be seen as a continuum between vertical and shared leadership where there could be different balances with vertical leadership on the one extremity and shared leadership at the other.

We define hundred percent (100%) vertical leadership as the absence of shared leadership, and hundred percent (100%) shared leadership as the state where no vertical leadership is present. There could also be a 50%/50% balance between the two leadership styles. Figure 3 illustrates the continuum between vertical and shared leadership. Internal and external factors could influence the balance between these two leadership styles but that is beyond the scope of this study.

2.2.3 Definition of leadership

In modern theory a number of definitions for leadership exists but, in order to limit the scope of this study, the following definition is used: “Leadership can be seen as the practice of influencing others to agree about how work should be done effectively, and the process of enabling individual and collective efforts to accomplish a shared objective” (Ensley, Hmieleski and Pearce, 2006; Pretorius, Steyn and Bond-Barnard, 2017).

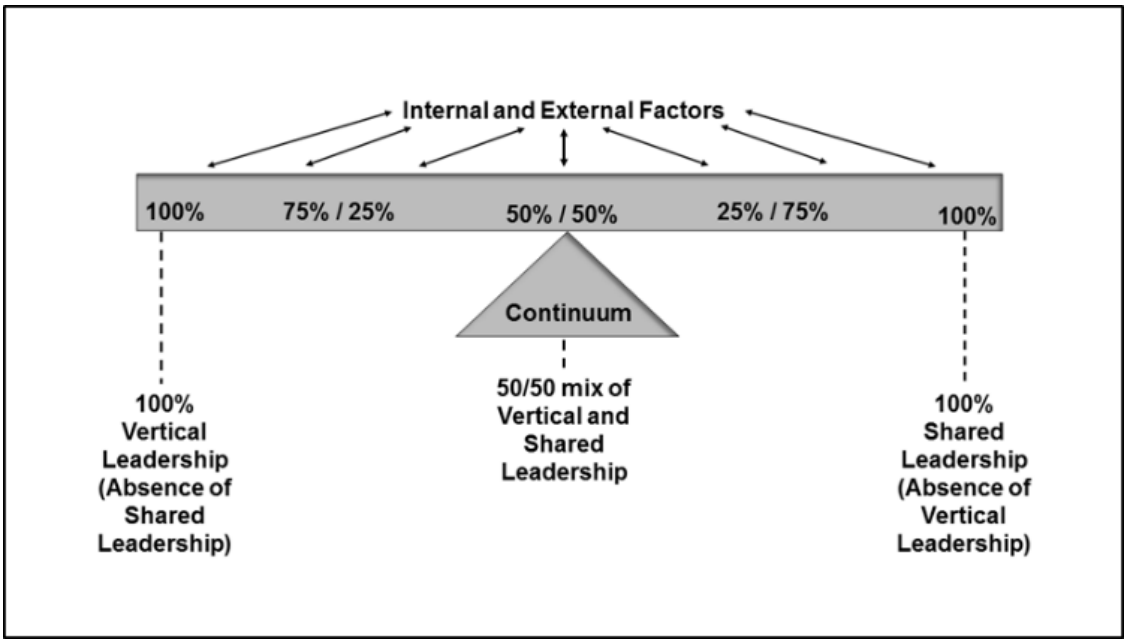

Figure 3: The continuum of vertical and shared leadership

(adapted from Pretorius *et al.*, 2017)

2.2.4 Leadership and management: Differences and similarities

The general perception exists that the most important skill of leaders is their ability to manage (Barker, 1997). Although leadership and management are similar and overlap in many ways, there are also fundamental differences between the two concepts. For example, if an organisation has strong management but weak

leadership, the outcome tends to be rigid and bureaucratic. On the other hand, if an organisation has strong leadership without management, the outcome could be pointless or "misdirected change for change's sake" (Northouse, 2016). Knox, Ellis, Speering, Asvadurov, Brinded and Brow (2017) point out that managing, and not leading and investing in the team, and failing to delegate decision making power to the lowest possible level, are two of the biggest mistakes that could hamper the delivery of exceptional project outcomes in ultra-large projects. They (Knox *et al.*, 2017) continue by saying that although leadership skills are frequently termed as "soft", in reality they can be the most challenging elements to instil within a capital project organisation. "The soft stuff is the hard stuff". It is therefore important to briefly investigate what current literature states about management versus leadership. Leadership cannot be investigated in the absence of management.

Table 1: The differences between leadership and management

(Northouse, 2016; Rost, 1991; Barker, 1997)

Generic Leadership	Generic Management
Leaders create visions for change and movement.	Managers anticipate change and adapt to it, but they do not create it.
Leaders frequently seek to influence others.	Managers mostly pursue order and stability through the development and control of standard operating procedures.
Leaders create new patterns of action and belief systems.	Managers protect stabilised patterns and beliefs.
Leadership is usually a "multidirectional influence relationship".	Management is usually a "unidirectional authority relationship".
Leaders mostly attempt to develop mutual/shared purposes and goals.	Managers are frequently driven toward coordinating activities in order to get the job done.
Leaders mostly aim to shape ideas instead of responding to them.	Managers mostly act to solve problems and limit choices.
Leaders are frequently emotionally active and involved.	Managers mostly have low emotional involvement.

Both leadership and management entails the following: (Barker, 1997; Northouse, 2016)

- It involves influence;
- It requires working with people;
- It is concerned with effective goal accomplishment;
- Both management and leadership are crucial if an organisation is to be successful.

To be prosperous and effective, an organisation needs to nurture both competent management and skilled leadership. The differences between leadership and management are outlined in Table 1.

For the purposes of this study, we focus on the leadership process.

2.2.5 Leadership in project management

In his seminal article, published in the Harvard Business Review 1959, Paul O. Gaddis defined the undertaking of being a project manager which was a relatively new concept at that stage (Lindgren and Packendorff, 2009). He identified a number of important characteristics that a successful project manager needs to possess in order to manage projects that perform well. An example of the characteristics is that the project manager needs to have the ability to handle both technological research and business matters at the same time, and he had to advance the project process, taking into consideration both the project team and the external stakeholders. Basically, the project manager had to be “a Jack of all trades”. From the start project management was thus labelled as a new kind of leadership task compared to the existing ones (Lindgren and Packendorff, 2009).

Traditionally, a person-centred approach was taken pertaining to the management of projects. The emphasis was given to the role of the project manager (vertical, formal appointed leader) in achieving project objectives and outcomes (Müller *et al.*, 2016).

Current studies demonstrate that leadership in projects is dependent on aspects which are not taken into consideration in traditional leadership theories (e.g. constant in-flow and out-flow of specialists and teams when the situation warrants it). Today, the role of leadership is progressively gaining more interest in project management research. In the year 2000, twenty-six research papers referred to the terms “lead” and “project management” in its titles, while the use of these terms grew to 271 in 2015 (Müller *et al.*, 2016). According to Müller *et al*. (2016) two major trajectories of leadership emerged out of these papers, namely the traditional vertical leadership track (with an “appointed or formal leader of a team”), and the shared/horizontal (person-centred) stream. These two major leadership streams/tracks will be discussed further in this paper.

Today, a great number of organisations experience challenges pertaining to uncertainty, fast-changing environments, globalisation and increasingly complex work tasks. Organisations typically adapt to such change by reorganising work, using team-based structures (Hoch, Pearce and Welzel, 2010). In the light of this, the question regarding how to best lead the team-based structures arises. Scholars proposed that the shared leadership approach possibly provides a more appropriate answer to team management than the traditional, hierarchical (or vertical leadership), as embodied by the typical solo-appointed-leader approach (Day, Gronn and Salas, 2004; Hoch *et al.*, 2010).

2.2.6 Vertical leadership

Leadership is frequently described as more “vertical” when an organisational hierarchy is in place (Pretorius *et al.*, 2017). In such a hierarchy, a leader is formally appointed to function as the main source of instruction, oversight and control for his/her subordinates. In most cases these vertical leaders influence projects in a downward, “one-to-many” style (Houghton, Neck and Manz, 2003; Müller, 2017; Pretorius *et al.*, 2017). This kind of leadership is viewed primarily as an input to team processes and performance – the team leader’s (vertical leader’s) skills, abilities, behaviours and personal characteristics are thought to directly affect team processes and performance (Day *et al.*, 2004).

Müller *et al*. (2018) define vertical leadership as “the interpersonal process through which the project manager influences the team and other stakeholders to carry the project forward”. In principle, the project manager (formally appointed vertical leader) oversees the activities of the team and the team executes the orders of the leader (Pretorius *et al.*, 2017). The vertical leader is the main source of information for team members, which implies, in its extreme form, that other team members do not have the prospect to evaluate information and reach consensus regarding a decision made by a superior. Team members merely follow orders (Ensley *et al.*, 2006).

The relationship between the leader and his/her followers is a top-down influence, and this model of leadership has been the most prominent one in the leadership field for many decades (Pearce and Conger, 2003). As stated earlier in this paper, vertical leadership can be defined as the absence of shared leadership.

2.2.6.1 Project managers as vertical leaders

According to Müller *et al.* (2018) project managers are both managers and leaders. They have both authority and accountability to deliver vertical leadership for the project team. In their role as managers, they are responsible to conduct and achieve project objectives, and as leaders they influence, guide, and direct team members. In these roles, they tend to use transactional leadership in simpler projects. For more complex projects, transformational leadership styles are practiced (Jaskyte, 2004; Ding *et al.*, 2017; Müller *et al.*, 2018).

2.2.7 Shared leadership

Since the mid-1990s, the theme of shared leadership has received considerable attention in the research community (Carson, Tesluk and Marrone, 2007; D'Innocenzo, Mathieu and Kukenberger, 2016). In recent years, some scholars confronted the more traditional form of leadership (vertical leadership) by stating that leadership is an activity that can be shared among team members of a team or organisation (Pearce and Conger, 2003).

Pearce and Conger (2003) define shared leadership as a "dynamic, interactive influence process among individuals in groups for which the objective is to lead one another to the achievement of team or organisational goals or both". They state that two types of influences are generally involved, namely peer (shared/horizontal) guidance, and upward or downward hierarchical influence. Thus, the key difference between shared/horizontal and the more traditional types of leadership is that teams are influenced by more than just downward influence on followers (subordinates) by a formally appointed leader. Leadership is largely dispersed among a set of individuals (Pearce and Conger, 2003).

Müller (2017) says that in shared leadership there is a supportive state of mutual influence where the leadership role emerges from individuals in the team. All team members participate in the decision-making process (collaborative decision-making), they perform duties that the vertical leader would traditionally have done, share accountability for outcomes, and, when necessary, offer direction to other team members to achieve group goals (Wood, 2005; Hoch and Dulebohn, 2013). Duties and responsibilities are cooperatively shared by the team members (Kocolowski, 2010). Shared leadership entails that team members have substantial power to direct the team's forward path (Cox, Pearce and Perry, 2003).

In a multifaceted team environment, an individual vertical leader (project manager) is less likely than the team as a whole to possess the knowledge and abilities needed to effectively lead the team (Cox *et al.*, 2003). Shared leadership attempts to solve this phenomenon when the team members recommend a specific team member to take over the leadership role at a specific point in time (Müller, 2017; Pretorius *et al.*, 2017).

In a typical project management environment, different skills and expertise are needed at different points in time in the project life cycle. Shared leadership is practised when the leadership role is shifted between team members with the necessary skills as dictated by either environmental needs and demands, or the developmental stage of the team at any given time (Burke, Fiore and Salas, 2003; Agarwal, Dixit, Jain, Sankaran, Nikolova, Müller and Drouin, 2017). When the situation warrants it, team members volunteer to provide the required leadership based on their skills, and then step back to allow others to assume the leadership role (Northouse, 2016). This transfer of leadership may happen many times during the advancement towards goal achievement or the completion of a project (Burke *et al.*, 2003). Shared leadership is more likely to be present in voluntary or empowered teams (Pearce and Sims, 2002).

Shared leadership displays the following characteristics: (Zhu *et al.*, 2018; Locke, 2003)

- Constant teamwork;
- Ad hoc, emergent and informal;
- A group focus;
- Sharing of information between team members;
- All team members are equal and interdependent;
- Independence is frowned upon;
- Each team member influences the others equally;
- Joint decision-making;
- Team members have social skills.

2.2.7.1 The implementation of shared leadership

The vertical leaders' actions are frequently critical to the implementation process.

They should specifically involve the following: (Conger and Pearce, 2003)

- Selecting suitable team members.
- Forming team norms supportive of shared leadership.
- Coaching and developing team members' leadership skills.
- Empowering team members to self-lead.
- Be a role-model for self-leadership behaviours.
- Boosting team problem solving and decision-making.

Conger and Pearce (2003) conclude by saying that they suspect that there could be a much broader collection of contributing factors, such as organisational culture,

incentives, performance management systems, organisational structure, job assignments, and senior management attitudes towards leadership.

2.2.8 Horizontal leadership

To date there is limited use of the term “horizontal leadership” and the difference between horizontal and shared leadership, probably as a result of the novelty of attention to this phenomenon (Pretorius *et al.*, 2017). Müller (2017) explains that horizontal leadership is practised by a team member after he/she was nominated by the project leader (vertical leader). The project manager governs this leadership for the duration of the nomination. Müller (2017) continues by saying that horizontal leadership has a closer connection with vertical leadership than described in the traditional shared leadership theories. In contrast, shared leadership is a cooperative action and shifting control to the most suitable team members is necessary (Agarwal *et al.*, 2017).

Horizontal leadership recognises the distributed form of leadership in projects. This implies that one or several team members influence the project manager and the rest of the team complete the project in a set manner (Agarwal *et al.*, 2017). Due to the fact that specific skills are needed at a certain point in time, team members become temporary leaders based on their skills and capabilities. They temporarily take over the leadership role on behalf of the project manager (vertical leader) (Müller *et al.*, 2018). The vertical leader is responsible to constantly maintain horizontal leadership by keeping the general vision and direction, encouraging the shift between vertical and horizontal leadership by including the team in the pursuit for solutions, and managing the fairness of the leadership assignments (Müller *et al.*, 2018). Horizontal leadership is facilitated through empowerment by the project manager and accomplished through self-management of the team (Agarwal *et al.*, 2017).

2.2.9 The difference between shared and horizontal leadership

We acknowledge the variances between shared and horizontal leadership as set out in Table 2**.**

Shared leadership is closely connected to horizontal leadership, and complimentary to vertical leadership in balanced leadership (Müller *et al.*, 2017). The difference between shared and horizontal leadership is summarised in Table 2. In both shared and horizontal leadership the leadership role is constantly shifted between team members based on the crucial expertise needed at different points in time (Müller *et al.*, 2016, 2017).

Table 2: The variances between shared and horizontal leadership

Shared leadership	Horizontal leadership
Executed by a team member upon nomination by the team members (Müller, 2017).	Executed by a team member upon nomination by the vertical leader (Müller, 2017).
There is a balance between autonomy and accountability and it is distributed among all team members (Wood, 2005).	Governed by the vertical leader for the duration of the nomination of the temporary team leader (Müller, 2017).
Collective activity and shifting control to the most suitable team member/s is essential (Agarwal, A. Dixit, V. Jain, K. Sankaran, S. Nikolova N, Müller, r. Drouin, 2017).	Closer connection with vertical leadership (Müller, 2017).

2.2.10 The appropriate balance between vertical and shared leadership

In both shared and horizontal leadership the leadership role is constantly shifting between team members, based on the crucial expertise needed at different points in time (Müller *et al.*, 2016, 2017).

However, in order to limit the scope of this paper, and due to the limited use of the notion of horizontal leadership in literature, no distinction will be made between these two styles in the rest of this paper. Shared leadership will be used to refer to both of these leadership styles.

While some scholars view vertical and shared leadership as specifically separate styles, shared leadership is not a substitute to hierarchical leadership (vertical leadership). Organisations should not be forced to choose between vertical and shared leadership, as the two concepts complement each other (Pearce *et al.,* 2014).

The occurrence of shared leadership is typically demonstrated in technical decisions, as team members have the best knowledge on how to address these issues. On the other hand, strategic decisions are usually deliberated with the project manager (vertical leader) and often escalated to more senior leaders for decisions (Agarwal *et al.*, 2017).

No single individual has the ability to competently perform all possible leadership roles within a group or organisation. Additionally, the vertical leader may have preferences for certain leadership tasks and not for others. Today, most teams are frequently composed of multifunctional and highly-skilled team members who have strong leadership skills. It is therefore logical to supplement the vertical leader's weak points and disinclinations pertaining to leadership with the individual members' strengths in the chosen areas (Conger and Pearce, 2003).

Project teams are often under a steady process of restructuring and therefore have little chance to develop and mature in the sense of traditional leadership theories. Previous studies indicated that leadership in projects is neither exclusively executed by the project manager, nor fully performed by the team or some of its members

(Müller *et al.*, 2018). Although the leadership responsibility rests formally with the project manager, it is regularly delegated to specialists to lead temporarily in order to solve a technical or other issue, and then handed back to the project manager. A contemporary stream of literature defines this action as balanced leadership (Müller *et al.*, 2018).

Shared leadership frequently supplements and enhances, but does not replace, vertical leadership (Hsu, Li and Sun, 2017). Figure 4 demonstrates an integrated model that clarifies the relationship between vertical and shared leadership. This model illustrates real leadership and lays out directions of influence. It can be seen that there is leadership from the top down (vertical leadership), but also upwards (from the bottom up), and between the team members (shared leadership) (Locke, 2003).

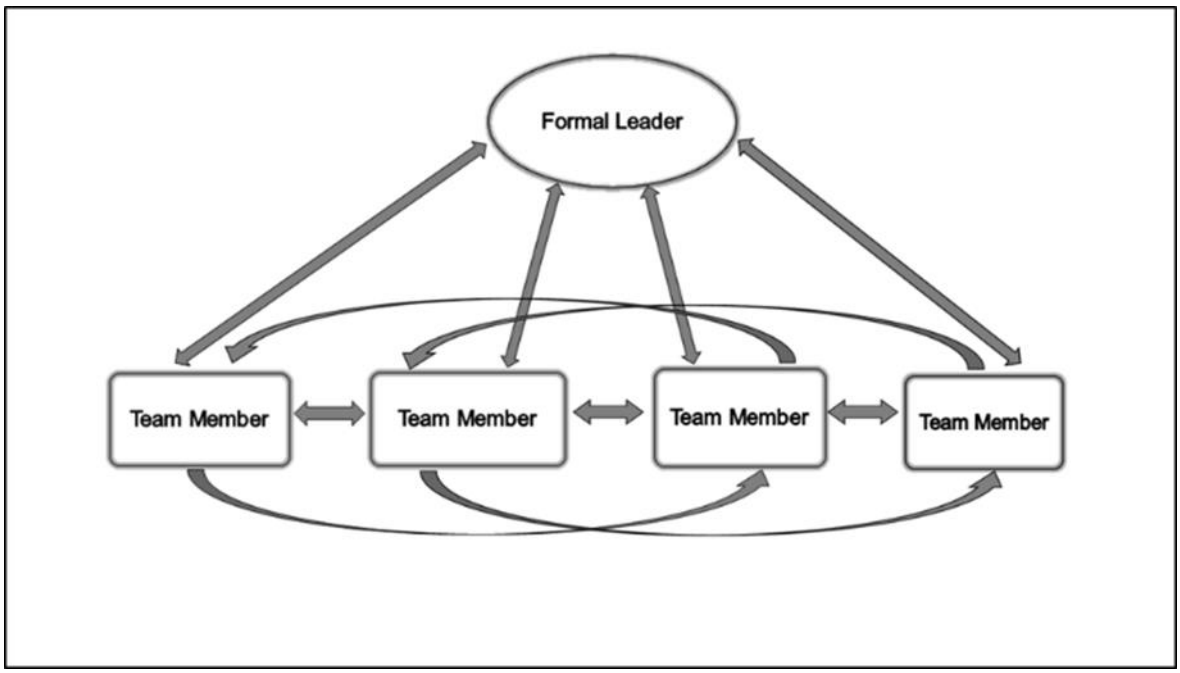

Figure 4: The balance between vertical and shared leadership
(Locke 2003)

Projects seldom depend on only one or the other form of leadership and most of the time a combination of vertical and shared leadership is used (Müller *et al.*, 2016). As mentioned previously, there is a continuum between vertical and shared leadership (see Figure 3) – there should be an appropriate balance where leadership style should be tailored based on the specific internal and external circumstances (Zander and Butler, 2010).

2.3 Future directions and opportunities

The individual-based "heroic" models of leadership may no longer be viable as "organisations are moving into a knowledge driven era where firms are distributed across cultures". Shared leadership could be better suitable and it should be further examined (Pearce, 2004; Avolio *et al.*, 2009). The field of shared leadership is still in its initial stages as very few empirical studies have been published to date (Pearce and Conger, 2003). Avolio *et al*. (2009) envisage that more theoretical work and empirical studies will focus on the follower (subordinate) as a crucial part in the leadership dynamic (Avolio *et al.*, 2009).

Clarke (2012) states that little research has been conducted to identify the conditions when shared leadership might be more effective than vertical leadership in projects. The factors that might be favourable to shared leadership should also be investigated. Although he addressed some of these issues in his research, and a number of studies have been conducted on the topic since 2012 (Fausing, Joensson, Lewandowski and Bligh, 2015; D'Innocenzo *et al.*, 2016; Müller *et al.*, 2016; Serban and Roberts, 2016; Agarwal *et al.*, 2017; Hsu *et al.*, 2017; Müller, 2017), there is still a considerable gap in the knowledge base of leadership in project management which needs to be addressed. This could be an opportunity for future research.

Conger and Pearce (2003) state that there are at least seven areas of opportunity for future research namely:

- The relationship between shared and vertical leadership;
- The more subtle dynamics of how leadership is shared in group and organisational settings;
- How to successfully introduce shared leadership to a team;
- The outcomes associated with shared leadership in groups;
- Measurement of the phenomenon that is shared leadership;
- Cross-cultural influences;
- The liabilities of shared leadership.

The education and training of project managers should address the dynamic nature of leadership within a broader systems perspective of projects. In order to achieve this, it is necessary to develop a new model of shared leadership processes that is of practical value to project managers (Clarke, 2012).

Project management research only recently began to study the notion of balanced leadership which combines the concepts of shared and vertical leadership and focusses on the dynamics of their interactions. This is an opportunity for further research (Müller *et al.*, 2018).

2.4 Conclusion and discussion

Jack Futcher says: *"Process does not deliver projects. Leadership does, and has to trump process."* (Knox *et al.*, 2017).

This paper investigates the current trends and future opportunities of leadership styles in project management and identifies a gap in the project management literature pertaining to leadership.

Since the mid-1990's the theme of shared leadership has brought in considerable attention in the research community and the roles of leadership and shared leadership are progressively gaining more interest in project management research (Carson *et al.*, 2007; D'Innocenzo *et al.*, 2016; Müller *et al.*, 2016). The term 'horizontal leadership' has recently began to appear in current literature (Wood, 2005; Zander and Butler, 2010; Müller, Sankaran, Drouin, Niklova, and Vagaasar, 2015; Müller, *et al.,* 2016, 2017, 2018; Agarwal, *et al.* 2017; Müller, 2017). A contemporary stream of literature investigates balanced leadership (Müller, 2017). It is clear that leadership trajectories are moving away from the traditional form of vertical leadership with one formally appointed leader, in favour of a more shared, distributed, horizontal and balanced leadership approach.

The fact that many projects fail due to problems of leadership within the projects, could be a consequence of the practice of employing project managers predominantly for their technical expertise rather than their leadership abilities (Jiang, Klein and Chenoun-Gee, 2001). Today most project teams consist of highly skilled and educated individuals that are capable to take over leadership functions when needed. This could potentially be a good basis for shared leadership (Clarke, 2012).

The project characteristics (project-related factors) that could influence the leadership style of the project manager and team members (shared and/or vertical leadership) have been neglected to a large extent in recent studies. This is a gap in the literature and it should be addressed in order to develop much needed practical models for project management scholars and practitioners alike.

Project-related factors could include, but are not limited, to the following: (Pretorius, *et al.* 2017).

- Organisational project management maturity;
- The project's position/level within the hierarchy of work in a project-oriented organisation;
- Organisational structure (functional, matrix or projectised);
- Type of project in terms of level of technological uncertainty, novelty, complexity and scope;
- The stage in the project life-cycle;
- Level of trust and collaboration between team members.

The shared leadership field is brimming with research opportunities for scholars and an extensive gap in the knowledge base of project management leadership still exists (Pearce and Conger, 2003; Clarke, 2012). Pearce and Conger (2003) predict that shared leadership will not merely be "another blip on the radar screen" of organisational science. Shared leadership's time has arrived and scholars should exploit this further.

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Chapter 3

Exploring project-related factors that influence leadership styles and its effect on project performance: A conceptual model.[2]

It is widely accepted that project leaders should adapt their behaviour to meet the unique leadership demands of a variety of situations. Recently, vertical, shared and horizontal leadership has gained prominence, especially in project management literature. Several factors are believed to play a role in determining an appropriate balance between these leadership styles. This theoretical study explores the influence of project types, the phase in the project life cycle, organisational project management maturity and the level of trust and collaboration between project team members on the appropriate balance of leadership styles in projects. This paper presents a conceptual framework of these factors while empirical results will be reported on in the sequel to this paper.

3.1 Introduction

Leadership can be seen as the practice of influencing others to agree about work and how it can be done effectively, and the process of enabling individual and collective efforts to accomplish a shared objective (Ensley, Hmieleski and Pearce, 2006). According to Crevani, Lindgren and Packendorff (2007), modern leadership theory started developing during the Industrial Revolution when mostly economists

[2] This chapter has been published in a slightly different format as Pretorius, S., Steyn, H. and Bond-Barnard, T.J. 2017. *South African Journal of Industrial Engineering,* 28(4), pp. 95-108.

started paying attention to leadership theory. There has been an evolving movement towards viewing leadership in terms of collaboration between two or more persons while the concept remains typically concerned with command and control (Ensley *et al.,* 2006)

Today the role of leadership is gaining interest in project management research. In 2000 only 26 research articles used the terms 'leadership' and 'project management' in their titles, while in 2015 the use of these terms grew to 271 (Müller, Niklova, Sankaran, Zhu, Xiaohang, Vaagaasar and Drouin, 2016). According to Müller *et al*. (2016), project management research is increasingly investigating the role of leadership in project management and two major streams have developed namely shared leadership and vertical leadership.

The concept of horizontal leadership has been investigated to some extent (Müller, Sankaran, Drouin, Niklova and Vagaasar, 2015; Müller, Zhu, Sun, Wang and Yu, 2016; Agarwal, Dixit, Jain, Sankaran, Nikolova Müller, and Drouin, 2017; Müller *et al.*, 2017; Müller, Sankaran, Drouin, Vaagaasar, Bekker, and Jain, 2018). Traditionally, research has taken a person-centred approach to project leadership by highlighting the role of the project manager in accomplishing project outcomes, while the current focus is more on shared leadership within the project team (Müller *et al*., 2016).

This study focuses on the effect that projects and related organisational properties have on leadership style. Personal and interpersonal factors (e.g. personality types and emotional intelligence) as well as technical engineering factors are beyond the scope of the study.

3.1.1 Vertical leadership

When an organisational hierarchy is in place, leadership may be described as more "vertical". In such a hierarchy, a formally appointed leader functions as the main source of instruction, oversight and control for those reporting to him or her. Customarily these leaders influence projects in a downward, "one-to-many" style (Houghton, Neck, and Manz, 2003; Müller, 2017). Employees in the higher organisational levels may assist as a source of control and oversight for other team members while the appointed leader delegates specific tasks to other group members. In essence, the leader oversees the activities of the group and the group executes the orders of this leader. The individual at the top is the primary source of information for group members. This implies, in its extreme form, that other team members are not granted the opportunity to evaluate information and reach consensus regarding a decision made through a process of top-down influence (team members merely follow orders) (Ensley *et al.*, 2006).

