Gordon Institute of Business Science
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Effective implementation of a Hybrid project management methodology combining Agile and traditional methods for IT-based projects in South African organisations

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Abstract

It has been documented that Agile and Stage-Gate management approaches can be combined and used by technology companies to run technical projects effectively, making them more flexible and adaptable, to remain competitive in the fast-paced business world (Conforto & Amaral, 2016). Stage-Gate and Agile approaches can be used to achieve this in their own right, but there is risk of oversimplifying complex projects using Agile, and overcomplicating smaller projects using Stage-Gate. Therefore, this research examined the possibility of combining the two methods to derive a Hybrid method which would be suitable for most projects, whether simple or complex, and still achieve effectiveness, flexibility, and adaptability.

This study evaluated factors for effectively implementing a Hybrid project management methodology along with the benefits and challenges of such implementation. This study undertook a mono-method qualitative study using interviews with thirteen participants who are key personnel involved in implementing IT-based projects in South African-based companies, to provide data that is timely, less costly, convenient, and to have in-depth knowledge of the subject to be able to accurately answer this study's research questions. An interpretive research philosophy enabled the researcher to make sense of the phenomenon being studied in a natural setting, which allowed for trust to be established between the researcher and the interviewees. The researcher used a deductive approach to theory development to adopt a theoretical position that could be tested through data collection. The study used the Information Technology Management Framework (Pollard & Geisler, 2014), which consolidates the various phases of project lifecycle management into five simplified phases: request, define, build, deploy and run. The implementation of this cross-platform methodology empowers organisations to successfully implement a stable, adaptive reporting matrix at a strategic management level. This methodology provides timely monitoring and control along with the project lifecycle's change from inception to beyond execution. Therefore, the ITMF can enable a Hybrid blend of various methodologies and models to form a single delivery-oriented ICT environment that helps Information Technology departments to deliver change at the speed of business. The study found that effective implementation of a Hybrid project management methodology relies on: a) reducing scope creeps in the request phase; b) offering sufficient Hybrid project

management methodology implementation training for project teams and having a well-defined financial model in the define phase; c) deploying highly skilled technical support in the build phase; d) maintaining active communication with all stakeholders, and creating an Agile and flexible project environment in the deploy phase; and lastly, e) enabling an organisational culture change in the run phase. These findings can motivate organisations to implement a Hybrid project management methodology that will facilitate project delivery success, therefore assisting in improving customer service levels and gaining optimal project performance that results in realising business profits.

Keywords:

Hybrid, Agile, Stage-Gate, Hybrid model, project management, waterfall

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.

Name: Nobayeni Getyengana

Signature: _____

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CHAPTER 1: INTRODUCTION TO THE RESEARCH

1.1 Introduction

This study is focused on the effective implementation of Hybrid methodologies for Information Technology (IT)-based projects in South African organisations. The Hybrid methodological approach is defined as any combination of Agile and traditional approaches that an organisational unit adopts and customises to its own contextual needs. An example of this would be combining Agile integration with Stage-Gate methodology (Kuhrmann et al., 2017). In Agile-Stage-Gate Hybrids: "the integration of Agile methods is done with traditional gating approaches to form a Hybrid methodology" (Vedmand, Kielgast & Cooper, 2016, p. 3). However, Hybrid methodologies are being implemented at the backdrop of a previous era of traditional and Agile methodologies as standalone models. Disciplined traditional methodologies, such as Waterfall and Spiral, suggest well organised, developmental life cycles but they have been linked to problems of rigidity (Gandomani and Nafchi, 2016). However, the choice to combine Waterfall with Agile has grown into a more powerful and more pragmatic one, proving that traditional Waterfall approaches are far from becoming extinct (Siriram, 2017).

Grey (2011) did a study that proposes development of an improved Hybrid Agile Project Management Methodology (APMM) (Ver. 2) that combines Agile Software Development Methodology (ASDM) and Project Management Methodology (PMM) to deliver IT projects successfully in an ever-changing business environment. Whereas the latest researchers have found that no one methodology can be regarded as the best in achieving excellent project performance, which has led to a proposition of using a balanced approach that combines Agile and Stage-Gate into a singular Hybrid Method to achieve success in the consistently evolving business environment (Cooper & Sommer, 2016; Conforto & Amaral, 2016; Jazil et al., 2018; Cooper & Sommer, 2018; Magistretti, Trabucchi, Dell'Era & Buganza, 2019). The relationship to this study is moving from development to the implementation of a Hybrid Project Management Methodology. Grey (2011) found the gap in literature to be to test Hybrid Methodology's accessibility, implementability, and applicability in practice. Ndlovu (2014) did a study to evaluate how Agile deals with challenges posed by traditional PMMs in complex organisations. The relationship to this study

is where it talks about the outcomes of applying Agile Project Methodologies (APM) to Traditional Project Methodology (TPM)-based organisations to reduce project delivery timelines, cost savings, leading to project success that enables organisations to be competitive. Ndlovu (2014) found the gap in literature to be the investigation of how difficult it is to apply APM in industries that have been predominantly dominated by traditional project management that has excelled in those environments such as construction and mining environments. Mapongwana's (2016) study explores the integration of Traditional Software Development Methodologies (TSDM) into ASDM. Whereas the latest researchers suggest combining the two methods of Stage-Gate and Agile approaches to derive a Hybrid Method which will be suitable for most projects whether simple or complex to still get to the results of effectiveness (Conforto & Amaral, 2016). It basically relates to this study in that it combines two PMMs (traditional and Agile) to exploit the benefits that come from using the best of both worlds. In the current study this integration culminates into a Hybrid PMM seeking similar benefits when implemented effectively. Mapongwana (2016) found the gap in literature to be the examination of the integration of PM practice into a diverse set of Agile methods. Additionally, performing a multi-case study in the subject to obtain different organisational and contextual perspectives, ad to investigate the validity of the proposed framework.

The complete abandonment of traditional methodologies and adoption of pure Agile practices has proved to have a greater cost than adopting Hybrid (Baranauskas, 2018). As many organisations are learning fast to be flexible and adaptive, the trend has been to integrate Agile with traditional methods to react to the fast-changing world (Cooper & Sommer, 2018). However, as held by Sommer, Hedegaard, Dukovska-Popovska and Steger-Jensen (2015), integrating pilots in existing project processes with Agile practices is a big challenge. It is against this background that this study seeks to explore the implementation of a Hybrid Model that integrates the traditional Stage-Gate (Waterfall) as well as the Agile methods for project delivery in organisations within South Africa.

