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The impact of project portfolio management (PPM) strategic alignment and agility on strategic goals - the “alignment-agility” paradox.

By

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ABSTRACT

Organizations are facing an uncertain and dynamic business environment, where conditions and customer requirements are continuously changing. Therefore, organizations are increasingly employing project portfolio management (PPM) as a key strategic implementation capability to compete in this complex environment. Moreover, agile organizations have been found to have a competitive advantage as they rapidly adapt to the unexpected external changes. However, alignment between the organization's business strategy and functional unit's strategy are critical to avoid chaos and ensure focus. The simultaneous requirement for organizations to be agile and strategically aligned results in the alignment-agility paradox.

Therefore, the purpose of this study was to analyse the alignment-agility paradox within the project portfolio management (PPM) context. This was done through analysing the relationships between agility, PPM strategic alignment, and the ability of the organization to achieve its strategic goals. A quantitative explanatory study, through the deductive approach was undertaken. An online questionnaire was used to collect the data. A sample size of 143 valid respondents was achieved from a total 155 responses that were received. The data was analysed through a hierarchical regression approach.

The key findings of the study supported the argument that agility is a critical capability for strategic alignment and for organizations to achieve their strategic goals. However, organizational size, organization type and industry had significant influences in the level of agility and the ability of organizations to achieve their strategic goals. This study contributes to the strategic management and project management body of knowledge.

KEYWORDS

Project Portfolio Management, Strategic Alignment, Agility, Strategic goals, Dynamic capabilities

DECLARATION

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

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1 CHAPTER 1: INTRODUCTION TO RESEARCH PROBLEM.

1.1 Introduction and description of the problem

Organizations are currently facing an uncertain external business environment (Shao, 2019). Therefore, projects are an important instrument for organizations to innovate and implement new business opportunities in this highly competitive environment (Loufrani-Fedida & Saglietto, 2016). Moreover, organizations are increasingly deploying Project Portfolio Management (PPM) to implement strategy, as PPM interlinks corporate strategy and projects (Clegg, Killen, Biesenthal, & Sankaran, 2018). This interlinkage has been found to improve the ability of the organization to reach its strategic goals and improves PPM effectiveness (Lee & Puranam, 2016; Sardana, Terziovski, & Gupta, 2016). Scholars argue that PPM is a key strategic implementation tool for organizations to achieve strategic goals and to prioritize competing needs (Bredillet, Tywoniak, & Tootoonchy, 2018; Kopmann, Kock, Killen, & Gemünden, 2017; Loufrani-Fedida & Saglietto, 2016; Musawir, Serra, Zwikael, & Ali, 2017). However, there is a gap between organizational level strategy and operational level project management (Löwstedt, Räisänen, & Leiringer, 2018). Furthermore, only 40% of project outcomes are aligned to organizational strategy, and only 50% of organizations observe frequent alignment of project benefits and organizational strategy (Musawir et al., 2017).

Although 66% of organizational strategies are never implemented, strategy research has not sufficiently scrutinized strategic implementation or execution, and its impact on the organization reaching its goals (Kaiser, El Arbi, & Ahlemann, 2015; Kopmann et al., 2017). Löwstedt et al. (2018) argued that there is an urgent requirement for research to focus on how the project, the portfolio, and the organization interface. Although PPM is expected to adapt to internal and external changes, most of the strategic alignment literature has focused on Information Technology strategic alignment (Gerow, Grover, Thatcher, & Roth, 2014; Street, Gallupe, & Baker, 2018; Wagner, Beimborn, & Weitzel, 2014). Furthermore, the alignment construct is still not clear, and lacks theoretical foundation (Wagner et al., 2014). Moreover, organizations that embrace agility have been found to perform better than those that do not (Shin, Lee, Kim, & Rhim, 2015).

Projects actors have been found to be mostly concerned with the day-to-day matters of executing a project, and not interested in long term strategizing (Löwstedt et al., 2018). This is not congruent with senior managers' expectation that projects must contribute to the strategic implementation of the organization, and their goals aligned with organizational strategy (Musawir et al., 2017). Musawir et al. (2017) also found that organizations invest in

Project Management Offices (PMOs) to ensure that projects are executed in alignment to business strategy. However, these PMOs are closed within three years of being established, due to businesses not realizing business value from them (Musawir et al., 2017).

The influence of the environment makes projects complex and continuously changing systems (Loufrani-Fedida & Saglietto, 2016). Due to this changing environment, strategic implementation is an emergent process, requiring agility and adaptability (Mitchell, 2018). However, in the information systems literature, some scholars have argued that strategic alignment may cause the "alignment-agility paradox" (p. 695), by impeding business agility/dynamic capability to adapt to a changing environment (Zhou et al., 2018). This paradox opens a gap in the literature on how organizations can benefit from both strategic alignment and agility, as both these constructs are argued to positively impact the achievement of organizational strategic goals.

In this uncertain environment, new rules are continuously being written and rewritten (D. Teece, Peteraf, & Leih, 2016). According to D. Teece, Peteraf, and Leih, (2016), as changes manifest in an uncertain environment, agile organizations need to adjust their strategy accordingly. Therefore, they argue that agility must be aligned with business strategy as agility and strategy are interdependent. This is supported by McAdam, Miller, and McSorley (2019) who posit that strategic fit (alignment) is dynamic and therefore should adapt to a changing environment.

Furthermore, the bounded rationality of decision makers who formulate strategy has been found to be a limitation ex ante (Killen, 2017). This limitation supports the requirement for further research on PPM strategic alignment, and how introducing agility, through bottom-up strategic input impacts organizational strategic goals. Patanakul (2015) also found strategic alignment as one of the six attributes for effective PPM. However, due to the lack of understanding of what constitutes PPM effectiveness, organizations are at the risk of realizing financial losses due to poor PPM implementation (Patanakul, 2015). If the original strategy is fallible due to bounded rationality, and PPM is aligned to this strategy as argued by the strategic alignment literature, the argument for bottom-up strategic agility finds support. Furthermore, studies have been skewed due to sample bias in terms of industries and types of companies, making it difficult to generalize agility across different contexts (Luftman, Lyytinen, & Zvi, 2017). This study is industry and company type agnostic, and it shifts the context of the research to South Africa to bring a different context to the theory.

Luftman et al. (2017) purported that most studies of alignment have been conceptual, and treated alignment as a normative requirement for business, therefore considering the lack of

alignment a major challenge for organizations. This necessitates this study to focus on measurement and not add to conceptual studies that have already been done and verified.

1.2 Purpose and scope of the research

The purpose of this research is to empirically assess the impact of PPM strategic alignment and agility on organizations achieving their strategic goals. This expands on the work done by Zhou et al. (2018) on the alignment-agility paradox. Furthermore, this is meant to contribute to the strategic implementation theory by focusing specifically on strategic implementation through PPM, with the lens of “strategy as practice”. It also purports to expand the strategic alignment body of knowledge, which Wagner et al. (2014) found to be lacking theoretical foundation. The research views PPM through the lens of organizational strategic goals and exclude the use of PPM for any other objectives.

Lee and Puranam (2016) posit that although effective strategic execution does not guarantee better organizational performance, strategic execution is still a critical factor for organizational success. Therefore, the scope of this research will not test the effectiveness of the organizational strategy, but the effectiveness of PPM in achieving the organizational strategic goals.

Strategic alignment focuses on vertical alignment between the competitive strategy and the function (Larsen, Masi, Jacobsen, & Godsell, 2018). Most research has focused on the Information Technology (IT) strategic alignment (Gerow et al., 2014; Street et al., 2018; Wagner et al., 2014); however, project management through PPM, has been found to be a critical function to achieve organizational strategic goals (Kaiser et al., 2015; Killen, 2017; Maniak & Midler, 2014). Moreover, Strategic alignment should be studied contextually and not generically (McAdam et al., 2019). Therefore, for this study, the context of PPM is used to study strategic alignment. Therefore, this research focuses on the PPM business function only, and its alignment to business strategy for the achievement of organizational strategic goals.

1.3 Research problem

The literature review in chapter 2 clearly outlines the criticality of strategic alignment for organizations to achieve their strategic goals. Shao (2019) also found that within the IS (information Systems) literature, the alignment between function and business strategy is critical. Furthermore, the strategy and PPM literature accentuates the importance of agility through the bottom-up adaptation of strategy for organizations to succeed. This opens up the alignment-agility paradox that was posited by Zhou et al. (2018). Although Zhou et al. (2018)

found a positive relationship between organizational agility and strategic alignment, they did not test how this impacted the organization achieving its strategic goals. Furthermore, the authors' research was limited to the Information Technology industry in China. This study broadens the knowledge to the project portfolio management field in a different context to evaluate if similar inferences are applicable.

Therefore, the research aims to understand the relationship between strategic alignment and agility, and how this relationship impacts the organization achieving its strategic goals. To enable achieving this research objective, four hypotheses are constructed as outlined in chapter three. Furthermore, to guide the understanding and testing of the hypotheses, a conceptual model is also developed in chapter three. This conceptual model indicates the hypothetical relationship between PPM, agility, strategic alignment, and organization strategic goals.

1.4 Theoretical and business needs

As strategic implementation has to do with decisions made at all levels of the organization (strategic, tactical and operational) (Larsen et al., 2018), business stands to benefit from this research by understanding how PPM agility and alignment to corporate strategy impacts the ability of the organization to reach its strategic goals. This will further assist management in deciding whether to implement PPM agility as a bottom-up input to corporate strategy to improve the ability of the organization to reach its strategic goals, and therefore contributing to organizational success. Strategic alignment gap (where organization strategy is not aligned to functional processes) causes loss of value for shareholders and customers (Larsen et al., 2018). This further accentuates the importance of this study for business.

The research endeavours to further contribute to both the strategic implementation and PPM theory. The contribution in the strategic implementation theory is based on determining the impact of the simultaneous existence of agility and strategic alignment in other contexts than Information Technology. The contribution to the PPM theory will be on expanding the work of Zhou et al. (2018) outside their country and industry context limitations to other contexts, while also introducing the strategic goals construct as a dependent variable to the study.

Although alignment is critical in the today's highly competitive environment, organizations are still having challenges achieving it (Ilmudeen, 2019). Moreover, Ilmudeen (2019) found that scholars have not agreed on a definition and model for the alignment construct. Furthermore, scholars' viewpoint is that more studies are required in strategic alignment as it remains an issue that needs to be resolved (Larsen et al., 2018). Therefore, this study purports to

contribute to the strategic alignment theory by bringing through agility within a PPM context.

1.5 Research structure

The literature review in the following chapter (chapter two) will establish the base theory of the key constructs for the research. This will position the argument of the research from the existing academic literature. Chapter three discusses research hypotheses and a conceptual model to be tested in this study. Chapter four details the research methodology for the study that entails the research design and strategy. Statistical results from the survey sample are then presented in chapter five. These results are discussed in chapter six, where the hypotheses from chapter three are analysed in relation to the results and the literature. Finally, chapter seven details the conclusion from the study based on the results and literature.

2 CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

A detailed review of existing literature within the strategic management and project management field was conducted. Key high impact and peer reviewed academic journals were the primary source of the literature review. To ensure focus and depth, the literature review was aligned to the three key constructs of this research, which are: project portfolio management, strategic alignment, and agility. Therefore, this chapter will discuss the existing theory based on the three theoretical constructs of this research.

2.2 Project portfolio management theory

There are organizations that view programs as large projects through which business benefits are realized (Musawir et al., 2017). Moreover, PPM deals with multiple projects that are all executed to achieve a coherent goal, and includes all aspects of selection, risk management and control (Kaiser et al., 2015; Maniak & Midler, 2014). Therefore, when referring to projects in this research, programs will be implicitly included as part of the PPM scope.

The importance of PPM has recently gained momentum in literature and business (Yamakawa, Sousa-Zomer, Cauchick-Miguel, & Killen, 2018). The Project Management Institute (PMI), defines PPM as managing a collection of projects or programs in a coordinated manner, with the purpose of achieving strategic business goals (Jafarzadeh, Akbari, & Abedin, 2018; Patanakul, 2015). These portfolio of projects are expected to maximize business value for the organization (Jafarzadeh et al., 2018; Musawir et al., 2017). Business value consists of financial and non-financial goals that are determined by the organization's stakeholders *ex ante* (Patanakul, 2015). Furthermore, organizations undertake projects for the benefits they will realize through adding value for customers (Musawir et al., 2017). Musawir et al. (2017) posits that, for organizations to realize these benefits, they must start with the strategic goals first and work backwards to project activities, thus linking projects to strategy.

Patanakul (2015) noted that the PMI defines three PPM process groups. The first is the portfolio definition, which determines how the portfolio assists in achieving the organization's strategy. The second is alignment, to ensure that the portfolio is aligned with the organizational strategy. Then last one pertains to the authorizing and controlling process group that ensure that the portfolio operates within the predefined metrices. This research will contribute to all these process groups. The first and second process groups focus on the strategic alignment construct of the research, while the third process group is mostly aligned to PPM agility.

Projects have been positioned as areas of strategic implementation for organizations (Löwstedt et al., 2018). Although project management is a critical tool for organizations to achieve their strategic objectives (Alexander Lord, 1993; Killen, 2017), the relationship between the project and the organization is complex (Musawir et al., 2017). Therefore, there is still a need for the project management practice and strategy to be integrated for the delivery of projects that achieve organizational goals (Löwstedt et al., 2018).

A critical phase in the approach of strategic execution through projects pertains to the translation of strategy to programs and projects (Loufrani-Fedida & Saglietto, 2016). In this phase, an organization selects projects for execution, using PPM, that are aligned to its strategic goals (Kaiser et al., 2015; Loufrani-Fedida & Saglietto, 2016). Selecting misaligned project(s) can lead to the demise of the organization (Kaiser et al., 2015). This makes the project selection criterion the best mediator for ensuring alignment of project portfolios to strategic goals (Kaiser et al., 2015). However, senior managers make project selection decisions with limited information, as knowledge is distributed across different levels of the organization (Hutchison-Krupat & Kavadias, 2014). Jafarzadeh, Akbari, and Abedin, (2018) argue that there are already numerous methods developed by scholars for projects selection and ranking. The authors further noted that, for the past six decades, many scholars have developed complex mathematical and qualitative project selection tools. These decisions are mostly made by specialized committees or boards that organizations establish for PPM (Killen, 2017; Patanakul, 2015). However, due to the bounded rationality of humans, some of the decisions made by these committees may be irrational (Killen, 2017). Therefore, this research will not look at selection tools as literature noted the significant work that has already been done in developing them. However, the research will look at PPM agility, and if it addresses the bounded rationality challenge during the project selection phase through bottom-up feedback.

Musawir et al. (2017) argued that project management success deals with meeting organizational strategic objectives, while project/product success deals with the achievement of the project outputs such as time, cost, quality and scope. Therefore, to meet strategic objectives, it is important for organizations to focus on project management success, and not project success.

2.3 Strategic alignment theory

Strategic alignment is a fit between the organization's competitive strategy and the individual strategies of the organization's functional units (Larsen et al., 2018). Some of the terms used

in the literature, which are considered synonymous with alignment are: ‘harmony’, ‘fit’, ‘fusion’, ‘integration’, and ‘linkage’ (Luftman et al., 2017). Similarly, these terms are used synonymously with agility in this study. Scholars and organizations consider strategic alignment to be an important factor in business, however the results realized by organizations have not correlated to its theoretical predictions (Renaud, Walsh, & Kalika, 2016). The authors posit that, this is due to the incongruity between the strategic alignment theory (particularly the SAM) and practice.

Although senior leaders in the organization are critical towards ensuring strategic alignment (Shao, 2019), alignment must not only be focused among senior executives, rather also permeate to strategy executing functional units (Wagner et al., 2014). The IT literature considers alignment between business strategy and IT as an important factor in business value creation (Wagner et al., 2014). Therefore, Information Systems (IS) academics have extensively researched the IT-business strategy alignment theory (Gerow et al., 2014; Ilmudeen, 2019; Larsen et al., 2018; Luftman et al., 2017; Sabherwal, Sabherwal, Havakhor, & Steelman, 2019; Wagner et al., 2014). Moreover, IT executives still mention alignment as one of their top three challenges (Wagner et al., 2014). Wagner et al. (2014) further noted that the business-IT strategic alignment was found to have significant impact on business performance. Furthermore, from a quality management perspective, and using a contingency theory lens McAdam, Miller, and McSorley (2019) posited that strategic alignment is seen as a contingency that will result in organizational effectiveness.

Factors affecting strategic alignment are: (i) general capabilities, (ii) information sharing, (iii) organizational structure, (iv) top management support, (v) product design, (vi) service design, and (vii) customer relational behaviour (Larsen et al., 2018). However, Ilmudeen (2019) posited that there are three dimensions of alignment, namely, (i) product-oriented (product innovation to meet customers’ needs), (ii) quality-oriented (better customer intimacy and brand image), and (iii) marketing-oriented (customer relationship management and intelligence).

Ilmudeen (2019) showed that the product-oriented strategic alignment had an influence on operational excellence and marketing performance, but not on financial performance. Secondly, quality-oriented strategic alignment had an influence on operational excellence, marketing and financial performance. Moreover, marketing-oriented alignment only has an influence on marketing performance and not on operational excellence and financial performance (Ilmudeen, 2019). These findings on marketing rebut the views of some scholars who posited that functional strategic alignment such as IT (Gerow et al., 2014) and supply chain (Larsen et al., 2018) create value for the organization. Therefore, this opens a gap for this study to analyse the value of PPM strategic alignment for organizations.

Moreover, most of the alignment work should focus on aligning function strategy to business strategy as this alignment improves employee morale and effectiveness across other dimensions (Ilmudeen, 2019). Furthermore, Ilmudeen (2019) posited that, from the resource based view perspective (RBV), alignment can be seen as an asset that can be used for competitive advantage over the competition. The RBV school of strategy posits that, an organization's competitiveness is determined by its ability to acquire and maintain strategic internal resources that are valuable, rare, difficult to imitate, and difficult to substitute (Mintzberg, Ahlstrand, & Lampel, 1998). Therefore, this study views strategic alignment as a strategic internal resource from the RBV perspective as noted by Mintzberg et al. (1998) and Ilmudeen (2019).