3.1.2 Shared leadership

In shared leadership there is a cooperative state of mutual influence where the leadership role emerges from individuals in the team (Müller, 2017). All team members participate in the decision-making process (collaborative decision-making), they take over tasks that the vertical leader would traditionally have done, share accountability for outcomes, and, when necessary, offer guidance to other team members to achieve group goals (Wood, 2005; Hoch and Dulebohn, 2013). The team members cooperatively share duties and responsibilities (Kocolowski, 2010). In this leadership style, the team members nominate a specific team member to take over leadership at a specific point in time (Müller, 2017).

In a project management environment, different skills are needed at different points in time in the project life cycle. Shared leadership is practised when leadership is transferred between those with the required skills as dictated by either environmental demands or the developmental stage of the team at any given time (Burke, Fiore, and Salas, 2003; Müller *et al.*, 2018). When the status quo warrants, team members step forward and provide the required leadership, and then step back to allow others to assume the leadership role (Northouse, 2016). This shift in leadership role may happen many times during the progression towards goal realisation or mission completion (Burke *et al.*, 2003).

According to Locke (2003) shared leadership displays the following characteristics:

- Constant teamwork;
- The focus is on the group and not the individual;
- Team members share information;
- Team members are all equal and interdependent;
- Independence is frowned upon;
- Each team member influences the other equally;
- There is joint decision-making; and
- Team members have social skills.

3.1.3 Horizontal leadership

To date little is written on the differences between shared and horizontal leadership, probably as a result of the novelty of this distinction. According to Müller (2017) horizontal leadership is executed by a team member upon nomination by the project manager (vertical leader), and governed by the vertical leader for the time of the nomination. This leadership style has a closer connection with vertical leadership

than is described in the traditional shared leadership theories (Müller, 2017). In contrast, shared leadership is a collective activity and shifting control to the appropriate team members is necessary in this leadership style (Agarwal *et al.*, 2017).

Horizontal leadership incorporates the distributed form of leadership in projects, where one or several members of the project team influence the project manager and the rest of the team execute the project in a particular manner (Agarwal *et al.*, 2017). Team members take on the leadership role in a project on behalf of the project manager (vertical leader) based on their skills that are needed at a certain point in time (Müller *et al.*, 2017). The role of the vertical leader is to constantly maintain horizontal leadership by keeping the general vision and direction, prompting the shift of leadership from vertical leadership to horizontal leadership by involving the team in the quest for solutions, and managing the fairness of the leadership assignments (Müller *et al.*, 2018). Horizontal leadership is enabled through empowerment by the project manager and executed through self-management by the team (Müller *et al.*, 2018).

3.1.4 Comparison between shared and horizontal leadership

The differences between shared and horizontal leadership is summarised in Table 3.

In both shared and horizontal leadership the leadership role is continuously transferred between team members based on the critical skills needed at different points in time in the project (Müller, 2016; Müller *et al.*, 2017).

Table 3: The differences between shared and horizontal leadership

Shared leadership	Horizontal leadership
Executed by a team member upon nomination by the team members (Müller, 2017).	Executed by a team member upon nomination by the vertical leader (Müller, 2017).
Balance of autonomy and accountability exist, and these characteristics are distributed among all team members (Wood, 2005).	Governed by the vertical leader for the time of the nomination of the temporary team leader (Müller, 2017).
Leadership is a collective activity and shifting control to the appropriate team members is necessary (Agarwal *et al.*, 2017).	Closer connection with vertical leadership (Müller, 2017).

3.1.5 The balance between the leadership styles

We acknowledge the differences between shared and horizontal leadership as explained in Table 3. However, in order to limit the scope of this study, and due to the limited use of the concept of horizontal leadership in literature, no distinction will be made between these two leadership styles in the rest of this paper. *Shared leadership* will be used to refer to both these styles.

While some scholars view vertical and shared leadership as distinctly separate styles, in reality, project leaders frequently have to utilise the different styles of leadership simultaneously; shared leadership often complements, but does not replace, vertical leadership. According to Hsu, Li and Sun (2017), shared leadership cannot be maintained at all times. In addition, teamwork goals may suffer as a result of absent or weak shared leadership. Shared leadership will most often not be successful when individual team members have different or inconsistent understandings of goals and the priority of their tasks. It therefore can be concluded that shared leadership enhances vertical leadership (Hsu *et al.*, 2017).

No single individual possesses the competency to efficiently play all possible leadership roles within a group or organisation. This is due to the fact that an individual (the formally appointed vertical leader) is unlikely to have the required skills and strengths in all the necessary areas. The vertical leader may also have strong inclinations for certain leadership tasks and not for others. Most teams are also composed of team members who are multifunctional, highly skilled, and who possess strong leadership abilities. It therefore makes sense to apply the individual members' strengths to supplement the vertical leader's capabilities (Conger and Pearce, 2003). Furthermore, a vertical leader could complete necessary project tasks when team members are not competent or able to perform certain shared-leadership functions. It should typically be expected from vertical leaders to intervene when shared leadership is inhibited or absent (Hsu *et al.*, 2017).

According to Müller *et al.* (2016) projects rarely depend on only one or the other form of leadership and most of the time a mix of vertical and shared leadership is used (see Table 3). One of the ways that shared leadership manifests itself, is where the vertically inclined leader shares with, or solicits information from other group members (Zander and Butler, 2010). Shared leadership is thus empowered by vertical leadership (Müller *et al.*, 2016). Figure 5 illustrates the notion of a continuum between vertical and shared leadership – it is not one or the other; there should be an appropriate balance where leadership style should be tailored based on the circumstances (Zander and Butler, 2010).

3.1.6 Objective of the study

The objective of this study is to establish a conceptual model for project-related factors that influence leadership styles and its effect on project performance, and is intended for both scholars and practitioners.

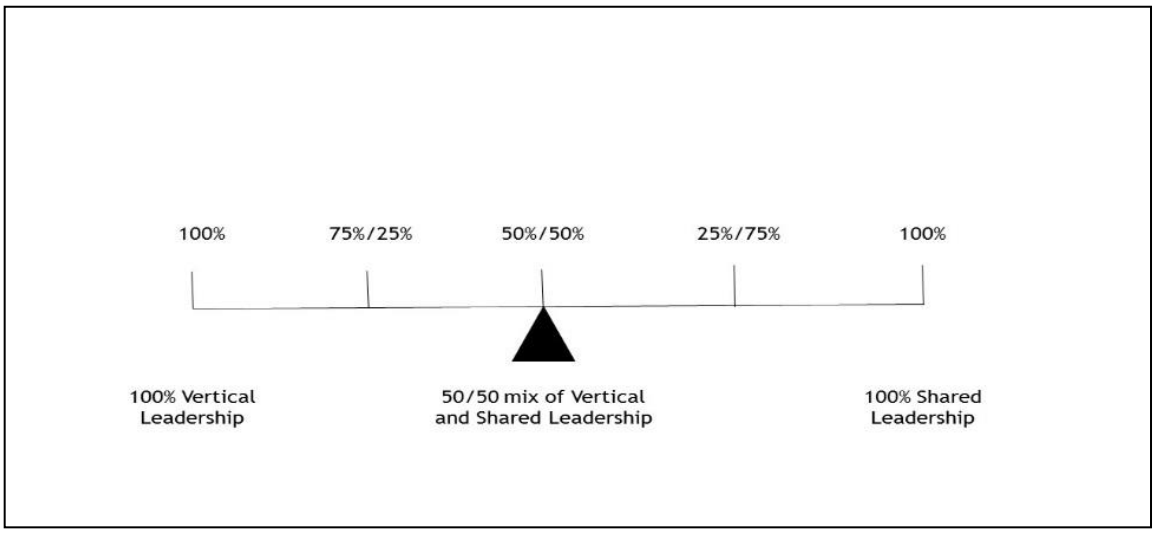

Figure 5: Balanced leadership

According to Müller *et al.* (2018) studies on balanced leadership are limited and not linked to a general framework which would allow researchers to hypothesise and practitioners to intentionally utilise it for the advantage of their projects.

Thus, we propose a number of factors that influence the choice of an appropriate mix of vertical and shared leadership styles. These factors include:

- The type of project (novelty, technology, pace and complexity);
- The phase in the project life cycle;
- The level of organisational project management maturity;
- The level in the hierarchy of a project-orientated organisation from portfolio through programme, project, sub-project, down to work package and activity level;
- The level of trust and collaboration in the team.

We are aware that a number of other factors like technical maturity of team members, and greenfields versus brownfields projects could influence the appropriate leadership balance, but due to scope limitations these aspects are excluded from the study.

Later on in this paper, we will put forward and discuss nine propositions. This will be followed by a conceptual model that may assist researchers and practitioners to better understand the project-related factors that influence the balance of vertical and shared leadership, and its effect on perceived project management success.

3.2 Factors that influence leadership style

3.2.1 Influence of the type of project on leadership style

Organisations should recognise that “one size does not fit all” projects. Teams should utilise a “rolling wave planning”, or an “agile project management style” in which they understand that not everything can be planned in advance (Shenhar, 2015b). In view of this, projects should frequently adapt to different levels of market, technological and environmental uncertainty; different levels of intricacy; or different restrictions and boundaries (Shenhar, 2015b). This typically changes often during the project life cycle. A project should also be tailored to the specific business environment and industry as no two businesses or industries are alike.

The “Diamond of Innovation Model” (Figure 6) suggests a framework for analysing a project’s specific setting, and selecting the appropriate project management style. The model includes four dimensions namely Novelty, Technology, Complexity and Pace. Each dimension is divided into four different project types, and has a different impact on project management (Shenhar, 2015b). Since the original version

(Shenhar, A. J. and Dvir, 2007), Shenhar developed a more complex diamond model, published in 2015 (Shenhar, 2015b). The latest version (Shenhar, 2015a) is presented in Figure 6. The four dimensions will described in more detail next.

The dimension “Pace” will be described below in order to explain the first proposition. (See Figure 6).

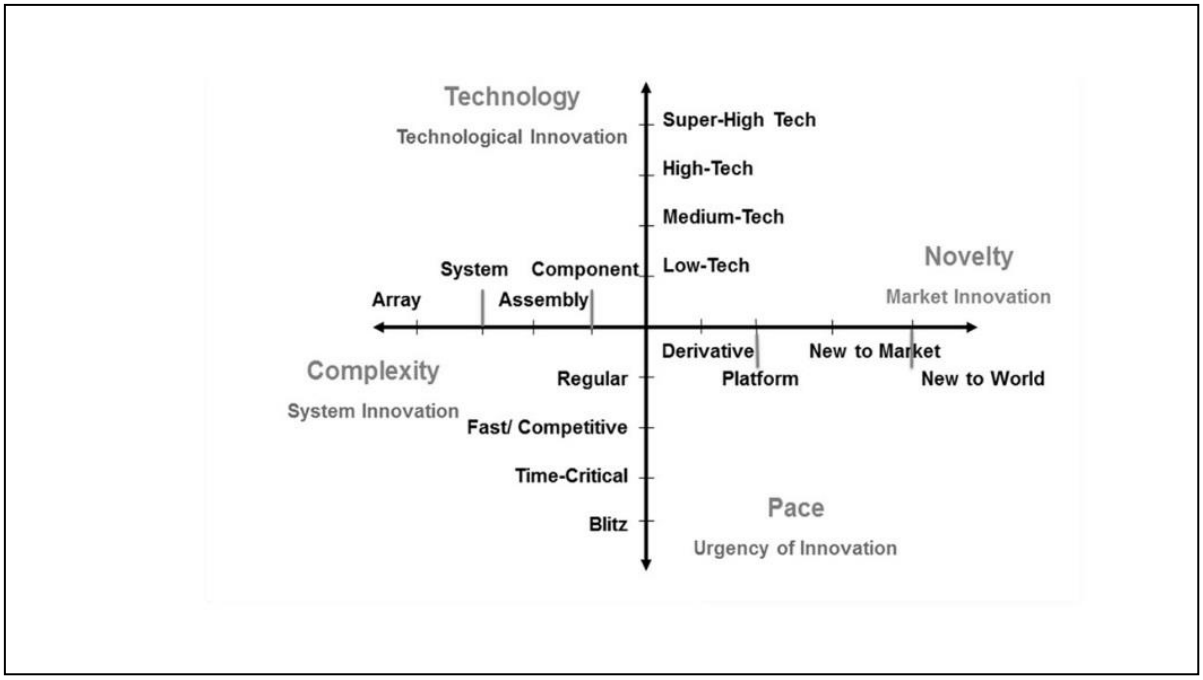

Figure 6: The Diamond of Innovation – for adapting a project to context

(Shenhar, 2015a)

3.2.1.1 Pace (How critical is the timeframe?)

The urgency of the project is represented by Pace, e.g. how much time is available to complete the project. The scale measuring Pace includes: (Shenhar and Dvir, 2007; Shenhar, 2015a, 2015b).

- *Regular* refers to projects where time is not critical for immediate success and the project is managed casually.
- *Fast/competitive* projects are typically those carried out by industrial and non-profit organisations. These projects must be managed with a strategic view and the emphasis should be on meeting schedules and addressing customer and market needs. Top management should support and closely monitor each important milestone, but they must also be watchful for things going wrong in-between.
- *Time-critical* projects must be completed by a specific date and missing the deadline implies project failure. The due date is constrained by a fixed event or a window of opportunity. Here time is the most critical factor: all others e.g. budget are secondary. In order to be prepared to deal with circumstances that might delay completion, contingency plans must be in place.
- *Blitz* projects are the most urgent and most time-critical; they are crisis projects. Success is measured by the timeframe in which the crisis is solved. Most blitz projects are in response to a crisis and there is little or no time for detailed planning. Work is performed twenty-four-hours-a-day with constant decision-making and continuous interaction. All regular bureaucracy is abandoned. The project manager should be given full autonomy with all team members reporting to this leader. Top management should be available at all times to support, monitor and make necessary decisions. Hsu *et al.* (2017) states that vertical leadership is more suitable for dealing with emergencies.

The above leads to the first proposition:

P1: The higher-paced a project, the more the appropriate balance is towards vertical leadership.

3.2.1.2 Complexity (system scope)

This dimension measures the complexity of the product, tasks and the project. The scale for complexity includes: (Shenhar and Dvir, 2007; Shenhar, 2015a, 2015b)

- *A component* is a single element or part. There is no formality or detailed planning and little bureaucracy.
- *An assembly* involves the combination of a collection of elements, components and modules into a single unit that performs a single function. The product to be developed may be a simple stand-alone product (e.g. CD player) or it could be a subsystem (e.g. automobile transmission). Assembly projects are typically technical in nature. There is very little bureaucracy; people often do not submit formal documentation and detailed planning (Shenhar, 2015a).
- *System* projects work with a multifaceted collection of interactive elements and subsystems. These subsystems together perform multiple functions to meet a specific operational need. Examples of system projects are the development of motorcars and computers and the construction of large buildings. The management style is more firm and formal. Due to the fact that system projects require integration of the final product, project management must focus on a combination of technical and administrative issues. System project managers tend to “bureaucratise” their projects (Shenhar, 2015a). A study done by Ogbonna and Harris (2011) indicated that bureaucratic cultures are characterised by integration, internal cohesiveness and uniformity. Jaskyte (2004) says that cohesive groups with a strong, commanding leader are more likely to pursue uniformity. Here individuals will be careful to express their opinions for fear of scorn and dismissal. It can thus be deducted that predominantly vertical leadership is practiced in system projects.

- *Array* projects (often called “programs”) involve large, widely dispersed collections of systems that function together to achieve a common purpose (sometimes they are called “systems of systems” or “super systems”). An example is national communications networks where formality is maximised and bureaucratised. The nature of the projects necessitates that projects are managed in a very formal manner and that the project manager put a lot of effort into the legal aspects of the various contracts. Leaders should pay close attention to the social and environmental impact of their projects and also the views of political decision makers. The reason being that no array project can survive if it loses its political support. When significant external stakeholders are involved e.g. political decision makers, shared leadership would be required (Shenhar, 2015a).

We therefore postulate that, on complex projects the balance should be more towards shared than vertical leadership. This notion is supported by Hsu *et al.* (2017) who states that the link between shared leadership and team performance becomes stronger when the team’s tasks are more complex.

P2: The more complex a project (larger scope), the more the appropriate balance is towards shared leadership.

3.2.1.3 Novelty (How new is the product in the market?)

This dimension represents uncertainty of the project’s goal, the market, or both (Shenhar, 2015b). It measures the “newness” of the project’s product to customers, users, or to the market in general. It gives an indication of how clear and well defined the initial product requirements are. The management style should be more

structured for less novel and more flexible for highly novel projects. More creativity is needed at the higher levels of novelty (Shenhar, 2015a,b).

Brockhoff (2006) found that a standardised project management methodology is not suitable for highly novel projects. He suggests that highly novel projects require significant new knowledge, which increases the importance of team involvement (as tacit knowledge typically comes from the project team). The importance of the roles of top management and the project manager are reduced, due to the fact that the project is prominent in the organisation and does not need as much attention from top management to maintain its visibility/keep it priority. Shared leadership frequently increases teams' creativity and innovation through information sharing and cooperation (Hsu *et al.*, 2017). We therefore deduce that highly novel projects rely more heavily on shared leadership. The right people should be chosen for the project (Shenhar, 2015a)**.** The levels of novelty are (Shenhar, 2015a):

- *Derivative* products are additions and advances of existing products.
- *Platform* products replace older generation products in a fixed market sector e.g. a new model motorcar.
- *New to market* e.g. the first rapid rail transportation system in South Africa (Gautrain).
- *New to world* products are brand new products that the market and world not have seen before e.g. the first portable mobile phone.

The above supports the following proposition:

P3: The higher the novelty of a project, the more the balance is towards shared leadership.

3.2.1.4 Technology

This is the next dimension on the Shenhar and Dvir (1996) “Diamond of Innovation Model” to be discussed:

- *Low-tech* projects are based on existing and well-established technologies e.g. regular construction projects where managers should be firm and stick to the original plan (Shenhar and Dvir, 1996).
- *Medium-tech* projects incorporate some new technology or a new feature that did not exist in previous products with existing or base technologies. Examples include products in stable industries such as appliances, automobiles or heavy equipment. Managers should be prepared to accept some changes early on, but after design-freeze they should do everything in their power to get the product ready as soon as possible (Shenhar and Dvir, 1996).
- *High-tech* projects use technologies that are new to the firm but already exist and are available at the start of the project e.g. computer and defence development projects (where it is common to utilise only existing technology in product development). Managers should be prepared to accept many changes and must wait longer for the final product design. According to Shenhar and Dvir (1996) the major flow of information is verbal and the projects are characterised by regular meetings to solve problems and to share information. The system consists of internal meetings of the project team, the subcontractors and the customers. There is open communication and constant discussion. In order to strengthen group cohesiveness managers often arrange team building exercises (Shenhar and Dvir, 1996).
- *Super-high-tech* projects employ new technologies that are used for the first time. The project mission is clear, but not the solution; therefore new

technologies have to be developed during the lifespan of the project (Shenhar and Dvir, 1996). The moon-landing program would be an example. Managers should master the art of patience, must be used to continuous change, and should make sure that alternative technologies have been evaluated. They should develop an attitude of “look for trouble” (Shenhar and Dvir, 1996). It often happens that the managers of super-high-tech projects are distinguished technical leaders in their organisations and engineers feel honoured to work for them. The culture is that of an “elite team” which “makes a difference” and “creates the future” (Shenhar and Dvir, 1996). The programme is managed in a very flexible manner – many ideas are presented and tested, and a huge number of changes and improvements are made. All team members should share information shortly after it is produced and not wait for meetings and formal reports to report it (Shenhar and Dvir, 1996).

The above supports the proposition that the higher the level of technology involved in a project, the more the balance is towards shared leadership (Shenhar and Dvir, 1996). This can be seen in the leadership style practised in super-high-tech projects where team members are not held back by meetings and reports to share new information and the team is managed in a flexible manner with patient managers (Shenhar and Dvir, 1996).

The above leads to proposition 4:

P4: The higher the level of technology involved in a project, the more the balance is towards shared leadership.

3.2.2 The phase in the project life cycle

Patanakul, Iewwongcharoen and Milosevic (2010), state that the project life cycle serves as a basic structure for the management of projects, while Turner and Müller (2005) say that it is perfectly suitable for a project manager to use different project leadership styles at each phase of the project life cycle.

The generic project life cycle in the *PMBOK® Guide* (PMI, 2013) is as follows:

- Starting the project;
- Organising and preparing;
- Carrying out the project work;
- Closing the project.

Post project business value must be assessed (Office of Government Commerce, 2009; Skulmoski and Hartman, 2010).

Shared and vertical leadership can be used when needed and should be appropriate to the phase during the life cycle of a firm or project (Crevani, Lindgren and Packendorff, 2007). Turner and Müller (2005) also mention that the phase in the project life cycle has an influence on leadership style. Patanakul *et al.*, (2010) agree by saying that the characteristics and required deliverables of each project phase influence the project management activities in that phase, and that it should include leadership style. Ensley *et al.* (2006), Patanakul *et al.* (2010), and Turner and Müller (2005) all agree that the leadership style should be appropriately tailored according to the life cycle of a project.

As illustrated in Table 4, we postulate that, in order to facilitate planning and the involvement of a variety of stakeholders, the balance should be towards shared

leadership during the early phases (starting the project and organising and preparing). While the execution of different types of project differ, carrying out the work (Executing, Monitoring and Control Processes) would in many cases require somewhat more vertical leadership style. During close-out shared leadership should be more appropriate again, because participation of team members is essential for identifying lessons learned.

The above leads to proposition 5:

P5: During the execution phase, the leadership tends to move towards vertical leadership. During the initial phases, organising and preparing, as well as during closeout and post project assessment of business value, the leadership style tends to be more shared. (See Table 4).

Table 4: Generic project life cycle phases and the leadership style during each phase

	Balance more towards shared leadership	Balance more towards vertical leadership
Phase within the project life cycle	1. Starting the project	3. Carrying out the project work (executing, monitoring and control processes)
	2. Organising and preparing	
	4. Closing the project	
	5. Post project business assessment	

3.2.3 Organisational project management maturity

A number of project management maturity models (PM^3s) have been developed since the mid-1990s and more than 30 models were available in 2012 (Pretorius, Steyn and Jordaan, 2012). Models include OPM3 (Office of Government Commerce, 2009), SPICE (Sarshar, Haigh, and Amaratunga, 2004) and $(PM)^2$ (Kwak and Ibbs, 2002). The majority of the models consist of five distinct levels that

describe an ordinal scale for measurement of maturity (Backlund, Chronéer and Sundqvist, 2014). Level 1 is the initial level where no project management is done and level 5 is the 'optimising' level where the company is fully mature. Figure 7 illustrates the typical five maturity levels. Ika, (2009) said in 2009 that no single maturity model was recognized worldwide and Yazici (2009) found that most organisations do not achieve level 3 or higher.

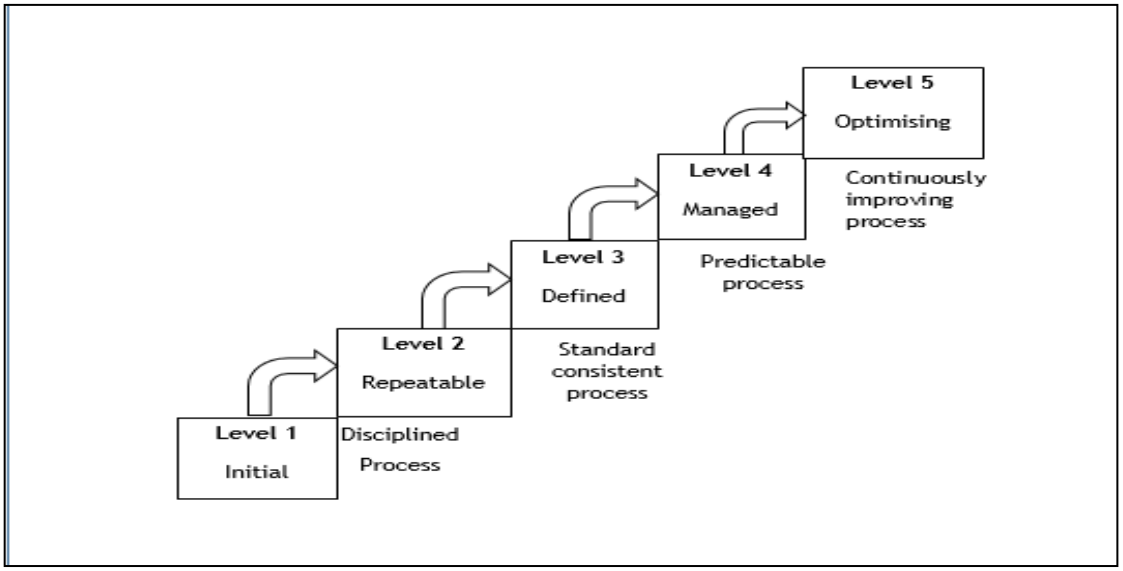

Figure 7: The PM^3

(Pretorius *et al*., 2012)

Torres (2014) identifies three major roles of maturity models in organisations namely:

- Measuring the current state of maturity;
- Providing advice to reach a higher level of maturity; and
- Benchmarking with other organisations.

Although maturity models can be a useful tool (Nicholas and Steyn, 2017), Mullaly (2014) asserts that maturity models should not be the beginning and end in the science of maturity. Mullaly (2014) criticises project management maturity models by stating that there is insufficient evidence that an increase in project management maturity, as it is currently defined, actually leads to an increase in organisational value. Skulmosky (2001) suggests, but does not demonstrate, that there is a link between project management maturity and competency.

Recent longitudinal studies of organisational maturity have also been unable to prove an obvious link between project management maturity and performance (Mullaly, 2006, 2014). Mullaly (2014) further suggests that project management maturity models need to increase their focus from just process maturity to a broader cognizance of organisational maturity. Project management maturity models need to be more flexible in their structure, more adjustable in their approach and more receptive in their applications in order for them to be appropriately relevant and meaningfully useful (Mullaly, 2006, 2014).

Dooley, Subra and Anderson (2001) said that maturity comprises of having a well-defined, managed, measured, and continuously improved process. Although certain studies, including research done by Mullaly (2006, 2014) as discussed in the previous paragraph, failed to prove that high maturity in project management correlates to better results (Müller, 2017), Dooley *et al*. (2001) disagree. They found that higher levels of maturity were associated with projects that met organisational goals like cost goals; i.e. projects that perform well. High–performance teams typically execute projects that perform well/meet organisational goals.

Studies by Shamir and Lapidot, (2003) showed that high-performance teams actively engaged in shared leadership, much more so than other teams. We thus deduct that high-performance teams are likely to be more mature and to engage in shared leadership. We therefore postulate that mature teams tend to engage in shared leadership.

The above leads to the following proposition (proposition 6):

P6: The higher the level of project management maturity in the organisation, the more shared leadership will be used.

3.2.4 The project's position/level within the hierarchy of work in a project-oriented organisation

Gareis (1991) defines project-oriented companies as those organisations that execute small and large projects as well as unique and standard projects to deal with new challenges and potential in an ever-changing business environment. The balance between vertical and shared leadership may be influenced by the level within the hierarchy of a project-oriented organisation, i.e. the level within the hierarchy from programme, project, sub-project, down to work package and activity level.

PRINCE2® (Office of Government Commerce, 2009) indicates that programmes and projects focus on applying change initiatives in the "correct" manner while portfolio management selects the initiatives that will realize benefits that contribute to contracted objectives. It seems that strategic decisions would require more shared leadership than work executed at activity level. Management of programmes, and

especially portfolios of projects, could therefore be expected to require leadership that is biased towards shared leadership.