The remainder of this chapter describes the research problem, provides details on the shift from implementing traditional project management methods to Agile Methods (which serves as a background to formulating a Hybrid Methodology as the focus of this research paper), states the research objectives and the scope definition of this study.

1.2 Description of the problem

Using Agile or traditional methodologies has become the customary way of handling products and software development projects; however, the Agile-Stage-Gate Hybrid or modified methodologies are gaining popularity (Cooper, 2016). According to Gandomani and Nafchi (2015), effective project management will always be important regardless of the development method used. Whether it is the traditional, Agile or Hybrid Methodology. Organisations choosing to adopt Hybrid Methodologies do so to match with changing requirements whilst attempting to leverage on the Agile principles and traditional method's strengths (Cooper & Sommer, 2016b). With many researchers (Auer & Rosenberger, 2018; Baranauskas, 2018; Cooper, 2016; Cooper & Sommer, 2016b; Jaziri, El-Mahjoub & Boussaffa, 2018; Mahadevan, Kettinger & Meservy, 2015) proposing Hybrid Method usage, limited empirical evidence exists in companies to explain how these Hybrid Methods can be used effectively. Therefore, this study seeks to explore the implementation of a Hybrid Model that seeks to integrate traditional Stage-Gate and Agile methods for project delivery in organisations within South Africa.

Shift from traditional to Agile

In the past few years, a growing technological development interest has been triggering movement from traditional methods to Agile methods (Cooper & Sommer, 2018). The main attraction of the movement to Agile was earlier defect detection, developer happiness, better product quality and adaptability that Agile brought to projects (Kielgast et al., 2016). According to Cooper (2016), software companies were amongst the first to integrate Stage-Gate with Agile development processes at the beginning of the millennium. Sommer et al. (2015) found the success in software development worthy to attract Hybrid into product development.

Despite this, the speed of technological and market change has accelerated to make traditional methodologies redundant (Rigby, Sutherland & Takeuchi, 2016). Gate processes of traditional methods are becoming rigid and too linear to inhibit a proactive response to change in the development processes (Ovesen & Sommer, 2015). Similarly, Waterfall models with clear start goals and end goals, follow a sequential, step by step, development and execution plan (Mahadevan et al., 2015). Therefore, uncertainties, time constraints and structural complexities in projects have

shifted organisations towards Agile practices (Gandomani, Zulzalil, Ghani, Sultan & Sharif, 2015). Because of the increasing complexity of the product's development environment, the traditional Stage-Gate model is no longer able to offer adequate support for today's fast paced product development environment (Sommer et al., 2015). Late specification changes and iterations are unavoidable for success in complex product development environments (Schön, Escalona & Thomaschewski, 2015). Hence, an attempt to eliminate iterations in Stage-Gate models is detrimental in conditions of uncertainty (Cooper & Sommer, 2016b). Papadopoulos (2015) therefore argued that effects of changes are reduced through the application of Agile's iterations approach. Agile processes challenge traditional methods by accelerating marketing time and aiding changing requirements (Mihalache, 2017).

According to Rigby et al. (2016), Agile project management is not without challenges. One challenge is presented by Cobb (2015) who argued that Agile processes do not work in all different environments where traditional practices have been applied because they are treated as independent domains with little or no integration between the two methodologies, to an extent of conflicting each other.

According to Sommer et al. (2015), implementing large Agile projects is too complex, as well as many firms struggle to prioritise flexibility over planning, work over documentation and people over processes. Despite these challenges and the evolving business environment, many organisations have been pressured to adopt more flexible solutions. The main challenge of the Agile models has been difficulty in finding a balance between discipline and agility (Rigby et al., 2016). Sommer et al. (2015) contend that Agile practices in manufacturing have a problem of lack of management buy-in, meeting proliferations and scalability absence because of gating differences.

Organisations try to adopt Agile practices to become more competitive, as well as improve processes to manage changing requirements, however, they face additional challenges in the integration of Agile development at the organisational level (Dumitriu, Mesnita & Radu, 2019). Although many companies use Agile methods, it is still unclear in which environments and under what conditions they really work (Cooper, 2016). Similarly, Cooper (2015) contended that Agile development in its pure form is likely not a good solution for large, traditional organisations. Cooper and Sommer (2018) argued that Agile and traditional philosophies are somewhat different

in relation to project documentation, that is, traditional methods emphasise on well-documented plans whilst the Agile approach has less emphasis on plans. The Agile methods' adherence to document governance is by ensuring that all necessary project documents such as plans are presented as lighter versions, unlike in traditional methods where documents are compiled and presented in a well-structured and detailed manner. Hence, the need to stick to at least one of these rather than combining the two to avoid confusion in an organisation. Other researchers such as Gandomani and Nafchi (2016) argued that transforming from traditional to Agile development requires the identification of specific changes and not entire changes to projects. Whereas Jain and Suman (2016) argued on making gradual changes when adopting Agile methods.

It is important to note that each of the two methodology approaches has its strengths and weaknesses which fit into their own project characteristics. Yet, some organisations try to use both side by side, either in concurrent projects or as an intermediate stage of migration from plan-driven to Agile methods (Cooper, 2016). However, their coexistence in the same organisation is seen generally as problematic, causing tensions on all organisational levels. This is because Agile methods bring drastic changes regarding team hierarchies, organisational structures and planning or controlling processes (Dumitriu et al., 2019).

1.3 The business environment

Many organisations in South Africa have been using traditional project methodologies, such as Waterfall, and has discovered the need to integrate with Agile to survive, succeed and remain competitive in the environment of continuous unpredictable change (Garbie, 2011). The history of these organisations and the nature of their projects show that many of the projects undertaken in recent years have adopted Agile practices for its benefits. However, due to the complex nature of some projects, a Hybrid project management approach has been shown to be the more preferred (Badawey, 2017). However, despite it being more preferred, the implementation of Hybrid methods has not been without its challenges.