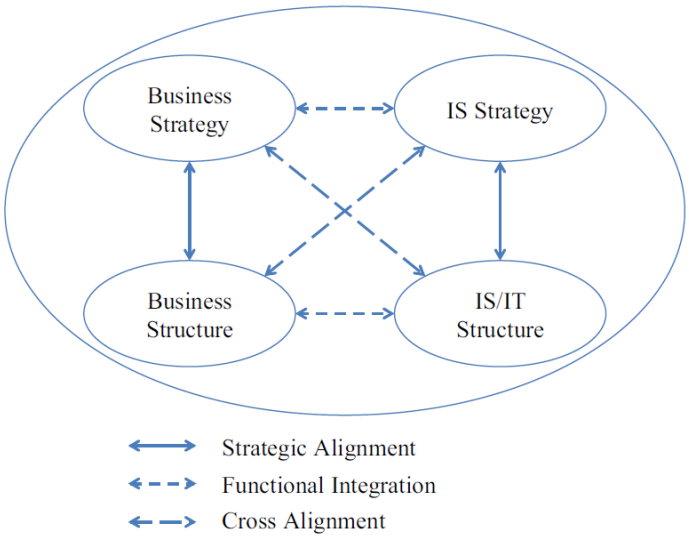
Luftman et al. (2017) postulated a model with six dimensions of IT-business alignment: communications, value analytics, IT Governance, Partnering, IT scope and ITT skills development. These dimensions were measured individually, however Luftman et al. (2017) found that individually, these dimensions did not have a significant influence on organizational performance. Further, Luftman et al. (2017) found that, collectively, these dimensions had a significant influence on organizational performance.

2.3.1 Strategic alignment model

Due to the lack of coherence on the studies of alignment, strategic alignment has been extensively studied for over 30 years in the IS (Information Systems) literature with multiple models being developed and no congruence reached (Luftman et al., 2017). IS scholars have studied alignment using two methods: (i) Strategic Alignment model (SAM) developed by Venkatraman, Henderson, and Oldach (1993) or (ii) a method developed by Reich and Benbasat, (1996) called the classification for alignment dimensions (Ilmudeen, 2019). However, Ilmudeen (2019) found that most studies have followed the SAM model as the platform from which other studies were developed. Wagner et al. (2014) also used the SAM model as a frame of reference for their study.

The strategic alignment concept originates from the strategic management literature before being used in the IS literature and the development of SAM (Renaud et al., 2016). Furthermore, the SAM model is the most popular model used by scholars and practitioners to study strategic alignment, particularly in the management information systems field (Renaud et al., 2016). Furthermore, most alignment models are based on the SAM 's four elements that need to be aligned (Luftman et al., 2017). Therefore, this study has also based the alignment construct test on the SAM model.

Figure 1: Strategic Alignment Model (Renaud et al., 2016, p. 91)



According to the SAM, organizations have four domains: business strategy, business structure, IS strategy, and IS structure (Renaud et al., 2016; Venkatraman et al., 1993). These domains are linked by functional integration and strategic alignment. In this model, functional managers and business managers must be aligned to each other's domains and adapt accordingly to changes in each other's areas (Renaud et al., 2016).

2.3.2 PPM strategic alignment

Strategic alignment has been found to improve organization performance (Street et al., 2018). Sardana, Terziovski, and Gupta (2016) further argued that strategic alignment is the primary contributor to organizational performance. Furthermore, project portfolio management effectiveness is directly proportional to PPM strategic alignment (Patanakul, 2015). However, if there is a lack of alignment with strategy, there is often a risk of "strategic blindness", whereby, projects are successfully implemented but fail to realize strategic goals of the organization (Arvidsson, Holmström, & Lyytinen, 2014). While the strategy is implemented through a portfolio of projects which compete, strategic alignment of these portfolio of projects is reached through portfolio management (Kopmann et al., 2017). PPM is the conduit between strategic formulation and implementation and translates organizational strategy into the project implementation roadmap (Kopmann et al., 2017). Therefore, organizations must closely manage the projects in the portfolio as the portfolio may have projects that are aligned to the formulated strategy, and emergent projects that are not (Kopmann et al., 2017).

On this note, planned emergence as a new strategic lens combines strategy as a plan, and

strategy as emerging, making project portfolio management a critical aspect of strategy, as the strategy transitions from the vision to execution (Kopmann et al., 2017). This approach departs from strategy as a plan only or strategy as emerging only. Kopmann et al. (2017) further posit that, to maximize value and reduce risk, organizations generally implement strategy through three stages of PPM:

- Prioritizing and selecting projects, which is seen as the most important phase;
- Allocating resources across all projects; and
- Steering the portfolio of projects by exploiting synergies, reprioritizing or terminating, and allocating resources.

Kopmann et al. (2017) also noted that top management determines or measures the success of strategic implementation on the fit between project portfolio and strategy. Therefore, to exploit the strategic potential of projects there needs to be an interaction between the project and other organizational levels (Pemsel, Müller, & Söderlund, 2016). This makes successful strategic implementation through PPM dependent on the organizational structural alignment with requirements of the organizational portfolio of projects (Kaiser et al., 2015). However, organizations do not involve project managers when discussing the expected project benefits, although project managers are critical in achieving the benefits envisaged by business (Musawir et al., 2017).

As a principle, Kim, Sting, and Loch (2014) argue that, an organization needs to approach strategy as an integrated and complimentary process. Thus, to achieve this alignment, strategy and PPM must be integrated and not managed separately whereby top management formulates strategy, and the project management components executes projects, without a requisite involvement in strategy formulation (Kaiser et al., 2015).

Lee and Puranam (2016) argue that, due to frequent imperfect strategy formulation by senior management, it is more beneficial to implement an imperfect strategy well, than to poorly implement a perfect strategy. Perfect implementation is defined by the extent to which execution activities are in alignment with strategic goals of the organization (Lee & Puranam, 2016). Moreover, it is possible for a project to fail with regards to achieving its internal project goals, but to still create value and benefits for business (Musawir et al., 2017). Conversely, it is possible for a project to meet its internal goals, and still not create the required business value (Musawir et al., 2017).

2.4 The theory of agility

The agility construct is relatively new (Shin et al., 2015) and was conceptualized by scholars

from the Iacocca Institute in 1991, and further studied and improved by other scholars (Brusset, 2016). Since then, there has been an increased interest in studying agility within academic research (Brusset, 2016). Agility can be assessed from the strategic lens as an organizational construct, or it can be assessed from a functional lens (i.e. manufacturing, operations, project management, etc.) (Conforto, Amaral, da Silva, Di Felippo, & Kamikawachi, 2016). For this study, the agility construct is analysed from the functional lens of the project portfolio management function.

Although agility is a construct that originates from the manufacturing field, known as “agile manufacturing” (Conforto et al., 2016) as a result of increased competition and a dynamic business environment, and uncertain production processes due to changing customer requirements (Vinodh & Aravindraj, 2015). “Global competition, changing customer demands, economic troughs, supplier upheavals and political turmoil have replaced business stability with permanent volatility” (Muduli, 2016, p. 1567). This is exacerbated by the increasing rate of turbulence in current business environments, which are in the era of digitization and big data (Park, El Sawy, & Fiss, 2017). Furthermore, organizations are facing complex, uncertain and turbulent business environments (Felipe, Roldán, & Leal-Rodríguez, 2016). Therefore, organizations are adopting agility as an enterprise wide strategy to survive and compete in this hypercompetitive, volatile and uncertain environment, where organizations struggle to survive (Brusset, 2016; Felipe et al., 2016). Alavi, Abd. Wahab, Muhamad, and Arbab Shirani (2014) support this argument by positing that organizations face an increasingly dynamic environment which requires them to be agile to remain competitive. Furthermore, Alavi et al. (2014) argue that agility is not an option for organizations, but a necessity. In an uncertain environment, an organization must be agile in order to survive unpredictable threats, take advantage of new business opportunities, and become competitive (Lu & Ramamurthy, 2011; Shin et al., 2015). Agility also allows organizations to perform better financially (Ghasemaghaei, Hassanein, & Turel, 2017).

Agility allows organizations to rapidly adapt to a changing environment and acquire new knowledge that enables them to be more effective and competitive (Cegarra-Navarro, Soto-Acosta, & Wensley, 2016). Cegarra-Navarro et al. (2016) further noted that organizations need to sustain agility through close coordination internally and with the environment. Furthermore, organizational agility has also been found to have a positive impact on organizational performance. Therefore, organizations that are not agile, will find it difficult to adapt to a changing environment. Organizational agility is important for organizations’ survival and competitiveness in this uncertain environment (Felipe et al., 2016; Park et al., 2017). Agility also enables organizations to detect changes in the environment and react accordingly (Felipe et al., 2016). In various industries such as fashion and electronics, organizations have no

choice but to be agile to survive as customer tastes and requirements are continuously changing (Brusset, 2016).

Lu and Ramamurthy (2011) argued that there are two types of agility. The first is market capitalization and operational adjustment agility. They define market capitalization agility as the ability of an organization to rapidly improve their products and services to address the needs of their customers by being entrepreneurial (entrepreneurial mind-set): reacting and anticipating changes in the external environment). Second is operational adjustment agility which refers to the ability of the organization's internal processes to rapidly respond to market demand changes (executional changes which are mostly routine and reactive). However, Lu and Ramamurthy (2011) warn that organizations must avoid information overload when doing an environmental scan as this may impede quick decision making.

Agility can be studied from different management lenses such as supply chain, marketing, human resources, etc. (Brusset, 2016). However, for this research, agility is studied from the project portfolio management lens.

Table 1: Semantic elements of the definition of agility (Conforto et al., 2016, p. 667)

<table>
<tr><th>Sub-Area</th><th>Entity (ENT)</th><th>Event (EVT)</th><th>(Event) Degree (DEG)</th><th>Trigger (TRG)</th></tr>
<tr><td>Agility in organization</td><td>Organization</td><td rowspan="3">Ability to change (e.g. products, platforms and services)</td><td rowspan="4">Quickly</td><td>Response to stakeholders or business' needs, technology, competitors, new market demands, or opportunities</td></tr>
<tr><td>Agility in manufacturing</td><td>Manufacturing</td><td rowspan="3">Response to customer or stakeholders needs, market or technology demands.</td></tr>
<tr><td>Agility in product development process</td><td>Product development process</td></tr>
<tr><td>Agility in project management</td><td>Project team</td><td>Ability to change the project plan</td></tr>
</table>

2.4.1 Defining agility

The goal of strategic agility is to quickly respond to shifting environmental conditions and customer requirements (Shin et al., 2015). However, there are different definitions of agility in the literature, making it difficult to measure the construct (Conforto et al., 2016). Furthermore,

literature is not consistent in defining agility, with varying definitions being proposed (Sherehiy & Karwowski, 2014).

Alavi et al. (2014) define organizational agility as "…the rapid and proactive adaption of organizational elements to uncertain and unexpected changes" (p. 6273). While Lu and Ramamurthy (2011) defined it as "a firm-wide capability to deal with changes that often arise unexpectedly in business environments via rapid and innovative responses that exploit changes as opportunities to grow and prosper" (p. 933). Felipe et al. (2016) posits that the organization's agility is about the ability of the organization to sense changes in the environment and act accordingly. Park, El Sawy, and Fiss (2017) defined organizational agility as "an organization's ability to quickly sense and respond to environmental changes in order to quickly seize market opportunities" (pg. 649).

Shin et al. (2015) define "strategic agility" as "a firm's strategic intent to achieve agile operations which are driven by the management emphasis on improving its time-based competitive advantage, namely responsiveness and adaptability to customers' needs and requirements." (p. 183).

Agility has various research streams, such as "organizational agility, manufacturing agility, supply chain agility, strategic agility" (Shin et al., 2015, p. 184). However, this research will view agility from the project portfolio management agility research lens.

To date, no robust definition has been developed in the project management theory to understand agility (Conforto et al., 2016). However from their study, Conforto et al. (2016) defined agility within project management as follows: "Agility is the project team's ability to quickly change the project plan as a response to customer or stakeholders needs, market or technology demands in order to achieve better project and product performance in an innovative and dynamic project environment." (p. 667).

2.4.2 Agility as a dynamic capability

"In fast-paced, globally competitive environments, consumer needs, technological opportunities, and competitor activity are constantly in a state of flux" (D. Teece, 2007, p. 1322). Therefore, organizations will not outperform their competitors by just using best-practice (D. Teece, 2007). In the current business environment, organizational agility is an important higher order (Ghasemaghaei et al., 2017) dynamic capability for organizations to effectively act in an uncertain business environment (Felipe et al., 2016; Shin et al., 2015). Agility has been identified as a dynamic capability, which tends to be applied by highly

entrepreneurial managers (D. Teece, 2007; D. Teece et al., 2016). Although uncertainty has always been part of doing business, in uncertain environments, it is important to execute the right activities than to executing correctly (D. Teece et al., 2016).

Teece, (2007) posits that dynamic capabilities have three categories:

- to sense opportunities and threats through continuously scanning and learning from the environment.
- to seize opportunities that are identified from scanning the environment through the development of a new product, service or process.
- to protect the organization's competitive advantage.

As competition and uncertainty have rapidly increased globally, agility has become an important dynamic capability in supply chain management, where organizations must adapt to the changes in customers' taste and behaviour (Brusset, 2016). However, D. Teece, Peteraf, and Leih, (2016) argue that, organizations cannot always remain agile as it is costly and involves foregoing efficiency. Therefore, management must ensure that agility is cost effective and appropriate. D. Teece et al. (2016) further warns that, having no agility is even more costly.

Agility is best analysed through the lens of the Resource-based View theory and Dynamic Capabilities theory, which is about reconfiguring resources in response to market changes. The ultimate outcome is to be competitive and further improve the ability of the organization to respond to an uncertain environment (Brusset, 2016). These capabilities are affected by internal and external factors.

Agility has been conceptualized from the strategic management theory of dynamic capabilities (Park et al., 2017). Dynamic capabilities have been defined as "firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments" (D. J. Teece, Pisano, & Shuen, 1997, p. 516). Therefore, this requires continuous sensing of the environment by the organization and adjusting itself accordingly (Park et al., 2017).

Alavi et al. (2014) argue that organizations require two capabilities to be effectively agile. Firstly, organizations must be able to quickly and effectively respond to threats in the environment. Secondly, they should quickly recognize and exploit opportunities in the environment. They authors further propose that this respond and exploit ability, must not only be reactive, but mostly proactive; allowing the organization to anticipate the business dynamics.

Within the agile project management literature, the dimensions used to measure agility lack sound theoretical conceptualization (Conforto et al., 2016). However, as agility should be measured as an independent construct not linked to any methodology or practice (Conforto et al., 2016), however, this study used agility in the PPM context due to the defined purpose and the research problem being with the PPM field.

2.4.3 The antecedents/dimensions of agility

Felipe et al. (2016) found that most of the research since the 1990s have studied organizational agility through a resource-based theoretical lens by focusing on information systems capabilities (ISC) as an antecedent for organizational agility. However, the authors noted that literature did not reach an academic consensus on the positive or negative impact of ISC on organizational agility as other factors (such as culture, organizational learning and leadership) may influence organizational agility. However, the authors posited that organizational agility originates from the two constructs of adaptability and proactivity. Moreover, three dimensions are identified, namely,: (i) gaining customer agility, (ii) partnering agility, and (ii) operational agility (Felipe et al., 2016). Brusset (2016) found that in the supply chain environment, information on partners do not have a positive impact on agility. However, internal capabilities (forecasting and planning) and external capabilities (responsiveness to customer requirements) had a positive impact on agility (Brusset, 2016). Moreover, Brusset (2016) posited that agility can be measured using two dimensions which are alertness and response capability.

Some researchers within the Information Systems field have argued that IT is a key driver towards achieving organizational agility (Felipe et al., 2016; Park et al., 2017). However, high amount of data generated by these IT systems have been found to cause information overload for organizations which impedes organizational agility (Park et al., 2017). Moreover, Park et al. (2017) found that IT's influence on agility was dependent on organizational and environmental contexts. The authors went further by arguing that agility is in general, context specific. While Ghasemaghaei et al. (2017) posited that IT is a lower order dynamic capability that is an antecedent for agility.

Based on the dynamic capabilities theory, Park et al. (2017) argued that there are three key dimensions of agility, which are,: (i) sensing, (i) decision making, and (iii) acting. However, D. Teece et al. (2016) posited that agility is dependent on two dimensions: (i) an entrepreneurial management team, and (iii) flexible business structures that can be changed quickly. The authors do agree that these capabilities allow the organization to sense and seize

opportunities.

Park et al. (2017) found that although various researchers define agility using different theoretical lenses, they mostly conceptualize it as the ability of the organization to sense and to respond to two critical dimensions of agility. However, they believe that sense-and-respond does not fully explain agility. Therefore, using the "…organizations as information processing and interpretation systems…" (p. 652) theoretical framework, they added decision making, as an important aspect of agility. Furthermore, the authors noted that this sense-respond process can either be proactive or reactive to opportunities or threats.

Although agility and flexibility have been used interchangeably, flexibility is an antecedent of agility (Shin et al., 2015). They further found that strategic agility has four dimensions, namely, (i) technology capability, (iii) collaborative innovation, (iii) organizational learning, and (iv) internal alignment. However, Ghasemaghaei et al. (2017) argued that agility has two dimensions, which are (i) operational adjustment (Internal) and (ii) market capitalization (external and entrepreneurial).

Agility also has three dimensions, which are (i) adaptability (ability of employees to change themselves to adapt to a changing environment), (ii) proactivity (employees; ability to take initiatives in a changing environment) and (iii) resilience (ability to work well under stress) (Cai, Huang, Liu, & Wang, 2018; Sherehiy & Karwowski, 2014). Moreover, Cai et al. (2018) argued that these dimensions had three moderating psychological conditions, namely, psychological meaningfulness, psychological availability, and psychological safety. Sherehiy and Karwowski (2014) found the following attributes for each dimension:

- **Proactivity**: anticipation of risks, taking action to mitigate against identified problems, generating solutions for problems.
- **Adaptive**: being able to adapt to deal with different personalities and cultures, continuous personal development, flexibility of roles by being able to take different roles based on work requirements.
- **Resilience**: embracing change, high tolerance to a turbulent environment (internal and external), high tolerance for stress.

2.4.4 Bottom-up agility

Strategy is dynamic and contextual, and it can occur at the project level (Löwstedt et al., 2018), as strategy and projects have a two-way relationship (Kopmann et al., 2017). Moreover, Löwstedt et al. (2018) argued that the project is not just a strategic execution arena, it can also

be an arena for strategizing, as projects have a bottom-up impact on organizational strategy. Therefore, organizations must pursue both top-down and bottom-up strategies, as the top-down strategy limits the organization's possibilities (Maniak & Midler, 2014). Furthermore, an organization will learn from the bottom-up feedback through projects (Löwstedt et al., 2018). As strategic formulation is rarely perfect due to the effect of bounded rationality, and limited information ex ante, organizations should promote bottom-up dynamic strategic formulation (Lee & Puranam, 2016). Lee and Puranam (2016) further argue that, organizations must adapt their strategies based on bottom-up feedback. This approach will allow organization to benefit from the strategy-as-practice, which is about what organizations do, rather than what organizations have, as what organizations do impacts organizational goals (Löwstedt et al., 2018).

Sardana et al. (2016) postulated that, for organizations to be effective and responsive to the changing environment, they must also have the dynamism to respond to these changes. Sardana et al. (2016) found dynamic capabilities to produce improved strategic goals in a manufacturing business. This view is supported by Teece (2007), who argued that dynamic capabilities are the key ingredient to sustainable, and superior long term business performance in a rapidly changing environment. Moreover, PPM is an organizational dynamic capability enabling organizations to better deal with dynamic change in the environment (Kopmann et al., 2017).