Levels within the project hierarchy are however not well standardised; although terms such as *project* and *work package* have been standardised to a large extent, some organisations would, for example, use the term *task* where others would use *activity*. A set of *sub-projects* or even *work packages* of a single, *large project* can be as complex to manage as a set of several small projects. What one organisation would consider as a large project, might even be considered to be a programme by another organisation.

Nicholas and Steyn (2017) state that programmes and projects are different; a programme ranges over a longer time than a project, and it also consists of a number of parallel or consecutive projects in order to meet a programme goal. The projects within a programme utilises common resources and are often interdependent. A portfolio is defined as “projects, programmes, subportfolios, and operations managed as a group to achieve strategic objectives” (PMI, 2013).

While programmes and portfolios of projects cannot be considered as simply higher levels of project hierarchy (Pellegrinelli, 1997), the “Diamond of Innovation Model” (described earlier) allows work entities such as projects, sub-projects, work packages and activities to all be measured on the same scales and compared with each other, regardless of the terms used to describe them (Steyn and Schnetler, 2015). Addressing the relationship between the type of project, as described by the diamond model, therefore obviates the need of investigating the relationship between leadership style and the level within the project hierarchy.

3.2.5 Organisational structure

In a classical functional organisation where each employee has one clear superior, staff members are frequently grouped by speciality, such as production, marketing, engineering and accounting at the top level (PMI, 2013). For example, an engineering project may be divided into chemical and electronic engineering. Each department in a functional organisation typically works independently of the other departments. In a projectised organisation, on the other hand, the project manager has the highest authority and a lower authority in other structures as indicated in Table 5 (PMI, 2013).

Although one might postulate that structures to the right at Table 5 may tend to require more vertical leadership, this aspect is beyond the scope of this study.

Table 5: The influence of organisational structures on the authority of the project manager (PMI, 2013)

	Type of organisational structure				
	Functional	**Matrix**			**Projectised**
		Weak	**Balanced**	**Strong**	
Project manager authority	Little or none	Low	Low to moderate	Moderate to high	High to almost total
Project manager's role	Part-time	Part-time	Full-time	Full-time	Full-time

3.3 The level of trust and collaboration

3.3.1 Level of trust and leadership style

Fox (2001) says that an environment of trust is crucial to communication and Kadefors (2004) defines trust as a psychological state, not a behaviour that is "ambiguous and complex".

The following authors identified enablers of trust:

- Nicholas and Steyn (2017) say that the best manner to construct trust is through face-to-face contact. People in virtual teams must get to know each other through meetings that are long enough. The project manager of a virtual team should meet at least once with each person in the team, but ideally more often. Trust typically decreases when team members doubt each other and/or the team leader. It often improves when the group members see their colleagues acting with integrity, performing competently and showing concern for each other's well-being (Lee, Gillespie, Mann and Wearing, 2010).
- Tyler (2003) defines trust as a matter of certainty in which people act based on their anticipations concerning the likely future behaviour of others. Trust can also be seen as an issue of competence where people trust only those who they believe can decipher problems and deliver desired outcomes. Trust is important because it typically enables co-operation. People usually have more trust in the motives of people with whom they share a social background (Tyler, 2003).
- Carvalho (2008) adds that where there is trust, team members will ask for help, speak openly and reliably, take risks, accept new challenges and carry out their undertakings with less anxiety and stress.

- Schoorman, Mayer and Davis (2007) say that trust is the "willingness to take risk" (i.e. "be vulnerable"). The level of trust frequently is an indication of the amount of risk that an individual is willing to take. When trust is at its lowest level, an individual will take no risk at all.
- For an environment to be conductive for trust, Fox (2001) stresses the significance of five actions that insure a common understanding of concepts, actions and results which are:
    - Sharing opinions and feelings;
    - Assuming obligations that one can fulfil;
    - Acknowledging mistakes;
    - Ask for and accepting feedback; and
    - Identify and test assumptions.
- Just as the perceptions about an individual's competencies, benevolence ("the extent to which a party is believed to want to do good for the trusting party, aside from an egocenytric profit motive"), and integrity ("will fulfil agreements as promised") frequently have an impact on how others trust the individual, these views might also affect the extent to which an organisation will be trusted (Schoorman *et al.*, 2007).

The systematic use of these techniques in the organisation inspires their circulation among collaborators. According to Hsu *et al.* (2017) shared leadership has been found to have better outcomes than vertical leadership in the creation of trust within a team.

The above supports proposition 7:

P7: The higher the level of trust, the more the balance would be towards shared leadership.

3.3.2 Degree of collaboration and leadership style

According to Bond-Barnard, Fletcher, and Steyn (2018) collaboration can take place between individuals, organisations, or between an organisation and its shareholders. Only interpersonal collaboration is considered in this study. Kadefors (2004) says that intuitive and emotional reactions that are sensitive to behavioural aspects, and that to show respect and concern, may strongly influence the development of trust and a tendency to collaborate.

Various factors influence collaboration (Bond-Barnard, *et al.*, 2018). Tyler (2003) says that trust affects performance through initiation of teamwork or other collaborative processes. Trusting teams can typically manage the interdependencies among their different areas of knowledge better. At an individual level, collaborative work usually predicts task and team performance. Collaboration indicators identified in Bond-Barnard *et al*. (2018) are relationships, coordination, proximity, commitment, conflict and incentives.

The above literature supports proposition 8:

P8: The higher the level of collaboration, the more the balance would be towards shared leadership.

3.4 Perceived project management performance/success

Success can mean different things to different people (Jugdev and Müller, 2005). Müller and Turner (2007) say that people could judge the success of projects differently depending on their personal objectives. What is considered as a success by one person might constitute a failure for another. According Bond-Barnard *et al*. (2018), *project success* is measured by "*things-related*" measures such as the

budget, quality and schedule of the project deliverable (which will be hereafter be collectively referred to as project performance) and “people-related” criteria such as communication, trust and collaboration which determine the team morale and stakeholder satisfaction in the project, amongst others (Bond-Barnard *et al.*, 2018). Furthermore, an additional construct, *knowledge integration and innovation* influences project success by bridging the gap between the “things-related” and “people-related” factors (Bond-Barnard *et al.*, 2018).

Müller and Turner (Müller and Turner, 2007) illustrated that a project manager’s success is reliant on their competence, predominantly their leadership style encompassing emotional intelligence, management focus and intellect. Several authors including Muenjohn and Armstrong (2007) investigated a variety of leadership concepts like transactional leadership, transformational leadership and laissez-faire. These topics are beyond the scope of this paper.

While Müller and Turner (2007) studied the success of the project manager, this paper investigates the factors that influence the appropriate balance between shared and vertical leadership and its influence on project success and performance.

The final proposition (proposition 9) addresses this:

P9: The more appropriate the balance between shared and vertical leadership, the higher the perceived likelihood of project management success/performance as illustrated in the conceptual model.

3.5 Conceptual model

Figure 8 illustrates the model based on the propositions described above.

An aspect not addressed in the model is the following: It might be postulated that sensitive issues that affect people personally (e.g. salaries and retrenchments) would require more shared leadership than non-sensitive issues (e.g. alternative building materials to be used).

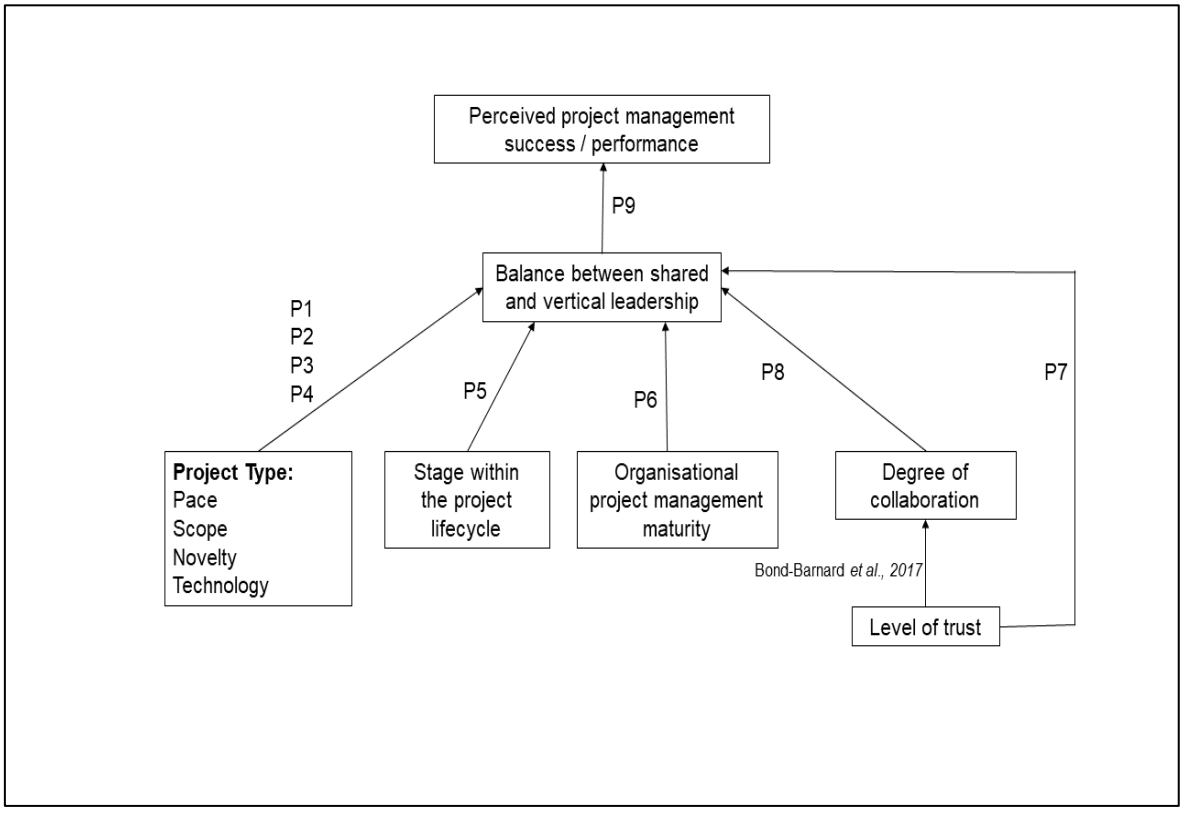

Figure 8: Conceptual model

3.6 Conclusion and discussion

Based on a literature survey, this paper presents a theoretical model of project-related factors that influence leadership styles (shared and vertical leadership) and its effect on project performance. The paper puts forward nine propositions and it should be noted that the propositions are not mutually exclusive. The nine propositions are:

P1: The higher-paced a project, the more the appropriate balance is towards vertical leadership.

P2: The more complex a project (larger scope), the more the appropriate balance is towards shared leadership.

P3: The higher the novelty of a project, the more the balance is towards shared leadership.

P4: The higher the level of technology involved in a project, the more the balance is towards shared leadership.

P5: During the execution phase, the leadership tends to move towards vertical leadership. During the initial phases, organising and preparing, as well as during closeout and post project assessment of business value, the leadership style tends to be more shared.

P6: The higher the level of project management maturity in the organisation, the more shared leadership will be used.

P7: The higher the level of trust, the more the balance would be towards shared leadership.

P8: The higher the level of collaboration, the more the balance would be towards shared leadership.

P9: The more appropriate the balance between shared and vertical leadership, the higher the perceived likelihood of project management success/performance as illustrated in the conceptual model.

It is planned to empirically determine particular balances of leadership styles for specific situations that would lead to improved perceived project management success/performance. Empirical results will be reported in a sequel to this paper.

Possible shortcomings could include that shared and vertical leadership were studied in isolation from the other leadership styles and this could be an opportunity for further research.

There are very few studies that have modelled project-related factors that influence leadership styles and its effect on project performance. This study attempts to fill this gap through a review of literature leading to nine propositions which constitute the theoretical framework proposed in this paper.

For the practitioner, this model presents a conceptual framework that explores the influence of project types, the phase in the project life cycle, organisational project management maturity and the level of trust and collaboration between project team members on the appropriate balance of leadership styles in projects. The framework provides practitioners with novel insights into the role of different project-related factors in determining the correct balance of leadership styles for a particular situation.

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Chapter 4

The effect of project types on leadership styles and project management success[3]

Leadership traditionally centred on the idea of a “person in charge” leading subordinates (i.e. vertical leadership). However, recent studies indicate that, depending on certain factors, leadership may also be shared in a team. This empirical paper presents a new perspective on the appropriate balance between vertical and shared leadership, based on four project types (pace, complexity, novelty and technology), and the influence of this balance on the likelihood of project management success.

4.1 Introduction

Leadership is a significant success factor in projects, and research on project leadership is becoming increasingly important for project management as a profession (Müller, Niklova, Sankaran, Hase, Zhu, Xu, Vaagaasar, and Drouin, 2016).

Knowledge work is increasingly becoming more team based as it is becoming more difficult for any one person to be an expert on various aspects of the work that needs to be done (Pearce, 2004). With this shift towards team-based work comes the need to question the more traditional models of leadership (Pearce, 2004). Traditionally, leadership centred around the idea that one person is “in charge” while the rest are

[3] This chapter has been submitted in a slightly different format as Pretorius, S., Steyn, H., Bond-Barnard, T.J. and Cronjé, T. (Submitted). The effect of project type on leadership style and project success. *Journal of Industrial Engineering and Management.*

simply followers (i.e. vertical leadership) (Pearce and Conger, 2003). However, recent literature indicates that leadership can be shared between the team leader and team members – rotating to the person with the key knowledge, skills and abilities to lead the team in dealing with a particular issue they face at that time (Müller, 2017; Pretorius, Steyn and Bond-Barnard, 2017).

Teamwork-based structures are increasingly replacing hierarchical ones, and as a result highlighting the importance of leadership (Hsu, Li and Sun, 2017). The growing practice of empowered teams, together with the flattening of organisational structures increase the need for a shift in the traditional models of leadership (Pearce and Sims, 2002).

Research on leadership in project management has increased dramatically in recent years. This is illustrated by the fact that in the year 2000 only 26 research papers used the terms ‘leadership’ and ‘project management’ in its titles, while in 2015 the number of such papers grew to 271 (Müller *et al*., 2016). Two major streams developed: shared leadership, and vertical leadership (Müller *et al.*, 2016). Both types of leadership occur in projects, and there is a need to investigate the balance between these two leadership styles, as well as how an appropriate balance between these styles contribute to project management success (Drouin, Müller and Sankaran, 2018).

This study builds on recent literature that, amongst others, investigated the project-related factors that influence leadership styles and their effect on project management success, and on empirical studies done in various countries, to investigate balancing vertical and shared leadership in projects (Drouin *et al*., 2018; Pretorius *et al.*, 2017). Thus, while many researchers have studied project leadership, little has been published to date on appropriate balances in project leadership styles, and how various project types may influence this balance. This study aims to empirically determine the appropriate balance of leadership styles

based on four dimensions of project type namely *pace*, *complexity*, *novelty*, and *level of technology applied*, as proposed by Shenhar and Dvir (1996, 2007); Shenhar (2015, 2011, 2003); and Shenhar, Dvir, Lechler and Poli (2002). It further investigates whether an appropriate balance of leadership styles improves the likelihood of perceived project management success. The paper is intended for academics and practitioners alike.

Five hypotheses, which are not mutually exclusive, have been investigated, namely:

H1: The higher-paced a project, the more the appropriate balance is towards vertical leadership.

H2: The more complex a project, the more the appropriate balance is towards shared leadership.

H3: The higher the novelty of a project, the more the appropriate balance is towards shared leadership.

H4: The higher the level of technology involved in a project, the more the appropriate balance is towards shared leadership.

H5: The more appropriate the balance between vertical and shared leadership, the higher the likelihood of perceived project management success.

The empirical results and a discussion of the outcomes follow later in this paper.

4.2 Literature review

4.2.1 Leadership

In material written from 1900 to 1990, more than 200 different definitions of leadership were found (Rost, 1991). The following definition is used in order to limit

the scope of the study: “Leadership can be seen as the practice of influencing others to agree about how work should be done effectively, and the process of enabling individual and collective efforts to accomplish a shared objective” (Pretorius *et al.*, 2017, Pretorius, Steyn and Bond-Barnard, 2018; Ensley, Hmieleski and Pearce, 2006). Leadership styles such as transactional, transformational and laissez faire leadership, and the success of the project manager as studied by Müller and Turner (2007), as well as personal and interpersonal factors (e.g. personality types and emotional intelligence), and technical engineering factors are beyond the scope of this study.

4.2.1.1 Vertical leadership

Vertical leadership typically occurs when a strong organisational hierarchy is in place (Houghton, Neck, and Manz, 2003; Müller, 2017). A formally appointed leader (project manager) is the main source of information, oversight and control for the team members (Ensley *et al.*, 2006). This is a top-down, ‘one-to many’ approach where the team members simply follow the orders of the leader (Ensley *et al.*, 2006). This leadership model has been most prominent for many years (Pearce and Conger, 2003).

4.2.1.2 Shared leadership

Mendez and Busenbark (2015) describe shared leadership as a “fluid, informal emergence of leaders among group members”. Thus, this leadership style is characterised by a cooperative state of joint influence where the leadership role emerges from individuals in the team (Pretorius, *et al.*, 2017, 2018; Müller, 2017). Responsibilities and accountability for outcomes are shared among the team members (Hoch and Dulebohn, 2013; Wood, 2005; Kocolowski, 2010). Shared leadership entails leadership by one team member, decided by the team (Pilkienė, Alonderiené, Chmieliauskas, Simkonis and Müller, 2018). During the project life

cycle, a project manager is likely to be confronted by these factors, and he/she does not necessarily possess what is required to effectively lead the team during that stage of the project (Pretorius, *et al*, 2018; Cox, Pearce and Perry, 2003). The leadership role then shifts to the team member who is most capable to lead the team in this situation. Afterwards, the team member steps down as leader to allow others to take up the leadership role. This shift in leadership may happen many times during the project life cycle (Pretorius, *et al.*, 2017). Shared leadership is grounded on the principle that leadership is basically a role and a set of behaviours, rather than positional power that is given to an individual team member (Lord, Day, Zaccaro, Avalio and Eagly, 2017).

4.2.2 Project types

Associations like the Project Management Institute (PMI), the International Project Management Association (IPMA) and The U.K. Association for Project Management have defined “Bodies of Knowledge” (BoKs) which, according to them, are the “core knowledge” of managing projects – it is implied that following these procedures will result in a successful project. However, many projects, particularly the larger and more complex ones, fail despite the guidelines (Williams, 2005). A possible reason could be the fact that all projects are different – “one size does not fit all” and no two organisations are alike. It is vital for projects to adjust to technological and environmental uncertainty, different levels of complexity and market fluctuations, to name only a few (Shenhar, 2012). During the project life cycle, a project manager is likely to be confronted by these factors and he/she must understand that an agile project management style should be planned for and adopted in order to deal with it (Shenhar, 2015; Pretorius *et al.*, 2017). Project managers should alter their leadership styles to “the environment, the task, and the goal, rather than stick to one set of rules” (Shenhar and Dvir, 2007; Bentahar and Ika, 2019). As a possible solution, Shenhar (2011, 2015) proposed a framework for evaluating a project’s specific setting to select the most suitable project management style. This model

has four dimensions: pace, complexity, novelty and, technology. Each dimension is subdivided into four different project types, ranging from low to high on the scale pertaining to the dimension. The four dimensions are described in more detail below.

4.2.2.1 Pace

Pace measures the urgency i.e. how much time is available to complete the project. In other words, it measures whether or not there are "hard" deadlines (Bentahar and Ika, 2019). The scale includes *regular* projects (where time is not critical), f*ast/competitive* projects (where the emphasis is to meet schedules and addressing customer and market needs), *time-critical* projects (where missing the deadline indicates project failure), and *blitz* projects (the most urgent and time-critical projects where there is little or no time for planning (Shenhar, and Dvir, 1996, 2007; Shenhar, 2011, 2015). Already in 1991, McDonough and Barczak (1991) found that the leadership style of the project manager does make a difference regarding how fast a project is established and the outcome of the project. In a high-paced project, time constraints often give team members little time to build trust, which is an important aspect of a more participative leadership style. A more assertive and directive project manager is therefore often required when there is pressure to complete the project as fast as possible (Nicholas and Steyn, 2017). Hsu *et al.* (2017) found that vertical leadership is more appropriate for projects that deal with emergencies (i.e. *blitz* projects).

This leads to the first hypothesis:

H1: The higher-paced a project, the more the appropriate balance is towards vertical leadership.

4.2.2.2 Complexity (System scope)

This dimension measures the degree of difficulty of the product, the tasks, and the project (Pretorius, *et al.*, 2017). The measurement varies from a *component* (a single element or part), an *assembly* (a collection of components), a *system* (a multifaceted collection of subsystems) to *array* projects (also referred to as 'programmes') (Shenhar and Dvir, 1996, 2015; Shenhar, 2011, 2015). In this study, we postulate that the balance on complex projects should be more towards shared leadership. Hsu *et al.*, (2017) support this notion by stating that the connection between shared leadership and team performance becomes more robust when the team's tasks are more complex. Shared leadership is particularly advantageous for teams involved in complex, knowledge-based, dynamic and interdependent tasks as it involves high levels of reciprocal interactions, freedom to make decisions, and innovation (Fausing, Joensson, Lewandowski and Bligh, 2013; Scott-Young, Georgy and Grisinger, 2019; Scott, Jiang, Wildman and Griffith, 2018). In highly complex projects, the management style is supportive; it is understood that there are a number of uncertainties, which could lead to a considerable amount of replanning during the execution of the project. Individuals, or groups within the team, are therefore allowed to take part in decision-making (Williams, 2005). It is useful to involve team members in the leadership process when work is complex and cannot be solved by the leader alone; this is often the case with innovative tasks (Friedrich, Griffith and Mumford, 2016). However, shared leadership may be unfavourable for teams with routine, familiar, and predictable tasks (Fausing *et al.*, 2013).

This leads to the second hypothesis:

H2: The more complex a project, the more the appropriate balance is towards shared leadership.

4.2.2.3 Novelty (How new is the product in the market?)

Novelty denotes the uncertainty of the project's goal, or market, or both, and therefore measures the "newness" of the product to customers, users, or the general market (Shenhar, 2015). The dimension includes the following levels namely *derivative* products (additions to existing products), *platform* products (products that replace older generation products in a fixed market sector, *new to the market*, and *new to the world* (Shenhar and Dvir, 1996, 2007; Shenhar, 2011, 2015).

Standardised project management practices and procedures are not appropriate for highly novel projects as it requires substantial innovative knowledge, which increases the importance of team involvement (as tacit knowledge typically originates from the project team) (Brockhoff, 2006; Pretorius *et al.*, 2017). These projects usually do not need as much attention from top management to uphold its visibility or priority status, and therefore top management and the project manager occasionally step back to some extent due to the prominence of the project in the organisation (Hsu *et al.* 2017). Shared leadership has the potential to increase teams' creativity and innovation through information sharing and cooperation (Hsu *et al.*, 2017). In addition, shared leadership is more associated with the success of change management teams responsible for innovation, than vertical leadership (Fitzsimons, James and Denyer, 2011). It could lead to positive outcomes if the leader includes team members in more innovative tasks (Friedrich *et al.*, 2016).

We therefore infer that highly novel projects partake more in shared leadership and this leads to the third hypothesis:

H3: The higher the novelty of a project, the more the appropriate balance is towards shared leadership.

4.2.2.4 Technology

This dimension consists of *low-tech* projects (based on existing and well-established technologies), *medium-tech* projects (incorporate some new technology or a new feature to a product), *high-tech* projects (use technologies that are new to the firm, but already exist) and super-*high-tech* projects (employ new technologies that are used for the first time) (Shenhar, and Dvir, 1996, 2007; Shenhar, 2011, 2015).

In *low-tech* projects, managers should be firm and stick to the original plan, whereas *super-high-tech* projects are managed in a very flexible manner, allowing team members to present and test many ideas, leading to an enormous number of changes and improvements being made during the life cycle of the project (Shenhar and Dvir, 1996). Shared leadership facilitates the applicable, up-to-date evaluation and support needed in high technology projects where group members have extremely specialised skills and interdepence is required (Cox, Pearce and Perry, 2003; Kruglianskas and Thamhain, 2000)

This supports Hypothesis 4:

H4: The higher the level of technology involved in a project, the more the appropriate balance is towards shared leadership.

4.2.3 Balanced leadership

Contemporary studies in the domain of Project Management started to question the divide between vertical and shared leadership, and scholars started to examine the leadership applied by the project team or individual team members (shared leadership). As a result the notion of “Balanced Leadership” developed. (Müller, Sankaran, Drouin, Vaagaasar, Bekker and Jain, 2018). Balanced leadership addresses the dynamics of the interface between vertical and shared leadership

(Drouin *et al.*, 2018). In a typical project, both vertical and shared leadership are present; most of the time a combination of these styles is used (Müller *et al.*, 2016). The project manager's leadership role and level of importance fluctuates according to the project type and its dimension (Bentahar and Ika, 2019). Holm and Fairhurst (2018) state that most organisations do not practice shared leadership independently of hierarchy; the hierarchy's standpoint pertaining to shared leadership seems to be both evolving and deliberate.

There is a continuum between vertical and shared leadership: it is not one or the other, as there should be an appropriate balance where the leadership style is tailored according to the requirements of the project at a specific point in time (Pretorius *et al.*, 2017, 2018). Balanced leadership affords an organisation a more "flexible, dynamic, robust and responsive leadership platform" (Pearce, Manz and Sims, 2009).

4.2.4 Perceived project management success

Despite the fact that several studies have been conducted on project success factors, many projects are still failing (Shenhar, Dvir, Levy and Maltz, 2001; Baccarini, 1999; Jugdev and Müller, 2005; Yu, Flett and Bowers, 2005; Pretorius, Steyn and Jordaan, 2012; Northouse, 2016; Todorović, Petrović, Obradović and Bushuyev, 2015). *Success* means different things to different people (Jugdev and Müller, 2005). A person's personal objectives may influence him/her to judge a project differently than his/her team member (Ika, 2009). One person could judge a project as a success, while another might regard it as a failure (Müller and Turner, 2007). In light of this, this paper refers to "perceived" success of a project. Nicholas and Steyn (2017) define project success as "hitting a target that floats in a three-dimensional space" with the dimensions being cost, time and performance (meet all requirements). "The purpose of project management is to hit the target" (Nicholas and Steyn, 2017). It can be deducted from this that a project could be perceived as

successful when the “target has been hit”. Several authors however realise that this “iron triangle” is an oversimplification (Baccarini, 1999; Atkinson, 1999; Shenhar, Dvir and Levy, 1997; De Wit, 1988; Jha and Iyer, 2007). For the purposes of this study, project management success was self-defined by the respondents.

Failure to recognise that it is imperative to also factor in project types for project management, leadership style, and ultimately project management success, can result in schedule and budget overruns, and not realising goals or the purpose of the project (Bentahar and Ika, 2019). This study investigates the project types that influence the appropriate balance between vertical and shared leadership, and its influence on perceived project management success.

The final hypothesis is:

H5: The more appropriate the balance between vertical and shared leadership, the higher the perceived likelihood of project management success.