The current fall in the economic climax and the continuing pressure on product and service demand has been exacerbating the need for companies to streamline their operations to remain profitable and competitive. The operations and processes of

most companies are driven by projects; therefore, the focus of companies has been more efficiency and agility to remain relevant in an environment with so much uncertainty and rapid changes. The use of traditional project methodologies has been highlighted as a major cause for inefficiency, lack of process optimisation and high cost runs in IT-based projects in South Africa. The continued use of ineffective project management models resulted in poor project performance (Conforto & Amaral, 2016). Therefore, the major trend has been to adopt Agile practices to bring agility into business processes to respond to continuous environmental changes. This means that the use of incompatible project methodologies can lead to inefficiencies such as incorrectly executed project lifecycle stages causing project failure which may mean unprofitability. Hence, the choice in this study is to explore Hybrid methodologies as an option to optimise project processes by integrating traditional methodologies with Agile methodologies.

1.4 Research objectives

The purpose of this case study research is to examine the effective implementation of Agile-Stage-Gate Hybrid methodologies (Hybrid methods) for IT-based projects in South African organisations.

This research aims to:

1. Evaluate factors for effectively implementing a Hybrid project management methodology considering the stages in the Information Technology Management Framework (ITMF) lifecycle.
2. Explore the benefits of implementing a Hybrid project management methodology.
3. Explore the challenges faced when implementing a Hybrid project management methodology.

1.5 Scope of the research

The choice to adopt Hybrid methodologies is not an easy one, as organisations must decide to abandon traditional methods completely and embrace Agile methods. The Hybrid method is an alternative method available for a firm to continue using traditional methods whilst utilising Agile techniques. Siriram (2017) argued that success of the Hybrid methods lies on the Agile practices being used at an

operational and tactical level, whereas the Stage-Gate model is used at the strategic level. However, organisations have found that the choice to implement a Hybrid model requires other factors to be taken into consideration. Due to several factors, companies in South Africa are preferring to use Hybrid methodologies instead of only Agile practices. Hence the need in this study is to evaluate the factors of effectively implementing a Hybrid methodology in IT-based projects within South African organisations.

For companies to adopt new methodologies they will engage in a cost-benefit analysis before deciding to implement a new system. It is essential for the benefits to surpass the costs related to Hybrid methodologies. According to Cooper (2016), the Hybrid Agile-Stage-Gate model in manufacturing assists in getting the product right, accommodates uncertainty, accelerates development, focuses teams and improves within-team communication. It is important to understand the nature of these benefits in more detail. Hence, it is critical in this study to understand what benefits are derived from implementing Hybrid methodologies when running IT-based projects in South African organisations.

The adoption of Hybrid methodologies is not fool proof and without problems and companies implementing Hybrid methodologies face numerous problems. According to Papadopoulos (2015), integrating Agile into a current Stage-Gate system is difficult. Business conflicts, people conflicts, and process conflicts develop when a traditional firm adopts Agile methods (Sommer et al., 2015). It is important to understand these conflicts in greater detail. It is therefore the reason this study asks the question on which challenges are encountered when implementing Hybrid methodologies for IT-based projects in South African organisations.

1.6 Conclusion

This research is important at a time when many organisations are attempting to change from traditional project methodologies to remain adaptive, competitive, and profitable. This study exposes how Agile can be integrated with traditional methodologies effectively to assist organisations with the successful implementation of a project. The knowledge of the possible challenges will assist project managers to strategise better to eradicate these problems. According to Conforto and Amaral (2016) recent studies provide evidence of how Agile processes, when combined with

Stage-Gate processes, become important in improving flexibility and adaptability in responding to the fast-changing and dynamic business world (Adapted from Cooper, 2008; Högman & Johannesson, 2013). The implementation factors, benefits, and challenges of Hybrid methodologies are examined to assist in exposing the best practices for project management success.

The problem is the lack of effective implementation of Hybrid methodologies in organisations that are using traditional project methodologies. These organisations are faced with the need to integrate with Agile practices to remain effective and efficient, and to realise the benefits derived from successful project implementation. In the South African business environment, organisations are challenged with inefficiencies and have a lack of optimisation in their projects at the backdrop of implementing Hybrid methodologies. The question of whether integrating two project management methodologies can be feasible and beneficial to the organisation, and how then to do it in a way that it does not impede on daily business operations and cause team destructions, remains unanswered.

Having detailed the problem, purpose and scope of this research paper, the next section provides a theory that grounds the study.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

To understand the research subject better and answer the research questions, the brief literature reviews in this chapter will show what past researchers have found regarding Hybrid project management methodologies. The literature discussion thus includes the theoretical framework guiding the analysis of Hybrid project management methodologies, views on the benefits, and challenges of such Hybrid methods highlighting the gaps in the literature. The discussion includes supporting and opposing views as found in the literature. Section 2.2 unpacks the theoretical framework that has been formulated by collecting several methodologies to create an over-arching project-lifecycle-management-framework. This will assist with the process of project delivery. Section 2.3 explains the factors leading to the effective implementation of a Hybrid project management methodology that combines Stage-Gate (Waterfall) and Agile methods for project success. Section 2.4 and 2.5 explore the benefits and challenges of implementing a Hybrid project management methodology in the project environment.

2.2 Theoretical framework

Pollard and Geisler (2014) created the ITMF to allow an organisation to collect multiple project's data that were utilising different project methodologies framed into a single framework lifecycle. The ITMF is developed to identify common themes across project development methodologies and models, to create an overarching project-lifecycle-management-framework with minimalistic governance touch points into multi-discipline delivery environments. This is achieved through the simplification of enterprise management and reporting of change initiatives and projects. Multiple industry standards and experience of project delivery across multiple industries and sectors have been considered in developing the ITMF. Hence, its relevance in this study to explore how Agile was integrated with traditional methodologies in organisations. Figure 2.1 shows the ITMF framework lifecycle and the variables that this study intends to examine such as the implementation factors, benefits and challenges.