Flexibility in strategy should be considered by organizations due to the changing business environment, changing customer requirements, technological changes, and the dynamic business environment, organizations should consider (Patanakul, 2015).

2.4.5 Agile project management

Agile Project Management (APM) is mostly used as a project management methodology in software development projects within the IT sector in order to improve project success through agility (Conforto et al., 2016). The methodology is used to adjust quickly to a continuously changing environment and user requirements within the field of software development projects in order to achieve project success (Conforto et al., 2016). However, Conforto et al. (2016) found that the project management literature notes that project success depends on the context and environment factors within which that project is executed.

2.4.6 Workforce agility

Agility is the ability of an entity (team or organization) and not a practice or methodology, while

the practice or methodology may be contributing factors to the entity's ability to be agile (Conforto et al., 2016). Although workforce agility and its accurate definition have not been fully established and studied (Muduli, 2016). Sherehiy and Karwowski (2014) found that existing literature agrees that an organization cannot be agile without an agile workforce, as people have been found to be more important than technologies in achieving agility (Muduli, 2016). This makes workforce agility a critical enabler for organization agility (Sherehiy & Karwowski, 2014). The ability to autonomously anticipate and prevent problems are important capabilities for an agile workforce, particularly in complex environments (Sherehiy & Karwowski, 2014).

Agility is a characteristic of an empowered workforce (Shin et al., 2015), which is an important capability for employees to acquire so that they can take advantage of environmental changes to benefit the organization (Cai et al., 2018). To improve agility, the workforce must be able to have the flexibility to deal with changes immediately at their working environment (Vinodh & Aravindraj, 2015), as an workforce is able to deal with uncertainty (Alavi et al., 2014).

Organizational learning, decentralization of decision-making and a flat structure were found to correlate with workforce agility (Alavi et al., 2014). However Alavi et al. (2014) propose that the workforce's attitude and behaviour are critical to an agile organization. Therefore, if an organization's employees are agile, there is likelihood that the organization will be agile, which is expected to improved business growth. The authors proposed that the dimensions of workforce agility are: Proactivity, Adaptability and Resilience. **Proactivity** is defined as "Initiation of the activities that have positive effect on changed environment", while **adaptability** is defined as " Changing or modifying oneself or their behaviour to better fit new environment" and **resilience** is defined as "Efficient functioning under stress, despite changing environment or when applied strategies and solutions have failed" (Alavi et al., 2014, p. 6277). This research used these dimensions and definitions of workforce agility to measure and analyse the construct of agility.

2.5 Alignment-agility paradox

Strategic alignment and agility is about moving quickly in harmony and congruence in order to reach an organization's strategic objectives (Shin et al., 2015). Furthermore, internal alignment is one of the four capabilities of agility (Shin et al., 2015). However, organization's cannot just embrace agility without stability as this will create chaos (Lu & Ramamurthy, 2011). Therefore, they must balance the conflicting requirements of both agility and stability to avoid unintended consequences of implementing agility (Lu & Ramamurthy, 2011).

Wagner et al. (2014) and Luftman et al. (2017) also found that agility was positively associated with performance. Furthermore, Ilmudeen (2019) supported this view, stating that strategic alignment is a predictor of business success, therefore better strategic alignment is expected to increase business success. However, Shin et al., (2015) noted that researchers in the IT field found that high levels of alignment may impede organizational agility. Sabherwal, Sabherwal, Havakhor, and Steelman (2019) also found that although scholars and senior executives in the IS field agree that strategic alignment between business and IT is important, there are scholars who have argued that alignment may negatively impact organizational performance and cause inflexibility. Lu and Ramamurthy (2011) also found that the tools that organizations implement to improve agility (such as IT infrastructure) sometimes bring unintended consequences of complexity and prohibits agility. This is similar to what Zhou et al. (2018) found and called this phenomenon the "alignment-agility" paradox. This is the main basis of this study within a PPM context.

2.6 Strategic goals

Gagné (2018) defines strategic goals as "Clear and specific sub-goals meant to achieve the mission (also referred to as vision)" (p. S84). These goals are at an organizational level and focus on "what" needs to be done (Gagné, 2018). Moreover, Gagné (2018) posits that an organization cannot set goals that are superficial. Organizations should develop strategic goals having considered their internal resource limitations or capabilities, as well as the external environment.

Management theory has accentuated the importance of strategic goals as they ensure overall organizational success: (Gagné, 2018; Kotlar, De Massis, Wright, & Frattini, 2018; Linder & Foss, 2018). Furthermore, strategic goals influence the organization's financial success, ensure efficiency in execution, improves engagement and motivation. Organizations also integrate efforts and influence behaviour (Gagné, 2018; Linder & Foss, 2018). Linder and Foss (2018) argued that strategic goals are "…central to the functioning, behaviour, performance and perhaps even survival of organizations." (p. S39).

2.7 Conclusions of literature review

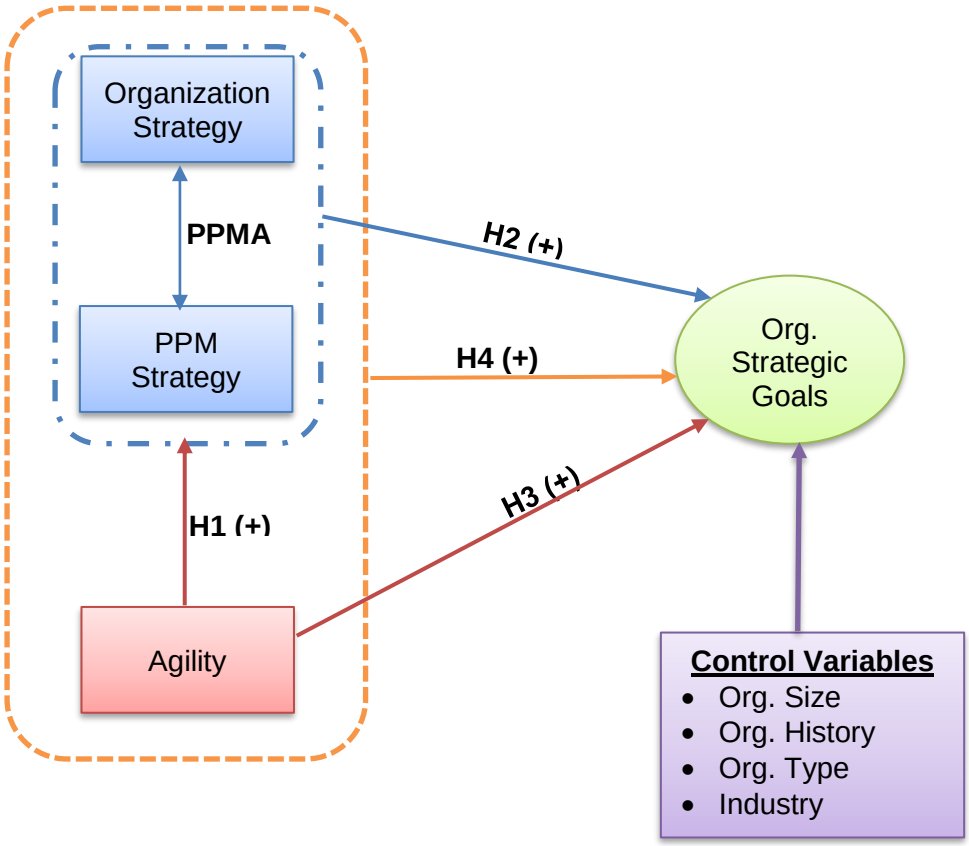
- Various scholars have accentuated the importance of aligning the project portfolio with the organization's strategy, and therefore contributing to organizational success in strategic implementation (Patanakul, 2015). This alignment has been found to be important to ensure that the organization reaches its strategic goals (Loufrani-Fedida & Saglietto, 2016).

- Organizational performance can be measured through three attributes: financial, productivity, and customer benefit (Gerow et al., 2014). Moreover, Gerow et al. (2014) found that organizational performance may also be measured through other attributes such as costs reductions, revenue, customer value, and operational efficiencies. However, for organizations to achieve this performance, they need to reach their strategic goals that are determined by the organization and its stakeholders (Patanakul, 2015).
- The construct of agility is relatively new (Shin et al., 2015), and still difficult to measure as literature has different definitions of the construct (Conforto et al., 2016).
- Other scholars have posited that PPM agility is an important attribute that moderates strategic alignment (Kopmann et al., 2017; Lee & Puranam, 2016; Maniak & Midler, 2014; Sardana et al., 2016). However, other authors have found that strategic alignment may impede business agility/dynamic capability to adapt to a changing environment in the IT industry. This opens a gap in literature to study the relationship of PPM strategic alignment and PPM agility, and how this relationship affects organizational strategic goals.

3 CHAPTER 3: RESEARCH HYPOTHESES

From the research problem identified in chapter one and the literature review thereafter (in chapter two). Four hypotheses were developed, which resulted in a conceptual research model that guided this research. The figure below (Figure 2) depicts the conceptual model of the hypotheses that were tested during this research.

Figure 2: Conceptual research model



Furthermore, control variables (Industry, organization size, organization history, and PPM methodology) similar to those used by Zhou et al. (2018) is introduced to test if they have a statistical significant impact on the constructs.

Four hypotheses have been identified:

- **H1**: There is a positive relationship between PPM agility and an organization's PPM strategic alignment.
- **H2**: There is a positive relationship between PPM strategic alignment and an organization achieving its strategic goals.
- **H3**: There is a positive relationship between PPM agility and an organization achieving its strategic goals

- **H4**: PPM strategic alignment and PPM agility have a positive relationship with an organization achieving its strategic goals.

The conceptual model presented in Figure 2 above and the resultant hypotheses will be used to guide the research methodology that will follow in chapter four. The research methodology will focus on strategies to test all the hypotheses based on the conceptual model.

4 CHAPTER 4: RESEARCH METHODOLOGY

4.1 Introduction

Saunders and Lewis (2018) argue that, the researcher's philosophy will influence the types of assumptions they make during their research. The authors note that these assumptions may be ontological, which deals with reality, epistemological dealing with knowledge or axiological which deals with values and ethics. Since there is existing theory for the current study, and its identified constructs, the author's epistemological assumptions were that of positivism as defined by Saunders and Lewis (2018). This chapter discusses the research methodology used, the unit of analysis, population, sample size and method, the research instrument, data collection and analysis process. Furthermore, this chapter outlines the quality controls processes to ensure validity and reliability of the results. Moreover, the statistical methods used are also discussed as selection of appropriate statistical methods is critical to ensure valid statistical findings (Wegner, 2016). Finally, the limitations of the research methodology are discussed.

4.2 Research design and methodology

The deductive approach is suitable where there is existing theory that needs to be further clarified, and where there is a need to test the relationship amongst constructs (Saunders & Lewis, 2018). Moreover, Saunders and Lewis (2018) suggested an explanatory study as suited for research which aims to explain the impact of the relationship between variables. As the purpose of this research is to test and explain existing theory, an explanatory study, following a deductive approach was followed to test the relationship between PPM strategic alignment, agility and organization strategic goals. Due to the researcher's philosophical assumption of positivism, and the selected research approach of deduction, a quantitative research methodology was suitable for this study. Furthermore, as there was no intervention undertaken on the study, and due to the time limited time-horizon, a cross-sectional study was undertaken.

When measuring latent variables, an indirect measurement instrument is required (Brusset, 2016). As this study measures latent variables (Alignment, Agility and Strategic Goals), a questionnaire was used as an indirect measurement instrument with most items adapted from existing literature.

4.3 Population

The population consisted of individuals that work for organizations that use PPM for strategic

implementation. Therefore, only respondents who met this criterion were selected for this study. To ensure that the correct respondents were selected for the sample, a screening question was included as part of the demographics section of the questionnaire. This question was studies as follows: “Does your organization manage a collection of projects or programs to achieve its strategic goals?”. If the respondent answered “No” to this question, they were excluded from the sample. The population included multiple respondents who did not have homogenous roles (i.e. executive) as this minimizes the possibility of a common method bias (Brusset, 2016; Lu & Ramamurthy, 2011).

4.4 Unit of analysis

The unit of analysis was organizations implementing the constructs of PPM for strategic implementation to reach their strategic goals.

4.5 Sampling method and size

A non-probability sampling technique should be used where the researcher cannot determine the complete list of the members of their population under study to further determine the sampling frame (Saunders & Lewis, 2018). Therefore, since the researcher was unable to determine the complete list of organization using PPM for strategic implementation, and the individuals within these organizations, the research followed a purposive non-probability sampling method. Furthermore, as the researcher was measuring the relationship between constructs, a survey was followed as an appropriate strategy for this research. The data collection instrument selected was a self-completed online questionnaire that consisted of the same questions, in the same order to all respondents.

Cegarra-Navarro et al. (2016) argued that their sample size of 110 valid questionnaires was sufficient for their study. Moreover, the authors had eight constructs (including organizational agility and organization performance) with 47 questions. This was less than three times responses per observed variable. However, the authors still managed to prove reliability and validity with a sample size of 110 valid responses. Furthermore, Brusset (2016) stated that a recommended “heuristic” value for a sample size is five times the observable variables quantity. For this study, there were 21 observable variables (six for PPM strategic alignment, twelve for agility, three for strategic goals achievement). Therefore, consistent with Brusset (2016), the minimum sample size was 105 valid responses. Having received 143 valid responses, this met the minimum sample size to proceed with further analysis.

4.6 Data collection

The researcher selected respondents who meet the criteria from their personal contacts within the professional working environment and social circles. This is a similar approach to Park et al. (2017) who used personal contacts to collect data. The following mediums were used to contact the respondents:

- Direct E-mail: A mailing list was created, which included the researcher's relevant acquaintances within the professional and social circles. The link to the online questionnaire was sent to these acquaintances through email, as a primary method of contacting respondents. an e-mail survey has been found to be effective where there is a large population size and unfavourable cost of contacting respondents (Brusset, 2016).
- Furthermore, the following secondary methods were used:
    - Professional Bodies: The researcher requested permission from the project management body called the Project Management Institute – South African Chapter (PMISA) and the South African Institute of Measurement and Control (SAIMC) for their administrators to share the research questionnaire with their members. However, these requests were somewhat unsuccessful.
    - LinkedIn – The link to the survey was shared on the researcher's LinkedIn profile and on relevant LinkedIn groups where the researcher is a member. Furthermore, direct LinkedIn messages were sent to some of the researchers' followers on LinkedIn.
    - Snowball: The researcher included a note on the emails and LinkedIn posts for respondents to share the survey link with their relevant contacts.

4.7 Research instrument

As per the research design and methodology discussed above, a questionnaire was used as a research instrument for this research. The questionnaire is attached in Appendix A. The questionnaire was mostly developed using items from existing instruments in literature. All questions were made compulsory to be completed to ensure that there are no incomplete responses received. The questionnaire was divided into four sections as follows:

- Section A: Demographics – to understand the respondent's background and demographics, their organization, and the industry they operate in. This information was used for descriptive statistics and analysis of control variables.
- Section B: Strategic alignment – items to measure PPM strategic

alignment.

- Section C: Agility – items to measure workforce agility which is divided into three dimensions: proactivity, adaptability and resiliency.
- Section D: Strategic Goals – this section is divided into two parts: part one asks the respondents to list their top three organizational strategic goals (with a minimum of one goal required), part 2 measures the level of the organization's achievement of its strategic goals.

All variables [strategic alignment, agility (through its three dimensions) and strategic goals] were measured using a five point Likert scale. As indicated in Table 2 below, the scale ranges from one (strongly disagree) to five (strongly agree), with scores coded from one to five respectively.

Table 2: Instrument five-point Likert scale

Rating	Score
Strongly disagree	1
Disagree	2
Neutral	3
Agree	4
Strongly agree	5

4.7.1 Workforce agility

There are various predictors of workforce agility such as those found by Alavi et al. (2014), and as noted in the literature review in chapter 2 above. However, for this study, three dimensions that were used to measure workforce agility are: proactivity, adaptability and resilience. These dimensions were chosen as they were evaluated to comprehensively explain the workforce agility construct (Alavi et al., 2014). Moreover, Alavi et al. (2014) found that scholars viewed workforce agility variable differently. Some scholars viewed it as a dependent variable, some defined it as an independent variable, while others studied it as a mediator variable. For this study, workforce agility was studied as an independent variable to align with the proposed research model in chapter three.

This study measured workforce agility using twelve items (four items per dimension) adapted from the instrument used by Alavi et al. (2014). Agility was measured as a second-order construct made up of the three latent variables (proactivity, adaptability and resiliency). This is similar to the approach by Felipe et al. (2016), where they used a two stage approach to

measure agility as a multidimensional construct.

4.7.2 PPM strategic alignment

PPM strategic alignment was measured using questions adapted from Gerow et al. (2014)'s study on alignment suing the SAM framework developed by Venkatraman et al. (1993). Only the six questions that measure alignment between business strategy and the business functional strategy (IT function in their study) were used for developing the questionnaire. This alignment is called strategic/intellectual alignment, and has been commonly used in other studies to measure strategic alignment (Gerow et al., 2014). However, these questions were adapted to suit the project portfolio management function by changing the concept of IT to PPM.

4.7.3 Strategic goals

The first part of the strategic goals section of the instrument allowed respondents to identify their organization's strategic goals. The Ansoff Matrix (Ansoff, 1957) was used to code/categorize strategic goals identified by the respondents. This work by H. Igor Ansoff is still used by many scholars in the field of strategic management (Martinet, 2010). Zeschky, Winterhalter, and Gassmann (2014) also recently used the Ansoff Matrix as part of their research methodology to classify cases in their study. Ansoff (1957) identified four strategies for organizations: market penetration, market development, product development, and diversification. However, while coding, two other common themes emerged from the data. The first theme was focused on "Operational Excellence" which encompassed improvement in efficiencies, implementation of new process, improving productivity, etc. The second theme was "Financial Performance" where respondents identified goals such as profitability, cost reductions, financial matrices, etc. These were added as they manifested themselves as common codes outside the Ansoff codes. Table 3 indicates the codes used for organizational strategic goals identified by respondents.

Table 3: Strategic goals codes

Strategic goals	Code
Market Penetration	1
Product Development	2
Market Development	3
Diversification	4
Operational Excellence	5
Financial Performance	6
Missing	0

The second part of the strategic goals section of the instrument measured the level of achievement of strategic goals by the organization. This section consisted of three items, which measured the respondent's view on the executives' satisfaction with the achievement of strategic goals, their own view of the organization's achievement of strategic goals, and the level of success of the organization's projects. These items were measured using the five-point Likert scale.