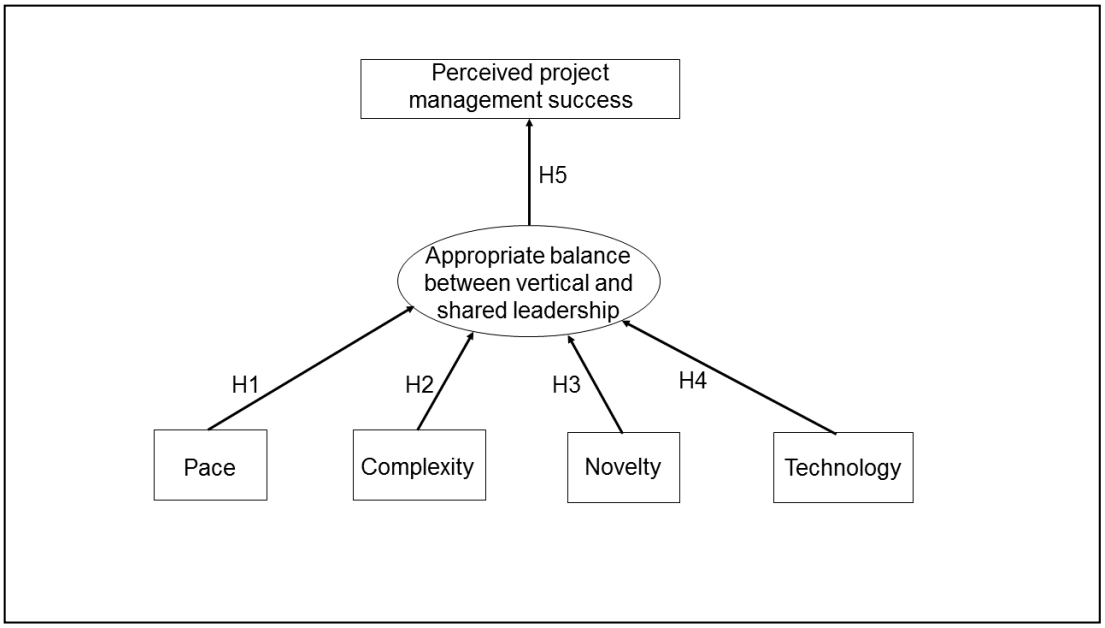

Figure 9: Conceptual model (project types)

4.2.5 Conceptual model

Figure 9 illustrates the model based on the hypotheses described above.

4.3 Research methodology

We conducted a quantitative study with the aim to verify theoretical relationships. A structured questionnaire was designed for this purpose. This was done because close-ended questions are frequently used in large-scale surveys, because they are faster and easier for both respondents and researchers; respondents are more likely to complete the questionnaire (Neuman, 2014).

Although multiple-choice scales were used in the demographic section of the questionnaire, the majority of the questionnaire consisted of graphic ratings scales and Likert scale summated ratings. The questionnaire is provided in Appendix 2.

A pilot study was conducted prior to the survey with a reference group of six people. The pilot study identified issues in the questionnaire in terms of the respondent's thinking and the problems they might face when answering the questions. This information was then used to improve the questionnaire in terms of clarity, accuracy and number of complete responses. The pilot study was also utilised to improve construct validity. Comments from pilot study reference group included:

- All participants indicated that the sliding scale (graphic rating scale) questions were easy to understand and to use.
- It took between 15 to 20 minutes to complete the questionnaire.
- The statistician indicated that at least three more questions pertaining project management success should be added to the questionnaire.

- One participant suggested that the monetary value increments should include an option of ≤ R500 000.00.

Purposive sampling was used because it is an accepted method in social sciences, and is a useful and efficient tool when used correctly (Tongco, 2007). The questionnaire was distributed to people working in a project environment, including project/programme/portfolio managers, project team members, project sponsors/clients and project stakeholders (e.g. regulatory authority, subcontractor and external party). This target population was chosen to ensure that respondents had in depth knowledge of projects and that they occupied key positions in the project environment.

The survey was conducted through an online, structured, self-administered questionnaire using Qualtrics XM Platform™. A total of 313 valid and complete responses were received. The data set was analysed using IBM SPSS Statistics 22, IBM SPSS AMOS 25 Graphics and SAS 9.4.

A one-sample chi-squared (χ^2) test was used for hypotheses 1 to 4. This test was done in order to evaluate if a significant difference exists between the number of respondents who indicated the proposed balance in leadership (vertical and/or shared) versus those who indicated opposing views regarding the survey questions.

Statistical hypothesis testing was conducted at a 5% level of significance.

4.3.1 The questionnaire

The part of the questionnaire that was used to test Hypotheses 1 to 4, the paired views for Hypotheses 1 to 4, and the descriptive statistics, consisted of graphic rating scales. In each case, the lowest and highest level of the project type was utilised (for instance: the simplest type of pace projects (hypothesis 1) are regular

projects, and the most complex projects are blitz projects). Respondents were requested to indicate, by using a sliding scale, in which direction the leadership will shift when a certain type of project is executed. Vertical leadership was on the one end of the scale (and accounted for 0% - minimum value in Appendix 2) and shared leadership on the other end (and accounted for 100% - maximum value in Appendix 2).

4.4 Results and analysis

Table 6 indicates the profile of the respondents, including typical roles in the project, nature of business entity and monitory value of a typical project.

Table 7 illustrates the type of project that the respondents were involved in. It is noted that a small proportion of respondents had experience in the highest level of each of the four project types: pace (4%), scope (14%), novelty (5%) and technology (8%).

The majority of respondents indicated their knowledge and experience were related to the middle levels of the project types: pace (84%), scope (84%) and technology (75%). The exception to this is novelty projects where the majority of the respondents (80%) fell into the first two, lower levels.

It can thus be deducted that the majority of the respondents were mostly exposed to medium-level project types (i.e. pace, scope, technology) and low-level novelty projects. This may be attributed to the fact that most of the respondents have experience working on projects in South Africa where very few novel projects have been undertaken in the last two decades.

Table 6: Summary of respondents' profile

	Frequency	Percent
Typical role in project		
Portfolio manager	14	5
Programme manager	46	15
Project manager	161	51
Project sponsor and/or client	10	3
Project team member	31	10
Stakeholder	3	1
Other	48	15
Total	313	100
Principal industry		
Agriculture	3	1
Construction	28	9
Consulting	33	11
Defence	3	1
Education and research	26	8
Engineering	39	12
Finance, insurance, real estate	25	8
Government	15	5
Health care	8	3
Information technology	35	11
Logistics and supply chain	3	1
Manufacturing	11	3
Mining	25	8
Non-profit	4	1
Petro-Chemical	6	2
Services	1	0
Telecommunication	8	3
Transportation	4	1
Utilities	8	3
Other[4]	28	9
Total	313	100
Monetary value of typical project[5]		
Under R1 million	24	8
R1 million – R10 million	86	27
R11 million – R100 million	96	31
R101 million – R500 million	44	14
R501 million – R1 billion	29	9
Over R1 billion	34	11
Total	313	100

[4] Include energy generation related projects, industrial and commercial energy efficiency projects, specialised water treatment for all industries, electricity manufacturing research consulting testing, E-commerce, retail industry and media and publishing.

[5] 1 USD ≈ 13.43 ZAR (Feb. 2019)

Table 7: Type of project that respondents were involved in

	Frequency	Percent
Pace		
Regular projects	39	12
Fast/competitive projects	194	62
Time-critical projects	69	22
Blitz/crisis projects	11	4
Total	313	100
Complexity		
A component	6	2
An assembly	61	19
A system	202	65
An array	44	14
Total	313	100
Novelty		
Derivative	114	36
Platform	137	44
New to the market	48	15
New to the world	15	5
Total	313	100
Technological uncertainty		
Low-tech	54	17
Medium-tech	124	40
High-tech	110	35
Super high-tech	25	8
Total	313	100

4.4.1 Hypothesis testing

A one-sample chi-squared test was performed in order to evaluate if there is a significant difference between the number of respondents who indicated the proposed direction in leadership versus those who did not. Thus, two categories of data and two hypothesis were tested (H_0 and H_a). The lowest significant level at which the H_0 would be rejected was 0.05 (5%). Table 8 provides a summary of the comparison results for H1 to H4. The hypothesis testing will now be discussed.

Table 8: Summary of comparison results for H1 to H4

Hypothesis number	Hypothesis	Indicated hypothesized balance n (%)	Indicated opposite balance n (%)	p-value
1	Pace	215 (69)	98 (31)	<0.001**
2	Complexity	193 (62)	120 (38)	<0.001**
3	Novelty	168 (54)	145 (46)	0.194
4	Technology	186 (59)	127 (41)	0.001**

'* Significant at a 5% level of significance
'** Highly significant at a 1% level of significance

H1: The higher-paced a project, the more the appropriate balance is towards vertical leadership.

This hypothesis states that one would expect the results to lean towards vertical leadership as the pace increases. As indicated in Table 8, 69% of the respondents did indicate that the balance would lean towards vertical leadership as the pace of the project increases. The p-value resulted in <0.001, which indicates that the number of respondents who indicated that the balance will lean toward vertical leadership is significant higher than those who indicated the opposite.

Hypothesis 1 is therefore supported.

H2: The more complex a project, the more the appropriate balance is towards shared leadership.

The hypothesis states that one would expect the results to lean towards shared leadership as the scope increases. A total of 62% of the respondents (Table 8) did indicate that the balance would lean towards shared leadership as the pace of the project increases. The p-value was <0.001 and this implies that the number of respondents who indicated that the balance would lean towards shared leadership is significantly higher than those who indicated the contrary.

Hypothesis 2 is therefore supported.

H3: The higher the novelty of a project, the more the appropriate balance is towards shared leadership.

This hypothesis states that one would expect the results to lean towards shared leadership as the novelty increases. Only 54% of the respondents indicated this. The p-value of 0.194 indicates that since the value is greater than 0.05 we can state at a 5% level significance the number of respondents who indicated that the balance would lean towards shared leadership is not significantly higher than those who indicated the opposite. H_0 cannot be rejected.

The validity of Hypothesis 3 could not be established.

H4: The higher the level of technology involved in a project, the more the appropriate balance is towards shared leadership.

This hypothesis states that one would expect the results to lean towards shared leadership as the technology involved (technological uncertainty) in a project increases. A total of 59% of the respondents indicated that the balance would lean towards shared leadership as the technological uncertainty of a project increases. A p-value of 0.001 was calculated, which means the H_0 can be rejected.
Hypothesis 4 is therefore supported.

H5: The more appropriate the balance between vertical and shared leadership, the higher the likelihood of perceived project management success.

In the questionnaire, four questions were included to test this hypothesis. The questions were designed to investigate whether respondents thought that the appropriate balance between vertical and shared leadership would lead to perceived project management success. A four-point Likert scale was used, where respondents had to indicate their opinion regarding the extent to which the appropriate style of leadership will have an influence on whether a project will be successful or not, a project will be delivered on time, a project will be delivered within

budget, and a project will meet all its requirements. The respondents had a choice between four options namely *to a very low extent, to a low extent, to a high extent and to a very high extent.* The four questions were analysed separately using a one-sample chi-squared test for each of the questions.

The p-value in all four cases resulted in <0.001, which means that the H_0 in each case can be rejected. From these findings, it can be deducted that most of the respondents agreed that an appropriate balance in leadership would lead to perceived project management success.

Hypothesis 5 is therefore valid.

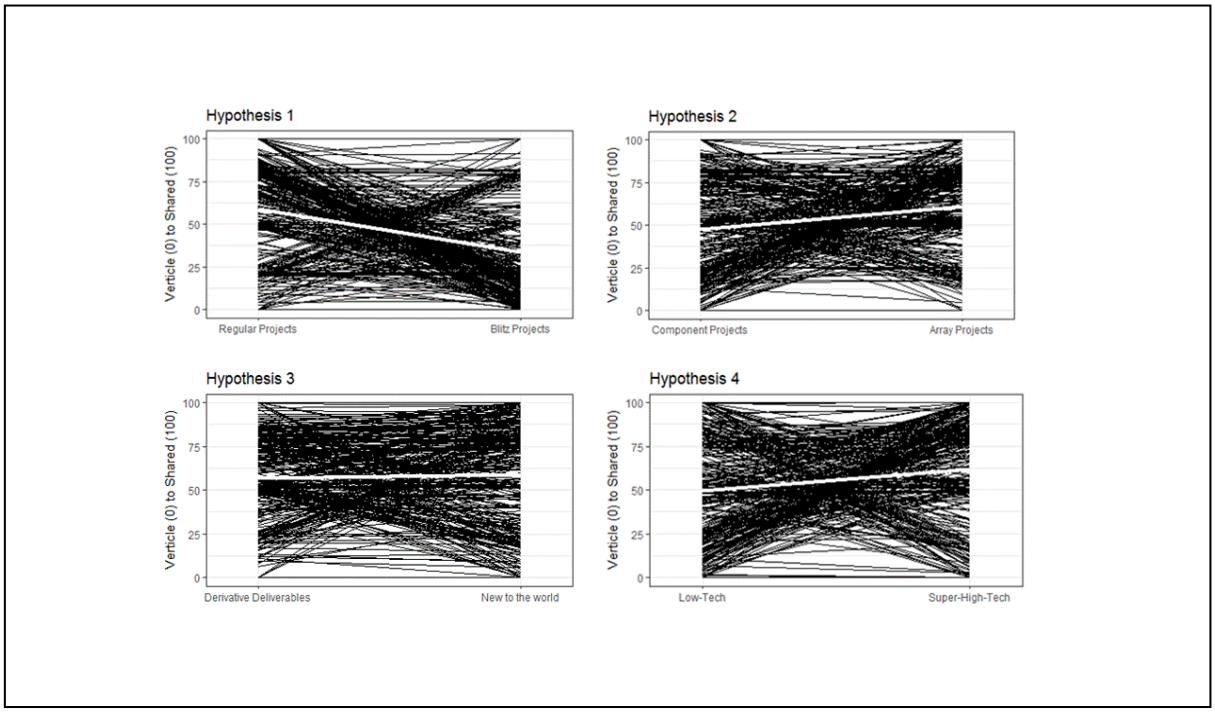

Figure 10: Paired views of Hypothesis 1 to 4

4.4.2 Paired views

The paired views are presented in Figure 10 and represent the same section of the questionnaire that was analysed for the hypothesis testing of Hypotheses 1 to 4. If the respondents who chose the 'correct' direction as well as those who did not, are presented in paired views, the median model (line in white) becomes almost horizontal (see Figure 10). This illustrates that there is no strong difference between the two questions that were analysed for each hypothesis, and hence implies the idea that there is some confusion regarding what direction (balanced leadership) is the 'correct' one.

4.4.3 Descriptive statistics[6]

The expectation was that there would be noteworthy differences in the means in relation to the two questions asked for each hypothesis and that the standard deviation would be fairly small (Table 9). However, if one takes into account that the scale was 0 to 100, one can clearly see that the means were mostly centred around the middle (50%) and especially Hypothesis 3 had means that were very close together. There is a large standard deviation (very close to, or even bigger than 30) which indicates that the data is broadly distributed (the last two columns of Table 9 also depicts this).

The results demonstrate that the respondents were not entirely sure of the influence of each project type on the leadership style, and that most of them indicated that the appropriate leadership balance should be close to 50% (the centre of the scale).

[6] It should be noted that this part of the paper analyses the actual numerical values, whereas the rest of the paper works with the direction (construct) of the balance in leadership that respondents indicated.

Table 9: Descriptive statistics (Hypothesis 1 to 4)

Variable	N	Min	Max	Mean	Median	Std Dev	Mean + Std Dev	Mean – Std Dev
Hypothesis 1: Pace Projects								
Regular	313	0.0	100.0	59.0	66.7	29.3	88.3	29.7
Blitz	313	0.0	100.0	33.3	22.8	28.5	61.8	4.8
Hypothesis 2: Complexity Projects								
Component	313	0.0	100.0	47.4	49.2	28.8	76.2	18.6
Array	313	0.0	100.0	60.9	65.0	26.3	87.2	34.6
Hypothesis 3: Novelty Projects								
Derivative	313	0.0	100.0	56.9	55.3	25.2	82.1	31.7
New to the world	313	0.0	100.0	58.9	65.2	31.3	90.2	27.6
Hypothesis 4: Technological uncertainty projects								
Low-Tech	313	0.0	100.0	49.7	49.6	31.4	81.1	18.3
Super-High-Tech	313	0.0	100.0	62.2	72.0	32.1	94.3	30.1

4.4.4 Reliability and internal consistency

Reliability is measured by determining Cronbach's alpha. For the measurement of the Cronbach's alpha in this study, we assumed that the questions in the questionnaire measured the same underlying construct.

The Cronbach's alphas measured were the following:

- Hypothesis 5: alpha = 0.85 (this is a high value, implicating that the individual respondents answered the questions more or less in the same manner).
- Hypotheses 1 to 4 where the construct measured 'shared leadership': alpha = 0.57 (this lower value implies that each respondent did not answer the questions in the same way – low internal consistency).

- Hypotheses 1 to 4 where the construct measured 'vertical leadership': alpha = 0.47 (this lower value indicates that each respondent did not answer the questions in the same manner – low internal consistency).

The above values also illustrate the fact that the respondents were unsure of the influence of the project types on the correct balance of leadership, and consequently they did not answer the questions consistently (low alpha values). However, there was certainty amongst the respondents that the correct balance of leadership will lead to project management success (Hypothesis 5). This can be seen in the high alpha value relating to this question.

4.4.5 Cross-tabulation

In the following section cross-tabulation was used to compare Hypotheses 1 to 4 with the typical role that the respondent had in a project, his/her years' experience, monetary value of the project and the industry that the respondent worked in. Table 10 provides a summary of the p-values.

Table 10: Summary of cross-reference results

Cross-reference	p-value			
	H1: Pace	**H2: Scope**	**H3: Novelty**	**H4: Technology**
Typical role in project	0.557	0.746	0.400	0.400
Years' experience in project management	0.725	0.159	0.017*	0.444
Monetary value of project	0.117	0.618	0.079	0.261
Industry	0.193	0.572	0.529	0.455

'* Significant at a 5% level of significance
'** Highly significant at a 1% level of significance

4.4.5.1 Cross-tabulation with the typical role that the respondents had in a project

This section was included in order to investigate whether the typical role of the respondents had an effect on the direction of the balance that was indicated. The chi-squared test was used:

H_0 could not be rejected as the p-value was not less than 0.05, which tells us that the typical role of respondents was not associated to the direction of the balance of leadership selected by the respondents.

4.4.5.2 Cross-tabulation with years' experience

This section was included in order to investigate whether the respondents' years' experience in project management had an effect on the direction of balance that was indicated. The chi-squared test was used.

Except for Hypothesis 3 (Novelty), where $p<0.05$, H_0 could not be rejected, which tells us that the respondents' years' experience was not associated to the direction of the balance of leadership selected by the respondents. The novelty of a project (H3) is an exception to this, as it has a p-value of 0.017. This means H_0 can be rejected - years' experience had an effect on the direction of balance that was chosen by the respondents in regards of the novelty of a project.

4.4.5.3 Cross-tabulation with monetary value of projects

This section was included in order to investigate whether the monetary value of a project had an effect on the direction of balance that was indicated. The chi-squared test was used. As can be seen in Table 10, H_0 cannot be rejected, which tells us

that the monetary value of a project has no influence on the direction of the balance that was chosen.

4.4.5.4 Cross-tabulation with industry

In this section it was investigated whether five industries had an effect on the direction of the balance that was indicated. The industries were construction, consulting, engineering, information technology and mining. The reason for choosing the above industries is that the authors were of the opinion that they are most representative of the target group that was tested. Across all five the industries, H_0 could not be rejected. The industry that the respondents worked in thus had no influence on the choice of direction in leadership.

4.5 Discussion

This paper investigates the influence of four project types (pace, scope, novelty and technology) on leadership style (vertical and/or shared leadership) and the influence of an appropriate balance in leadership styles on perceived project management success. Five hypotheses were tested. Table 11 provides a summary of the hypotheses and their validity. Cross tabulations with the typical role that the participant had in a project, his/her years' experience, monetary value of the project and the industry that the respondent worked in were also done, but yielded no significant findings.

Although Hypotheses 1, 2 and 4 had a p-value of <0.05 and were supported, based on the chi-squared test results, the pairwise views indicated that overall, there is no substantial difference between the two questions (relevant to each hypothesis) and hence implies the idea that there is some confusion regarding what direction (vertical or shared leadership) is the 'correct' direction. In other words, although the majority of the respondents agreed with the direction of the hypothesis, the group

that disagreed was still large enough to be taken into consideration. It can also be seen that H1 to H4 had a low internal consistency ($\alpha<0.7$) meaning that each candidate did not answer the questions in the same manner.

Table 11: Hypotheses and their validity

Hypothesis	Validity
1. The higher-paced a project, the more the appropriate balance is towards vertical leadership	Supported
2. The more complex a project, the more the appropriate balance is towards shared leadership.	Supported
3. The higher the novelty of a project, the more the appropriate balance is towards shared leadership.	Rejected
4. The higher the level of technology involved in a project, the more the appropriate balance is towards shared leadership.	Supported
5. The more appropriate the balance between vertical and shared leadership, the higher the likelihood of perceived project management success.	Supported

It can be concluded that in terms of pace, scope and technological uncertainty of projects, the respondents understood the definition of balance (it was clearly provided to them in the questionnaire and there was a qualifying question pertaining to shared leadership which they had to get correct in order to be allowed to continue with the survey). They were however unsure of how the project type influence the choice of leadership style and/or the position of this balance on the continuum between vertical and shared leadership. This could be explained by the fact that most of the respondents were exposed to medium-level project types (pace, scope and technology) (Table 7) and possibly did not have the necessary knowledge and experience which affected their answers, and ultimately the data.

The third hypothesis pertaining to the novelty of a project is rejected ($p=0.19$). A possible explanation for this could be the fact that South Africa generally has not

had many highly novel projects ('new to the market' and 'new to the world' projects) in the last two decades. This phenomenon can also be seen in Table 7 where 80% of all respondents indicated that they work in the lower range (derivative and platform products) of novelty projects. In Table 10 it can be seen that years' experience in correlation with novelty has a p-value of <0.05 (p=0.017) which indicates that there is an association between the two. This makes sense if it is considered that South Africa had few highly novel projects in the past two decades. A person with many years' experience would therefore be more likely to have had exposure to a highly novel project or projects earlier in his or her career. It can be concluded that the respondents simply did not have the necessary knowledge and/or exposure to high novelty projects and this had a huge influence on their answers, which reflected in the data.

Hypothesis 5 is supported (p<0.001) and it has a high alpha value (0.85), implicating that the individual respondents answered the questions more or less in the same manner. The respondents were sure that the appropriate balance of leadership would lead to perceived project management success.

The respondents' typical role in a project, years' experience (except novelty projects), monetary value and the industry that they worked in had no influence on the choice of the direction of the leadership style for each project type.

4.6 Conclusion

This study indicates that the respondents working in the project management domain agree that an appropriate balance between vertical and shared leadership would lead to project management success. The more complex a project, the more shared the leadership style should be. In addition, the higher the levels of technology employed, the more shared the leadership style should be. On the other hand, the higher the pace of a project, the more vertical the leadership style should be.

Respondents were however, not sure how specific project types influence the appropriate balance of leadership styles. Possible reasons and explanations for this phenomenon are provided above.

Another possible explanation for the results of this study differing from previous literature could lie in what Ika (2012) describes as “the cultural trap”. Western project management methodologies often fail because team members in developing countries (like South Africa) simply do not accept them (Ika, 2012). Most developing countries have diverse cultural traditions and customs and should be managed in different ways; project management should be tailored to this (Ika and Saint-Macary, 2014). This “cultural trap” could have a tremendous impact on the leadership style (and team members’ perception of the appropriate balance), especially in a patriarchal, male-dominated culture where there are women team members.

In recent times, South Africa experienced an outflow of skilled and semi-skilled people (Leonard and Grobler, 2006). This emigration of skilled and experienced people (the so-called “brain-drain”) could have led to less-qualified people occupying positions previously held by people that were more suitable in terms of qualifications and experience. This could have an influence on the way that the respondents responded in the survey.

It should be taken into consideration that the five hypotheses that were proposed in this study were derived from international studies, which were done in developed countries. South Africa is a diverse, multicultural, developing country. It is therefore only reasonable to expect different outcomes from what is described in international literature. Further research on leadership styles in South Africa, and other developing countries, should be conducted to explore this phenomenon further and to determine the actual balance for different project situations.

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Chapter 5

Vertical and shared leadership in project management[7]

As companies have become increasingly "projectised", there has been a shift towards teamwork. With this shift, the question arises if the traditional leadership models and methodologies (where a formally appointed individual leads a number of subordinates, i.e. vertical leadership) are still applicable. Researchers have explored vertical and shared leadership, and the appropriate balance between these two leadership styles to some extent. This paper specifically investigates how the phase within the project life cycle may influence the choice of leadership style, and how the appropriate balance between vertical and shared leadership influences the likelihood of project management success. An online questionnaire resulted in 313 responses from experienced project practitioners. The data was analysed with hypothesis testing and cross-tabulation. Respondents agreed that an appropriate balance of leadership styles (vertical and shared leadership) improves the likelihood of project management success. They also agreed that, during the post-execution phase, the leadership style should move towards more shared leadership than prior phases. However, they were uncertain of the most appropriate balance of leadership styles for other project phases. In this paper we discuss various reasons for this uncertainty and expand on the concept of balanced leadership, based on the project life cycle phases.

[7] This chapter has been submitted in a slightly different format as Pretorius, S., Steyn, H., Bond-Barnard, T.J. and Cronjé, T. (Submitted). Vertical and shared leadership in project management. *Journal of Modern Project Management.*

5.1 Introduction

> "We live in a period of profound transformation, very similar to when we had a transition from agricultural societies to industrial societies" – German Chancellor Angela Merkel.

In recent years several companies transformed into more "projectised" structures and worldwide expenditure on projects amounts to billions of dollars per annum (Williams, 2005). Organisations have to adapt to increasing demands for innovation, and an increase in the complexity and changing aspects of work confronts them on a daily basis (Fausing, Jeppesen, Jønsson, Lewandowski and Bligh, 2013). Today nearly every economic sector has progressed towards globalisation, deregulation, and transparency, and in order to accommodate this shift, effective teamwork has become critical (Thamhain, 2004a). It has been estimated that globally more than 80% of companies with in excess of 100 employees depend on teams to complete run-of-the-mill work, as well as solving complex problems (Scott, Jiang, Wildman and Griffith, 2018). Knowledge-work, involving a highly educated and skilled workforce, is progressively becoming more team-based. With this shift to teamwork, and keeping in mind that effective team leadership is a significant factor in developing high-performance teams (Scott *et al.*, 2018; Mathieu, Maynard, Rapp and Gilson, 2008), the question arises if the traditional models and methodologies to leadership are still applicable (Pearce, 2004).

Leadership theories often describe leadership as "overly individualistic, hierarchical, one-directional and de-contextualised" (DeRue, 2011). Leadership is frequently associated with supervision, and it commonly centres on the actions of one entity (i.e. vertical leadership) at the detriment of a better understanding of the dynamic and collective processes which forms part of leadership (DeRue, 2011; Avolio, 2007). However, this focus is shifting - researchers such as Pearce (2004), Müller,

Sankaran, Drouin, Niklova and Vagaasar (2015), Müller, Niklova, Sankaran, Hase, Zhu, Xu, Vaagaasar and Drouin (2016), Müller, Packendorff and Sankaran (2017), Kocolowski (2010), Drouin, Müller and Sankaran (2018), and Scott-Young, Georgy and Grisinger (2019), to name only a few, explored the phenomenon of *shared and horizontal leadership* in teams. Project management research is increasingly studying the role of leadership in projects (Müller *et al.*, 2016). This paper aims to contribute to the body of knowledge in project management by investigating the effect of the project life cycle phases on the appropriate balance between vertical and shared leadership and moreover, whether an appropriate balance of leadership styles has an influence on perceived project management success. Both academics and practitioners could find the paper useful – it provides a novel model for the balancing of leadership styles based on project life cycle stages.

Four hypotheses were investigated:

H1: During the pre-execution phase, the leadership style tends towards shared leadership.

H2: During the execution phase, which includes much of the monitoring and controlling aspects, the leadership style tends towards vertical leadership.