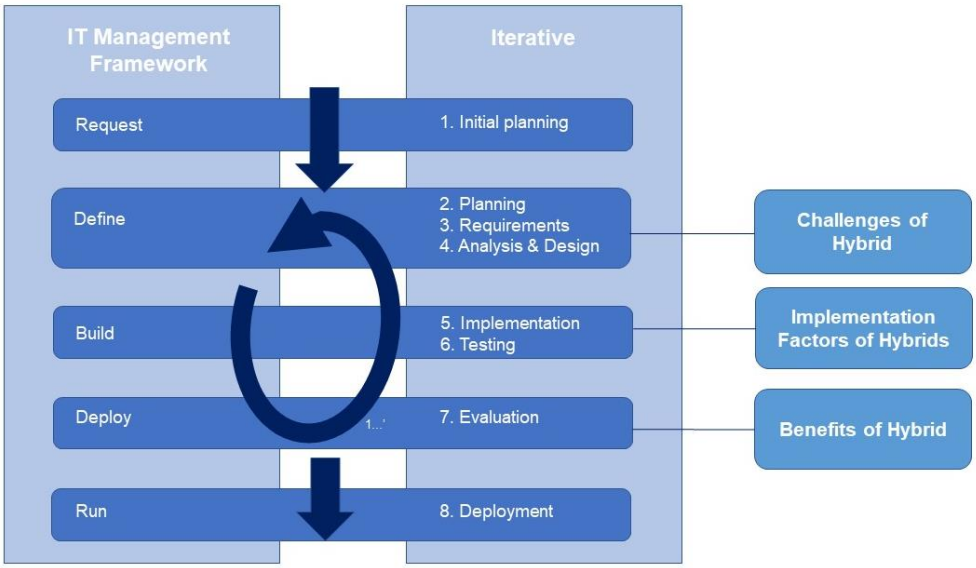

Figure 2.1: Modified ITMF - alignment with contemporary application development iterative (Adapted from Pollard & Geisler, 2014)

The ITMF provides a framework that is independent of a project management methodology which simplifies governance when delivering a project and is non-prescriptive on which methodology to implement, making it adaptable to individual organisational needs and changes (Pollard & Geisler, 2014). This framework is therefore ideal to be applied when implementing a hybrid methodology as it accommodates growth and can be contracted according to the individual needs of the project lifecycle stages.

With the project methodology customisation and utilising a Hybrid form, comparisons can be done in a common way (Mahadevan et al., 2015). According to Papadopoulos (2018), ITMF permits methodology comparison on similar concepts and standardised information. However, the ITMF is non-prescriptive and is based on a mixed model philosophy to be customised to fit the culture and unique challenges faced by the organisation (Pollard & Geisler, 2014). The ITMF consolidates the various phases of project lifecycle management into five simplified phases namely; request, define, build, deploy and run. Pollard and Geisler (2014) explained the ITMF's five overall phases in the table below:

Table 2.1

The meaning of the five ITMF stages

ITMF Phase	Meaning
Request	Presents the project goals and objectives motivating the need for change
Define	Presents the project plans, specifications, requirements, and execution
Build / Implement	Where delivery construction is done through the project resources procurement
Deploy	Comprises of delivery integration, testing and running at business level and within the actual environment it will be used. This fits well in the verification and testing stages within the System Development Life Cycle (SDLC) methodology
Run	Consists of transitioning from the project owners to the business owners. In addition, full support is given in the operationalisation and adoption processes after project delivery

The implementation of this cross-platform methodology empowers organisations to successfully implement a stable, adaptive reporting matrix at a strategic management level. This methodology provides timely monitoring and control along with the project lifecycle's change from inception to beyond execution. Therefore, the ITMF can be a Hybrid framework that blends various methodologies and models to form a single delivery-oriented ICT environment that helps IT to deliver change at the speed of business (Pollard & Geisler, 2014). This leads to the discussion on the development of a Hybrid Method in the next section.

2.2.1 Hybrid Methodology

According to Cooper and Sommer (2018), a Hybrid Method integrates Agile into gating systems to enable more control, structure, and focus with an Agile mindset towards productivity, agility and speed. A Hybrid model is a result of project failure of Agile and traditional methodologies (Jaziri et al., 2018). Hybrid models therefore integrate a traditional structure approach to an Agile flexibility approach to achieve more efficiency and effectiveness (Mahadevan et al., 2015). However, Siriram (2017)

argued that not all projects are compatible with Hybrids because of differences in requirements.

Given how the Stage-Gate and Agile models work independently, the Agile-Stage-Gate Hybrid model brings them together (Cooper & Sommer, 2016b). The need to act faster and to be more flexible during product development is required whilst still maintaining the idea-to-launch process in a form of a rapid design cycle that provides for changes in client needs and earlier client validations (Cooper & Sommer, 2016b). This Hybrid model also works well when Agile is applied to some of the selected stages as required. The Agile-Stage-Gate Hybrid model allows for design flexibility, reduces delivery cycle times, and allows for proactive and continuous engagement to address the changing customer needs (Cooper & Sommer, 2016b). Figure 2.2 depicts how the Agile and Stage-Gate processes are integrated into the Agile-Stage-Gate Hybrid model.

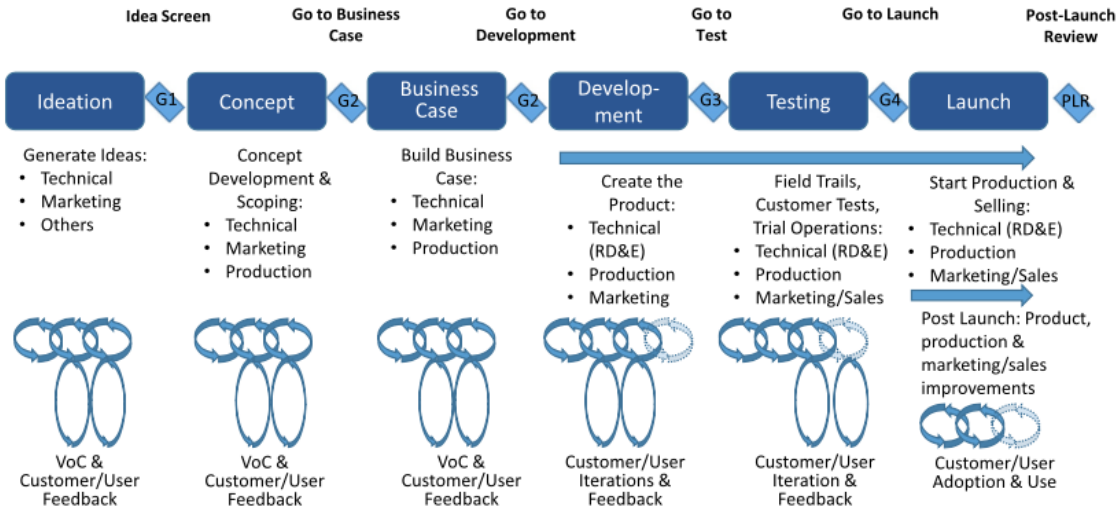

Figure 2.2: The integrated Agile-Stage-Gate Hybrid model – a typical 5-stage, 5-gate Stage-Gate idea-to-launch system, with Agile built into each of the stages (Cooper & Sommer, 2016b)