4.7.4 Control variables

Although agility is mainly expected to have a positive influence on organization performance, scholars have found mixed results on the association between agility and various organization performance matrices such as return on assets, market penetration, etc. (Shin et al., 2015). Moreover, the authors found that strategic agility did not have a significant influence on organizational financial performance. Therefore, the control variables in Figure 2 from chapter 2 (organization size, industry, organization history and PPM methodology) are used to test for variances amongst these variables that may impact the relationships. Furthermore, Park et al. (2017) argued that organizational size has an impact on the ability of the organization to be agile due to the varying capabilities, behaviours and complexities of organizations based on size. They further posited that, the number of employees was one of the proxies used to determine organizational size. Furthermore, as the organization's size increases, its complexity increases, which may create agility difficulties.

Lu and Ramamurthy (2011) used industry sector, organization size (number of employees), organization age (number of years the organization has been in business) as control variables in their study. Felipe et al., 2016 also controlled for organization size and organization age in their study. Furthermore, Brusset (2016) included economic sector as a control variable in their study. It has also been argued that agility levels may vary based on organization size and industry (Ghasemaghaei et al., 2017). D. Teece (2007) also posited that the requirement for dynamic capabilities is mostly critical for multi-national organizations, and for certain business and sectoral contexts. However, Conforto et al. (2016) argued that the team's ability to be agile and use agile methods is not dependent on the industry.

Scholars have also found that smaller businesses use speed and responsiveness as a competitive advantage over larger, more resourced organizations (Shin et al., 2015). Furthermore, in smaller organizations, alignment is expected to be higher as senior managers/owners are more involved in the daily operations of the business.

4.7.5 Instrument pre-test

The questionnaire was tested through an online pilot survey of two respondents that are similar to the selected sample to ensure correct phrasing and clarity, thereafter the questionnaire was refined before final administration. This was to ensure that the online technology functioned properly and ready for implementation, the questions are clear, and the respondents will be able to answer them accurately. Any issues with the questionnaire were corrected before the questionnaire was distributed to all potential respondents. This is a common method used by other scholars (Alavi et al., 2014; Conforto et al., 2016; Felipe et al., 2016; Lu & Ramamurthy, 2011; Park et al., 2017) to test and improve instrument validity and reliability.

After doing a pilot of the questionnaire and getting some feedback from the pilot respondents. Minor changes were done to the questionnaire. The changes are as noted below

- Section D: Under Organization Goals. Added a question: "What are your organization's top 3 strategic goals". This is to ascertain if most companies have similar goals, and if the type of goal is related in any way to it being achieved.
- Question 12: Add Professional Services/Consulting as an additional industry under the "type of industry" question.
- Question 7. Change question 7 to: "Does your organization manage a collection of projects or programs to achieve its strategic goals?". This is to tighten it as a qualifying question. The options are YES/NO. If the answer is NO, then these respondents will not qualify. This is to improve reliability of the results.
- Consent Statement: Spelling/Grammar errors noted and corrected on the consent statement.

4.8 Data analysis process

The data was analysed using hierarchical regression analysis to allow for the influence of control variables on the model. This analysis was undertaken through the SPSS statistical software. The analysis focused on independent variables (PPM agility, and PPM strategic alignment), and the dependent variable (organization strategic goals).

4.8.1 Data cleaning and coding

Data cleaning is an important step before analysing data, as data may come with errors and may result in poor statistical analysis (Wegner, 2016). The data was downloaded from Google Forms to an Excel spreadsheet to allow for data cleaning and coding before loading to the

IBM® SPSS® Statistics Version 25 (SPSS) statistical tool to be used for analysis.

To make it easier to import the data into SPSS for analysis, instrument questions were replaced with codes on Excel. A code book was generated in Excel to keep track of these codes. The code book, with the complete list of codes is attached as Appendix B. PPMA (x), where "x" is the item number, was used to code project portfolio management strategic alignment, PAC (x) for resiliency, ADP (x) for adaptability, RES (x) for resiliency, SGA (x) for strategic goals achievement, and STG (x) for strategic goals.

Thereafter, all responses were coded as discussed in chapter 2. For example, Likert scale answers were replaced with their defined numerical codes: Strongly agree was replaced by 5, agree replaced by 4, etc. Similarly, the rest of the questions were coded by their respective codes as per chapter 2 and the code book in Appendix B.

The cleaned and coded the data was loaded on SPSS. However, three negative questions were included in the questionnaire (PAC03, RES01 and RES02). Therefore, the Likert scale answers for these questions had to be reverse coded, where 5 = 1, 4 = 2, 3 = 3, 2 = 4, 1 = 5). Thereafter, these variables were renamed (PAC03_r, RES01_r and RES02_r) to identify them as reverse coded variables.

Furthermore, it is important for correct measurement scales and data types to be selected to ensure that appropriate statistical methods are applied to the data (Wegner, 2016). Therefore, the correct data types were selected for each variable. For the demographics: gender job description country, strategy phase, project management method organization type, and industry were selected as nominal type data. Similarly, the strategic goals variable was also selected as nominal data. Nominal data is qualitative and does not have any numeric properties (Wegner, 2016). However, work experience, organizational history, and organizational size were selected as ordinal data. Ordinal data is categorical data that has an "implied ranking" as each category can be ranked against another category (Wegner, 2016). For example, organizational experience can be ranked by organizations which have been in existence for the highest number of years, down to organizations with the least number of years. The rest of the variables were measured using the five-point Likert scale. Likert scale variables are categorized as interval variables that can be treated as numeric data as they have enough numeric properties, however, they do not have a *zero point* (Wegner, 2016).

4.8.2 Testing for construct validity

Content validity has been found to be subjective and judgmental (Brusset, 2016). However,

Alavi et al. (2014) and Park et al. (2017) argued that developing a questionnaire and scales from existing instruments and literature improves reliability and validity of the instrument. Therefore, for this study, content validity was further strengthened as all questions were adapted from existing instruments that were from peer reviewed articles published in high impact journals.

Although the instrument was mainly developed from existing instruments and literature, it was adapted to suit the context of PPM. Furthermore, the respondents were mostly from South Africa, which is a different context from the population of the instruments. Therefore, to determine the underlying factor structure and instrument validity, an Exploratory Factor Analysis (EFA) was conducted. EFA is used test for convergent validity and unidirectionality of constructs, with validity and unidimensionality being achieved when items load on their relative factors (Lu & Ramamurthy, 2011). Furthermore, construct unidirectionality is confirmed when Eigenvalues are greater than one (Beavers et al., 2013; Cegarra-Navarro et al., 2016). Construct validity measures how well questions relate to each other with regards to the common construct (Brusset, 2016). It is proved by high factor loadings of measures of the constructs (Brusset, 2016).

Moreover, convergent validity is assessed by determining whether the correlations for the same indicators are high amongst themselves. Finally, discriminant validity is assessed by determining if all item loadings have the strongest loadings on their respective construct compared to other constructs (Alavi et al., 2014; Zhou et al., 2018).

Before analysing the rest of the results of the EFA. The Bartlett's Test of Sphericity and the Kaiser-MeyerOlkin Test of Sampling Adequacy (KMO) were used to assess if variables can be factored (Beavers et al., 2013). When the Bartlett's Test of Sphericity is significant at ($p < .05$), it means that the matrix is factorable. The KMO indicates the degree of common variance amongst the items. A KMO of less than .70 is not acceptable, while a KMO greater than .80 is "meritorious", and a KMO greater than .90 is "marvellous" as per the interpretation guidelines (Beavers et al., 2013). Therefore, for this study a KMO was required to be above .70 to accept the model.

Factor loadings of greater than .70 on an item are considered good identifiers of the factor. However, these factors must cross load for more than .40 on another factor (Beavers et al., 2013). Moreover, Beavers et al. (2013) noted that some scholars have argued that factor loadings greater than .50 can be considered as strong loadings, with cross lower loadings lower values ($r = .32$).

The two types of rotational methods available for EFA are orthogonal and oblique rotations (Beavers et al., 2013). However, orthogonal rotations are rotations that have been found to be suitable for uncorrelated dimensions and mostly not theoretically appropriate (Beavers et al., 2013). Therefore, Beavers et al. (2013) recommends oblique rotations as an appropriate rotational method in social science where correlation between dimensions is prevalent . From the oblique methods available, there is no one method that is superior to the other (Beavers et al., 2013). Therefore, the Promax rotation method that is available on SPSS was used for this study.

As the EFA analysis is an iterative process (Beavers et al., 2013), multiple steps were taken before arriving at the final solution. Items which do not have significant loadings ($r < 0.3$) (Beavers et al., 2013) were removed and the solution rerun for further analysis as they do not significantly explain the dimension. Furthermore, items which cross loaded to other factors significantly ($r > 0.4$) (Beavers et al., 2013) also need to be removed and the EFA rerun again to achieve a more refined solution.

4.8.3 Testing for instrument reliability

Reliability of the entire scale was tested by using the Cronbach's Alpha, with a generally accepted lower limit of 0.6 (Sardana et al., 2016). However, Zhou et al. (2018) argued that the Cronbach's Alpha higher than .70 indicates sufficient reliability. This assertion is supported by Alavi et al. (2014) who stated that Cronbach's Alpha values higher than .70 for variables were considered to be high and acceptable to prove reliability.

Furthermore, a consistency matrix was used to ensure that a coherent, logical golden thread was followed for consistency and a tightly researched problem. Saunders and Lewis (2018) argued that coherence between the research problem, the methodology, and research questions are fundamental to ensure the credibility of the findings.

4.8.4 Descriptive Statistics of items and constructs

Furthermore, descriptive statistics were conducted on all observable items of the questionnaire to analyse the range, the mean scores, and the standard deviation of the responses. These results were then used to calculate the construct means based on the factors deducted from the EFA conducted in section 4.8.2 above. The average per factor were then calculated on SPSS using the means of its related items to calculate the factor/construct mean. This factor mean was then used to further analyse relationships between constructs at the factor level, and not at the item level as validity and reliability had been confirmed in

sections 4.8.2 and 4.8.3.

4.8.5 Mean scores comparison

Consistent with what Alavi et al. (2014) undertook in their study. Central tendency statistical measures were conducted per construct to determine whether there was a difference in responses across different demographics that were identified in section 4.7.4 above. For the test of means between two variables, the *t-test* statistic is appropriate. However, for the testing of more than two variables, an analysis of variance (ANOVA) test should be conducted (Wegner, 2016).

4.8.6 Test for constructs relationships

Correlation analysis is used to determine the strength of the relationships between variables (Wegner, 2016). Zhou et al. (2018) and Alavi et al. (2014) also used correlation analysis for the same test between all constructs. The Pearson's r correlation was used to understand the relationship between the constructs.

4.8.7 Hypothesis testing

Hierarchical regression analysis was used to test the four research hypotheses stated in chapter three above. Control variables (industry, organization history, organization type, and organization size) were loaded in step one, while latent variables (PPM strategic alignment and/or agility) were loaded in step two. Therefore, the hierarchical regression analysis produced an output with two models. Model one results explained the effects of control variables, while model two explained the effects of latent variables on the model. However, for the fourth hypothesis (H4), a three-step hierarchical regression analysis was conducted to allow for the additional latent variable in the model. Guided by the hierarchical regression analysis conducted by Zhou et al. (2018) and guidelines by Field (2013) , the key indicators that were analysed were:

- *R* (Correlation coefficient): This indicated how closely correlated the predictors (independent variables) were to the dependent variable. The values ranged from zero to one, where a correlation of one meant perfect correlation, and zero meant no correlation.
- R^2 (R square/coefficient of determination): This value represented how much of the variability in the dependent variable could be explained by the loaded independent variable (ranged between zero and one, which related to a proportional value between

0% and 100%).

- *ANOVA Sig.*: Indicated whether the model loaded is a good fit for the data at the 95% confidence interval.
- *Unstandardised co-efficients Sig.*: Determined if each of the independent variables were significant predictors of the dependent variable in the linear equation at the 95% confidence interval.
- *B (Slope/Gradient)*: These were the numbers for the straight line equation of the regression model which was: *Dependent Variable = B*Independent Variable + Constant*. If the *B* value indicated negative, this indicated a negative relationship between the independent variable and the dependent variable. However, if the *B* value was positive, this indicated a positive relationship. The larger the value, the more contribution that variable made to the model.
- ΔR^2 *(R Square Change*) and *Sig. F Change*: The change in R^2 from model one to model two and three. This indicated how much contribution the additional independent variables made to the model. This was read together with the *Sig. F Change* to determine the significance of the change at a 95% confidence level.
- Furthermore, Beta weights and their statistical significance in the coefficients output were used to evaluate weather each of the individual predictor variables accounted for a unique amount of variance in the dependent variable.

4.9 Conclusion

The research methodology that will guide the statistical tests conducted in the following chapter (chapter five) were outlined in this chapter. This chapter outlined the tests and parameters for construct validity through EFA, instrument reliability through the Cronbach's Alpha, and hypotheses tests through hierarchical regression analysis. Furthermore, other descriptive and correlation statistical tests were outlined. Chapter five will follow the research methodology as outlined in this chapter in a broadly sequential manner.

5 CHAPTER 5: RESULTS

The results of the statistical tests that were run through SPSS are outlined in this chapter with limited discussion. A detailed discussion on the results will be provided in chapter six. This chapter starts by describing the sample and its demographics. Furthermore, construct validity, instrument reliability, descriptive statistics, and means scores comparison results are also presented. The chapter will conclude by presenting the results of the hypothesis tests through hierarchical linear regression.

5.1 Sample description

The data collection period started with the first respondent's completion of the questionnaire on 30th July 2019, while the last respondent completed the questionnaire on 19th October 2019. A total of 155 completed responses were received. The data was exclusively collected using Google Forms. Having downloaded the data to Excel, the respondents were labelled RSP001 (respondent number 1) to RSP155 (respondent number 155), and their email addresses were deleted from the data to ensure anonymity. Duplicate responses were checked by using e-mail addresses to verify that each respondent only completed one survey (one response per respondent). Furthermore, it was confirmed by comparing the answers of the duplicate responses. These were found to be the same, confirming that they were duplicate responses. Four pairs of duplicate responses were found (RSP072 and RSP073, RSP101 and RSP102, RSP118 and RSP119, RSP148 and RSP149), therefore, four were deleted from the data (RSP072, RSP101, RSP118 and RSP148), ensuring that only unique respondents were left in the sample.

The questionnaire had one disqualifying question as discussed in chapter 4, which was: "Does your organization manage a collection of projects or programs to achieve its strategic goals?". If the respondent answered "No" to this question, a filter function was used in Excel to identify them, and they were deleted from the data as they did not meet the requirement of the target population (individuals who work for organizations who use the construct of PPM for executing strategy). Eight respondents had answered "No" to this question (RSP138, RSP085, RSP143, RSP019, RSP020, RSP091, RSP072 and RSP104). Having deleted the duplicate responses and the disqualified responders, the sample size was reduced from 155 to N = 143 responses.

5.2 Respondents demographics

Table 4 below outlines the demographics of the sample 143 qualified respondents in the sample. From these respondents, 119 (83.22%) were males, while 24 (16.78%) were females.

Most of the respondents were based in South Africa (96.50%) and occupied management positions in organizations such as, Executives/Directors (25.17%), Project managers (23.78%), and other managers (18.18%). Furthermore, most of the respondents had working experience of 11 years or more (74.83%), worked for organizations with 100 or more employees (77.62%) that have been in business for 11 years or longer (86.01%).

The results of the organizations' top three strategic goals in Appendix C indicate that the top strategic goal for most organizations is operational excellence as (39.16% of respondents as SG1). It is followed by market penetration (23.78%) and market development (13.99%). Moreover, operational excellence was selected by most respondents as the second (SG02: 37.80%) and third strategic goal (SG03: 43.75%). However, product development is a second choice in both SG02 (18.90%) and SG03 (17.86%). Financial performance was second in SG02 (16.54%) and SG03 (16.07%), while diversification was consistently rated last from SG01 to SG03 (2.80%, 4.72%, and 3.57%.

Table 4: Sample demographics (N = 143)

		Frequency	Percent
Gender	Male	119	83.22%
	Female	24	16.78%
Job Description	Executive/Director	36	25.17%
	Project Manager	34	23.78%
	Other Managers	26	18.18%
	Engineers, Technicians	19	13.29%
	Senior Project Manager	11	7.69%
	Portfolio Manager	10	6.99%
	Administrators, Planners	4	2.80%
	Projects Director	3	2.10%
Country	South Africa	138	96.50%
	Other Countries	5	3.50%
Work Experience	16+ years	61	42.66%
	11 - 15 years	46	32.17%
	6 - 10 years	28	19.58%
	1 - 5 years	8	5.59%
Phase in Strategy	Strategy Implementation/Execution	69	48.25%
	Both	62	43.36%
	Strategy Formulation	12	8.39%
Project Management Methodology	PMBOK	53	37.06%
	No formal methodology	49	34.27%
	Mixed Methodologies	23	16.08%
	Other	9	6.29%
	Agile	4	2.80%
	PRINCE2	4	2.80%

	Waterfall	1	0.70%
Organization History	16+ years	111	77.62%
	11 - 15 years	12	8.39%
	1 - 5 years	11	7.69%
	6 - 10 years	9	6.29%
Organization Size	Greater than 1000	72	50.35%
	0 - 100	39	27.27%
	101 - 500	21	14.69%
	501 - 1000	11	7.69%
Organization Type	Private (Not Listed)	69	48.25%
	Public (Listed on the stock exchange)	30	20.98%
	Government Entity	24	16.78%
	State Owned Entity	19	13.29%
	Other	1	0.70%
Industry	Energy	29	20.28%
	Other	22	15.38%
	Manufacturing	17	11.89%
	Water	17	11.89%
	Professional Services/Consulting	16	11.19%
	Construction	14	9.79%
	Mining	8	5.59%
	Information Technology	5	3.50%
	Financial Services	5	3.50%
	Telecommunications	5	3.50%
	Education	3	2.10%
	Agriculture	2	1.40%

5.3 Construct validity results

5.3.1 The Bartlett's Test of Sphericity and the Kaiser-MeyerOlkin Test of Sampling Adequacy (KMO)

Construct validity was tested by conducting the EFA test as outlined in paragraph 4.8.2. However, before proceeding with the EFA a KMO and Bartlett's Test of Sphericity had to be conducted to ensure model can be used for factor analysis. High KMO of .882, which is higher than the lower limit of .70 was found. The Bartlett's Test of Sphericity was also significant (p = .000) at the confidence level of ($p < 0.05$). Therefore, these results indicated that the variables may be factored and the EFA conducted. The results of the KMO and Bartlett's Test of Sphericity are outlined in Table 5 below.

Table 5: KMO and Bartlett's test of sphericity results

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.882
Bartlett's Test of Sphericity	Approx. Chi-Square	1817.357
	df	210
	Sig.	.000

5.3.2 Exploratory factor analysis

As posited in chapter four, EFA is an iterative process, therefore, multiple steps (four) were taken to arrive at a final solution. These steps are outlined below with step four being the final EFA solution.