H3: During the post-execution phase, the leadership style tends towards shared leadership.

H4: The more the appropriate balance between vertical and shared leadership, the higher the likelihood of perceived project management success.

5.2 Literature review

5.2.1 Leadership

A number of definitions for leadership exists, but for this study, the following definition was used: “Leadership can be seen as the practice of influencing others to agree on how work should be done effectively, and the process of enabling individual and collective efforts to accomplish a shared objective” (Ensley, Hmieleski and Pearce, 2006; Pretorius, Steyn and Bond-Barnard, 2017).

5.2.1.1 Vertical leadership

For many years leadership was depicted as a “one-directional process whereby one crucial actor exerts influence over another actor” (DeRue, 2011; Lord, Day, Zaccaro and Avolio, 2017). This person-centred outlook thus accentuates the individual as either a source of leadership, or followership (DeRue, 2011). Vertical leadership typically occurs when an organisational hierarchy, where a leader is officially appointed, is in place. This leader manages a project in a downward, ‘one-to-many’, style (Houghton, Neck, and Manz, 2003; Müller, 2017). In its purest form, the team members just follow the orders of the team leader, and are not granted the opportunity to provide inputs and take part in decision-making (Ensley *et al.*, 2006).

5.2.1.2 Shared leadership

Over the last two decades the practise of implementing shared leadership to improve the performance of teams has grown increasingly (D’Innocenzo, Mathieu and Kukenberger, 2016). Many organisations realise that traditional hierarchical structures are no longer beneficial for the management of a professional workforce, nor are they beneficial to enable innovative results to complex and interconnected

tasks (Scott, Jiang, Wildman and Griffith, 2018). In shared leadership more than one team member may, despite the existence of a formal leader, undertake “leadership behaviours” when the project requires it, and be regarded by the rest of the team as leaders (Scott-Young *et al.*, 2019; Müller, Sankaran, Drouin, Vaagaasar, Bekker and Jain, 2018). Thus, shared leadership can be defined as an “emergent process”. The leadership-role is shifted to the group member/s with the applicable expertise and knowledge that is needed by a project at a certain point in time (Pearce and Conger, 2003; Carson, Tesluk and Marrone, 2007; Fausing, Joensson, Lewandowski and Bligh, 2015; Author, 2018), after which the temporary leader/s steps back to allow others to take up the leadership role (Northouse, 2016). This transferral of the leadership role may occur several times during the project lifecycle (Burke, Fiore and Salas, 2003).

5.2.1.3 Balanced leadership

Shared leadership may not be suitable for all project situations (Hsu, Li and Sun, 2017). It should not stand in isolation - most of the time a combination of vertical and shared leadership is used. Shared leadership both augments, and is empowered by vertical leadership (Müller *et al.*, 2016). The relationship between vertical and shared leadership is that of a continuum: at times shared leadership is more dominant, and at other times vertical leadership (Zander and Butler, 2010). It is not one or the other, as there should be an appropriate balance between the two leadership styles, which is determined by project circumstances and requirements (Zander and Butler, 2010; Pretorius *et al.*, 2017).

5.2.2 The project life cycle

The project life cycle functions as the basic structure for project management (Patanakul, Iewwongcharoen and Milosevic, 2010) and a project manager often

applies different leadership styles at different times within the project life cycle (Turner and Müller, 2005). The PMI (2017) identifies four generic project life cycle phases which may be consecutive, iterative, or coinciding.

The phases are:

- Starting the project;
- Organising and preparing;
- Carrying out the work;
- Ending the project.

Archibald, Di Filippo and Di Pilippo (2012) propose that "Post-project business value assessment" be considered as the final project life cycle phase. This phase is also mentioned in other papers and is included in the PRINCE2® methodology (Office of Government Commerce, 2009; Skulmoski and Hartman, 2010). In the light of this, although it is not listed in the *PMBOK® Guide* (PMI, 2007), this phase is included in this study.

For the purposes of this study, the following three phases, as illustrated in Table 12, were considered:

- Pre-execution;
- Execution;
- Post-execution.

The use of vertical and shared leadership should be tailored to the phase in the project life cycle (Crevani, Lindgren and Packendorff, 2007) as there is no fixed leadership style for a specific phase of a project (Patanakul *et al.*, 2010; Turner and Müller, 2005) The above three phases are discussed next.

Table 12: Phases used in the study

Phases used in this study	Pre-execution		Execution	Post-execution	
PMBOK® phases	Starting the project	Organising and preparing	Carrying out the work	Ending the project	
PRINCE®2 stage					Post-project assessment

5.2.2.1 Pre-execution

We acknowledge that there are two opposite views in literature pertaining to the appropriate leadership style during the pre-execution phase. Edkins, Geraldi, Morris and Smith (2013) accentuates the importance of the project manager to get the "fuzzy front-end" of a project right, therefore implying that predominantly vertical leadership should be practiced during the first phase of a project. Thamhein (2004b), on the other hand, says that for most projects, the participation of team members early in the development of a project is vital for effective project planning and high project team performance later on in the project (Thamhain, 2004b). Project managers should discuss work packages with individual team members in order to pin down the scope, goals and appropriate performance measures. This will equip the project manager with a better understanding of front-end activities (Thamhain, 2004b). Team members can often elaborate on the finer points of essential work in their particular areas of expertise, which can contribute to the development of a more accurate schedule, budget and resource plan (Kloppenborg and Petrick, 2018).

The first Hypothesis is:

H1: During the pre-execution phase, the leadership style tends towards shared leadership.

5.2.2.2 Execution, including much of the monitoring and controlling aspects

This is usually the lengthiest stage of the project where much monitoring and controlling work takes place; effective measures, including regular progress reports and a change control process where crucial changes are approved, should be in place – progress should be monitored closely (Kloppenborg and Petrick, 2018). Team members frequently feel that involvement from other individuals may take up too much of their time, and that it is unpractical due to the fact that they know what is expected of them, and also, that they are capable to perform their work independently (Fausing *et al.*, 2013).

This leads to the second Hypothesis:

H2: During the execution phase, which includes much of the monitoring and controlling aspects, the leadership style tends towards vertical leadership.

5.2.2.3 Post-execution

Just like the execution and success or failure of a project is the responsibility of the entire project team, and not only of the project manager, ownership for project closure should be integrated within the team as well as with the other stakeholders (Sarfraz, 2009). The post-project assessment is an essential stage of project management, but in spite of this, many organisations have failed to establish a structured methodology to carry it out properly (Schroeder, 2013; Von Zedtwitz, 2002).

A post-project assessment can be defined as “a formal review of the project examining the lessons that have been learned and may be used to the benefit of future projects” (Von Zedtwitz, 2002). The information and understanding of events

during the project is usually disseminated among several team members, and it is therefore important to consult these team members to ascertain their process knowledge (Busby, 1999). The only way to learn from experience is to do so in a team (Busby, 1999).

This supports the third Hypothesis:

H3: During the post-execution phase, the leadership style tends towards shared leadership.

5.2.3 Project management success

Despite a relatively vast body of knowledge pertaining to project success factors and project management success, many projects are still failing (Shenhar, Dvir, Levy and Mantz, 2001; Baccarini, 1999; Jugdev and Müller, 2005; Yu, Flett and Bowers, 2005; Northouse, 2016; Todorović, Petrović, Obradović and Bushuyev, 2015; Author, 2012; Davis, 2018; Ika, 2009; Cooke-Davies, 2002). Project success is subjective - an individual's personal goals and intentions may influence his/her perception of the success or failure of a project (Ika, 2009).

One team member could judge a project as a success, while another member might view it as a failure (Jugdev and Müller, 2005). Rolstadås, Tommelein, Schiefoe and Ballard (2014) say: "The recipe to project management success has yet to be found, and there will probably be no single best solution". Success factors may most likely change between different projects and organisations (Rolstadås *et al.*, 2014; McClory, Read and Labib, 2017).

Nicolas and Steyn (2017) describe how three dimensions of projects namely cost, time and performance/quality (also known as the "iron triangle") could be utilised as

indicators to determine the success of a project. Several authors however feel that the “iron triangle” on its own is inadequate, as other objective and subjective criteria should also be included in the measurement of project management success (Baccarini, 1999; Atkinson, 1999; Shenhar, *et al.*, 1997; De Wit, 1988; Jha and Iyer, 2007; Williams, 2005; McClory *et al.*, 2017). In this study, project management success is self-defined by the respondents.

The final Hypothesis is:

H4: The more the appropriate balance between vertical and shared leadership, the higher the likelihood of perceived project management success.

5.2.4 Conceptual model

Figure 11 illustrates the conceptual model based on the hypotheses discussed above.

5.3 Research methodology

In order to conduct a quantitative study with the purpose to confirm theoretical relationships, a structured questionnaire was designed. Close-ended questions were used in this questionnaire as, compared with open-ended questions, they are faster and easier for the respondent to complete and for the researcher to analyse. Respondents are also more likely to complete this type of questionnaire (Neuman, 2014). The demographic section of the questionnaire consisted of multiple-choice questions, but the majority of questions were graphic rating scales and Likert scale summated ratings. The questionnaire is provided in Appendix 2.

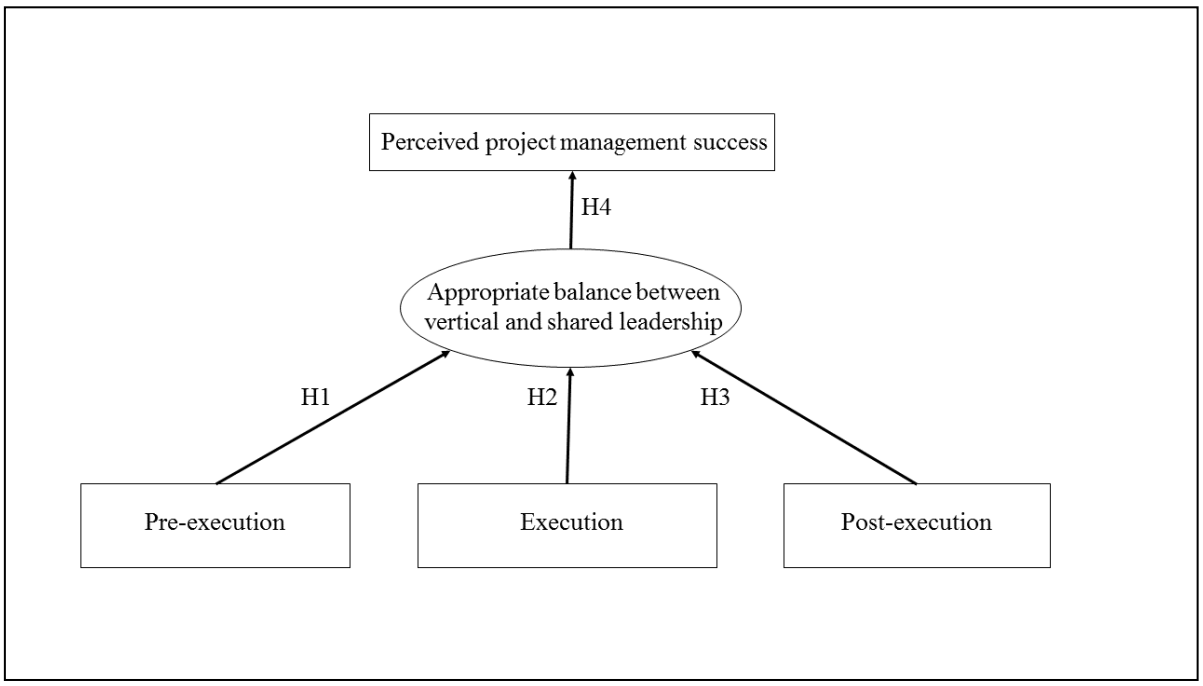

Figure 11: Conceptual model (life cycle phases)

A pilot study was conducted prior to the distribution of the survey to the target group. It consisted of a reference group of six people. The goal of this study was to identify problems that respondents might face when completing the survey, as well as other issues in terms of the respondent's thinking. The feedback from this study was utilised to improve the questionnaire in terms of clarity, accuracy and number of complete responses. The pilot study also improved construct validity.

Purposive sampling was used as it is an established method in social sciences, and it is a valuable and capable tool when used properly (Tongco, 2007). The target population was selected to ensure that respondents had comprehensive knowledge of projects, and that they were employed in key positions in the project environment. The survey was distributed to people working in the project environments, including project/programme/portfolio managers, project team members, project

sponsors/clients and other project stakeholders (e.g. subcontractor, regulatory authority, and external party).

Qualtrics XM Platform™ was used to distribute an online, structured and self-administered survey to respondents. Resulting from this, 313 complete responses were received.

5.4 Results and analysis

Figure 12 illustrates the respondents' profile including typical role in projects, nature of business entity, monitory value, involvement in leadership in project phases, and involvement in life cycle phases.

It is noted that the majority of participants were from engineering, consulting, information technology and construction as their principal industries. Just more than half (51%) of the participants were project managers, and 58% of respondents indicated that they worked in projects with a monetary value of R1 million to R100 million (ZAR 14.18 to US$ 1, based on the 23 April 2019 exchange rate). This finding indicates that most of the participants were not involved in mega-projects.

Most participants had worked in all the project life cycle phases (it should be noted that they could select more than one phase in the questionnaire). An exception to this is the 'post-project business assessment phase' where about half of the participants indicated that they were not regularly involved in this phase. This finding correlates with previous studies that indicate that many projects do not have a post-project business assessment phase (Schroeder, 2013; Zedtwitz, 2002). Most participants (75%) participate in the leadership function in the project phase/s that they are involved in.

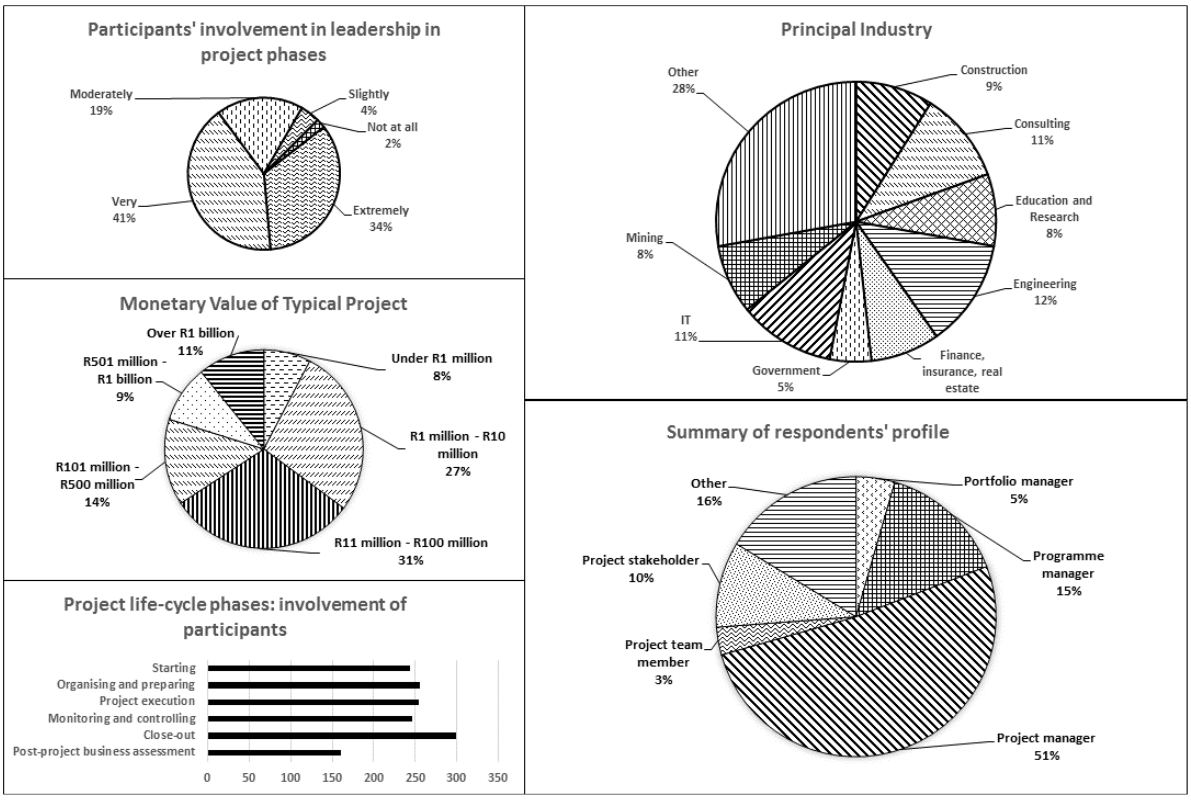

Figure 12: Respondents' profile

5.4.1 Hypothesis testing (H1 to H3)

The questionnaire assessed each of the life cycle phases of a project. The phases, as discussed in section 5.2.2 of this paper, are the following:

- Starting the project;
- Organising and preparing;
- Carrying out the work;
- Ending the project;
- Post-project business assessment.

For the purposes of the study, the above phases were organised into three phases, resulting in three hypotheses as described in section 5.2.2 of this paper.

Respondents rated the variables on a continuum from 0 (vertical) to 100 (shared). See the Appendix 2 for further illustration of the continuum between vertical and shared leadership.

The first three hypotheses were tested in this section: (Also see Table 12)

H1: During the pre-execution phase, the leadership style tends towards shared leadership.
H2: During the execution phase, which includes much of the monitoring and controlling aspects, the leadership style tends towards vertical leadership.
H3: During the post-execution phase, the leadership style tends towards shared leadership.

The three hypotheses were tested in two ways:

- Comparing counts;
- Comparing means.

5.4.1.1 Comparing counts

An indicator was created to specify if the questions in each of the three hypotheses groups were indeed in the hypothesised direction (e.g. the continuum between vertical and shared leadership). A one-sample chi-square test evaluated whether a significant difference existed between the number of respondents who indicated the proposed direction and those who did not. The lowest significant level for the rejection of H_0 was 0.05 (5%). Table 13 illustrates the p-values for this test.

H_0: The categories (0 and 1) occur with equal probabilities.

H_a: The categories (0 and 1) do not occur with equal probabilities.

H1: If the questionnaire questions pertaining to the hypothesis were above 50 (leaning towards shared leadership as hypothesised) the indicator was set to 1, if not, it was set to 0. The p-value was 0.865, thus H_0 cannot be rejected.

The validity of H1 could not be established.

Table 13: Hypothesis testing for H1 to H3

Hypothesis	p-value Comparing Counts	p-value Comparing Means	Null Hypothesis	Validity of Hypothesis
H1: During the pre-execution phase, the leadership style tends to move towards shared leadership.	0.865	0.185	Cannot be rejected	Rejected
H2: During the execution phase, which includes much of the monitoring and controlling aspects, the leadership style tends to move towards vertical leadership.	0.283	0.079	Cannot be rejected	Rejected
H3: During the post-execution phase, the leadership style tends to move towards shared leadership.	0.001**	<0.001**	Rejected	Supported

* Significant at a 5% level of significance
** Highly significant at a 1% level of significance

H2: If the questionnaire questions pertaining to the hypothesis were below 50 (leaning towards vertical leadership as hypothesised) the indicator was set to 1, if not, it was set to 0. The p-value was 0.283 - H_0 cannot be rejected.

The validity of H2 could not be established.

H3: If the questions pertaining to the hypothesis were above 50 (leaning towards shared leadership as hypothesised) the indicator was set to 1, if not, it was set to 0. The p-value was 0.001, which means that, at a 5% level of significance, the H_0 can be rejected. It implies a significant difference between the number of participants who indicated the hypothesised balance; and their number is significantly larger than those who did not indicate this balance.

H3 is therefore supported.

5.4.1.2 Comparing means

This test was performed to investigate whether the average score (between 0 and 100) for the questions involved in each hypothesis, was above or below 50 as stated in the hypothesis. A one-sample t-test was used to compare the means of each hypothesis to 50. Table 13 illustrates the p-values for this test.

H_0: The average is not significantly different from 50, hence indicating the hypothesised balance.
H_a: The average differs significantly from 50, hence indicating the hypothesised balance.

H1: This hypothesis states that one would expect the results to lean towards shared leadership (>50), however, the p-value was 0.185, which indicates that the H_0 cannot be rejected – the mean does not differ significantly from 50.

The validity of H1 could not be established.

H2: This hypothesis states that one would expect the results to lean towards vertical leadership (<50). The p-value resulted in 0.079, which implies that H_0 cannot be rejected – the mean does not differ significantly from 50.

The validity of H2 could not be established.

H3: This hypothesis states that one would expect the results to lean towards shared leadership (>50). The mean was higher than 50 and the p-value was <0.001, which indicated that the H_0 can be rejected and the mean differs significantly from 50.

H3 is therefore supported.

5.4.2 Hypothesis testing

H4. The more appropriate the balance between vertical and shared leadership, the higher the likelihood of perceived project management success.

Four questions were incorporated in the questionnaire to test this hypothesis. The questions were intended to explore whether respondents believed that the appropriate balance between vertical and shared leadership would result in perceived project management success. A four-point Likert scale was utilised for this purpose; respondents had to indicate their view regarding the degree to which the appropriate balance of leadership style would have an impact on whether a project will be successful or not: be delivered within budget, on time, and meet all requirements. Four options namely “to a very low extent”, “to a low extent”, “to a high extent”, and “to a very high extent” were provided. A one-sample chi-square test was used to analyse the four questions separately.

The p-value for all four cases resulted in $p<0.001$, which indicates that it is highly significant at a 1% level of significance. Thus, H_0 in in each case can be rejected and it can be deducted that an appropriate balance in leadership styles would lead to perceived project management success.

Hypothesis 5 is therefore supported.

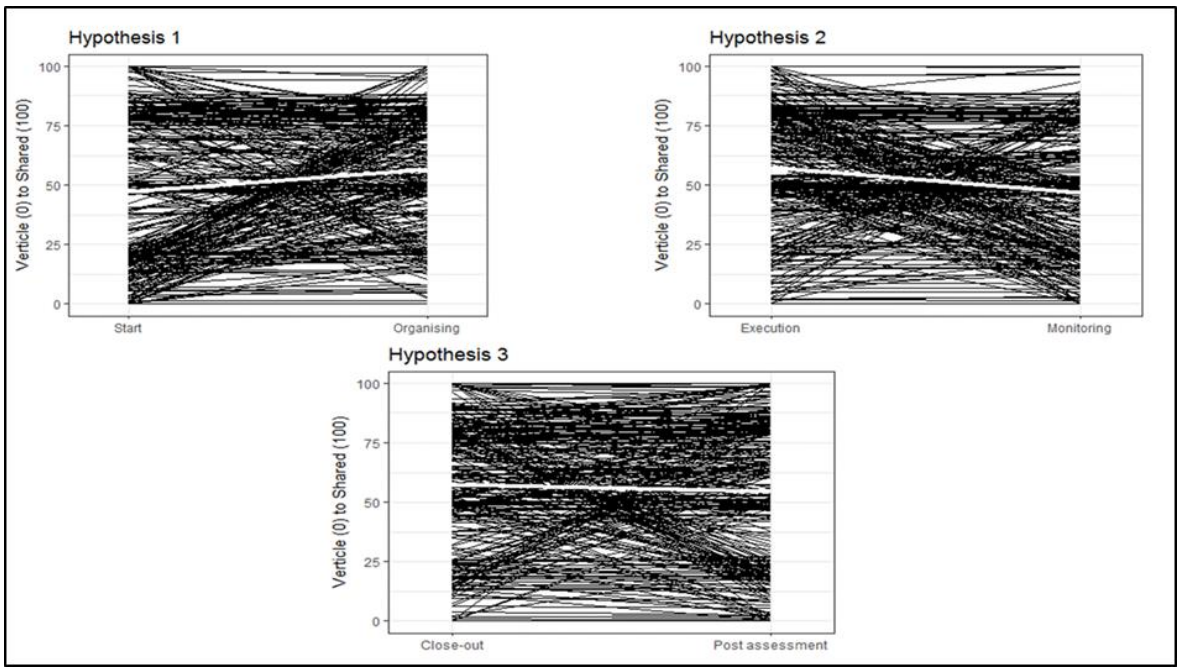

Figure 13: Paired views

5.4.3 Paired views

The paired views are presented in Figure 13 and it denotes the same section of the questionnaire that was analysed for the hypothesis testing of Hypotheses 1 to 3. If the respondents who chose the hypothesised direction, as well as those who did not, are presented in paired views, the median model (white line) becomes virtually horizontal (see Figure 13). This suggests that no major differences exist for these

three hypotheses. The implication for this is that there appears to be some confusion regarding what direction (position on the continuum between vertical and shared leadership) is most appropriate.

5.4.4 Reliability and internal consistency

Cronbach's alpha measures reliability. For the measurement of the Cronbach's alpha in this study, the assumption was made that the questionnaire questions measured the same underlying construct.

The Cronbach's alphas measured were:

- H4: α = 0.85 (this is a high value, implicating that the respondents answered the questions more or less in the same manner – high internal consistency).
- H1: α = 0.53
- H2: α = 0.40
- H3: α = 0.60

The lower alpha-values for H1 to H3 imply that each respondent did not answer the relevant questions consistently – low internal consistency.

The above values further demonstrate the fact that the respondents were uncertain about the correct balance for each project life cycle phase, and subsequently did not answer the questions consistently, which resulted in low alpha-values for H1 to H3. However, the high alpha value relating (0.85) to H4 indicates that there was certainty between respondents that the correct balance of leadership will lead to project management success.

5.4.5 Cross-tabulation

Cross-tabulations were used to compare H1 to H3 with the following demographic data derived from the questionnaire:

- The respondent's typical role in a project;
- Respondents' years' experience in project management;
- Monetary value of projects that the respondents were involved in;
- Principal industry of the respondent.

The chi-square test was used to do the comparison. Table 14 provides the p-values for the above.

Table 14: Summary of cross-reference results (p-values)

Cross-reference	p-value		
	H1	H2	H3
Usual role in project	0.712	0.385	0.312
Years' experience in Project Management	0.076	0.788	0.905
Monetary value	0.378	0.740	0.767
Industry	0.324	0.325	0.421

As can be seen in Table 14, H_0 could not be rejected in all cases. This implies that the role in the project, years' experience, monetary value of the project and principal industry did not have an influence on the choice of the direction of the balance of leadership style for any life cycle phase.

5.5 Discussion

This paper investigates the effect of the different project life cycle phases on leadership style (vertical and/or shared leadership), and the influence that the appropriate balance of project leadership styles has on perceived project

management success. Four hypotheses were tested: H1 and H2 were rejected, while H3 and H4 were supported. Cross-tabulations with demographic data produced nothing worth noting.

Even though H3 was accepted, based on chi-square and t-test results, the pairwise comparisons pointed out visually that there is no significant difference between the questions asked for each hypothesis in the questionnaire. Hence, implying that there was confusion amongst respondents regarding the “correct” direction of leadership style (vertical or shared leadership) for each life cycle phase. Although H3 was supported, thus implying that the majority of the respondents agreed with the direction of the hypothesis, the group that disagreed was still large enough to be considered. To further strengthen the above findings, it can be seen that H1 to H3 had a low internal consistency (alpha value <0.7), which indicated that candidates did not answer the questions in a similar way.

No uncertainty existed among respondents regarding the definition of balance (the definition of it was provided, and it was asked in a qualifying question in the questionnaire). Candidates were however uncertain of what the real balance should be for particular phases in the project and/or the optimum point of this balance on the continuum between vertical and shared leadership. This may be because, due to shortage of skills in South Africa, technical and operational skills are mainly located in the private sector and therefore the relatively large government sector and some other sectors have to subcontract many of their projects. Due to this, the individuals who were involved in the pre-execution phase of a project (i.e. completed the tender document), those who executed the project, and those who participated in the post-execution phase, might be in different teams. The team responsible for the execution of the project usually need to work together to get buy-in from the client and to clarify the tender, hence project execution could result in mostly shared leadership. The hypotheses were derived from international studies on leadership

styles, and South Africa could differ from those hypothesised in this paper. The above could also explain why the median lines (white lines in the paired views in Figure 13) are almost horizontal. Unlike South Africa, many industries internationally employ technically skilled people as part of their workforce and practice concurrent engineering, resulting in people involved in a project from start to end.