Drawing from Karlstroem and Runeson (2005) an attempt to study Hybrid methods was done by Magistretti, Trabucchi, Dell'Era & Buganza (2019). The results reported the feasibility of using Agile methods in traditional Stage-Gate project management environments. Their findings show that despite there being management resistance to such an attempt, it is possible to use Agile methods in such environments. However, Cooper (2016) drawing from Boehm and Turner (2003) argued that no one

methodology can be regarded as the best because it is hard to find an approach which can be regarded as a 'silver bullet'. Rather, the proposition has been that instead of adopting just one methodology, a balanced approach dealing with a mix of both the Agile and plan driven practices would be a more successful (Boehm & Turner, 2003). While Agile approaches are better in dealing with issues relating to customer satisfaction, lower defect rates, faster changeability of requirements and faster development times, the traditional/plan-driven approaches are better in ascertaining the predictability, stability and high assurance in the development processes (Sommer et al., 2015).

2.3 Implementation of a Hybrid project management methodology

Companies implementing an Agile-Stage-Gate Hybrid method operate at three distinct levels, which are, the operational, tactical, and strategic levels (Sommer et al., 2015). Siriram (2017) argued that the success of Hybrid models relies on Agile practices being used at operational and tactical levels whereas the Stage-Gate model, is used at the strategic level. Cooper and Sommer's (2016) study on four companies also found the use of the value chain model at a tactical level to assist in coordination, task breakdown and total value creation across all departments.

Mahadevan et al. (2015) observed the isolation of development teams as a critical success factor for Hybrids. This permitted the continuing of project deliverables without interruption of work. Despite this, Jaziri et al. (2018) contended that the isolation of the development team can lead to further isolation of the department from the entire company. However, in contrast to this, Magistretti et al. (2019) proposed integration through the interface of Agile development teams using the requirements of the Stage-Gate model. Auer and Rosenberger (2018) contended that this interface of development team assists in managing change and attitudes of department members.

A Danish study by Baranauskas (2018) found the following five circumstances for successful Hybrid model usage. These are organisational culture change willingness, stakeholder management ability, proper structure building for managing and involving clients, proper management of employee autonomy and supervision abilities, and employee growth and development of project methodology competencies. In a contrasting study by Cooper and Sommer (2018) it was found

that the critical factors for successful Hybrid methods were resolving inconsistencies, addressing management scepticism, finding resources, defining sprint deliverables, and matching projects to processes.

A study by Magistretti et al. (2019) found that for successful implementation of Hybrid methods, an organisation needs ambidextrous design, dedicated assets, heterogeneous staffing, continuous learning and modularisation. Auer and Rosenberger (2018) argued that though Agile-Stage-Gate Hybrid methods are regarded as suitable in all development projects; empirical evidence is showing better benefits being realised in more uncertain and ambiguous conditions. In addition, Agile will need a fully dedicated team that may not be compared to a simple incremental project team (Sommer et al., 2015). Hence, Agile can be reserved for deserving projects requiring greater resources (Cooper & Sommer, 2018).

However, these findings all came from Hybrid models over short experiences with less than five years of implementation. There is still limited empirical evidence in Hybrid models for organisations, hence the focus in this study of implementing a Hybrid method in a competitive and fast-changing business environment in South Africa. Grey (2011) proposed the development of an improved Hybrid Agile project management methodology that combines Agile software development methodology and project management methodology to deliver IT projects successfully in an ever-changing business environment. The relationship of this study to Grey's (2011) study is moving from the development of Hybrid project management methodology to its implementation.

Grey (2011) bridged the gaps between Agile Software Development Methodologies and Traditional Project Management methodologies by developing a Hybrid method that combines the strengths and addresses the weaknesses of both as depicted in Figure 2.3.

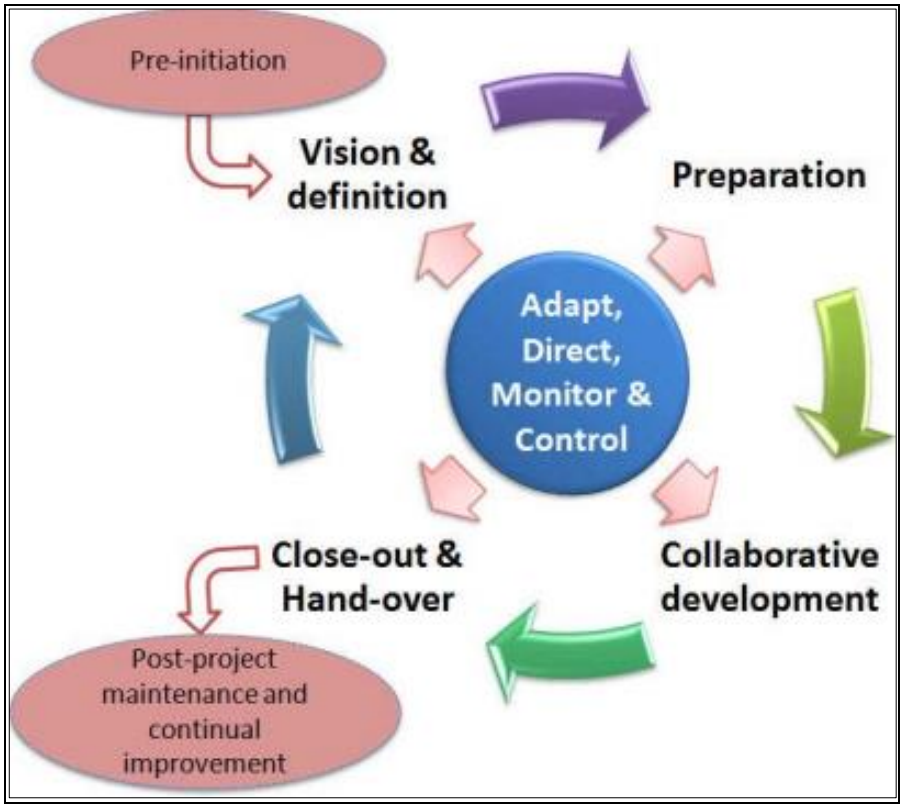

Figure 2.3: Hybrid Agile Project Management Methodology (Grey, 2011)

Ndlovu's (2014) study relates to this study in relation to the outcomes of applying Agile project management to traditional project management-based organisations, to reduce project delivery timelines, cost savings, leading to project success that enables organisations to be competitive. Mapongana (2016) explored the integration of traditional software development methodology into Agile software development methodology relating to this study by combining two project management methodologies (traditional and Agile) to exploit the benefits that come from using the best of both worlds. In the current study, this integration culminates into a Hybrid project management methodology seeking similar benefits when implemented effectively.