5.3.2.1 EFA Step 1

For step one, all Likert scale items which represented all latent variables were loaded. Extraction was set at principal axis factoring for an EFA analysis with extraction based on an Eigenvalue of greater than one. Promax rotation was selected as argued in chapter four, with a default Kappa of four. Absolute reduction was set to 0.300 (non-significant loadings as argued in chapter four). Therefore, the EFA output did not display loadings less than 0.300.

From the output of step 1 in Table 6 below, one cross loading (r = -.307) for item SGA03 was found. Moreover, the cross loading was too small to generate a major difference to the model as SGA03 loaded high (1.066) on factor three. However, PAC02 and RES04 did not load on any factor (r < .300); therefore, these items were removed from the model in step two. Furthermore, RES03 is loading with the adaptability construct (r = .339) (ADP), which is not rational, and it is the lowest loaded item on the construct. Therefore, RES03 was also removed from the model in step two.

Table 6: Step 1 EFA results

	Factor				
	1	2	3	4	5
PPMA05	.963				
PPMA06	.923				
PPMA03	.875				
PPMA04	.824				
PPMA01	.809				

PPMA02	.755				
PAC02					
ADP04		.927			
ADP03		.779			
ADP02		.778			
ADP01		.576			
RES03		.339			
RES04					
SGA03			1.066		-.307
SGA01			.740		
SGA02			.615		
PAC01			.568		
RES02_r				.713	
RES01_r				.650	
PAC03_r					.592
PAC04					.408

Extraction Method: Principal Axis Factoring.
Rotation Method: Promax with Kaiser Normalization.
a. Rotation converged in 6 iterations.

5.3.2.2 EFA Step 2

Having made the changes to the model as outlined above in step one, the EFA was the run again. The results of the step two EFA are show in Table 7 below. RES01_r had a high cross loading (*r* >.400), therefore this item was removed for step three of the EFA.

Table 7: Step 2 EFA results

	Factor			
	1	2	3	4
PPMA05	.951			
PPMA06	.919			
PPMA03	.861			
PPMA04	.830			
PPMA01	.779			
PPMA02	.704			
SGA03		.910		
SGA01		.693		
PAC01		.652		
SGA02		.613		
ADP01		.389	.374	

ADP04			.940	
ADP03			.749	
ADP02			.628	
PAC03_r				.661
RES01_r			.408	.427
PAC04		.390		.422
RES02_r				.304

Extraction Method: Principal Axis Factoring.
Rotation Method: Promax with Kaiser Normalization.
a. Rotation converged in 7 iterations.

5.3.2.3 EFA Step 3

For step three item RES02_r was not loaded on any factor due to low factor loading (*r* <.300). Therefore, RES02_r was removed for step four of the EFA.

Table 8: Step 3 EFA results

Pattern Matrix[a]

	Factor			
	1	2	3	4
PPMA05	.961			
PPMA06	.932			
PPMA03	.869			
PPMA04	.833			
PPMA01	.789			
PPMA02	.726			
ADP04		.975		
ADP03		.817		
ADP02		.727		
ADP01		.478		
RES02_r				
SGA03			1.153	-.324
SGA01			.640	
SGA02			.572	
PAC01			.464	.300
PAC03_r				.619
PAC04				.570

Extraction Method: Principal Axis Factoring.
Rotation Method: Promax with Kaiser Normalization.
a. Rotation converged in 5 iterations.

5.3.2.4 EFA Step 4

The final EFA model output is shown in Table 9 below. All loadings are above 0.300 and there are no cross loadings higher than 0.400. The factors have been reduced from five in step one to four in step four. The four factors are: PPM Strategic Alignment (PPMA), Adaptability (ADP), Strategic Goals Achievement (SGA), and Proactivity (PAC). PAC01 has loaded with SGA and was left in the SGA construct. However, all items of Resiliency (RES), which is a dimension of agility, have been removed from the model, as the EFA found them to be invalid.

Table 9: Step 4 EFA results

Pattern Matrix[a]

	Factor			
	1	2	3	4
PPMA05	.957			
PPMA06	.930			
PPMA03	.868			
PPMA04	.831			
PPMA01	.787			
PPMA02	.729			
ADP04		.951		
ADP03		.807		
ADP02		.730		
ADP01		.479		
SGA03			1.149	-.319
SGA01			.646	
SGA02			.572	
PAC01			.476	
PAC03_r				.611
PAC04				.536

Extraction Method: Principal Axis Factoring.

Rotation Method: Promax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

5.4 Instrument reliability results

Only items that passed the EFA validity test in paragraph 5.3 were kept as part of the constructs to measure reliability. Reliability was measured using the Cronbach's Alpha as outlined in paragraph 4.8.3.

5.4.1 Project portfolio management strategic alignment reliability results

From the EFA results, all six PPM strategic alignment (PPMA) items loaded high on the construct. Therefore, all six items were loaded for the Cronbach's alpha reliability test. The outcome of the test is indicated in Table 10 below. A high Cronbach's alpha at (r = .936) was found, therefore the PPMA construct was reliable (r > .700). Item total statistics indicated that this is the best model fit, as no higher Cronbach's alpha can be achieved with any item deleted. Therefore, all items were kept for measuring the PPMA construct.

Table 10: PPMA reliability results

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.936	.936	6

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
PPMA01	17.30	21.677	.777	.640	.929
PPMA02	17.39	22.113	.738	.610	.933
PPMA03	17.73	21.098	.830	.704	.922
PPMA04	17.64	21.472	.814	.682	.924
PPMA05	17.71	20.730	.858	.809	.918
PPMA06	17.62	20.872	.847	.805	.920

5.4.2 Adaptability reliability results

From the EFA results, all four adaptability (ADP) items loaded high on the construct. Therefore, all four items were loaded for the Cronbach's alpha reliability test. The outcome of the test is indicated in Table 11 below. A high Cronbach's alpha at (r = .881) was found, therefore the ADP construct was reliable (r > .700). Item total statistics indicated that this is the best model fit, as no higher Cronbach's alpha can be achieved with any item deleted. Therefore, all items were kept for measuring the ADP construct.

Table 11: Adaptability reliability results

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.881	.882	4

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
ADP04	11.01	7.204	.765	.622	.839
ADP03	10.96	7.505	.784	.636	.832
ADP02	10.89	7.044	.750	.565	.846
ADP01	10.57	8.387	.683	.480	.870

5.4.3 Proactivity reliability results

From the EFA results, only two out of four proactivity (PAC) items loaded high on the construct. Therefore, these two items were loaded for the Cronbach's alpha reliability test. The outcome of the test is indicated in Table 12 below. The Cronbach's alpha was too low at (r = .365), therefore this model is not reliable (r < .700). Furthermore, item total statistics indicate that there is no better model fit, as no higher Cronbach's alpha can be achieved with any item deleted.

Table 12: Proactivity reliability results

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.365	.365	2

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
PAC03_r	3.95	1.019	.223	.050	.
PAC04	2.97	1.048	.223	.050	.

5.4.4 Strategic goals achieved reliability results

From the EFA results, all three Strategic Goals Achieved (SGA) items loaded high on the construct. Moreover, one proactivity item (PAC01) also loaded on the SGA construct. Therefore, the three SGA items and PAC01 were loaded for the Cronbach's alpha reliability test of SGA. The outcome of the test is indicated in Table 13 below. A high Cronbach's alpha at (r = .818) was found, therefore the SGA construct was reliable (r > .700). Item total statistics indicated that this is the best model fit, as no higher Cronbach's alpha can be achieved with any item deleted. Therefore, all items were kept for measuring the SGA construct.

Table 13: Strategic goals achieved reliability results

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.818	.822	4

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
PAC01	10.25	6.500	.576	.332	.800
SGA01	10.49	6.618	.619	.478	.782
SGA02	10.80	5.642	.622	.448	.786
SGA03	10.57	5.825	.764	.620	.714

5.5 Measurement items and descriptive statistics

The descriptive statistics were only conducted on items and constructs that had passed validity and reliability in sections 5.3 and 5.4 above. Three constructs that met this condition were: adaptability/agility, PPM strategic alignment, and strategic goals achieved. The output of histogram frequencies below (Figure 3, Figure 4, and Figure 5) for all constructs indicates that the constructs mostly fit normality.

5.5.1 Project portfolio management strategic alignment descriptive statistics

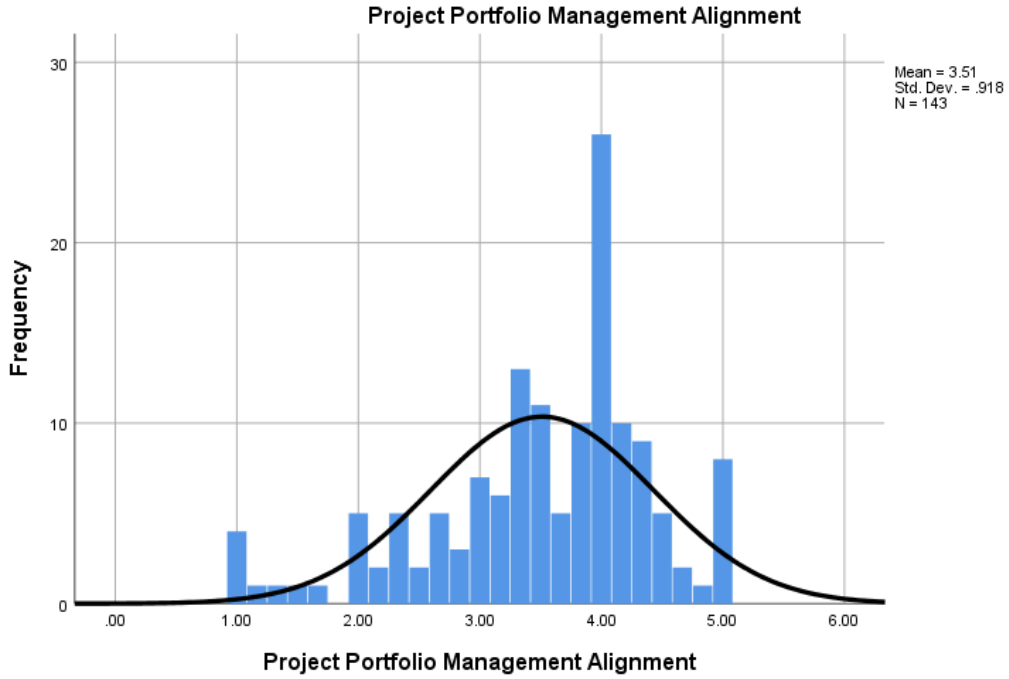
The descriptive statistics for observable items of PPMA are indicated in Table 14 and Figure 3 below. The overall PPMA construct had a mean score of 3.513 (SD = 0.918).

Table 14: PPMA items descriptive statistics (*n* = 143)

	PPMA01	PPMA02	PPMA03	PPMA04	PPMA05	PPMA06	Project Portfolio Management Alignment
Mean	3.78	3.69	3.34	3.44	3.37	3.46	3.5128
Std. Deviation	1.044	1.031	1.062	1.032	1.079	1.073	.91780

The highest item score was for PPMA01 (*M* = 3.780, *SD* = 1.040), and the lowest scored item was PPMA03 (*M* = 3.340, *SD* = 1.062).

Figure 3: PPMA frequencies histogram



5.5.2 Adaptability (Agility) descriptive statistics

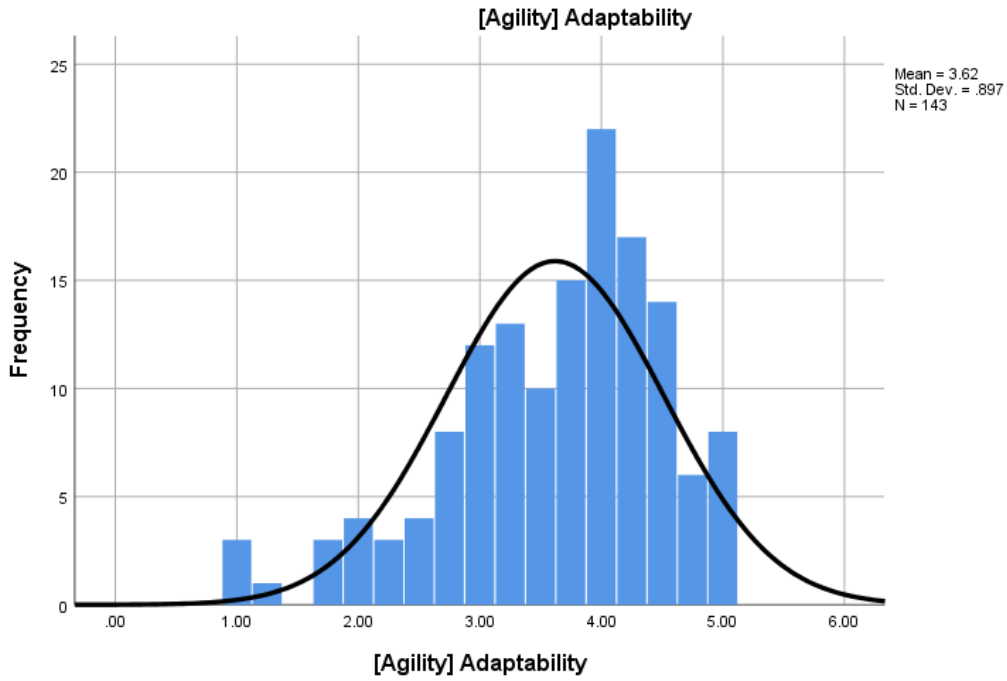
The descriptive statistics for observable items of ADP are indicated in Table 15 and Figure 4 below above. The overall ADP construct had a mean score of 3.619 (*SD* = 0.897).

Table 15: Adaptability (Agility) descriptive statistics (*n* = 143)

Statistics					
	ADP01	ADP02	ADP03	ADP04	[Agility] Adaptability
Mean	3.90	3.59	3.52	3.47	3.6189
Std. Deviation	.922	1.140	1.013	1.093	.89739

The highest item score was for ADP01 (*M* = 3.900, *SD* = 0.922), and the lowest scored item was ADP04 (*M* = 3.470, *SD* = 1.093).

Figure 4: Agility frequencies histogram



5.5.3 Strategic goals achieved descriptive statistics

The descriptive statistics for observable items of SGA are indicated in Table 16 and Figure 5 below. The overall SGA construct had a mean score of 3.509 (*SD* = 0.802).

Table 16: Strategic goals achieved descriptive statistics (*n* = 143)

Statistics					
	SGA01	SGA02	SGA03	PAC01	Strategic Goals Achieved
Mean	3.55	3.24	3.47	3.78	3.5087
Std. Deviation	.902	1.138	.963	.972	.80240

The highest item score was for PAC01 (*M* = 3.780, *SD* = 0.972), and the lowest scored item was SGA02 (*M* = 3.240, *SD* = 1.138).

Figure 5: Strategic goals achieved frequencies histogram

5.6 Mean scores comparison between demographics results

Mean scores tests were conducted to verify if there were differences in responses between respondents' organizational demographics. Only organizational demographics tests were conducted as the unit of analysis for this study are organizations. An analysis of variance (ANOVA) test was conducted as there are more than two groups (variables) for all organizational demographics (independent variables) measured in this study.

5.6.1.1 Mean scores comparison by project management methodology

The results outlined in Table 17 indicate that, there is no statistically significant difference at a 95% confidence level ($p < 0.05$) amongst the different project management methodologies used by organizations in this sample group.

Table 17: Mean scores results by project management methodology

Descriptives

		N	Mean	Std. Deviation
Project Portfolio Management Alignment	No formal methodology	49	3.3707	0.85545
	Agile	4	3.3750	0.79786
	PMBOK	53	3.6918	0.78745
	Waterfall	1	3.5000	
	PRINCE2	4	4.0833	0.48113
	Other	9	3.3889	1.28290
	Mixed Methodologies	23	3.3768	1.20313
	Total	143	3.5128	0.91780
[Agility] Adaptability	No formal methodology	49	3.4286	0.88682
	Agile	4	3.5625	0.62500
	PMBOK	53	3.6368	0.86403
	Waterfall	1	4.0000	
	PRINCE2	4	4.4375	0.82601
	Other	9	3.5000	1.12500
	Mixed Methodologies	23	3.8804	0.90726
	Total	143	3.6189	0.89739
Strategic Goals Achieved	No formal methodology	49	3.4184	0.80102
	Agile	4	3.8125	0.59073
	PMBOK	53	3.4198	0.77331
	Waterfall	1	3.5000	
	PRINCE2	4	4.6250	0.32275
	Other	9	3.7500	0.84779
	Mixed Methodologies	23	3.5652	0.84348
	Total	143	3.5087	0.80240

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Project Portfolio Management Alignment	Between Groups	4.629	6	0.772	0.913	0.488
	Within Groups	114.986	136	0.845		
	Total	119.615	142			
[Agility] Adaptability	Between Groups	6.331	6	1.055	1.328	0.249
	Within Groups	108.023	136	0.794		
	Total	114.354	142			

Strategic Goals Achieved	Between Groups	6.770	6	1.128	1.813	0.101
	Within Groups	84.657	136	0.622		
	Total	91.427	142			

5.6.1.2 Mean scores comparison by organization's history

The results outlined in Table 18 indicates no statistically significant difference at a 95% confidence level ($p < 0.05$) amongst the different organization's history in this sample group.

Table 18: Mean scores results by organization's history

Descriptives				
		N	Mean	Std. Deviation
Project Portfolio Management Alignment	1 - 5 years	11	3.3485	1.27901
	6 - 10 years	9	3.0185	1.24846
	11 - 15 years	12	3.4028	0.97302
	16+ years	111	3.5811	0.83783
	Total	143	3.5128	0.91780
[Agility] Adaptability	1 - 5 years	11	3.9318	1.10731
	6 - 10 years	9	4.0000	0.57282
	11 - 15 years	12	3.7917	0.83824
	16+ years	111	3.5383	0.89582
	Total	143	3.6189	0.89739
Strategic Goals Achieved	1 - 5 years	11	3.7727	1.01523
	6 - 10 years	9	3.6667	0.64952
	11 - 15 years	12	3.5833	0.98473
	16+ years	111	3.4617	0.77327
	Total	143	3.5087	0.80240

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Project Portfolio Management Alignment	Between Groups	3.159	3	1.053	1.257	0.292
	Within Groups	116.457	139	0.838		
	Total	119.615	142			
[Agility] Adaptability	Between Groups	3.464	3	1.155	1.447	0.232
	Within Groups	110.890	139	0.798		
	Total	114.354	142			
Strategic Goals Achieved	Between Groups	1.303	3	0.434	0.670	0.572
	Within Groups	90.123	139	0.648		
	Total	91.427	142			

5.6.1.3 Mean scores comparison by organization's size

The results outlined in Table 19 indicate only one statistically significant difference at a 95% confidence level ($p < 0.05$) for strategic goals achieved by different organization sizes at $p = 0.029$. The highest mean score for organizations of sizes between 501 – 1000 employees ($M = 3.681$, $SD = 0.759$). The lowest mean score for organizations with greater than 1000 employees ($M = 3.319$, $SD = 0.804$).