Hypothesis 4 is supported at a 1% level of significance. It also has a high alpha value (0.85). These findings indicate that respondents answered the questions more or less in the same way and that they were certain that the appropriate balance of leadership styles would lead to perceived project management success.

The respondents' role in a project, experience, monetary value of the project, and principal industry, had no significant impact on the choice of the direction of leadership style for each project phase.

5.6 Conclusion

The target population for this study (respondents working in the project management domain) agreed that an appropriate balance between vertical and shared leadership would increase the likelihood of a project being perceived as successful. In contrast with previous studies referred to in the paper (Thamhain, 2004b; Kloppenborg and Petrick, 2018; Fausing *et al.*, 2013), respondents agreed with Edkins *et al.* (2013) that the leadership style should be relatively vertical during the pre-execution phase. The respondents also indicated that the leadership styles should be relatively shared during the execution phase. On the other hand, respondents agreed that the leadership style should be more shared during the post-execution phase of a project. This corresponds with current literature (Sarfraz, 2009; Schroeder, 2013; Zedtwitz, 2002; Busby, 1999). Respondents were uncertain what the appropriate balance (i.e. the location on the continuum between vertical and shared leadership)

should be for different project life cycle phases. Possible reasons and explanations for this occurrence are provided above.

Ika (2012) provides another probable reason for the outcomes of this study. He refers to a supposed “cultural trap” where western project management approaches are unsuccessful because team members in developing countries (like South Africa) do not accept them. These countries have different ethnic and social traditions and beliefs, which should be managed accordingly (Ika and Saint-Macary, 2014).

A considerable number of professional, technically skilled and semi-skilled people has left South Africa in recent years (Leonard and Grobler, 2006), which resulted in a general shortage of skills, mostly in the government, but also in private industry, which consequently led to the strong tendering approach for project work (as described above) in South Africa. This could have an effect on the way that respondents answered the survey questions.

It is also imperative to take into consideration that South Africa is a developing country with a great cultural diversity, while most of the literature that led to the formulation of the hypotheses originates from research done in developed countries. Further research on leadership styles in terms of vertical and shared leadership in South Africa should be undertaken to determine the actual balance for different project life cycle phases.

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Chapter 6

Balancing leadership styles based on project types and life cycle phases: A Model[8]

With the current trend towards empowered teams, hierarchical company structures are increasingly being replaced by team-based ones. As a result, a shift in the classic understanding of leadership is needed and research on leadership in project management is increasing. Two major concepts have developed in recent years: shared and vertical leadership styles. This paper reports on the development of a new model of leadership styles that considers the effect of project types and the project life cycle phases on leadership style (vertical versus shared leadership), and how an appropriate balance between the two styles influences the likelihood of perceived project management success. A web-based questionnaire yielded 313 complete responses and the data was analysed using hypothesis testing. Based on this empirical work, an initial conceptual model, derived from literature, was revised and a novel model proposed. The model explains how project types and life cycle phases influence the appropriateness of different leadership styles, and it also guides the practitioner to selecting appropriate leadership styles for specific situations. Recommendations for furthering the model are discussed.

[8] This chapter has been submitted in a slightly different format as Pretorius, S., Steyn, H., Bond-Barnard, T.J. and Cronjé, T. (Submitted). Balancing leadership styles based on project types and life cycle phases: A Model. *SAIIE NeXXt Conference,* 30 September to 2 October 2019, Port Elizabeth, South Africa.

6.1 Introduction

Scholars and practitioners have realised that leadership is a major success factor in projects and, as a result, leadership is progressively gaining interest in project management research (Müller, Niklova, Sankaran, Hase, Zhu, Xu, Vaagaasar and Drouin, 2016). In 2000 only 26 research papers used the terms 'leadership' and 'project management' in their titles, while in 2015 the use of these terms grew to 271 (Müller *et al.*, 2016). Hierarchical organisational structures are increasingly being replaced by team-based ones, which also emphasises the importance of leadership (Hsu, Li and Sun, 2017). The emergent practice of empowered teams, as well as the levelling of organisational structures necessitates the need for a shift in the classic understanding of leadership (Pearce and Sims, 2002). Two major streams have developed: shared leadership and vertical leadership (Müller, Sankaran, Drouin, Niklova, Vagaasar, 2015; Müller *et al.*, 2016; Agarwal, Dixit, Jain, Sankaran, Nikolova, Müller, and Drouin, 2017; Müller, Zhu, Sun, Wang and Yu, 2017). Both leadership styles take place in projects, resulting in the need to study the balance between them, including how an appropriate balance between the styles may lead to perceived project management success (Drouin, Müller and Sankaran, 2018).

This paper reports on a study, carried out amongst South African project practitioners, to investigate the influence that specific project types and phases have on the leadership style (vertical and shared leadership), and how an appropriate balance between the two leadership styles may influence the likelihood of perceived project management success. The study builds on current literature, which includes empirical studies done in various countries to investigate the project-related aspects that have an impact on the choice of leadership style, and the effect of the style on project management success. Although many researchers have studied project leadership, little has been published on the appropriate balance in leadership style,

and how project type and phase may influence this balance. Moreover, South African studies relating to this topic are very limited.

We have therefore undertaken a research project with the aim of determining whether:

- Project types influence the balance in leadership style;
- Project phase influences the balance in leadership style;
- An appropriate balance of project leadership styles influences perceived project management success.

We conducted a web-based questionnaire in which several questions asked respondents to indicate on a sliding scale how specific project types and project life cycle phases influence the appropriate balance between vertical and shared leadership. A total of 313 project practitioners completed the questionnaire. Statistical analysis allowed us to determine how the different project types (pace, complexity, novelty and technology) as well as different project life cycle phases (pre-execution, execution and post-execution) influence the appropriate balance of leadership styles (vertical and shared leadership).

Pretorius, Steyn and Bond-Barnard (2017) developed a conceptual model from nine propositions that were derived from literature. We decided to narrow the scope of this study by omitting three of the propositions and to break down the proposition relating to project phase into three separate hypotheses. We also test “hypotheses” instead of the “propositions”, suggested by Pretorius *et al.* (2017) because the data gathered was empirically testable (Neuman, 2014). Thus, the following eight hypotheses are tested in this paper:

H1: The higher-paced a project, the more the appropriate balance is towards vertical leadership.

H2: The more complex a project, the more the appropriate balance is towards shared leadership.

H3: The higher the novelty of a project, the more the balance is towards shared leadership.

H4: The higher the level of technology involved in a project, the more the balance is towards shared leadership.

H5: During the pre-execution phase, the leadership style tends towards shared leadership.

H6: During the execution phase, which includes much of the monitoring and controlling aspects, the leadership style tends towards vertical leadership.

H7: During the post-execution phase, the leadership style tends towards shared leadership.

H8: The more the appropriate balance between vertical and shared leadership, the higher the likelihood of perceived project management success.

The next section will provide a literature review and explain how the above hypotheses were derived from literature.

6.2 Literature review

6.2.1 Leadership

Leadership definitions have abounded during the past decade (Northouse, 2016). Rost (1991) found more than 200 different definitions for leadership in material written from 1900 to 1990. Each person usually know what leadership is, until asked to define it (Barker, 2001). The word ‘leadership’ also has different connotations to different people (Crevani, Lindgren and Packendorff, 2007).

6.2.1.2 Vertical leadership

Leadership is often referred to as “vertical” when an organisational hierarchy is in place. In such a hierarchy, a formally appointed leader functions as the main source of instruction, oversight and control for those reporting to him/her (Houghton, Neck and Manz, 2003; Müller, 2017). Ordinarily these leaders influence projects in a downward, ‘one-to-may-style’ (Houghton *et al.*, 2003; Müller, 2017). This leadership model has been most prominent for many years (Pearce and Conger, 2003).

6.2.1.3 Shared leadership

In shared leadership there is a “cooperative state of mutual influence”, in which the leadership role emerges from individual team members (Müller, 2017; Pretorius, Steyn and Bond-Barnard, 2018). This leadership style incorporates collaborative decision-making, shared accountability for outcomes, the sharing of information and interdependency (Locke, 2003; Wood, 2005; Hoch and Dulebohn, 2013). A project manager is likely to be confronted with stages or situations in the project where he/she does not have the required skills and knowledge to lead the team effectively (Cox, Pearce and Perry, 2003). One team member who, chosen by the team because he/she is the most capable person to lead the team in a particular situation, will then take over the leadership role for the period that his/her particular skills are needed (Pilkienė *et al.*, 2018; Pretorius *et al.*, 2018). This temporary leader subsequently steps down as leader to allow others to take up the leadership role; this shift may occur many times during a project (Pretorius, Steyn and Jordaan, 2012).

6.2.2 Project types

Shenhar's (Shenhar, 2003, 2011, 2015; Shenhar, A. J. and Dvir, 2007) "Diamond of Innovation" model (see Figure 14) was used for the study. This model suggests a framework for analysing a project's specific setting and for selecting the appropriate project management style. The model has four dimensions: pace, complexity, novelty and technology, and each has a different impact on project management (Shenhar, 2011). Each dimension is subdivided into four different project types, ranging from low to high on the scale pertaining to the dimension.

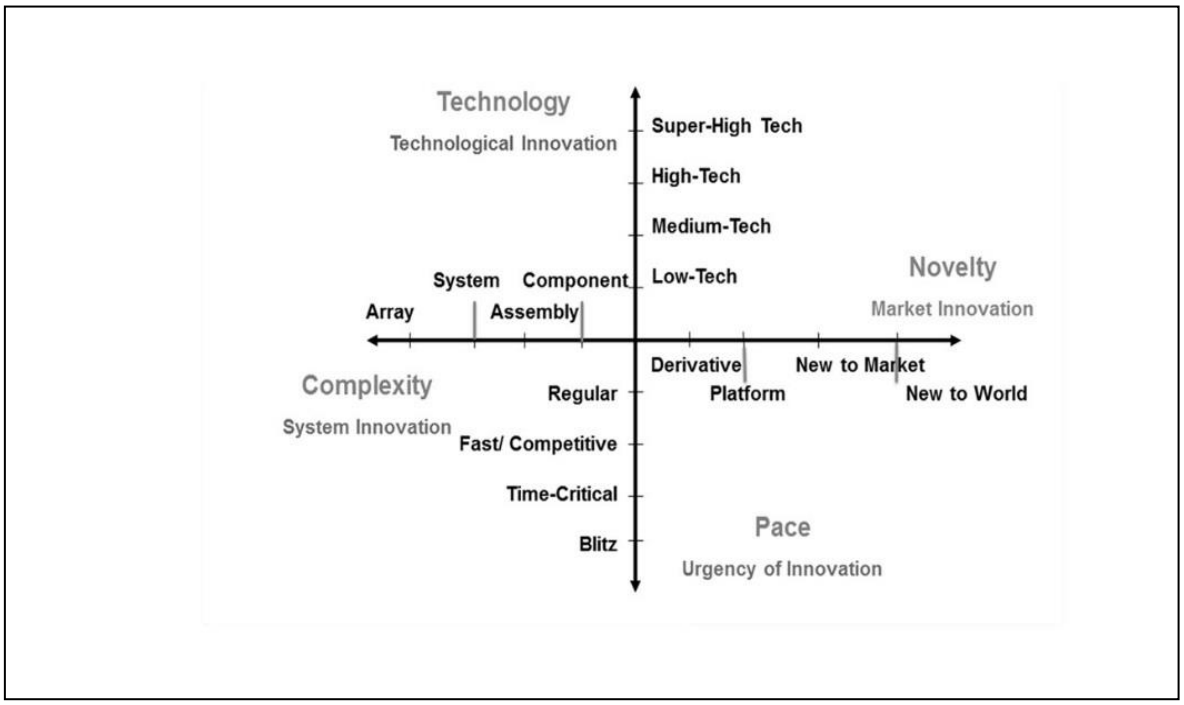

Figure 14: Shenhar's "Diamond of Innovation" Model

(Shenhar, 2015)

Based on, and supported by previous studies, we postulated the following in the study:

- Vertical leadership is more appropriate for 'Blitz' projects or projects dealing with emergencies (McDonough and Barczak, 1991; Shenhar and Dvir, 1996; Shenhar *et al.*, 2001; Shenhar, 2011, 2015; Hsu *et al.*, 2017; Nicholas and Steyn, 2017).
- Shared leadership is predominantly beneficial for teams involved in complex, knowledge-based, self-motivated and inter-reliant tasks (Williams, 2005; Fausing *et al.*, 2015; Scott *et al.*, 2018; Scott-Young, Georgy and Grisinger, 2019).
- Teams working on highly novel projects participate more in shared leadership (Brockhoff, 2006; Fitzsimons, James and Denyer, 2011; Friedrich, Griffith and Mumford, 2016; Hsu *et al.*, 2017).
- Shared leadership is utilised by teams involved in high technology projects, as interdependence is required between the highly specialised team members (Shenhar and Dvir, 1996; Kruglianskas and Thamhain, 2000; Cox *et al.*, 2003).

The above statements lead to the first four hypotheses:

H1: The higher-paced a project, the more the appropriate balance is towards vertical leadership.

H2: The more complex a project, the more the appropriate balance is towards shared leadership.

H3: The higher the novelty of a project, the more the balance is towards shared leadership.

H4: The higher the level of technology involved in a project, the more the balance is towards shared leadership.

6.2.3 Project life cycle phases

The PMI (2017) classifies four generic project life cycle phases, which may be successive, iterative, or overlapping. The phases are:

- Starting the project;
- Organising and preparing;
- Carrying out the work;
- Ending the project.

Archibald, Di Filippo and Di Pilippo (2012) propose that 'Post-project business value assessment' be considered as the final project life-cycle phase. This phase is also stated in other papers and is incorporated in the PRINCE2® methodology (Office of Government Commerce, 2009; Skulmoski and Hartman, 2010). In the light of this, although it is not listed in the *PMBOK® Guide* (PMI, 2017), this phase was included in the study as the final project life-cycle phase (Pretorius, Steyn, Bond-Barnard and Cronjé, 2019).

For the purposes of this study, the following three phases, as illustrated in Table 15 were considered:

- Pre-execution;
- Execution;
- Post-execution.

Based on, and supported by previous studies, we postulate the following in the study:

- Shared leadership is predominantly practised during the pre-execution phase (Thamhain, 2004; Kloppenborg and Petrick, 2018).
- During the execution phase, which includes much of the monitoring and controlling aspects, the leadership style tends to be more vertical (Fausing *et al.*, 2013; Kloppenborg and Petrick, 2018).
- Shared leadership is beneficial for the post-execution phase (Busby, 1999; Zedtwitz, 2002; Sarfraz, 2009; Schroeder, 2013).

Table 15: Life cycle phases used in the study

(Pretorius *et al.*, 2019)

Phases used in this study	**Pre-execution**		**Execution**	**Post-execution**	
***PMBOK® Guide* phases and PRINCE2® stage**	Starting the project	Organising and preparing	Carrying out the work	Ending the project	Post-project assessment

The above statements lead to Hypotheses 5 to 7:

H5: During the pre-execution phase, the leadership style tends towards shared leadership.

H6: During the execution phase, which includes much of the monitoring and controlling aspects, the leadership style tends towards vertical leadership.

H7: During the post-execution phase, the leadership style tends towards shared leadership.

6.2.4 Balanced leadership

Shared leadership is not a substitute for vertical leadership and organisations should not be forced to choose between the one or the other; the two styles complement each other (Pearce, Wassenaar and Manz, 2014). There is a continuum between vertical and shared leadership and there should be an appropriate balance where the leadership style is tailored, based on the specific circumstances and needs of the project (Zander and Butler, 2010).

6.2.5 Project management success

Despite the fact that there has been an increase in studies on project management success factors in recent years, many projects are still failing (Baccarini, 1999; Shenhar *et al.*, 2001; Jugdev and Müller, 2005; Yu, Flett and Bowers, 2005; Pretorius *et al.*, 2012; Todorović *et al.*, 2015; Northouse, 2016). Success furthermore does not have the same meaning for everyone (Jugdev and Müller, 2005) as people judge the success of projects differently, depending on their personal objectives (Müller and Turner, 2007; Ika, 2009). The “iron triangle” (i.e. budget, time and quality) is often used to assess the success of a project (Nicholas and Steyn, 2017; PMI, 2017). However, several authors are of the opinion that it is an oversimplification (De Wit, 1988; Shenhar *et al.*, 1997; Atkinson, 1999; Baccarini, 1999; Jha and Iyer, 2007). In this study, success was self-defined by the respondents.

The final Hypothesis is:

H8: The more the appropriate balance between vertical and shared leadership, the higher the likelihood of perceived project management success.

6.2.6 The Project Leadership Style (PLS) Model

Figure 15 illustrates the Model that was used in this study, based on the eight hypotheses that were derived from literature as discussed above.

6.3. Research methodology

A structured questionnaire with close-ended questions was employed to conduct a quantitative study with the objective of confirming theoretical relationships. A pilot study was conducted with a reference group of six people prior to the survey. The pilot study improved the questionnaire in terms of clarity, correctness and construct validity.

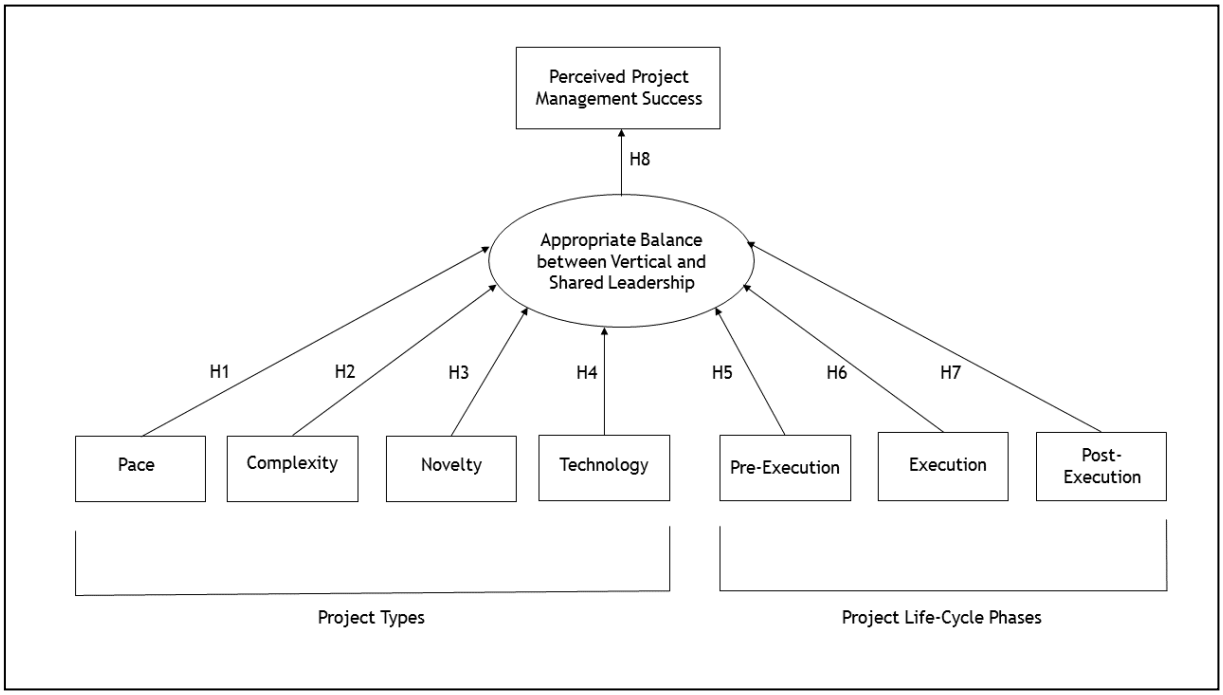

Figure 15: The PLS-Model used in the study

Purposive sampling was used as it is a recognised method in social sciences research, and is a valuable instrument when used correctly (Tongco, 2007). The self-administered questionnaire was distributed as a web-based questionnaire using

Qualtrics XM Platform™. The target group consisted of individuals working in project environments, such as project/programme/portfolio managers, project team members, project sponsors and project stakeholders. A total of 46 members of the PMI South Africa Chapter also participated in the survey. The target group was selected on the grounds that they have comprehensive knowledge of projects and that they are working in key positions in the projects. A total of 313 complete responses were received.

Table 16: Hypothesis testing for H1 to H8

	Hypothesis	p-value	Null hypothesis	Validity of hypothesis
Project type	H1: Pace	p<0.001**	Rejected	Supported
	H2: Complexity	p<0.001**	Rejected	Supported
	H3: Novelty	p=0.194	Cannot be rejected	Could not be established
	H4: Technology	p=0.001**	Rejected	Supported
Project life cycle phase	H5: Pre-execution	Counts: p=0.865 Means: p=0.185	Cannot be rejected	Could not be established
	H6: Execution	Counts: p=0.283 Means: p=0.079	Cannot be rejected	Could not be established
	H7: Post-execution	Counts: p= 0.001** Means: p<0.001**	Rejected	Supported
	H8: Balanced Leadership	p<0.001**	Rejected	Supported

*Significant at a 5% level of significance
**Highly significant at a 1% level of significance

A one-sample chi-square (X^2) test was used to test Hypotheses 1 to 8. For Hypotheses 1 to 4 as well as Hypothesis 8, this test was done to assess if a significant difference exists between the number of respondents who indicated the hypothesised direction (e.g. the continuum between vertical and shared leadership) as opposed to those who indicated contrasting views. Thus, this test was based on

counts. An additional one-sample t-test was done for Hypotheses 5 to 7: this test was performed to investigate whether the average score (between 0 and 100 with 0 being vertical leadership and 100 shared leadership) was above or below 50 as hypothesised. Thus, this test was based on means.
Table 16 provides the resulting p-values. Statistical hypothesis testing was done at a 5% level of significance.

6.4 Results and analysis

6.4.1 Demographic data

The bulk of the respondents indicated that their principal industry was engineering (12%), consulting (11%), information technology (11%), construction (9%) and mining (8%). A total of 51% of the respondents were project managers, and 58% of respondents specified that they worked in projects with a monetary value of R1 million to R100 million. This information indicates that most of the respondents did not work in mega-projects.

Figure 16 illustrates the project types that respondents were involved in.

6.4.2 Hypothesis testing

Table 16 provides a summary of the hypotheses, their p-values, and their validity.

Hypotheses 1, 2, 4, 7 and 8 were supported while the validity of Hypotheses 3, 5 and 6 could not be established.

6.4.3 Reliability and internal consistency

Cronbach's alpha was used to test the reliability and internal consistency of the questionnaire. It was assumed that the questions in the questionnaire measured the same underlying construct.

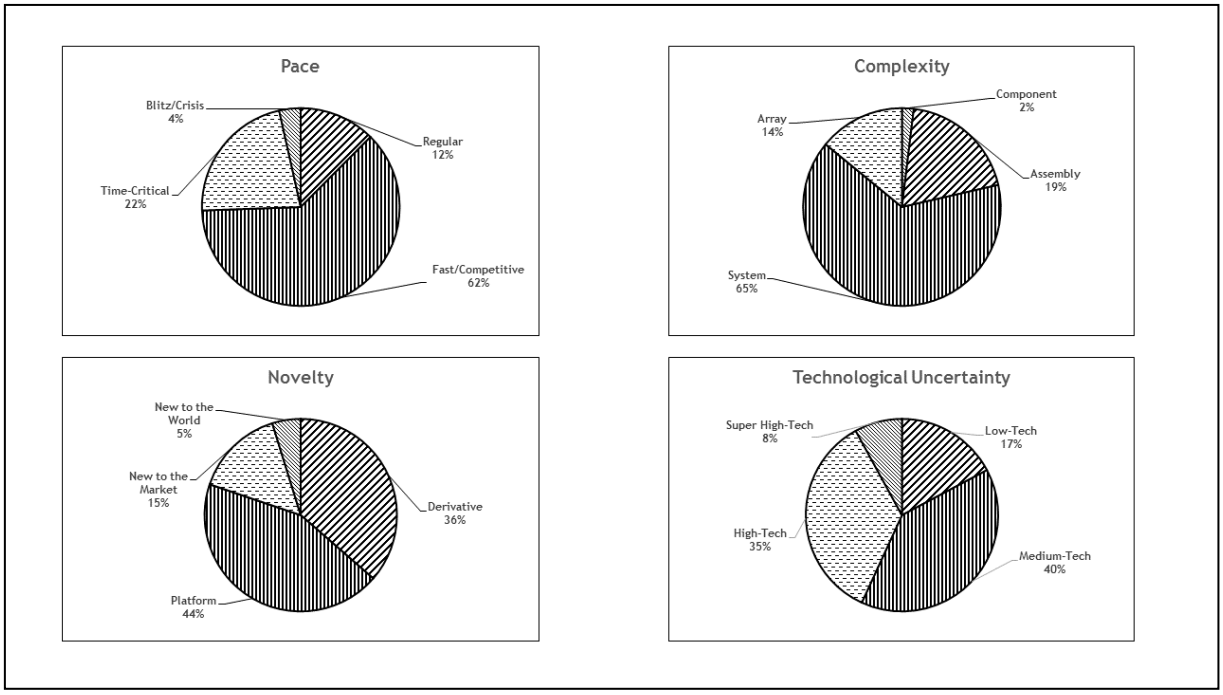

Figure 16: Project types that respondents worked in

The alpha-values for H1 to H7 were low ($0.5 \leq \alpha < 0.6$), which imply a poor internal consistency – each respondent did not answer the questions consistently. This indicates that the respondents were uncertain of the influence of each project type and life cycle phase on the appropriate balance of leadership style. The alpha value for H8 was 0.85, which shows a high internal consistency – the questions were answered consistently. This indicates that there was certainty between respondents that the correct balance of leadership will lead to project success.

6.4.4 Cross-tabulation

Cross-tabulations were used to compare H1 to H7 with the following demographic data derived from the questionnaire:

- The respondent's typical role in a project;
- Respondents' years' experience in project management;
- Monetary value of projects that the respondents were involved in;
- Principal industry of the respondent.

The chi-square test was used to do the comparisons. H_0 was rejected for only one of the cross tables. H_0 for H3 (novelty) was compared with years' experience, which resulted in p=0.017 and could thus be rejected. This indicates that years' experience had an effect on the influence that novelty projects have on the direction of the leadership balance. All the other H_0 values for the role in the project, years' experience, monetary value and principal industry did not have an effect on the influence that project types and phases have on the balance of leadership style.

6.5 Discussion

This study investigates the influence of four project types (pace, complexity, novelty and technology), and the effect of the different life cycle phases on leadership style (vertical and/or shared leadership), and moreover the influence that the appropriate balance of leadership styles has on perceived project management success. Eight hypotheses were tested: H1, H2, H4, H7 and H8 were supported while H3, H5 and H6 were rejected. Cross-tabulations with demographic data yielded no noteworthy findings, except for "years' experience" that had an effect on H3 (novelty).

Even though H1, H2, H4, and H7 were supported based on the chi-square test results, the low alpha-values pointed out that there is no significant difference between the questions asked for each hypothesis in the questionnaire. This implies that there was a measure of confusion amongst respondents regarding the “exact” direction of leadership style (vertical and/or shared leadership) on the continuum.