According to Cooper and Sommer (2016); Conforto and Amaral (2016); Jaziri et al. (2018); Cooper and Sommer (2018); and Magistretti et al. (2019), no one methodology can be regarded as the best in achieving excellent project performance. This has led to a proposition of using a balanced approach that combines Agile and Stage-Gate into a singular Hybrid method to achieve success in the consistently evolving business environment. Therefore, latest research posits that Hybrid project

management methodology can be used in small and large organisation, across industries, in software and hardware product development. This includes manufacturing companies for IT and non-IT projects, be it small or large.

2.4 Benefits of implementing a Hybrid project management methodology

According to Cooper (2015), Hybrid methods bring improved morale and communication, better responses, and faster product release. However, Agile models require modifications in some projects (Sommer et al., 2015). According to Conforto and Amaral (2016), the integration into Hybrid methods permits improved communication in the project team resulting in more team control and improvements and more visible management intuitive progress metrics, such as burndown charts. The benefits of Hybrid methods Cooper and Sommer (2016) achieve more efficient planning, clear document resolution, improved attitude, avoids inflexible, fixed plans that lead to delays on important features, and "requirements cramming" at the end of development. According to Jaziri et al. (2018), Hybrid models are considered to reduce uncertainties and risks as well as an increase in stakeholder's feedback.

When combined, Agile methods provide Stage-Gate models with "powerful tools for progress reporting, day to day work control and microplanning" (Cooper, 2017, p. 49). On the other hand, Stage-Gate provides support through communication and decision making. In addition, an Agile's method of daily meetings, give continuous feedback and better communication than written forms to make the project more efficient (Cooper & Sommer, 2016a, p. 169). Hence, achieving a balance between the benefits and challenges of the two different approaches, which creates several important advantages (Sommer et al., 2015). According to Cooper (2016), the Hybrid Agile-Stage-Gate model in manufacturing assists in getting the product right, accommodates uncertainty, accelerates development, keeps the team focused on project goals, and improves within-team communication.

Additional benefits include Hybrid methods' boost of dedicated project teams derived from Agile practices, collocated into team rooms holding daily scrum meetings that facilitate productivity and communication (Sommer et al., 2015). The use of Gates in the Hybrid model provides go/kill decision points that help focus the development pipeline, cull weak projects, and enable management review at the project's key transition points (Jaziri et al., 2018). Sommer (2015) contends that by having stages

in Hybrid methods, which project the main phases of high-level overview, it will act as a guide for each stage's expected deliverables. Figure 2.4 shows an ideal Hybrid model with Gate 1 to Gate 5 and Ideation stage to the Launch stage.

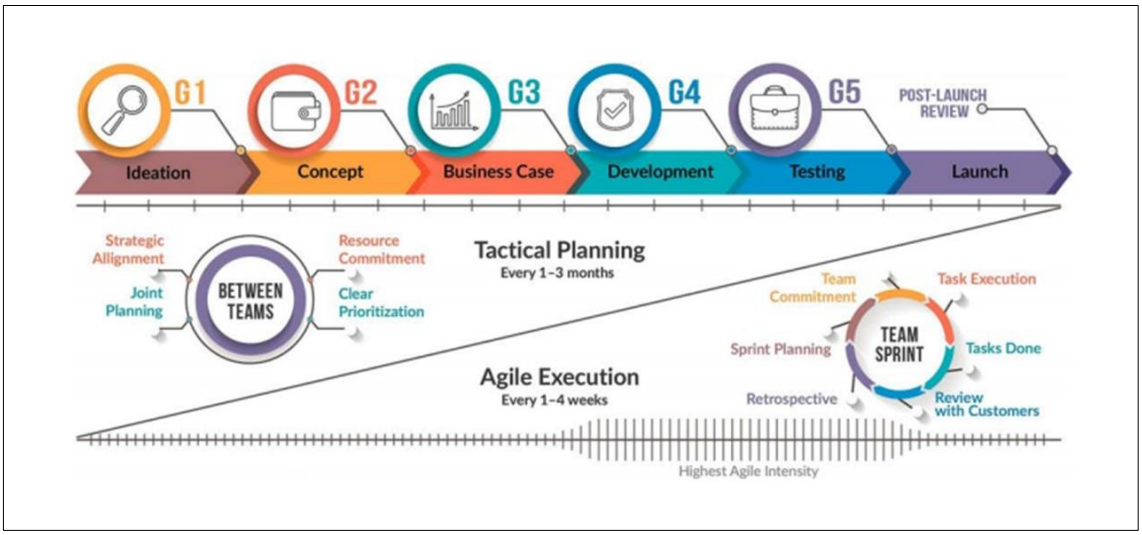

Figure 2.4: Hybrid method model (Cooper & Sommer, 2018)

Hybrid methods provide improved support for both exploitative and explorative capabilities (Cram & Marabelli, 2018). Hybrid methods have the capability to combine agility and structure into one project that can lead to improved innovation solutions (Kielgast et al., 2016). However, Salah, Darwish and Hefny (2017) argued that whilst Hybrid methods appear to introduce more project planning and documentation overheads, it brings business value focus, instead of only budget and time focus. In addition, a Hybrid model permits the customisation of the existing problems instead of applying a generic solution. This assists in achieving better delivery in complex projects (Auer & Rosenberger, 2018).

According to Cram and Marabelli (2018), Hybrid methods bring an Agile project's flexibility and data transparency into a traditional method. There will be better project performance through reduced costs, high success rates (which is achieved through improved information accuracy), leadership and commitment (Salah et al. 2017). In addition, rework is reduced through flexibility to allow changes to be affected timeously throughout the project (Sommer et al., 2015).