Table 19: Mean scores results by organization's size

Descriptives

		N	Mean	Std. Deviation
Project Portfolio Management Alignment	0 - 100	39	3.1966	1.12187
	101 - 500	21	3.5794	0.85735
	501 - 1000	11	3.7273	0.57384
	Greater than 1000	72	3.6319	0.82457
	Total	143	3.5128	0.91780
[Agility] Adaptability	0 - 100	39	3.9103	0.83012
	101 - 500	21	3.5952	0.78053
	501 - 1000	11	3.6364	0.91763
	Greater than 1000	72	3.4653	0.93852
	Total	143	3.6189	0.89739
Strategic Goals Achieved	0 - 100	39	3.6346	0.84458
	101 - 500	21	3.8333	0.58808
	501 - 1000	11	3.6818	0.75904
	Greater than 1000	72	3.3194	0.80406
	Total	143	3.5087	0.80240

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Project Portfolio Management Alignment	Between Groups	5.521	3	1.840	2.242	.086
	Within Groups	114.095	139	0.821		
	Total	119.615	142			
[Agility] Adaptability	Between Groups	5.025	3	1.675	2.130	.099
	Within Groups	109.329	139	0.787		
	Total	114.354	142			
Strategic Goals Achieved	Between Groups	5.740	3	1.913	3.104	.029
	Within Groups	85.687	139	0.616		
	Total	91.427	142			

5.6.1.4 Mean scores comparison by organization's type

The results outlined in Table 20 indicate only one statistically significant difference at a 95% confidence level ($p < 0.05$) for strategic goals achieved by different organization type at $p = 0.009$. The highest mean score for non-listed private companies ($M = 3.688$, $SD = 0.789$). Lowest mean score for organizations with greater than 1000 employees (M = 3.3194, $SD = 0.80406$). The lowest mean scores were by "other" types of organizations, however, there was only one organization measured, which was not sufficient to make inferences. Therefore, the next lowest organization type was considered. Therefore, the lowest mean score was that of state owned entities ($M = 3.184$, $SD = 0.686$).

Table 20: Mean scores results by organization's type

Descriptives				
		N	Mean	Std. Deviation
Project Portfolio Management Alignment	Public (Listed on the stock exchange)	30	3.3667	1.00706
	Private (Not Listed)	69	3.5242	0.93684
	Government Entity	24	3.5069	0.81424
	State Owned Entity	19	3.7719	0.81500
	Other	1	2.3333	
	Total	143	3.5128	0.91780
[Agility] Adaptability	Public (Listed on the stock exchange)	30	3.7000	0.83923
	Private (Not Listed)	69	3.7500	0.86496
	Government Entity	24	3.3438	0.95500
	State Owned Entity	19	3.4079	0.97969
	Other	1	2.7500	
	Total	143	3.6189	0.89739
Strategic Goals Achieved	Public (Listed on the stock exchange)	30	3.5333	0.75354
	Private (Not Listed)	69	3.6884	0.78871
	Government Entity	24	3.2917	0.82642
	State Owned Entity	19	3.1842	0.68639
	Other	1	1.7500	
	Total	143	3.5087	0.80240

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Project Portfolio Management Alignment	Between Groups	3.317	4	0.829	0.984	.418
	Within Groups	116.298	138	0.843		
	Total	119.615	142			
[Agility] Adaptability	Between Groups	4.801	4	1.200	1.512	.202
	Within Groups	109.553	138	0.794		
	Total	114.354	142			
Strategic Goals Achieved	Between Groups	8.471	4	2.118	3.523	.009

	Within Groups	82.956	138	0.601		
	Total	91.427	142			

5.6.1.5 Mean scores comparison by organization's industry

The results outlined in Table 21 indicate only one statistically significant difference at a 95% confidence level ($p < 0.05$) for project portfolio management strategic alignment by different industries at $p = 0.040$. The highest mean score for organizations within the construction industry ($M = 3.982$, $SD = 0.504$). The lowest mean score for organizations within the information technology industry (M = 2.233, $SD = 1.211$).

Table 21: Mean scores results by organization's industry

Descriptives				
		N	Mean	Std. Deviation
Project Portfolio Management Alignment	Manufacturing	17	3.5686	0.83554
	Information Technology	5	2.2333	1.21106
	Energy	29	3.5920	0.86326
	Construction	14	3.9405	0.46962
	Water	17	3.6373	0.62426
	Financial Services	5	3.7667	0.76012
	Mining	8	3.7083	0.75986
	Agriculture	2	3.1667	0.23570
	Telecommunications	5	3.7333	1.25610
	Professional Services/Consulting	16	3.6354	0.99855
	Other	22	3.1136	1.12850
	Education	3	3.0556	0.85527
	Total	143	3.5128	0.91780
[Agility] Adaptability	Manufacturing	17	3.5588	0.91656
	Information Technology	5	4.1500	0.57554
	Energy	29	3.4741	0.98730
	Construction	14	4.1250	0.38916
	Water	17	3.4412	0.92504
	Financial Services	5	3.6000	1.21963
	Mining	8	3.8125	0.94255
	Agriculture	2	3.8750	0.53033
	Telecommunications	5	3.6500	0.89443
	Professional Services/Consulting	16	3.6563	0.86060
	Other	22	3.5114	0.92414
	Education	3	3.0000	1.39194
	Total	143	3.6189	0.89739
Strategic Goals Achieved	Manufacturing	17	3.4265	0.94689
	Information Technology	5	3.6500	0.69821

Energy	29	3.2672	0.86585
Construction	14	3.9821	0.50444
Water	17	3.3235	0.74354
Financial Services	5	3.8000	0.32596
Mining	8	3.6563	0.68057
Agriculture	2	3.3750	0.53033
Telecommunications	5	2.8500	1.23238
Professional Services/Consulting	16	3.6250	0.87560
Other	22	3.7045	0.60078
Education	3	3.1667	1.23322
Total	143	3.5087	0.80240

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Project Portfolio Management Alignment	Between Groups	16.728	11	1.521	1.936	.040
	Within Groups	102.888	131	0.785		
	Total	119.615	142			
[Agility] Adaptability	Between Groups	8.066	11	0.733	0.904	.539
	Within Groups	106.288	131	0.811		
	Total	114.354	142			
Strategic Goals Achieved	Between Groups	9.841	11	0.895	1.437	.164
	Within Groups	81.585	131	0.623		
	Total	91.427	142			

5.7 Constructs relationships results

Correlations between constructs were tested using Pearson's correlation as purported in chapter four paragraph 4.8.6. The results of the correlation test are shown in Table 22 below. These results indicate that there are statistically significant correlations ($p < .01$) amongst all constructs. All correlations are significant at $p = .000$. The strongest correlation was found between agility and the organization achieving its strategic goals ($r = .635$), while the weakest correlation was found between agility and PPM strategic alignment ($r = .422$).

Table 22: Constructs correlation results

Correlations				
		Project Portfolio Management Alignment	[Agility] Adaptability	Strategic Goals Achieved
Project Portfolio Management Alignment	Pearson Correlation	1	.422**	.495**
	Sig. (2-tailed)		.000	.000
	Sum of Squares and Cross-products	119.615	49.324	51.734
	Covariance	.842	.347	.364
	N	143	143	143
[Agility] Adaptability	Pearson Correlation	.422**	1	.635**
	Sig. (2-tailed)	.000		.000
	Sum of Squares and Cross-products	49.324	114.354	64.976
	Covariance	.347	.805	.458
	N	143	143	143
Strategic Goals Achieved	Pearson Correlation	.495**	.635**	1
	Sig. (2-tailed)	.000	.000	
	Sum of Squares and Cross-products	51.734	64.976	91.427
	Covariance	.364	.458	.644
	N	143	143	143
**. Correlation is significant at the 0.01 level (2-tailed).				

5.8 Research hypotheses tests results

A hierarchical regression analysis was conducted to test all four research hypotheses following the procedure outlined in paragraph 4.8.7. However, for hypothesis four, a three-step hierarchical regression analysis was conducted, while a two-step hierarchical regression analysis was conducted for the other three hypotheses.

5.8.1 Hypothesis 1 (H1)

- **H_0 (Null hypothesis 1):** There is no relationship between PPM agility and an organization's PPM strategic alignment.
- **H_1 (Alternative Hypothesis 1):** There is a positive relationship between PPM agility and an organization's PPM strategic alignment.

A two-step hierarchical regression analysis was conducted to examine the relationship between PPM agility and an organization's PPM strategic alignment. Table 23 summarizes the results of the test. In the first step, only the control variables were loaded to the model to examine their predictive capacity of the PPM strategic alignment construct. From the model summary, model one indicates that the control variables are not statistically significant predictors of PPM strategic alignment at the significance level of $p < 0.05$ where F (4, 138) = 1.667, p = .161. Furthermore, a variance of 4.60% (R^2 = .046) is attributable to the control variables.

However, after introducing agility as a predictor variable in model two, the model accounts for 27.3% of the variance (R^2 = .273). The ANOVA results indicate that the model is statistically significant at the significance level of $p < 0.05$ where F (5, 137) = 10.269, p = 0.000. Therefore, when combined, agility and the control variables are statistically significant predictors of PPMA.

Furthermore, from the change statistics in the model summary section of Table 23, indicates that a 22.70% of the variance was attributable to agility when it was added to the model (ΔR^2= .227). This additional variance was statistically significant at the significance level of $p < 0.05$ where F (1, 137) = 42.661, p = .000. Therefore, agility accounts for a statistically significant unique variance in PPMA above and beyond the control variables.

All Beta weights were not statistically significant for model one (p > 0.05) on all control variables. Therefore, none of the control variables were unique predictors of PPM strategic alignment in model one. However, when agility was introduced in model two, the agility beta weight was significant at the significance level of $p < 0.05$ (p = .000). Moreover, organizational size also had a statistically significant Beta weight (p = .018). However, agility had the highest Beta (B = .502), making it the highest predictor variable. This was followed by organizational size with a Beta of .151. The rest of the control variables (organizational history, industry and organizational type) were not statistically significant unique predictors of PPMA. Therefore, the resultant equation for predicting PPM strategic alignment was as follows:

Equation 1

$$PPMA = .782 + (.078 \times Org\_Hist) + (.151 \times Org\_Size) + (.099 \times Org\_Type) - (.015 \times Industry) + (.502 \times Agility)$$

Table 23: Hypothesis 1 hierarchical regression results

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.215[a]	.046	.018	.90930	.046	1.667	4	138	.161
2	.522[b]	.273	.246	.79693	.227	42.661	1	137	.000

a. Predictors: (Constant), Industry, Org_Hist, Org_Type, Org_Size

b. Predictors: (Constant), Industry, Org_Hist, Org_Type, Org_Size, [Agility] Adaptability

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.514	4	1.378	1.667	.161[b]
	Residual	114.102	138	.827		
	Total	119.615	142			
2	Regression	32.608	5	6.522	10.269	.000[c]
	Residual	87.008	137	.635		
	Total	119.615	142			

a. Dependent Variable: Project Portfolio Management Alignment

b. Predictors: (Constant), Industry, Org_Hist, Org_Type, Org_Size

c. Predictors: (Constant), Industry, Org_Hist, Org_Type, Org_Size, [Agility] Adaptability

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.068	.435		7.045	.000
	Org_Hist	.040	.100	.040	.397	.692
	Org_Size	.107	.071	.153	1.498	.136
	Org_Type	.041	.082	.043	.507	.613
	Industry	-.021	.019	-.092	-1.103	.272
2	(Constant)	.782	.518		1.510	.133
	Org_Hist	.078	.088	.078	.890	.375
	Org_Size	.151	.063	.216	2.401	.018
	Org_Type	.099	.072	.104	1.374	.172
	Industry	-.015	.017	-.065	-.890	.375
	[Agility] Adaptability	.502	.077	.491	6.532	.000

a. Dependent Variable: Project Portfolio Management Alignment

5.8.2 Hypothesis 2 (H2)

- **H_0 (Null hypothesis 2):** There is no relationship between PPM strategic alignment and an organization achieving its strategic goals.
- **H_1 (Alternative Hypothesis 2):** There is a positive relationship between PPM strategic alignment and an organization achieving its strategic goals.

A two-step hierarchical regression analysis was conducted to examine the relationship between PPM strategic alignment and an organization achieving its strategic goals. Table 24 summarizes the results of the test. In the first step, only the control variables were loaded to the model to examine their predictive capacity of an organization achieving its strategic goals.

From the model summary, model one indicates that the control variables are statistically significant predictors of an organization achieving its strategic goals at the significance level of $p < 0.05$ where F (4, 138) = 2.849, p = .026. Furthermore, a variance of 7.60% (R^2 = .076) is attributable to the control variables.

However, after introducing PPM strategic alignment as a predictor variable in model two, the model accounts for 39.00% of the variance (R^2 = .390). The ANOVA results indicate that the model is statistically significant at the significance level of $p < 0.05$ where F (5, 137) = 17.48, p = 0.000. Therefore, when combined, PPM strategic alignment and the control variables are statistically significant predictors of an organization achieving its strategic goals.

Furthermore, from the change statistics in the model summary section of Table 24, the results indicate that a 31.30% of the variance was attributable to PPM strategic alignment when it was added to the model (ΔR^2= .310). This additional variance was statistically significant at the significance level of $p < 0.05$ where F (1, 137) = 70.30, p = .000. Therefore, above and beyond the control variables, PPM strategic alignment accounts for a statistically significant unique variance in an organization achieving its strategic goals.

Only the beta weight of organization type was statistically significant for model one at the significance level of $p < 0.05$ (p = .036). However, when PPM strategic alignment was introduced in model two, the PPM strategic alignment beta weight was significant at the significance level of $p < 0.05$ (p = .000). Moreover, organizational size (p = .004) and organization type (p = .004) also had statistically significant beta weights at the significance level of $p < 0.05$. However, PPM strategic alignment had the highest beta (B = .501), making it the highest predictor variable. It was followed by organizational type (B = -.170) and organizational size (B = -.119), which were negatively correlated to an organization achieving

its strategic goals. Therefore, the resultant equation for predicting an organization achieving its strategic goals was as follows:

Equation 2

$$SGA = 2.528 - (.029 \times Org\_Hist) - (.149 \times Org\_Size) - (.170 \times Org\_Type) + (.025 \times Industry) + (.501 \times PPMA)$$

Table 24: Hypothesis 2 hierarchical regression results

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.276[a]	.076	.050	.78229	.076	2.849	4	138	.026
2	.624[b]	.390	.367	.63827	.313	70.299	1	137	.000

a. Predictors: (Constant), Industry, Org_Hist, Org_Type, Org_Size

b. Predictors: (Constant), Industry, Org_Hist, Org_Type, Org_Size, Project Portfolio Management Alignment

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.974	4	1.744	2.849	.026[b]
	Residual	84.452	138	.612		
	Total	91.427	142			
2	Regression	35.614	5	7.123	17.484	.000[c]
	Residual	55.813	137	.407		
	Total	91.427	142			

a. Dependent Variable: Strategic Goals Achieved

b. Predictors: (Constant), Industry, Org_Hist, Org_Type, Org_Size

c. Predictors: (Constant), Industry, Org_Hist, Org_Type, Org_Size, Project Portfolio Management Alignment

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.065	.375		10.851	.000
	Org_Hist	-.009	.086	-.010	-.103	.918
	Org_Size	-.095	.062	-.155	-1.547	.124
	Org_Type	-.149	.070	-.178	-2.118	.036
	Industry	.014	.017	.069	.848	.398
2	(Constant)	2.528	.356		7.093	.000
	Org_Hist	-.029	.070	-.033	-.410	.682
	Org_Size	-.149	.051	-.243	-2.941	.004
	Org_Type	-.170	.057	-.203	-2.955	.004
	Industry	.025	.014	.122	1.819	.071
	Project Portfolio Management Alignment	.501	.060	.573	8.384	.000

a. Dependent Variable: Strategic Goals Achieved

5.8.3 Hypothesis 3 (H3)

- **H_0 (Null hypothesis 3):** There is no relationship between PPM agility and an organization achieving its strategic goals.
- **H_1 (Alternative Hypothesis 3):** There is a positive relationship between PPM agility and an organization achieving its strategic goals

A two-step hierarchical regression analysis was conducted to examine the relationship between PPM agility and an organization achieving its strategic goals. Table 25 summarizes the results of the test. In the first step, only the control variables were loaded to the model to examine their predictive capacity of an organization achieving its strategic goals. As this was the same test as in paragraph 5.8.2 above. The results for model one, were the same as what was found in paragraph 5.8.2 above.

However, after introducing agility as a predictor variable in model two, the model accounts for 43.2% of the variance (R^2 = .432). The ANOVA results indicate that the model is statistically significant at the significance level of $p < 0.05$ where F (5, 137) = 20.81, p = 0.000. Therefore, when combined, agility and the control variables are statistically significant predictors of an organization achieving its strategic goals.

Furthermore, from the change statistics in the model summary section of Table 25, indicate that a 35.50% of the variance was attributable to agility when it was added to the model (ΔR^2= .355). This additional variance was statistically significant at the significance level of $p < 0.05$ where F (1, 137) = 85.65, p = .000. Therefore, above and beyond the control variables, agility accounts for a statistically significant unique variance in an organization achieving its strategic goals.

The beta values for model one were the same as the results from paragraph 5.8.2 above. However, when agility was introduced in model two, its beta weight was significant at the significance level of $p < 0.05$ (p = .000). However, all the beta weights of the control variables were not statistically significant predictors ($p > .05$) at the significance level of $p < 0.05$. Agility had the highest beta (B = .550), making it the highest predictor variable. It was followed by organizational type (B = -.086) and organizational size (B = -.047), which were negatively correlated to an organization achieving its strategic goals. Therefore, the resultant equation for predicting an organization achieving its strategic goals was as follows:

Equation 3

$$SGA = 1.562 + (.033 \times Org\_Hist) - (.047 \times Org\_Size) - (.086 \times Org\_Type) + (.021 \times Industry) + (.550 \times Agility)$$

Table 25: Hypothesis 3 hierarchical regression results

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.276[a]	.076	.050	.78229	.076	2.849	4	138	.026
2	.657[b]	.432	.411	.61587	.355	85.653	1	137	.000

a. Predictors: (Constant), Industry, Org_Hist, Org_Type, Org_Size

b. Predictors: (Constant), Industry, Org_Hist, Org_Type, Org_Size, [Agility] Adaptability

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.974	4	1.744	2.849	.026[b]
	Residual	84.452	138	.612		
	Total	91.427	142			
2	Regression	39.462	5	7.892	20.808	.000[c]
	Residual	51.964	137	.379		
	Total	91.427	142			

a. Dependent Variable: Strategic Goals Achieved

b. Predictors: (Constant), Industry, Org_Hist, Org_Type, Org_Size

c. Predictors: (Constant), Industry, Org_Hist, Org_Type, Org_Size, [Agility] Adaptability

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.065	.375		10.851	.000
	Org_Hist	-.009	.086	-.010	-.103	.918
	Org_Size	-.095	.062	-.155	-1.547	.124
	Org_Type	-.149	.070	-.178	-2.118	.036
	Industry	.014	.017	.069	.848	.398
2	(Constant)	1.562	.400		3.903	.000
	Org_Hist	.033	.068	.038	.489	.626
	Org_Size	-.047	.049	-.076	-.959	.339
	Org_Type	-.086	.056	-.102	-1.536	.127
	Industry	.021	.013	.103	1.594	.113
	[Agility] Adaptability	.550	.059	.615	9.255	.000

a. Dependent Variable: Strategic Goals Achieved

5.8.4 Hypothesis 4 (H4)

- **H_0 (Null hypothesis 4):** PPM strategic alignment and PPM agility have no relationship with an organization achieving its strategic goals.
- **H_1 (Alternative Hypothesis 4):** PPM strategic alignment and PPM agility have a positive relationship with an organization achieving its strategic goals.