No uncertainty existed amongst respondents regarding the definition of ‘balance’, as it was provided, and respondents’ understanding of the concept was tested in a qualifying question in the questionnaire. Respondents were however unsure of the ideal point of this balance on the continuum between vertical and shared leadership for different kinds of projects and life cycle phases. The uncertainty pertaining to pace (P1), complexity (H2) and level of technology (H4) could be explained by the fact that the majority of the respondents were not exposed to high-paced, highly complex or high-technology projects (see Figure 16). They probably did not possess the necessary understanding and experience, which influenced their answers, and in the end the data.

A possible explanation of the rejection of H3 (novelty), is that South Africa in general has not had many highly novel projects in the past two decades and that 80% of all respondents indicated that they work in the less novel projects. We found that respondents with more years’ experience tended to agree that high-novel projects lead to a more shared leadership approach, which makes sense if it is considered that an individual with many years’ experience could have been exposed to highly novel projects earlier in his/her career when more projects that are novel were executed in South Africa. It can thus be deducted that the respondents simply did not have adequate exposure to highly novel projects to answer the questions.

The respondents’ uncertainty of the influence of project life cycle phases on the appropriate balance of leadership style may result from South Africa’s current lack

of skilled people. Many skilled and semi-skilled people have left South Africa in recent years, resulting in a workforce of less-qualified people in positions previously occupied by more suitable candidates in terms of qualifications and experience (Leonard and Grobler, 2006). Due to this lack of expertise, technical and operational skills are predominantly situated in the private sector while the relatively large government sector has to subcontract many of their projects. The situation then arises where the people who were involved in the pre-execution phase (i.e. preparation of the tender document), those who carried out the work, and those who participated in the post-execution phase, might be in separate teams. It is often required from those involved in the project execution phase to work with the client team to get their buy-in on the project and to clarify the scope of the tender. In such cases, some shared leadership is required for project execution. The hypotheses were derived from international studies and leadership styles in South Africa could differ from those hypothesised in the study. In contrast with South Africa, many international companies employ more people that are skilled and probably practise concurrent engineering, resulting in team members being more involved in a project from start to finish.

6.6 Conclusion

In the study the target group all agreed that an appropriate balance in leadership styles (vertical and shared leadership) would increase the likelihood of project management success. This is in line with studies done in other countries. However, most respondents were uncertain of the influence of different project types (pace, complexity, novelty and complexity) as well as different project life cycle phases (pre-execution, execution and post-execution) on the ‘exact’ position on the continuum between vertical and shared leadership (i.e. the appropriate balance of leadership style). Possible reasons and explanations for this occurrence are provided above.

Figure 17 provides the final Project Leadership Style (PLS) Model.

Another possible reason for the outcomes of the study could be the so-called "cultural trap" (Ika, 2012). This phenomenon occurs when western project management approaches are not recognised by team members in developing countries (like South Africa). Reasons for this include different ethnic and social traditions and beliefs, and patriarchal, male-dominated cultures.

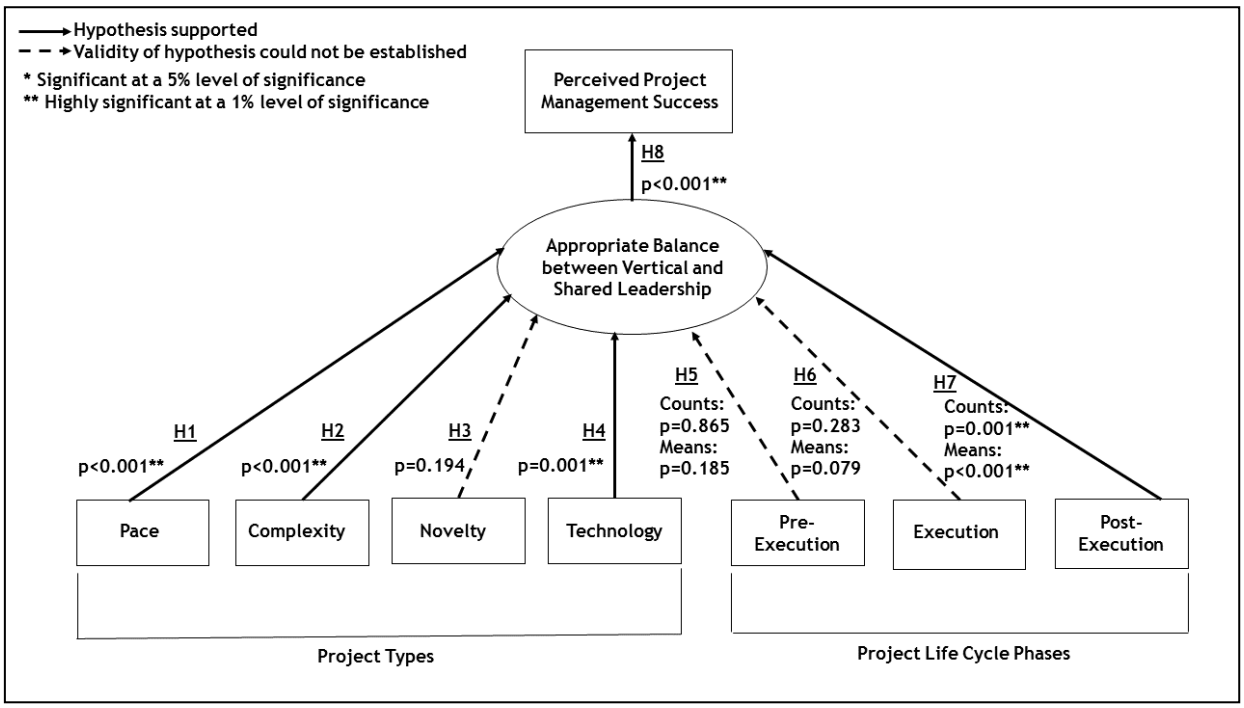

Figure 17: The PLS-Model with values

It should also be noted that South Africa is a developing country with a great cultural diversity, while the majority of the literature that led to the formulation of the hypotheses originates from studies done in developed countries. Further work should be done to get to an ultimate, empirically supported model.

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Chapter 7

Conclusions

7.1. Introduction

In recent times, organisations are facing many challenges like uncertainty, globalisation, deregulation, the liberalisation of markets, increasingly complex tasks and demands for innovation. Many organisations adapt to these challenges by becoming more 'projectised', and worldwide expenditure on projects has increased exponentially over the last couple of years. In response to this, a shift to teamwork is increasingly taking place, and organisational structures are becoming progressively more flat, as supposed to hierarchical. The importance of the "human factor" (e.g. leadership, effective communication, conflict resolution and ethical and moral considerations for decision-making) is emphasised in literature. Effective leadership and teamwork are recognised as significant success factors in projects (Thamhain, 2004). With more than 200 different definitions of leadership (Rost, 1991), how does a project manager and the project team decide which leadership style is the most appropriate for the success of a project?

In project management research, two major streams of leadership have developed in recent years: vertical leadership and shared leadership. Chapter 2 suggests that shared leadership is a meta-theory of leadership; at times leadership is shared completely, or not shared at all. Vertical leadership in its extreme form is merely the absence of shared leadership. Thus, this research investigated the balance of two leadership styles: vertical leadership and shared leadership.

The scientific relevance of this research is to establish a novel model of leadership styles that consider the effect of project types and project life cycle phases on leadership style (vertical leadership versus shared leadership), and how an appropriate balance between the two styles influences the likelihood of project management success. The main research question can therefore be stated:

How does the leadership style influence perceived project management success?

To answer the above over-arching question, Chapter 2 addresses current trends in the literature pertaining to leadership – specifically vertical leadership and shared leadership – and future opportunities for research. Chapter 3 presents a literature-based conceptual model of project-related factors that influence leadership styles (vertical leadership and shared leadership), and the effect of an appropriate balance between the two leadership styles on the likelihood of perceived project management success. In Chapter 2 and Chapter 3 it becomes clear that different project types and project life cycle phases influence the choice of leadership styles in different ways.

Chapters 4 to 6 address the following sub-questions:

- Chapter 4 answers sub-question 1 empirically: *How do different project types (pace, complexity, novelty and technological uncertainty) influence the balance between vertical and shared leadership?*
- Chapter 5 answers sub-question 2 empirically: *How do different project life-cycle phases (pre-execution, execution and post-execution) influence the balance between vertical and shared leadership?*
- Chapters 4 and 5 answer sub-question 3 empirically: *How does an appropriate balance between vertical and shared leadership influence the likelihood of project management success?*

- Chapter 6: Combines sub-questions 1, 2 and 3 to put forward a model of how project types and life cycle phases influence the leadership style and perceived project management success.

Section 7.2 of this concluding chapter will provide a theory-based summary of the Leadership Style Model put forward in this study. Section 7.3 will discuss the research methodology used in the empirical studies reported in Chapters 4 to 6. Section 7.4 deliberates on the data analysis and findings after which a discussion will follow in Section 7.5. Section 7.6 discusses the implications to theory and practice. Lastly, the limitations of this study and recommendations for further research will be discussed in Section 7.7.

7.2. Theoretical framework

An initial conceptual model was developed from nine propositions that were derived from literature (details in Chapter 3). It was decided to narrow the scope of the study by emitting three of these propositions: the propositions relating to the effect of maturity, trust and collaboration on leadership style. Proposition 5 (*"During the execution phase, the leadership tends to move towards vertical leadership. During the initial phases, organising and preparing, as well as during close-out and post project assessment of business value, the leadership style tends to be more shared"*) was subdivided into three separate propositions. It was also decided to test 'hypotheses' instead of the 'propositions' suggested in Chapter 3, due to the fact that the data gathered were empirically testable (Neuman, 2014). Thus, the following eight hypotheses were tested in this study:

H1: The higher-paced a project, the more the appropriate balance is towards vertical leadership.

H2: The more complex a project, the more the appropriate balance is towards shared leadership.

H3: The higher the novelty of a project, the more the appropriate balance is towards shared leadership.

H4: The higher the level of technology involved in a project, the more the appropriate balance is towards shared leadership.

H5: During the pre-execution phase, the leadership style tends towards shared leadership.

H6: During the execution phase, which includes much of the monitoring and controlling aspects, the leadership style tends towards vertical leadership.

H7: During the post-execution phase, the leadership style tends towards shared leadership.

H8: The more the appropriate balance between vertical and shared leadership, the higher the likelihood of perceived project management success.

Chapter 2 outlines and discusses leadership theories and definitions as described in relevant and current studies. While conducting the literature study, it became apparent that the above types of leadership style could be contained within the definitions of vertical and shared leadership, as all forms of leadership are shared leadership to a certain extent. Chapters 2 and 3 describe the continuum between vertical leadership on the one end, and shared leadership on the other, and the appropriate balance between the two styles. One style never replaces the other; they are complementary.

Every project is unique and it became obvious that the influence of different types of projects on the choice of leadership style should be investigated. Hypotheses 1 to 4 (details in Chapter 4) explore the influence of four project types on the appropriate balance of leadership style (i.e. the ‘correct’ direction of leadership style on the continuum between vertical and shared leadership). The chosen project types (*pace, complexity, novelty* and *technological uncertainty*) were based on

Shenhar's (Shenhar, 2003, 2015a, 2015b; Shenhar, A. J. and Dvir, 2007) "Diamond of Innovation" model (details in Chapter 3).

The four project phases listed in the *PMBOK® Guide* (PMI, 2017), as well as the "Post-project business value assessment" that is included in PRINCE®2 (Office of Government Commerce, 2009) were rearranged into three phases: *pre-execution*, *execution* and *post-execution* (details in Chapter 5). Hypotheses 5 to 7[9] address the influence of each project phase on the appropriate balance of leadership style.

Hypothesis 8[10] was investigated in Chapters 4, 5 and 6. The reason being that project types and project life cycle phases influence the appropriate balance of leadership (vertical leadership versus shared leadership). The appropriate balance in turn influences the likelihood of perceived project management success. A number of papers indicated that the so-called "iron triangle" on its own is inadequate of measuring project management success; other objective and subjective criteria should also be included in determining project management success (Details in Chapter 4). In this study, project management success was therefore self-defined by the respondents.

7.3. Research methodology

A quantitative study, with the aim of verifying theoretical relationships was conducted (details in Chapters 4, 5 and 6). The structured, web-based and self-administered questionnaire was distributed using Qualtrics XM Platform™ (Included in Appendix 2). Prior to the survey, a pilot study was conducted in order to improve the questionnaire in terms of clarity, accuracy and number of complete responses, as well as construct validity (Details in Chapters 4 and 5).

[9] It should be noted that Chapter 5 was submitted as a journal paper and therefore Hypotheses 5 to 7 were classified as Hypotheses 1 to 3 in that chapter.
[10] Chapters 4 and 5 were submitted as separate journal papers and therefore Hypothesis 8 is classified as Hypothesis 5 in Chapter 4, and Hypothesis 4 in Chapter 5.

Purposive sampling was used (Details in Chapters 4, 5 and 6) and a total of 313 complete responses were received. Statistical hypothesis testing was done at a 5% level of significance. A one-sample chi-square (χ^2) test, based on counts, was used to test Hypotheses 1 to 8 (Details in Chapters 4, 5 and 6). An additional one-sample-t-test, based on means, was done for Hypotheses 5 to 7 (Details in Chapter 5 and Chapter 6). Paired views were used to confirm the results visually (Details in Chapter 4 and Chapter 5).

The sample size was sufficient and therefore inferences of the general population may be drawn. Hence, the study is generalizable to people working in the South African project environment. Some of the findings in the study however contradict existing findings in other countries (possible reasons and explanations are provided in Section 7.4.6).

Figure 18 illustrates the Project Leadership Style (PLS) Model.

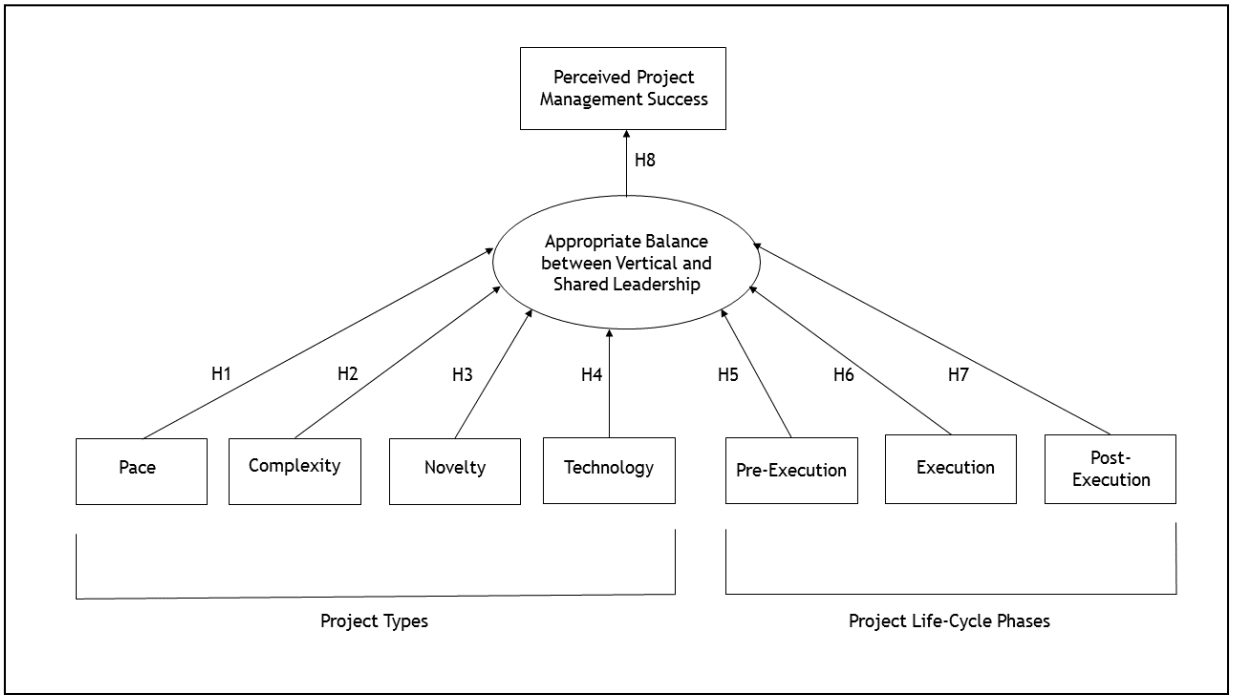

Figure 18: The Project Leadership Style Model (PLS-Model)

7.4 Main empirical findings and interpretations

7.4.1 Demographic data

Figure 19 and Figure 20 illustrate the following main points:

- Just more than half of respondents were project managers (51%).
- The principal industries were engineering (12%), consulting (11%), information technology (11%), construction (9%), and education and research (8%).
- A total of 58% of respondents worked in projects with a monetary value of R1 million to R100 million (ZAR 14.18 to US$ 1, based on the 23 April 2019 exchange rate). This finding indicates that most of the respondents were not involved in mega-projects.
- Most respondents had worked in all the project life cycle phases (it should be noted that they could select more than one phase in the questionnaire. An exception to this is the “post-project business assessment phase” where about half of the respondents indicated that they were not regularly involved in this phase. This finding correlates with previous studies that indicate that many projects do not have a post-project business assessment phase (Zedtwitz, 2002; Schroeder, 2013).
- Most respondents (75%) participated in the leadership function in the project phase/s that they were involved in.
- The majority of the respondents were not exposed to high-paced, highly complex, and high-technology projects. The bulk of the respondents also indicated that they worked on less novel projects. This may be attributed to the fact that most of the respondents have experience working on projects in South Africa where very few novel projects have been undertaken in the last two decades.

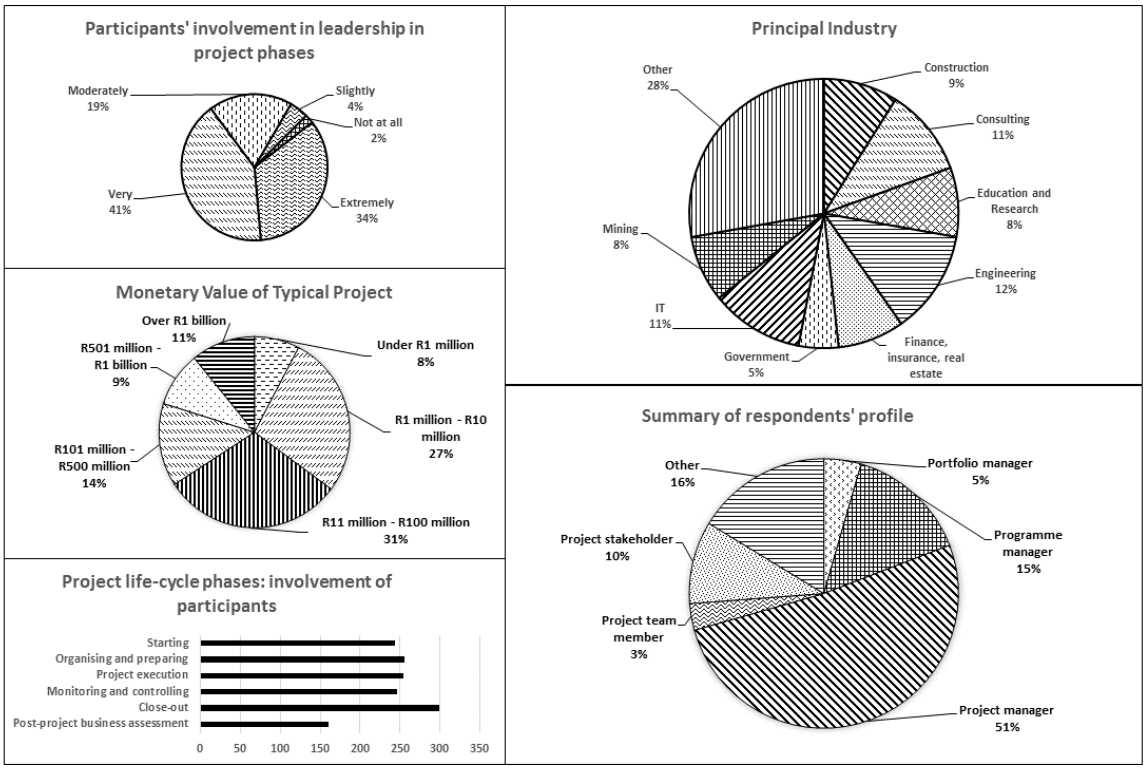

Figure 19: Profile of the respondents

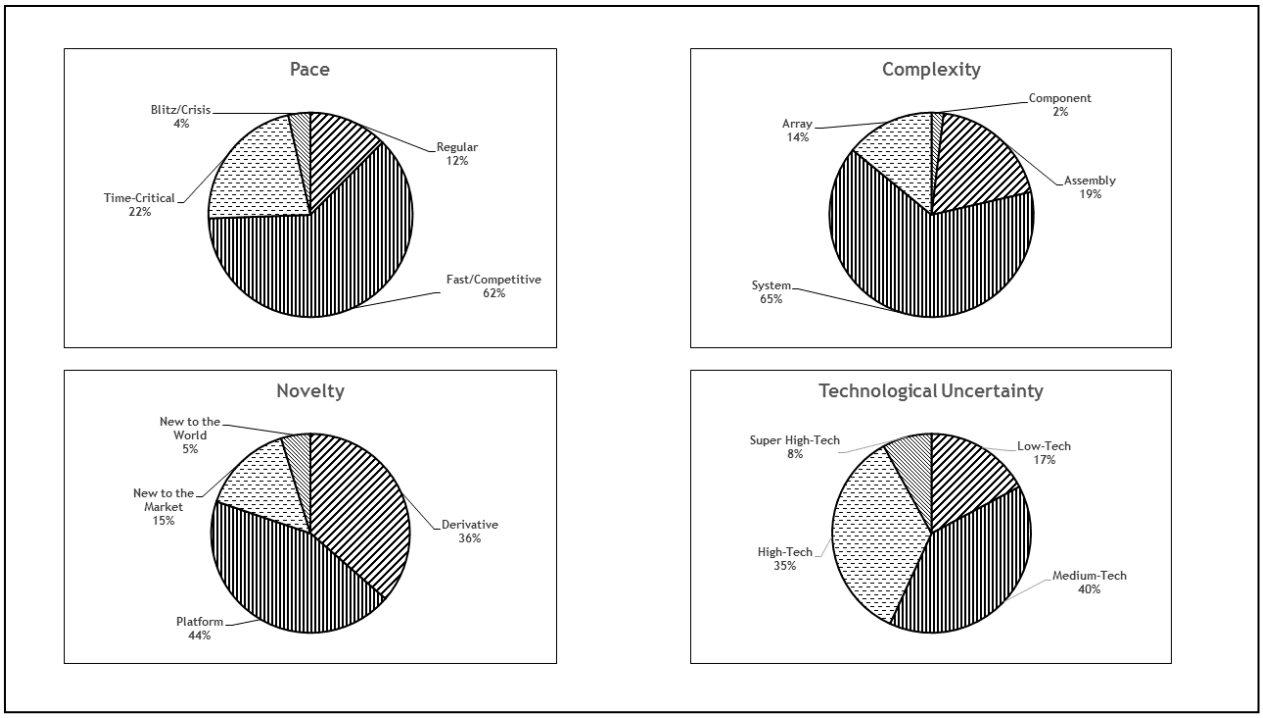

Figure 20: Project types of respondents

Table 17: Hypothesis testing for hypotheses

	Hypothesis	p-value	Null Hypothesis	Validity of Hypothesis
Project Type	H1: Pace	p<0.001**	Rejected	Supported
	H2: Complexity	p<0.001**	Rejected	Supported
	H3: Novelty	p=0.194	Cannot be rejected	Could not be established
	H4: Technology	p=0.001**	Rejected	Supported
Project Life Cycle Phase	H5: Pre-execution	Counts: p=0.865 Means: p=0.185	Cannot be rejected	Could not be established
	H6: Execution	Counts: p=0.283 Means: p=0.079	Cannot be rejected	Could not be established
	H7: Post-execution	Counts: p=0.001** Means: p<0.001**	Rejected	Supported
	H8: Balanced Leadership	p<0.001**	Rejected	Supported

*Significant at a 5% level of significance
**Highly significant at a 1% level of significance

7.4.2 Hypothesis testing

Table 17 provides a summary of the hypotheses, their p-values, and their validity.

- Hypotheses 1, 2, 4, 7 and 8 were supported.
- The validity of Hypotheses 3, 5 and 6 could not be established.

7.4.3 Reliability and internal consistency

Cronbach's alpha was used to test the reliability and internal consistency of the questionnaire. It was assumed that the questions in the questionnaire measured the same underlying construct.

- The alpha-values for H1 to H7 were low ($0.5 \leq \alpha < 0.6$), which imply a poor internal consistency – each respondent did not answer the questions consistently. This indicates that the respondents were uncertain of the influence of each project type and life cycle phase on the appropriate balance of leadership style.
- The alpha-value for H8 was 0.85, which indicates a high internal consistency – the questions were answered consistently. This indicates that there was certainty between respondents that the correct balance of leadership style will lead to project management success.

7.4.4 Paired views

The paired views for Hypotheses 1 to 7 are presented in Figure 21.This is a visual representation of the results of the graphic rating scale questions (questions 9 and 12) in the questionnaire (see Appendix 2).

If the respondents who chose the “correct” direction (hypothesised in the study), as well as those who did not, are presented in paired views, the median model (the line in white) becomes almost horizontal. This implies that most respondents indicated that the appropriate balance on the continuum between vertical leadership (0%) on the left end of the scale, and shared leadership (100%) on the right end of the scale, should be close to 50% (centre of the scale). This indicates that there is no significant difference between the two questions that were analysed for each hypothesis, and hence implies the idea that there is some confusion regarding which direction (balanced leadership) is the “correct” one.

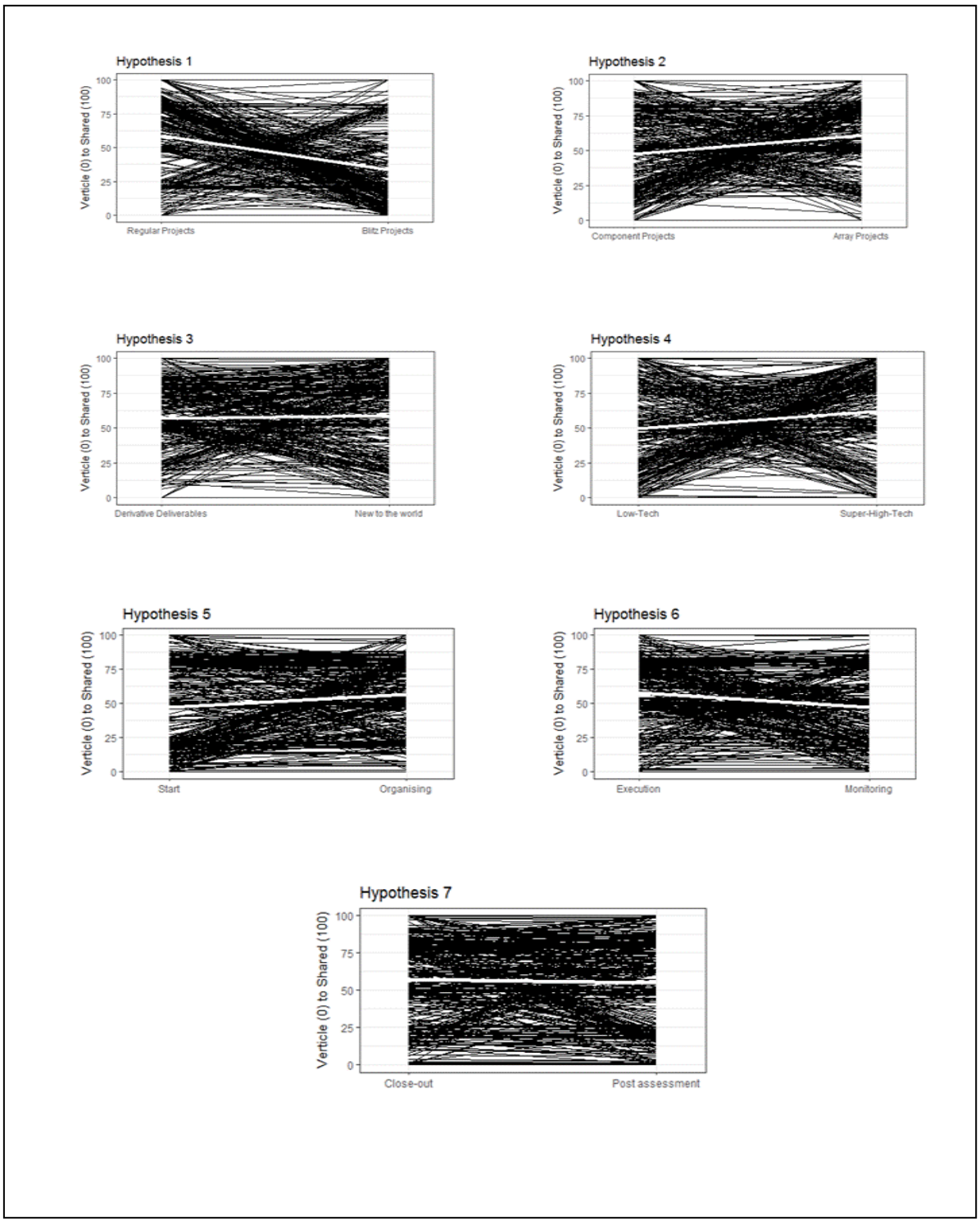

Figure 21: Paired views for H1 to H7

7.4.5 Cross-tabulation

Cross-tabulations, employing the chi-square test were used to compare Hypotheses 1 to 7 with the following demographic data derived from the questionnaire:

- Respondents' typical role in a project;
- Respondents' years' of experience in project management;
- Monetary value of projects that the respondents were involved in;
- Principal industry of the respondent.