The effectiveness of the Agile–Stage-Gate Hybrid processes have been empirically examined in diverse situations, in the development of physical Business to Business

(B2B) products and in Business to Consumer (B2C) companies outside of South Africa (Cooper & Sommer, 2016). However, there is no empirical evidence of effective Hybrid method implementation in organisations within the South African context. In addition, these studies were done on projects with less than five years of implementation. Furthermore, in the Stage-Gate model, project completion may take up to twelve months to delivery or launch (Cooper & Sommer, 2016). During this time, the objective of the requirements may have changed over the period due to a shift in the business outlook, making the delivery to no longer be relevant. The introduction of Agile methods in projects deals with these issues using adaptive planning and iterative delivery methods (Cooper & Sommer, 2016b). Hence the need for a Hybrid model that brings together Agile and Stage-Gate processes where the need to act faster and to be more flexible during product development is required whilst still maintaining the idea-to-launch process in a form of a rapid design cycle that provides for changes in client needs and earlier client validations (Cooper & Sommer, 2016a).

2.5 Challenges of implementing a Hybrid project management methodology

The opposing assumptions and principles of Agile and traditional methods create conflicts and unavoidable adjustments (Leite & Braz, 2016). When a company uses Hybrid methods, these challenges are more evident and similar when a traditional organisation adapts Agile project management (Dikert, Paasivaara & Lassenius, 2016). Business conflicts, people conflicts, and process conflicts develop when a traditional company adopts Agile methods (Sommer et al., 2015). When tasks run late, sprint timelines become difficult to continue (Siriram, 2019). The Danish study by Sommer et al. (2015) also revealed that in Hybrid methods there are delays because it is not easy to find dedicated team members, link project teams with the entire organisation, match reward systems with Scrum requirements and deal with system bureaucracy. According to Papadopoulos (2015), integrating Agile into a current Stage-Gate system is difficult as it culminates into various challenges and issues that bring questions of systems compatibility, team competencies, and budget or cost implications at the least. Various challenges and issues are encountered as a result. A study by Magistretti et al. (2019), revealed the difficulty of Hybrid models in connecting project teams with the rest of the organisation because of the

requirement for project teams to co-locate away from the rest of the organisation, creating easy access to team members which assists in making quick decisions.

The pitfalls of Hybrid methods is having poor communication, underestimated deadlines, inability to recognise the essential details and inattentive management (Aurer & Rosenberger, 2018). They further contend that Hybrids are characterised with unrealistic project planning, lack of cooperation, absence of goal definition and insufficient project management.

Resistance against Hybrid methods is high in big companies because of status quo challenges that lead to differences in capabilities and competencies (Baranauskas, 2018). Cooper and Sommer (2018) argued that “the biggest problem of Hybrid models is the acquisition of dedicated resources and management scepticism that resist the model to work” (p. 25). As argued by Cooper (2016), the challenge in Hybrids is that dedicated teams may be isolated from others resulting in long-range planning being sacrificed in favour of current sprint. In this way, resistance and conflicts remain between Agile managers failing to give up their control during the development process (Salah et al., 2017).

There are a few, recent researchers on Hybrid models who aim to understand and explore its use in product development, such as (Auer & Rosenberger, 2018; Baranauskas, 2018; Cooper, 2016; Cooper & Sommer, 2016b; Jaziri et al., 2018; Mahadevan et al., 2015). Despite this, not much empirical research on Hybrid exists with a focus on hardware product development’s successful usage. The studies on manufacturing companies using Hybrid models have found problems with inconsistency between long term and short-term planning cycles and fixed versus fluid product definitions (Cooper & Sommer, 2018). Similarly, as highlighted in the previous discussion, no empirical evidence exists for the successful implementation of Hybrid methodology in organisations within the South African context, as well as these studies were done on projects with less than five years of implementation. Hence, a good research ground is needed to explore how these methodologies are being implemented effectively.

2.6 Conclusion

The literature review reveals that Hybrid project management methodologies have not been in use for a long time. The few studies done on the early adopters of this innovative model found benefits and challenges in shorter periods of using them. In addition, the studies have been for specific industries and specific uses. Implementing a Hybrid project management methodology is an alternative for organisations to use when faced with the need for a flexible methodology that integrates with existing traditional methods. As explored by other researchers, it has been found that Hybrid methods also come with problems. There is a need in this study to explore how organisations using Hybrid methods for longer periods have managed to implement them effectively. This study focuses on IT projects in South African organisations that implement Hybrid methodologies when delivering projects.

CHAPTER 3: RESEARCH QUESTIONS

The purpose of this study is to answer the following three questions.

3.1 Research Question 1

How effective is the implementation of a Hybrid project management methodology, considering the Information Technology Management Framework (ITMF) lifecycle?

Implementing an effective Hybrid methodology in the context of this study means combining Waterfall and Agile methodologies to successfully deliver on a project. The objective of this question was to determine the effectiveness of implementing a combination of two project management methodologies as a Hybrid methodology throughout the stages of the project lifecycle.

3.2 Research Question 2

What benefits are derived from implementing a Hybrid project management methodology?

In the study, advantages are interpreted as benefits. Hybrid benefits reflect on how quick delivery can be achieved whilst still meeting the necessary project governance standards and requirements. The objective of this question was to determine what the benefits of implementing a Hybrid project management methodology are and whether the advantages can be interpreted as benefits in this instance.

3.3 Research Question 3

What challenges are derived from implementing a Hybrid project management methodology?

In the study, disadvantages are interpreted as challenges. The combination of Agile and Waterfall methodologies is structured in such a way that Agile practices are embedded from the planning and scoping phases of the project lifecycle. However, the documentation may be leaner than what it would have been using the Waterfall methodology. The leaner documentation is intended to make the process easier and to move quicker with the project. However, documents like the project plan and

business case often lack the necessary detail which eventually necessitates a back and forth to try and gather this information during the running of the project.

The objective of this question was to determine whether the disadvantages can be interpreted as challenges as well as what the challenges of implementing a Hybrid project management methodology are.

CHAPTER 4: RESEARCH METHODOLOGY

4.1 Introduction

The purpose of the research design is to conduct an exploratory study that emphasises the use and prioritisation of qualitative research (Saunders & Lewis, 2018). It allows for open-ended questions which enable the researcher to delve into details to gain more insights on existing theories. A case study was used as a research strategy to study the research phenomenon within its context without being subjected to controlled and limited contextual variables. It also allowed the ability to explore the context within which the research subject exists and other real-life related contexts (Saunders & Lewis, 2018).