Table 26 below summarizes the results of the test for H4. As there were two latent variables of interest. A three-step hierarchical regression analysis was conducted to examine if PPM strategic alignment and PPM agility had a relationship with an organization achieving its strategic goals. However, as the first two steps are the same as the analysis conducted above in paragraph 5.8.2 for hypothesis number two (H2), the results for these steps were the same as that of H2.

However, after introducing agility as an additional predictor variable in model three, the model accounts for 52.70% of the variance (R2 = .527). The ANOVA results indicate that the model is statistically significant at the significance level of $p < 0.05$ where $F (6, 136) = 25.22$, $p = 0.000$. Therefore, when taken together, agility, PPM strategic alignment and the control variables are statistically significant predictors of an organization achieving its strategic goals.

Furthermore, from the change statistics in the model summary section of Table 26, indicate that a 13.70% of the variance was attributable to agility when it was added to the model ($\Delta R2 = .137$). This additional variance was statistically significant at the significance level of $p < 0.05$ where $F (1, 136) = 39.40$, $p = .000$. Therefore, above and beyond the control variables and PPM strategic alignment, agility accounts for a statistically significant unique variance in an organization achieving its strategic goals.

The beta values for model one and, two are the same as the results for H2 in paragraph 5.8.2 above. However, when agility was introduced in model three, its beta weight was significant at the significance level of $p < 0.05$ ($p = .000$). Moreover, only the beta weight organization history was not a statistically significant predictor ($p > .05$) at the significance level of $p < 0.05$. However, the beta weights of organization size ($p = .040$), organization type ($p = .025$), industry ($p = .035$) and PPM strategic alignment ($p = .000$) were statistically significant predictors at the significance level of $p < 0.05$. Furthermore, agility had the highest beta ($B = .391$), making it the highest predictor variable. It was followed by PPM strategic alignment ($B = .316$) and organizational type ($B = -.117$). Therefore, the resultant equation for predicting an organization achieving its strategic goals was as follows:

Equation 4

$$SGA = 1.315 + (.009 \times Org\_Hist) - (.095 \times Org\_Size) - (.117 \times Org\_Type) + (.026 \times Industry) + (.316 \times PPMA) + (.391 \times Agility)$$

Table 26: Hypothesis 4 hierarchical regression results

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.276[a]	.076	.050	.78229	.076	2.849	4	138	.026
2	.624[b]	.390	.367	.63827	.313	70.299	1	137	.000
3	.726[c]	.527	.506	.56409	.137	39.403	1	136	.000

a. Predictors: (Constant), Industry, Org_Hist, Org_Type, Org_Size

b. Predictors: (Constant), Industry, Org_Hist, Org_Type, Org_Size, Project Portfolio Management Alignment

c. Predictors: (Constant), Industry, Org_Hist, Org_Type, Org_Size, Project Portfolio Management Alignment, [Agility] Adaptability

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.974	4	1.744	2.849	.026[b]
	Residual	84.452	138	.612		
	Total	91.427	142			
2	Regression	35.614	5	7.123	17.484	.000[c]
	Residual	55.813	137	.407		
	Total	91.427	142			
3	Regression	48.152	6	8.025	25.221	.000[d]
	Residual	43.275	136	.318		
	Total	91.427	142			

a. Dependent Variable: Strategic Goals Achieved

b. Predictors: (Constant), Industry, Org_Hist, Org_Type, Org_Size

c. Predictors: (Constant), Industry, Org_Hist, Org_Type, Org_Size, Project Portfolio Management Alignment

d. Predictors: (Constant), Industry, Org_Hist, Org_Type, Org_Size, Project Portfolio Management Alignment, [Agility] Adaptability

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	4.065	.375		10.851	.000
	Org_Hist	-.009	.086	-.010	-.103	.918

	Org_Size	-.095	.062	-.155	-1.547	.124
	Org_Type	-.149	.070	-.178	-2.118	.036
	Industry	.014	.017	.069	.848	.398
2	(Constant)	2.528	.356		7.093	.000
	Org_Hist	-.029	.070	-.033	-.410	.682
	Org_Size	-.149	.051	-.243	-2.941	.004
	Org_Type	-.170	.057	-.203	-2.955	.004
	Industry	.025	.014	.122	1.819	.071
	Project Portfolio Management Alignment	.501	.060	.573	8.384	.000
3	(Constant)	1.315	.370		3.558	.001
	Org_Hist	.009	.063	.010	.136	.892
	Org_Size	-.095	.046	-.154	-2.076	.040
	Org_Type	-.117	.051	-.140	-2.275	.025
	Industry	.026	.012	.126	2.131	.035
	Project Portfolio Management Alignment	.316	.060	.361	5.226	.000
	[Agility] Adaptability	.391	.062	.438	6.277	.000

a. Dependent Variable: Strategic Goals Achieved

5.9 Conclusion on results

The SPSS software tool was exclusively used to conduct all statistical tests in chapter following the research methodology outlined in chapter four. Only key outputs that were relevant to study were presented in this chapter. The outputs from SPSS were presented as they are without any further manipulation. These results will be the basis of the discussion in the following chapter (chapter six).

6 CHAPTER 6: DISCUSSION OF RESULTS

6.1 Introduction

This chapter discusses the results found in chapter five in relation to the research problem, the hypotheses, and the literature review outlined in this study. This is achieved through analysis of the demographics and descriptive results to understand the sample of the study. Thereafter, each hypothesis is analysed by linking the results to the theory found in the literature review. The chapter is then concluded by summarizing the results of the study through the research model proposed in chapter three.

6.2 Discussion of results for sample demographics

Consistent with what was purported by Cegarra-Navarro et al. (2016) and Brusset (2016), the sample size of 143 valid respondents for this study was determined to be sufficient. Furthermore, the study consistent of respondents who were project actors (project/portfolio management professionals and senior managers). These actors were ideal to respond to the questionnaire as they fit the description of "social actors" (Saunders & Lewis, 2018), and therefore key to the study.

6.3 Discussion of results for research hypothesis 1

6.3.1 The relationship between PPM agility and an organization's PPM strategic alignment.

Some scholars (Lu & Ramamurthy, 2011) argued that organizations must embrace both agility and strategic alignment, as agility without alignment can create disorder in the organization. However, some scholars such as Shin et al., (2015), posited that an improvement in strategic alignment may hinder organizational agility. These conflicting views are as a result of unintended consequences of implementing agility and strategic alignment which result in the "alignment-agility" paradox (Zhou et al., 2018).

The results of this study support the arguments by Lu and Ramamurthy (2011) that indicate that agility has a positive influence on PPM strategic alignment. Having accounted for the control variables, agility accounted for 22.70% (ΔR^2= .227) of the variance at the significance level of $p < 0.05$ where $F(1, 137) = 42.661$, $p = .000$. This assertion was supported by the predictive strength of agility on PPMA with a positive significant correlation ($p = .00$, $r = .422$)

at the significance level of $p < 0.01$ that was found with the Pearson's correlation test in paragraph 5.7. Moreover, the results supported the arguments by Park et al. (2017) and Ghasemaghaei et al. (2017) that, organizational size may have an impact on the level of organizational agility. However, in this model, organizational size had a statistically significant beta weight ($p = .018$). However, its beta weight ($B = .151$) had a low contribution to equation the PPMA (Equation 1).

6.3.2 Conclusive findings for research hypothesis 1

The results of this study indicate that there is a significant positive relationship between agility and PPM strategic alignment. Therefore, the null hypothesis is rejected, and the alternative hypothesis accepted. Furthermore, although organizational size had a low beta weight, it should still be considered as a contributor to PPMA in this model as it has a statistically significant beta weight. These findings contribute to the existing body of knowledge as outlined in chapter two by affirming the positive influence of agility of strategic alignment within a broader PPM context.

6.4 Discussion of results for research hypothesis 2

6.4.1 The relationship between PPM strategic alignment and an organization achieving its strategic goals.

Strategic alignment is viewed as an integration between the organization's competitive strategy, and its functional unit's (i.e. PPM) strategy. Strategic alignment has been argued to improve organizational performance (Sardana et al., 2016; Street et al., 2018), business value creation (Wagner et al., 2014), and organizational effectiveness (McAdam et al., 2019). These theoretical views have found support in this study as PPMA accounted for 31.30% ($\Delta R^2 = .31$) of the variance at the significance level of $p < 0.05$ where F (1, 137) = 70.30, $p = .000$ over and above the control variables. Furthermore, this was supported by the predictive strength of PPMA on strategic goals having a positive significant correlation ($p = .000$, $r = .495$) at the significance level of $p < 0.01$.

To some extent, organizational size ($B = -.15$, $p = .004$) and organization type ($B = -.17$, $p = .004$) had statistically significant relationship with an organization's achievement of strategic goals at the significance level of $p < 0.05$. However, these relationships were negative. Therefore, the results indicate that as the organizational size increased in the sample, the respondents rated the level of an organization achieving its strategic goals lower. Moreover, the mean cores results indicated that privately listed organizations were assessed to achieve

their strategic goals better than other types of organizations, while state-owned entities and government entities were scored the lowest in achieving their strategic goals. However, Equation 2 shows that the beta weight of PPMA (B = .501) contributes the most to an organization achieving its strategic goals.

6.4.2 Conclusive findings for research hypothesis 2

The results of this study indicate that there is a significant positive relationship between PPM strategic alignment and an organization achieving its strategic goals. Therefore, the null hypothesis is rejected, and the alternative hypothesis accepted. Furthermore, although organizational size and organizational type had low beta weights, they should still be considered as a contributor to an organization achieving its strategic goals in this model due to their statistically significant beta weights. These findings contribute to the existing body of knowledge as outlined in chapter two by affirming the positive influence PPM strategic alignment and an organization achieving its strategic goals within a PPM context.

6.5 Discussion of results for research hypothesis 3

6.5.1 The relationship between PPM agility and an organization achieving its strategic goals.

Agility has been found to give organizations a competitive advantage (Shin et al., 2015) in the current uncertain environment (Felipe et al., 2016; Shin et al., 2015). Furthermore agility improves the ability of the organization to respond to an uncertain environment (Brusset, 2016). Although D. Teece et al. (2016) argued that organizations cannot always remain agile as it is costly and involves foregoing efficiency, D. Teece et al. (2016) still warn hat, having no agility is even more costly. The results of this study further supported these views as agility accounted for 35.50% ($\Delta R2 = .355$) of the variance to the model at the significance level of $p < 0.05$ where $F(1, 137) = 85.65$, $p = .000$. This predictive strength of agility on an organization achieving its strategic goals was further supported by the positive significant correlation ($p = .00$, $r = .635$) at the significance level of $p < 0.01$.

Moreover, in this model, none of the control variables beta weights had a statistically significant relationship ($p > .05$) with an organization achieving its strategic goals. This finding does not support the argument by Park et al. (2017) and Ghasemaghaei et al. (2017) that organizational size has an impact on the ability of the organization to be agile. However, the results support Conforto et al. (2016)'s assertion that agility is not dependent on the industry the organization operates in. Conforto et al. (2016) argued that agility is dependent on the

project team and its context.

6.5.2 Conclusive findings for research hypothesis 3

The results of this study indicate that there is a significant positive relationship between agility and an organization achieving its strategic goals. Therefore, the null hypothesis is rejected, and the alternative hypothesis accepted. Furthermore, none of the control variables had a statistically significant beta weight. These findings contribute to the existing body of knowledge as outlined in chapter two by affirming the positive influence agility on an organization achieving its strategic goals within a PPM context. Furthermore, it supports one of two views in literature on the non-significant influence of organizational size and industry on agile organizations achieving their strategic goals.

6.6 Discussion of results for research hypothesis 4

6.6.1 The relationship between agility and PPM strategic alignment with an organization achieving its strategic goals.

Organizations are advised to balance the conflicting requirements of both agility and strategic alignment to ensure harmony in the organization (Lu & Ramamurthy, 2011). The argument for organizations to be agile, and to have strategic alignment between business strategy and functional strategy has been outlined in detail in chapter one and two. However, in chapter two there was a concern of the alignment-agility paradox (Zhou et al., 2018) which could result in organizational chaos if not managed correctly (Lu & Ramamurthy, 2011). Therefore, statistical tests were conducted to analyse the impact on an organization achieving its strategic goals by introducing agility and PPM strategic alignment. Having included the control variables, PPMA accounted for 31.30% ($\Delta R2 = .31$), while agility accounted for 13.70% ($\Delta R2 = .137$) of the variance in an organization achieving its strategic goals at the significance level of $p < 0.05$, where $F (1, 137) = 70.30$, $p = .000$ for PPMA and $F (1, 136) = 39.40$, $p = .000$ when agility is introduced to the model. These results support the argument by Shin et al. (2015), Wagner et al. (2014) and Luftman et al. (2017) that strategic alignment and agility are associated with organizations reaching their strategic goals and improving organizational performance. However, the view that agility may create chaos and unintended consequences (Lu & Ramamurthy, 2011) is not supported by the results.

In this model, three of the control variables had statistically significant beta weights at the significance level of $p < 0.05$, which were: organization size ($B = -.095$, $p = .040$), organization type ($B = -.117$, $p = .025$), and industry ($B = .026$, $p = .035$). These results support the views by

various authors ((Brusset, 2016; Felipe et al., 2016; Ghasemaghaei et al., 2017; Lu & Ramamurthy, 2011; Park et al., 2017; Shin et al., 2015) that organizational size, organizational type, and industry may affect such a model.

Moreover, the results indicated that organization type and organizational size generated a negative beta which indicated a negative correlation to strategic goals in this study. However, the industry had a positive correlation to strategic goals. Further insights on these results are revealed by the mean scores comparisons paragraph 5.6. The highest mean score was for organizations of sizes between 501 – 1000 employees (*M* = 3.681, *SD*= 0.759), while the lowest mean score for organizations with greater than 1000 employees (*M* = 3.319, *SD* = 0.804). As organization sizes increased beyond 500 employees, the mean scores for achieving strategic goals declined. Furthermore, having excluded the "other" category for organization types, the highest mean score was for non-listed private companies (*M* = 3.688, *SD* = 0.789), with the lowest mean score being for state owned entities (*M* = 3.184, *SD*= 0.686). The second lowest mean score was for government entities (*M* = 3.290, *SD*= 0.830).

Furthermore, the mean scores comparison by an organization's industry indicated that there is a statistically significant difference for PPM strategic alignment across different industries. The highest mean score was for organizations within the construction industry (*M* = 3.982, *SD* = 0.504), while the lowest mean score was for organizations within the information technology industry (M = 2.233, *SD* = 1.211). Equation 4 indicates that agility had the highest beta (B = .391), followed by PPM strategic alignment (B = .316). Therefore, PPMA and agility are the strongest predictors on an organization achieving its strategic goals above the control variables.

6.6.2 Conclusive findings for research hypothesis 4

The results of this study indicate that there is a statistically significant positive relationship between agility and PPM strategic alignment with an organization achieving its strategic goals. Therefore, the null hypothesis is rejected, and the alternative hypothesis accepted. However, the impact of organizational size, organizational history and industry should still be considered as they have a statistically significant beta weights in the model. These findings contribute to the existing body of knowledge as outlined in chapter two by affirming the positive influence agility and PPMA on an organization achieving its strategic goals within a PPM context.

6.7 Conclusion

Through the results presented in chapter five, this chapter combined the theory in chapter two

with the research methodology framework in chapter four to accept or reject the hypotheses outlined in chapter three; and therefore, contribute to addressing the research problem in chapter one. Therefore, this chapter is the conjunction of the preceding chapters (chapters one to five). The discussions in this chapter will be used to make overall conclusions and recommendations of this study in the following chapter (chapter seven).

7 CHAPTER 7: CONCLUSION AND RECOMMENDATIONS

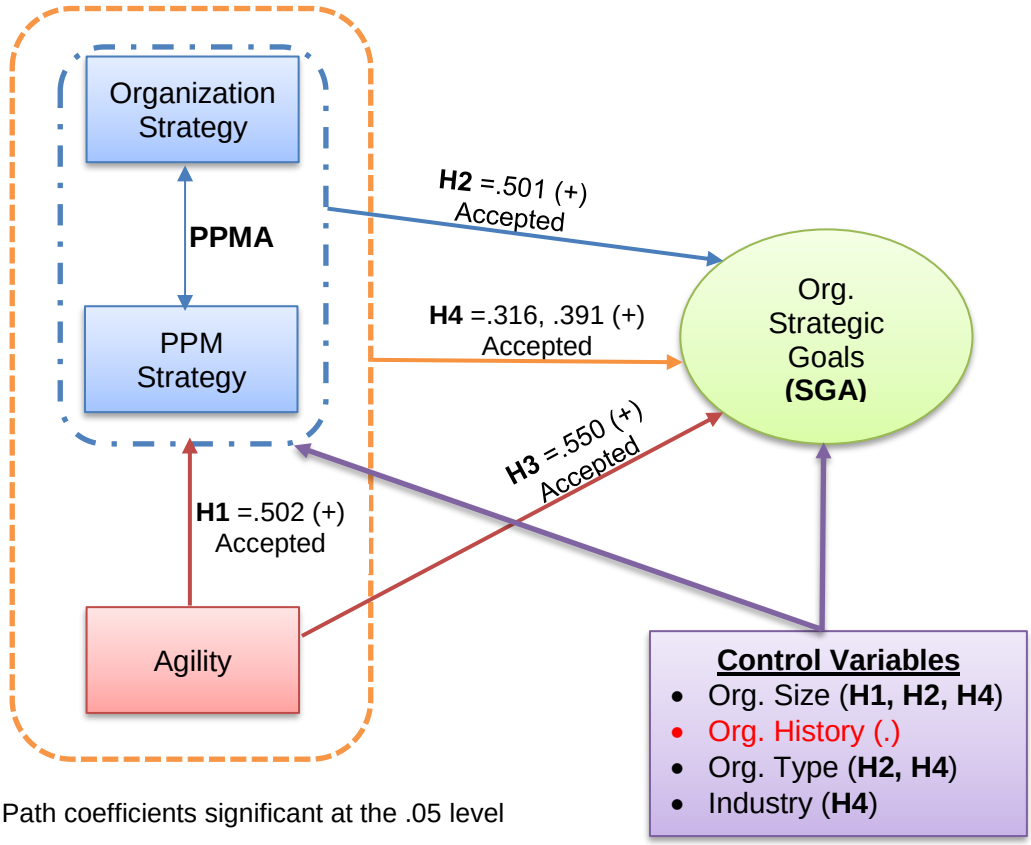
7.1 Introduction

This chapter begins by discussing the original research purpose from chapter one that guided the literature review in chapter two and the resultant research model in chapter three. Moreover, as a result of the results and discussions in chapters five and six, the principal findings and a refined model are presented in this chapter. This chapter further discusses the theoretical and practical implications of this study, followed by recommendations for future research and concluding remarks.