H_0 was rejected for the cross table where H3 (novelty) was compared with years' experience. This indicates that years' experience had an effect on the influence that novelty projects have on the direction of the leadership balance. The remainder of the null hypotheses could not be rejected, indicating that the respondent's role in a project, the monetary value of a project and principal industry did not have an influence on the choice of the direction of the balance of leadership style relating to each project type and life cycle phase.

7.4.6 Discussion

This study investigates the influence of four project types (*pace, complexity, novelty* and *level of technology*), and the effect of the different project life cycle phases (*pre-execution, execution* and *post-execution*) on leadership style (*vertical leadership* and/or *shared leadership*), and moreover, the influence that the *appropriate balance* of project leadership styles has on *perceived project management success*. Eight hypotheses were tested: H1, H2, H4, H7 and H8 were supported, while H3, H5 and H6 were rejected. Cross-tabulations with demographic data yielded no noteworthy findings, except for 'years' experience that had an effect on H3 (novelty).

Even though H1, H2, H4 and H7 were supported, based on the chi-square test results, the low alpha-values for H1 to H7, confirmed by the pairwise comparisons, imply that the respondents' answers to the graphic rating scales pertaining to H1 to H7 were mostly centred around the middle (40% to 60%) of the continuum between vertical leadership on the left (0%) and shared leadership on the right (100%). This indicates that there was a measure of confusion among respondents regarding the ideal point on the continuum pertaining to different kinds of projects and life cycle phases.

The uncertainty pertaining to pace (H1), complexity (H2) and level of technology (H4) could be explained by the fact that the majority of the respondents were not exposed to high-paced, highly complex or high-technology projects (see Figure 20). As a result of this lack of exposure to "higher" level project types, respondents probably did not possess the necessary understanding and experience, which influenced the manner in which they responded to questions in the questionnaire, and in the end the data.

A possible explanation of the rejection of H3 (novelty), is that South Africa in general has not had many highly novel projects in the past two decades and that 80% of all respondents indicated that they worked in the less novel projects. It was found that respondents with more years' experience tended to agree that high-novel projects lead to a more shared leadership approach, which makes sense if it is considered that an individual with many years' experience could have been exposed to highly novel projects earlier in his/her career when more novel projects were executed in South Africa. It can thus be deducted that the respondents simply did not have adequate exposure to high novel projects to answer the questions.

The respondents' uncertainty of the influence of project life cycle phases on the appropriate balance of leadership styles may result from South Africa's current lack of skilled people. Many skilled and semi-skilled people have left the country in recent

years, resulting in a workforce of less-qualified people in positions previously occupied by more suitable candidates in terms of qualifications and experience. Due to this lack of expertise, technical and operational skills are predominantly situated in the private sector, while the relatively large government sector has to subcontract many of their projects. The situation then arises where the people who were involved in the pre-execution phase (i.e. preparation of the tender document), those who carried out the work, and those who participated in the post-execution phase, might be in separate teams. It is often required from those involved in the project execution phase to work with the client team to get their buy-in on the project and to clarify the scope of the tender. In such cases, some shared leadership is required for project execution. The hypotheses were derived from international studies and leadership styles in South Africa could differ from those hypothesised in the study. In contrast with South Africa, many international companies employ highly-skilled people and probably practise concurrent engineering, resulting in team members being more involved in a project from start to finish.

The target group all agreed that an appropriate balance in leadership styles (vertical and shared leadership) would increase the likelihood of project management success. This finding is in line with what was found in studies conducted in other countries.

The validity of H3 ("*The higher the novelty of a project, the more the appropriate balance is towards shared leadership*.")*)* and H5 *("During the post-execution phase, the leadership style tends towards shared leadership."*) could not be established in this study. A possible reason for this outcome could be the so-called "cultural trap" (Ika, 2012). This phenomenon occurs when western project management approaches are not recognised by team members in developing countries (like South Africa). Glover, Friedman and Jones (2002) say when leaders and organisations are stuck in cultural traps, they are incapable and/or averse to change. Their cultural background prevents them to adapt to changes in their milieus.

Different ethnic and social traditions and beliefs, a patriarchal society and chauvinistic attitudes on the part of male colleagues contribute to the *status quo* (Denton and Vloeberghs, 2003). There could be incidences where the majority of team members working on a project are women. Although South Africa has progressed considerably pertaining to sexual discrimination in recent years, there could still be situations where women are stereotyped as inferior by their male colleagues - it is dictated by their traditional social and ethnic beliefs. This in turn could lead to the exclusion of females where decision-making and information sharing in the project is concerned. In this patriarchal culture men are often considered as better choices pertaining to technical expertise; women with the same skills and knowledge as their male counterparts are often overlooked and can therefore not step forward as temporary leaders when a particular set of skills are needed in a project. Shared leadership cannot be practised in the above conditions.

Kuada (2010) provides a second possible reason for the situation. He states that leadership styles in Africa are “outocratic, dictatorial and incompetent”. Subordinates are supervised, rather than motivated and empowered. Independent thinking and creativity are not encouraged. Bolden and Kirk (2009) describe leadership styles in Africa as multifaceted and moulded by a long history of cultural beliefs and historical events. This is also applicable to the South African context.

In empirical studies on balanced leadership conducted in Australia, Canada, Norway and Sweden by Drouin, Müller, Sankaran and Vagaasar (2018), it was found that culture acts as both an enabler and supporter of balanced leadership. In this study the opposite was found in some cases (e.g. the rejection of H3). It is important to note that it cannot be presumed that what is considered as building blocks for effective leadership in Western societies will be successful in the African context (Senaji, Metwally, Sejjaaka, Puplampu, Michaud and Adedoyin-Rasaq, 2014).

7.4.7 The Project Leadership Style (PLS) Model

Figure 22 provides the Project Leadership (PLS) Style Model. This empirical model is a representation of the current situation in South Africa pertaining to leadership, and it indicates the validity of the eight hypotheses. It should however be noted that South Africa is a developing country with a great racial, cultural and language diversity. As discussed in Section 7.4.6, the country is also currently experiencing a major technical an operational skills shortage (the so-called 'brain drain'). The majority of the literature that led to the formulation of the hypotheses and Figure 22 originates from studies done in developed countries.

7.5 The unique/original contribution of the study

The thesis addresses an important topic of current relevance to the project leadership field and throws some light on South African perspectives. A number of papers on "leadership" has been published in recent years, but none addresses the effect of project types and project life cycle phases on leadership styles. This study aims to fill this gap in the body of knowledge.

The use of Aaron Shenhar's "Diamond of Innovation Model" to raise questions on the balancing of vertical and shared leadership is a novel approach and the main contribution of the study is the proposed PLS Model.

7.6 Implications to theory and practice

7.6.1 Implications to theory

This research is relevant to project management theory because it proposes an empirical model for project-related factors that influence leadership styles and its effect on perceived project management success. A number of authors published

papers on leadership and balanced leadership in recent years. These papers include, but is not limited to: Conger and Pearce (2003); Hoch (2013); Müller, Sankaran, Drouin, Niklova and Vagaasar (2015); Müller, Niklova, Sankaran, Hase, Zhu, Xu, Vaagaasar and Drouin, (2016); Hsu, Li and Sun, (2017); Agarwal, Dixit, Jain, Sankaran, Nikolova, Müller and Drouin, (2017); Yu, Vaagaasar, Müller, Wang and Zhu, (2018); Müller, Sankaran, Drouin, Vaagaasar, Bekker and Jain, (2018); Cook, Meyer, Gockel and Zill, (2019).

This thesis aims to build on the above studies by linking balanced leadership to a general framework that would allow researchers to hypothesise and practitioners to intentionally use it for the advantage of their projects. Moreover, South African studies relating to this topic are very limited.

The implications of the findings in this thesis include:

- The Leadership Style Model provides a roadmap of South Africa's current position in terms of balanced leadership in project management, and it identifies starting points pertaining to future directions in leadership research, both local and internationally.
- The Leadership Style Model highlights how certain project factors (i.e. project type and project life cycle phase) triggers the shift between vertical and shared leadership, and explore how this shift in leadership style influences perceived project management success.

7.6.2 Implications to practice

Studies on balanced leadership in the project management domain within the South African context are limited. This empirical study aims to address this crucial gap in the project management body of knowledge, and to propose a model to guide the practitioner to selecting appropriate leadership styles for specific project situations.

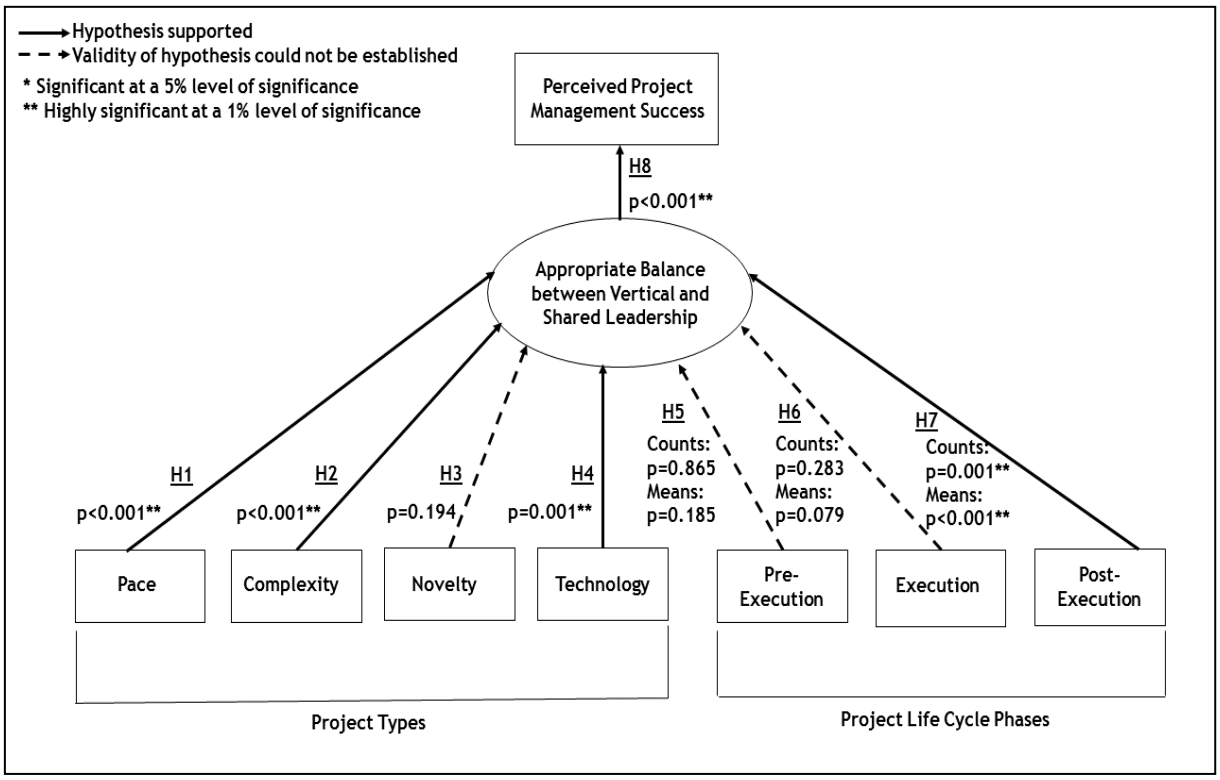

Figure 22: The PLS-Model with results indicated

Aspects that should be highlighted include:

- Project leadership is a dynamic process that could be influenced by the type of project and the phase in the life cycle of a project.
- Shared leadership does not replace vertical leadership; shared leadership supplements and enhances vertical leadership, and *vice versa*. There is a continuum between the two styles and the appropriate balance (position on the continuum) move continuously during the lifetime of a project.
- The appropriate balance between vertical and shared leadership could influence the likelihood of perceived project management success.
- The team member (follower/subordinate) is a crucial part in the leadership process and should be treated as such.
- The leader affects and is affected by followers.

- In this study the respondents were uncertain on how project types and stages influence the appropriate leadership balance. Reasons for this uncertainty were provided in Sections 7.4.5 and 7.4.6. Another factor for consideration could be the fact that few project managers in South Africa are made aware of different leadership styles or receive training on it. It is therefore recommended that the education and training of project managers should include the dynamic nature of leadership within a broader systems perspective of projects. Leadership is however a prominent topic in the *PMBOK® Guide* (PMI, 2017) and PRINCE2® methodology (Office of Government Commerce, 2009) and therefore also their certification examinations. Various courses on project management (many of them web-based) which also address leadership are presented in South Africa. Project managers who meet the prerequisites should be encouraged to take these examinations or attend the courses.
- The level of experience and knowledge of the project manager and team members could influence their choice of leadership style. An example of this in the study is the finding that respondents with more years' experience tended to indicate that high-novelty projects lead to a more shared leadership style (the hypothesised direction on the continuum).

7.7 Limitations and future research

A possible limitation of this research is that shared leadership is detached from other types of concurring leadership concepts such as emergent leadership, self-leadership, empowering leadership, participative leadership and team leadership, this could be an opportunity for future research.

Secondly, the research was limited by the scope of the study. A number of other project factors that could influence leadership style (e.g. maturity, organisational design/structure, collaboration and trust) that are not considered in this research

could also influence the appropriate balance of leadership style. This provides opportunities for future research.

The potential interactions among the contingency variables (project types and life cycle phases) were excluded by the study. Due to scope limitations, the variables were treated as independent of each other. Future research should be undertaken to explore the probable interactions.

Another limitation is that the study does not consider personal and interpersonal factors (e.g. personality types and emotional intelligence), nor does it contemplate the influence of technical engineering factors. Further research could consider the above factors.

Although certain pre-emptive actions were taken to increase the validity of the study (i.e. a pilot study, a qualifying question to test the respondent's understanding of the concepts, and clear, informal and understandable definitions in the survey instrument), some sections of the questionnaire may lack internal consistency. This is illustrated by the low Cronbach's alpha values ($\alpha<0.7$) for H1 to H7. This should be further investigated.

Based on the theory-based study conducted in Chapter 2, a recommendation for further research could also include:

- The more subtle dynamics of how leadership is shared in group and organisational settings;
- How to successfully introduce shared leadership to a team where applicable;
- The outcomes associated with shared leadership in groups.
- Measurement of the phenomenon that is shared leadership;
- Cross-cultural influences;
- The liabilities of shared leadership.

Further research should be conducted to improve the Leadership Style Model and to get to an ultimate, empirically supported model.

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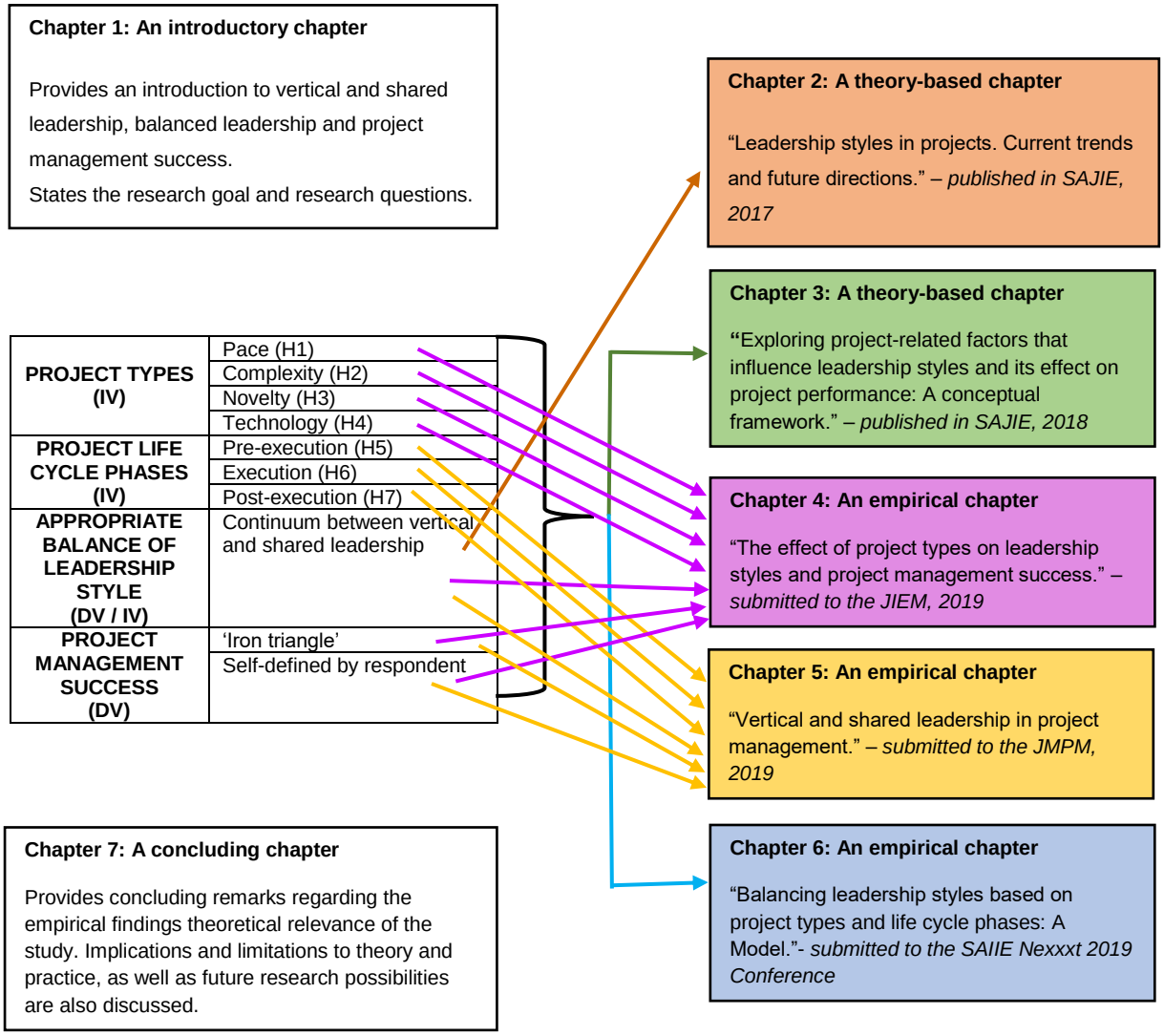
APPENDIX 1: Guiding Diagram



IV: Independent Variable

DV: Dependent Variable

APPENDIX 2: Questionnaire

Leadership Styles and its Effect on Project Performance

As part of a PhD study, this survey explores the project-related factors that influence leadership styles and its effect on project performance. It is widely accepted that project leaders should adapt their behavior to meet the unique leadership demands of a variety of situations. This study explores leadership styles on projects

Please note that your participation in this survey is voluntary and all information will remain confidential and will only be used for academic purposes. The results of the investigation may be used for the purposes of publication. This survey will take 10-15 minutes to complete.

If you have any questions, please contact Suzaan Pretorius (Department of Engineering and Technology Management, University of Pretoria): E-mail: suzaan.pretorius@up.ac.za.

Q1 Please indicate your agreement with the following: I hereby voluntarily grant my permission for participation in the project as has been explained to me in the above section.

- ☐ I agree
- ☐ I do not agree

Qualifying question: Respondents not allowed to continue when 'I do not agree' is chosen.

Q2 Do you work in a project environment?

- ☐ Yes
- ☐ No

Qualifying question: Respondents not allowed to continue when 'No' is chosen.

Q3 How many years' experience do you have working on projects?

- □ 5 years or less
- □ 6-10 years
- □ 11-20 years
- □ 21 or more years

Q4 What is typically your role:

- □ Portfolio Manager
- □ Programme Manager
- □ Project Manager
- □ Project Team Member
- □ Project Sponsor and/or client
- □ Stakeholder
- □ Other (Please specify below)

_____

Q5 What is the principal industry of your organisation?

- □ Agriculture
- □ Construction
- □ Consulting
- □ Defense
- □ Education and Research
- □ Engineering
- □ Finance, insurance, real estate
- □ Government
- □ Health Care
- □ Information Technology
- □ Logistics and Supply Chain
- □ Manufacturing
- □ Mining
- □ Non-Profit
- □ Petro-Chemical
- □ Services
- □ Transportation
- □ Telecommunication
- □ Utilities
- □ Other (Please specify below)

_____

Q6 What is the Rand value of the typical project you have been involved in?

- □ Under R1 million
- □ R1 million - R10 million
- □ R11 million - R100 million
- □ R101 million - R500 million
- □ R501 million - R1 billion
- □ Over R1 billion

Q7 For the following four (4) questions please refer to your experience working on projects.

7.1 Please indicate to what extent your projects were time critical in general from the description below: (Choose one)

□ **Regular Projects** where time is not critical for immediate success.

□ **Fast/Competitive Projects** where emphasis is on meeting schedules and addressing client and customer needs.

□ **Time-Critical Projects** where missing the deadline implies project failure.

□ **Blitz/Crisis projects** are the most urgent and most time-critical projects. Little or no time for detailed planning.

7.2 Please indicate the general level of complexity of your projects from the description below: (Choose one)

□ **A Component** is a single element or part with no formality or detailed planning.

□ **An Assembly** involves the combination of a collection of elements, components and module into a single unit that performs a single function.

□ **A System** is a multifaceted collection of interactive elements and subsystems.

□ **An Array** is a system of systems or "super" systems.

7.3 Please indicate the general level of novelty (new to the market) of your projects from the description below: (Choose one)

□ **Derivative** deliverables (products) are additions and advances to existing products.

□ **Platform** deliverables (products) replace older generation products in a fixed market sector.

□ **New to the market.**

□ **New to the world** are brand new deliverables (products) that the market would not have seen before.

7.4 Please indicate the general level of technological uncertainty of your projects from the description below: (Choose one)

☐ **Low-Tech** projects are based on existing and well-established technologies.

☐ **Medium-Tech** incorporate some new technology or a new feature that did not exist in previous products.

☐ **High-Tech** projects use technologies that are new to the firm but already exist and are available at the start of the project.

☐ **Super-High-Tech** projects employ new technologies that are used for the first time. The project mission is clear but not the solution, therefore new technologies must be developed during the lifespan of the project.

Q8 Vertical Leadership is a "top-down" approach where there is an appointed leader that functions as the main source of instruction, oversight and control for the other employees. The employees executes the wishes of the formally appointed leader.
Shared Leadership refers to a team environment where leadership is dispersed among team members. Because different skills are needed at different points in time, leadership is transferred between those with critical skills in any given time in a project.

In your opinion, what kind of leadership is involved in the following example: *"The project manager calls in all the project team members, ask their opinions, encourages participation, summarises and tries to reach consensus before he/she makes a decision."*

☐ Vertical Leadership

☐ Shared Leadership

Qualifying question: Respondents not allowed to continue when 'Vertical Leadership' is chosen.

Q9 *The appropriate balance between Vertical and Shared Leadership is the shift in leadership between the project manager as vertical leader, and a team member as temporary leader.*

Based on your experience working on projects, what would you say would be the appropriate balance between Vertical and Shared Leadership for the different kinds of projects:

	Mainly Vertical Leadership — **Mainly Shared Leadership**
Regular Projects. Time is not critical.	
Blitz Projects. Crisis, most urgent projects.	
Component Projects develop a single element or part.	
Array Projects can be described as a system of systems or "super" system.	
Derivative Deliverables (Products) are additions and advances to existing products.	
New to the world. Deliverables (Products) are brand new products that the market would not have seen before.	
Low-Tech Projects are based on existing and well-established technologies.	
Super-High-Tech Projects employ new technologies that are used for the first time. The project mission is clear, but not the solution.	

Q10 Which phase(s) in the project life cycle are you mainly involved in? (You can tick more than one option).

□ **During the starting of a project.** (Those processes performed to describe a new project or a new phase of an existing project by obtaining authorisation to start the project or phase.)

□ **During organising and preparing.** (Those processes that are needed to define the scope, improve the objectives, and outline the strategy needed to achieve the objectives that the project is supposed to achieve.)

□ **During project execution.** (Those processes implemented to complete the work set out in the project management plan to meet the project specifications.)

□ **During monitoring and controlling.** (Those processes that track, evaluate, and regulate the progress and performance of the project or phase; detect any areas in which a change of plan is needed; and implement the resultant changes.)

□ **During close-out to determine lessons learned.** (Those processes that finalise all activities to formally close the project or phase.)

□ **During post-project assessment of value.**

Q11 Please indicate the extent to which you lead the project lifecycle phase(s) selected in the previous question.

□ Not at all involved in leading.

□ Slightly involved in leading.

□ Moderately involved in leading.

□ Very involved in leading.

□ Extremely involved in leading.

Q12 Based on your experience working on projects, please indicate what you think the appropriate balance of leadership style (Vertical vs Shared Leadership) should be for each project lifecycle phase.

	Mainly Vertical Leadership	**Mainly Shared Leadership**
During the starting of a project.		
During organising and preparing.		
During project execution.		
During monitoring and controlling.		
During close-out to determine lessons learned.		
During post-project assessment of value.		

Q13 In your opinion, to what extent does the appropriate style of leadership (Balance between Vertical and Shared Leadership) have an influence on whether a project will be successful or not.

- ☐ To a very low extent.
- ☐ To a low extent.
- ☐ To a high extent.
- ☐ To a very high extent.

Q14 In your opinion, to what extent does the appropriate style of leadership (Balance between Vertical and Shared Leadership) have an influence on whether a project will be delivered on time.

- □ To a very low extent.
- □ To a low extent.
- □ To a high extent.
- □ To a very high extent.

Q15 In your opinion, to what extent does the appropriate style of leadership (Balance between Vertical and Shared Leadership) have an influence on whether a project will be delivered within budget.

- □ To a very low extent.
- □ To a low extent.
- □ To a high extent.
- □ To a very high extent.

Q16 In your opinion, to what extent does the appropriate style of leadership (Balance between Vertical and Shared Leadership) have an influence on whether a project will meet all its requirements.

- □ To a very low extent.
- □ To a low extent.
- □ To a high extent.
- □ To a very high extent.

Q17 Thank you for completing the survey. If you would like to receive a copy of the final results, please enter your e-mail address below:

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