7.2 Principal findings

The purpose of this study was to empirically assess the impact of PPM strategic alignment and agility on organizations achieving their strategic goals, mainly due to the "alignment-agility paradox" identified by Zhou et al. (2018). A conceptual model in chapter three was developed to test four research hypotheses. All hypotheses were confirmed and accepted as indicated in the summarized theoretical model in Figure 6 below. The final model was refined to include the assessment of the impact of the control variables on strategic alignment when agility is loaded as the predictor of PPMA.

Figure 6: Summarized theoretical model



Path coefficients significant at the .05 level

7.2.1 The importance of agility

The results indicate that the strongest correlation ($p < .01$) amongst all constructs was between agility and an organization achieving its strategic goals ($r = .635$, $p = .000$), while the weakest correlation was between agility and PPMA ($r = .422$, $p = .000$). Furthermore, when testing hypothesis 4, where all predictors and control variables are loaded, agility had the strongest beta weight (B = .391, ΔR^2 = 13.7%, $p = .000$). Moreover, agility was the least affected predictor by the control variables. When conducting the hierarchical regression analysis for hypothesis 3, none of the control variables had a significant relationship with an organization achieving its strategic goals in model two of the test.

These results suggest that, over and above PPMA and all control variables, agility is an important factor in the ability of the organization achieving its strategic goals. Furthermore, agility is a significant predictor of PPMA. Therefore, in this sample, agile organizations have a better chance of achieving their strategic goals, while positively improving their PPM strategic alignment.

7.2.2 The weakness of organization history

Across all hierarchical regression hypothesis tests, organization history had no statistically significant influence on an organization achieving its strategic goals, nor on PPM strategic alignment. Therefore, it can be concluded that, from this sample, the age of the organization has no influence of an organization achieving its strategic goals.

7.2.3 Organization size matters

Consistent with the views various authors (Lu & Ramamurthy, 2011; Park et al., 2017; Shin et al., 2015), organization size was a strong control variable in the model, with a significant influence on three of the hypotheses. On the first hypothesis, larger organizations were rated to have better PPM strategic alignment than smaller organizations (positive beta weight, where B = .151). However, the organization size had a negative significant relationship with H2 (B = -.149), and H4 (B = -.095). Therefore, except for highly agile organizations, in this sample, the larger an organization became, its ability to achieve its strategic goal was rated weaker.

7.2.4 The challenge for government entities and state owned enterprises

Following organizational size, organization type was the second highest statistically significant control variable on the model. The organization type impacted the model only on H2 (B = -.17,

p = .004) and H4 (B= -.117, p = .025). State owned entities and government entities were scored the lowest in achieving their strategic goals for H2. Furthermore, they achieved the lowest mean scores for H4. These results suggest that state owned and government entities tend to not achieve their strategic goals. From the mean scores statistics paragraph 5.6, the results indicate that these entities received the highest mean scores for PPMA, however, the received a low mean score for agility. However, both PPMA and agility ANOVA results were not statistically significant ($p > .05$). Therefore, there is a partial indication (although not statistically significant) that government and state owned entities be strategically aligned but not agile. As agility was found to be the strongest lever to achieve strategic goals, this may explain the low scores on SGA.

7.3 Theoretical implications

This study has contributed to the existing body of knowledge in the strategic management and project management fields. The construct of agility has been confirmed to be a key contributor to PPM strategic alignment and the ability of an organization to achieve its strategic goal. However, the theoretical construct of agility and its observable items is still not clear. Two of the three dimensions suggested by Alavi et al. (2014) failed validity and reliability tests. In their study, Alavi et al. (2014) warned that agility has various predictors. Furthermore Shin et al. (2015) posited that the construct of agility is relatively new. Therefore, this study has contributed to the further understanding of agility, particularly within a PPM context.

7.4 Implications for management

The study has confirmed the theoretical conjectures by various scholars as outlined in paragraph 2.4 that agile organizations have a competitive advantage in the industry of their operation. Moreover, agility has a positive relationship with strategic alignment. Therefore, management should seriously consider that agility is a critical capability for their organizations to compete in the volatile environments. Furthermore, managers of large organizations must put more effort in building an agile organization, as larger organizations were found to be less agile, and more strategically aligned. However, these larger organizations were rated lower in achieving their strategic goals. Managers of government entities were the lowest scored for agility and achieving strategic goals. Therefore, managers within government are to consider implementing agility principles to improve their probability in achieving their strategic goals.

7.5 Limitations of the study

The following limitations to the study were noted:

- Organizational strategic goals are defined by the organization itself and its stakeholders. This may impact the quality of the results and correlation of the responses across different organizations.

- The online questionnaire data collection method isolated the researcher from the respondent. This precluded the researcher from posing clarification and follow up questions to the respondents. Furthermore, this data collection method assumed that the respondent had adequate knowledge about the constructs and the questions being posed. Therefore, this may have impacted the results.

- The complete population of organizations that use PPM for strategic implementation has not been fully determined by the researcher. Therefore, the sample size and participants are not representative of the entire population. This limited the research in external validity for the generalization of the conclusion. This limitation made it difficult for the researcher to make statistical inferences about the whole population (Saunders & Lewis, 2018).

- External validity was further affected by the possibility of other factors, which influenced the dependent variable (strategic goals), thus, not being able to prove causality. Although the research allowed for some control variables, these may not be exhaustive factors that affected the results. These variables further limited the conclusions of the research from eliciting causality between constructs relationships.

- The literature review in chapter two indicated that the construct of agility still needs clarification and further study to cement its theoretical foundations. This study found evidence of this assertion as the “proactivity” and “resiliency” dimensions of agility failed the validity and reliability tests. Therefore, this limited the study in diagnosing agility to its proposed dimensions.

- The sample of this study was mostly skewed to male respondents (83.22%) from South Africa (95.50%). Therefore, this limits the ability to generalize the results of this study to other equally relevant populations.

7.6 Recommendations for future research

As a result of this study, the following recommendations are made for future research:

- Many definitions of agility were found which were indicative of a theory that has not yet matured. Therefore, more work needs to be done on building the theory of agility and its dimensions across multiple industries and contexts. This will assist in building the theoretical foundations of agility and its observable items. If other researchers embark on a similar study, it is recommended that more observable items sourced across the existing agility body of knowledge should be used to measure agility and test for validity and reliability of these items.

- As the respondents were mostly from South Africa, a similar study (with the PPM context) needs to be conducted across other geographies to build on the findings of this study.

- Further research is required to determine why larger organizations and government entities/companies are less agile and seem to achieve their strategic goals. This study found no statistically significant differences with regards to agility and strategic alignment across different types of organizations.

7.7 Concluding remarks

The “alignment-agility” paradox is an unavoidable problem that organizations must deal with in the highly competitive and dynamic environment. This study confirmed the positive influence of PPM agility and strategic alignment on the ability of organizations to achieve their strategic goals. However, agility was found to be the main contributor to both strategic alignment and the achievement of strategic goals. Furthermore, organization size was found to have a negative relationship with agility. Government and state-owned entities were particularly found to be the least agile, which impacted their ability to achieve strategic goals. The study achieved its research objectives and further opened new possible areas of research within the strategic management and project management field.

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9 APPENDICES

Appendix A: Research questionnaire

The Impact of PPM strategic alignment and agility on strategic goals.

Dear Participant,

I am currently a student at the University of Pretoria's Gordon Institute of Business Science and completing my research in partial fulfillment of an MBA. I am conducting research on the Impact of PPM strategic alignment and agility on strategic goals. To that end, you are asked to complete an online questionnaire. This will help us better understand how agility and strategic alignment impact the achievement of strategic goals.

Your participation is voluntary, and you can withdraw at any time without penalty. Your participation is anonymous and only aggregated data will be reported. By completing the survey, you indicate that you voluntarily participate in this research. If you have any concerns or questions related to this research, please contact myself or my supervisor. Our details are provided below.

The questionnaire has been divided into 4 short sections as follows:

- Section A: About you and your organization
- Section B: Strategic Alignment
- Section C: Agility
- Section D: Strategic Goals

The questionnaire should take approximately 10 –15 minutes to complete. Thank you for your time and contribution to this research study.

Researcher Name: Mothibi Thabeng
Email: thabeng.m@gmail.com

Research Supervisor: Dr. Ngwako Sefoko
Email: nsefoko@gmail.com

Please feel free to share this survey (by forwarding the mail that was sent to you) with a colleague or acquaintance who whose organization manages a portfolio of projects to achieve strategic its goals.

*Required

Email address *

Section A: About you and your organization

This section aims to understand your background and demographics, your organization, and the industry you operate in.

Gender *

Mark only one oval.

- Male
- Female

Job description *

Mark only one oval.

- ◯ Project Manager
- ◯ Projects Director
- ◯ Senior ProjectManager
- ◯ Portfolio Manager
- ◯ Executive
- ◯ Other: _____

Country (Where are you based?) *

Mark only one oval.

- ◯ South Africa
- ◯ Other: _____

Your Working Experience? *

Mark only one oval.

- ◯ less than 1 Year
- ◯ 1 - 5 years
- ◯ 6 - 10 years
- ◯ 11 - 15 years
- ◯ 16+ years

Which phase of strategy are you involved in within your organization? *

Mark only one oval.

- ◯ Strategy Formulation (i.e EXCO Strategic Sessions/Planning sessions)
- ◯ Strategy Implementation/Execution (i.e Project Management, Engineering, Operations, etc.)
- ◯ Both

Does your organization manage a collection of projects or programs to achieve its strategic goals? *

Mark only one oval.

- ◯ Yes
- ◯ No

Does your organization use any formal project management methodology? *

Tick all that apply.

- ☐ No formal methodology
- ☐ Agile
- ☐ Scrum
- ☐ PMBOK
- ☐ Waterfall
- ☐ PRINCE2
- ☐ Other: _____

How long has your organization been in existence? *

Mark only one oval.

- ◯ less than 1 year
- ◯ 1 - 5 years
- ◯ 6 - 10 years
- ◯ 11 - 15 years
- ◯ 16+ years

What is the size (estimated number of employees) of the organization that you work for? *

Mark only one oval.

- ◯ 0 - 100
- ◯ 101 - 500
- ◯ 501 - 1000
- ◯ Greater than 1000

What is the type of your organization? *

Mark only one oval.

- ◯ Public (Listed on the stock exchange)
- ◯ Private (Not Listed)
- ◯ Government Entity
- ◯ State Owned Entity
- ◯ Other: _____

In which industry is your organization? *

Mark only one oval.

- ◯ Manufacturing
- ◯ Information Technology
- ◯ Energy
- ◯ Construction
- ◯ Water
- ◯ Financial Services
- ◯ Mining
- ◯ Agriculture
- ◯ Telecommunications
- ◯ Retail
- ◯ Professional Services/Consulting
- ◯ Other: _____

SECTION B: STRATEGIC ALIGNMENT

If there is a lack of alignment with strategy, there will be a risk of “strategic blindness”, whereby, projects are successfully implemented but fail to realize the strategic goals of the organization (Arvidsson, Holmström, & Lyytinen, 2014). We would like to explore how your organization's Project Portfolio Management (PPM) is aligned to business strategy.

PPM = Project Portfolio Management

Alignment *

Mark only one oval per row.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Our PPM processes support our business strategies					
We adapt our internal PPM processes to our business strategies.					
Our business strategies and internal PPM processes match each other					
We identify the fit between our business-related stragies opportunities and our PPM infrastructure.					
Our PPM infrastructure and business strategies correspond to each other					
Our PPM infrastructure aligns with our business strategie					

SECTION C: AGILITY

Sardana et al. (2016) postulated that, for firms to be effective and responsive to the changing environment, they must also have the dynamism to respond to these changes. We would like to explore your organization's agility in this section. Please tell us how your Project Management team deals with the following?

Proactivity *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
We address difficulties in our tasks before they become major problems.					
We design new procedures or processes for our work area.					
At work, we stick to what we are told or required to do					
We try to think 'outside the box' in order to solve problems					

Adaptability *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
We adapt our behavior to show respect for others' customs and values.					
We quickly acquire new knowledge/skills (new methods, new tasks, new equipment, etc.) required for our work.					
We find it easy to adjust to working in different work environments and teams.					
We find it easy to adjust our way of doing things for different work environments					

Resiliency *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
We are reluctant to accommodate and incorporate changes into our work					
The changes at work frustrate us					
We like to change old ways of doing things.					
We drop everything and take an alternate course of action to deal with an urgent problem.					

SECTION D: STRATEGIC GOALS

Furthermore, organizations undertake projects for the benefits they will realize from them through adding value for customers (Musawir et al., 2017). We would like to explore the level of achievement of strategic goals through PPM.

What are your organization's top 3 strategic goals? (i.e enter new markets, new product development, increase market share, etc.) - Minimum one goal:

Strategic Goal 1 *

Strategic Goal 2

Strategic Goal 3

Rate the level of achievement of strategic goals. *

Mark only one oval per row.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Our executives/senior management is mostly satisfied with the achievement of strategic goals?					
Most of our projects were completed successfully (i.e. on time, within budget, within scope and quality)					
Our organization is achieving most of its strategic goals					

THANK YOU

We sincerely appreciate the time you have taken to complete this questionnaire and look forward to your responses.

Appendix B: Code book

QUESTIONNAIRE CODING	
Question	**Code**
Gender	Gender
Job description	Job_Descr
Country (Where are you based?)	Country
Your Working Experience?	Work_Exp
Which phase of strategy are you involved in within your organization?	Strategy_Phase
Does your organization manage a collection of projects or programs to achieve its strategic goals?	PPM_Org
Does your organization use any formal project management methodology?	PM_Method
How long has your organization been in existence?	Org_Hist
What is the size (estimated number of employees) of the organization that you work for?	Org_Size
What is the type of your organization?	Org_Type
In which industry is your organization?	Industry
Alignment [Our PPM processes support our business strategies]	PPMA01
Alignment [We adapt our internal PPM processes to our business strategies.]	PPMA02
Alignment [Our business strategies and internal PPM processes match each other]	PPMA03
Alignment [We identify the fit between our business-related stragies opportunities and our PPM infrastructure.]	PPMA04
Alignment [Our PPM infrastructure and business strategies correspond to each other]	PPMA05
Alignment [Our PPM infrastructure aligns with our business strategies]	PPMA06
Proactivity [We address difficulties in our tasks before they become major problems.]	PAC01
Proactivity [We design new procedures or processes for our work area.]	PAC02
Proactivity [At work, we stick to what we are told or required to do]	PAC03_r
Proactivity [We try to think outside the box in order to solve problems.]	PAC04
Adaptability [We adapt our behavior to show respect for others customs and values.]	ADP01
Adaptability [We quickly acquire new knowledge/skills (new methods, new tasks, new equipment, etc.) required for our work.]	ADP02
Adaptability [We find it easy to adjust to working in different work environments and teams.]	ADP03
Adaptability [We find it easy to adjust our way of doing things for different work environments]	ADP04
Resiliency [We are reluctant to accommodate and incorporate changes into our work]	RES01_r
Resiliency [The changes at work frustrate us]	RES02_r
Resiliency [We like to change old ways of doing things.]	RES03
Resiliency [We drop everything and take an alternate course of action to deal with an urgent problem.]	RES04
What are your organization's top 3 strategic goals? (i.e enter new markets, new product development, increase market share, etc.) - Minimum one goal: Strategic Goal 1	STG01
Strategic Goal 2	STG02
Strategic Goal 3	STG03

Rate the level of achievement of strategic goals. [Our executives/senior management is mostly satisfied with the achievement of strategic goals?]	SGA01
Rate the level of achievement of strategic goals. [Most of our projects were completed successfully (i.e. on time, within budget, within scope and quality)]	SGA02
Rate the level of achievement of strategic goals. [Our organization is achieving most of its strategic goals.]	SGA03

ITEM CODES	CODE
Gender	
Male	1
Female	2
Job_Descr	
Project Manager	1
Projects Director	2
Senior Project Manager	3
Portfolio Manager	4
Executive/Director	5
Other Managers	6
Engineers, Technicians	7
Administrators, Planners	8
Country	
South Africa	1
Other Countries	2
Work_Exp	
less than 1 yea	1
1 - 5 years	2
6 - 10 years	3
11 - 15 years	4
16+ years	5
Strategy_Phase	
Strategy Formulation (i.e EXCO Strategic Sessions/Planning sessions)	1
Strategy Implementation/Execution (i.e Project Management, Engineering, Operations,etc.)	2
Both	3
PPM_Org	
Yes	1
No	2
PM_Method	
No formal methodology	1
Agile	2
Scrum	3
PMBOK	4
Waterfall	5
PRINCE2	6
Other	7
Mixed Methodologies	8
Org_Hist	

less than 1 year	1
1 - 5 years	2
6 - 10 years	3
11 - 15 years	4
16+ years	5
Org_Size	
0 - 100	1
101 - 500	2
501 - 1000	3
Greater than 1000	4
Org_Type	
Public (Listed on the stock exchange)	1
Private (Not Listed)	2
Government Entity	3
State Owned Entity	4
Other	5
Industry	
Manufacturing	1
Information Technology	2
Energy	3
Construction	4
Water	5
Financial Services	6
Mining	7
Agriculture	8
Telecommunications	9
Retail	10
Professional Services/Consulting	11
Other	12
Education	13
Likert Scale Questions	
Strongly Disagree	1
Disagree	2
Neutral	3
Agree	4
Strongly Agree	5
Strategic Goals	
Market Penetration	1
Product Development	2
Market Development	3
Diversification	4
Operational Excellence	5
Financial Performance	6
Missing	0

Appendix C: Organizations' strategic goals pie charts

Appendix D: Ethical clearance letter

Gordon Institute of Business Science
University of Pretoria

31 July 2019

Thabeng Mothibi

Dear Mothibi

Please be advised that your application for Ethical Clearance has been approved.

You are therefore allowed to continue collecting your data.

Please note that approval is granted based on the methodology and research instruments provided in the application. If there is any deviation change or addition to the research method or tools, a supplementary application for approval must be obtained

We wish you everything of the best for the rest of the project.

Kind Regards

GIBS MBA Research Ethical Clearance Committee