4.2 Research methodology and design

This research chose a mono-method qualitative study using a single data collection technique in the form of interviews. The choice of philosophy in the study was interpretive philosophy that enabled the researcher to make sense of the phenomenon being studied in a natural setting, which allowed for trust to be established between the researcher and the interviewee. This also allowed for the appropriate level of access to provide meaning and understanding of the interpretation held on the immediate surroundings (Saunders & Lewis, 2018).

The researcher used a deductive approach to theory development to adopt a theoretical position that can be tested through data collection. Research questions in this study implicate the multiple realities that may contribute to practical solutions to inform future practice instead of looking to a single view to give an entire picture (Saunders & Lewis, 2018).

To address the time horizon, a cross-sectional study was done which allowed for a snapshot of the research to be taken given the time constraints of the study (Saunders & Lewis, 2018). The case study was completed at a point in time; therefore, interviews were conducted over the available short period of time using the techniques and procedures of data collection and analysis to be carried out in smaller in-depth samples (Saunders & Lewis, 2018).

The researcher used data collection and analysis techniques and procedures that allowed for in-depth exploration of the research concept to be able to identify common themes and patterns to create a conceptual framework (Saunders & Lewis, 2018). “The mono qualitative method chosen will allow for the collection of non-numeric information that is unquantifiable and the data collected will be based on meanings and non-standardised data that is analysed through contextualisation” (Creswell, 2014. p. 180).

In trying to gain some insights through theories and applying thematic analysis techniques, an exploratory research design was more appropriate to use (Bryman & Bell, 2015). An exploratory purpose was thus a valuable means of finding out what is happening; to seek new insights, to ask questions; and to assess the phenomena of Hybrid project management methodology (Saunders, Lewis & Thornhill, 2016). The study explored the benefits and challenges of implementing a Hybrid PMM for IT-based projects in South African-based organisations.

The choice to use a case study design was motivated by the need for intensive and detailed research of the problem (Saunders et al., 2016). This helps achieve a deeper comprehension of the research. Therefore, the IT-based projects considered are from recent years (2015 to date) where attempts have been made to implement Hybrid project management methodology, with interviews with individuals that were involved in such attempts.

4.3 Population

As held by Babbie and Mouton (2015), a population is the universe or complete list of subjects to be studied possessing similar attributes worth studying. This may be a group of objects, people, events that represent the collection of units to be researched (Creswell, 2014). For the purposes of this research, the population was the select individuals working with IT-based projects in South African-based companies. This symbolises all the individuals in the area under study thus depicting the population. The population, as the universe of a study subject, is important to permit a sample to be drawn (Corbin & Strauss, 2017).

4.4 Unit of analysis

According to Corbin and Strauss (2017), the unit of analysis answers the “who” and “what” of the research study. The unit of analysis reflects the entity or phenomenon being studied. In this instance the “who” is an embedded study involving individuals working in IT-based project teams of South African-based companies. The “what” addresses the subject of implementing Hybrid PMM for IT-based projects in South African-based companies. Therefore, this study interprets Corbin and Straus’ (2017) unit of analysis framework as using an embedded case study strategy to conduct an in-depth exploration of the research phenomenon within its context, without being subjected to controlled and limited contextual variables. It allows the ability to explore the context within which the research subject exists and other real-life related contexts.

In addition, the case study equally enabled this research to challenge and confirm existing theory on the benefits and challenges of implementing Hybrid PMM for IT-based projects. This is consistent with Eisenhardt’s (1989, p. 548) study “Theory developed from case study research is likely to have important strengths like novelty, testability and empirical validity, which arise from the intimate linkage with empirical evidence”. In selecting semi-structured interviews, the translation of research questions into solid knowledge aimed to represent the practicality of the questions and therefore justifies the choice of the type of interviews (Dul & Hak, 2008; Verschuren, Verschuren & Doorewaard, 1999). Achieving the knowledge aim first requires for the research topic to be specified and then the aspect of the topic to be studied. Then it must be specified what the empirical domain needs to cover and lastly the unit to be observed (Jansen, 2010). In this study, the project office of the South African-based companies was the unit to be observed as the possible custodian of project implementation for the company.

4.5 Sampling method and size

This study used purposive sampling with thirteen respondents to reach saturation due to the time constraints that prevented the researcher from interviewing the entire population (Saunders & Lewis, 2018). This meant selecting specific people within selected project teams using a criterion of the roles they fulfil in traditional (Stage-

Gate) and Agile run IT projects. The choice to use purposive sampling was to allow usage of judgement in choosing the best sample adequate for the study (Saunders et al., 2016). Such judgement was applied to ensure the sample consisted of people who deal with Hybrid project management methodology at strategic, operational and tactical levels. Looking at the formulation of the Hybrid model, Agile development teams' skill set is normally broad and includes analysis, development, database architecture and project management. Whereas in the traditional model, the skill sets are normally defined for specific functions in the development process (Tripp, Riemenschneider & Thatcher, 2016). The roles in Agile and traditional models must be well integrated for the Agile-Stage-Gate Hybrid model to be applied successfully (Cooper & Sommer, 2016b). A list of proposed respondents was provided in the table below. The selection was based on project team members delivering on IT-based projects using either Agile, traditional, or hybrid methods.

Table 4.1

Proposed participants sample with roles and responsibilities

Combined roles from both traditional and agile project management methods		
Role		**Duties**
1.	Project Sponsor	Champions the project at the highest level and is accountable for signing off on project outcomes. Provides resources and communicates with key stakeholders (HBR Staff, 2016).
2.	Programme Manager	Leads all project managers in the various projects within the programme. Coordinates, manages, and creates synergies between all projects ensuring success at programme level (Fernandes, Pinto, Araujo, & Machado, 2020)
3.	Product Owner	Knowledgeable on the company and has a clear vision of the product to be delivered. Guides the development team on what is to be prioritised in the short term (Jovanovic, Mas, Mesquida & Lalic, 2017).
4.	Project Manager	Defines the project scope and resource schedules. Has oversight of overall project deliverables and directs project teams (HBR Staff, 2016).

5.	Scrum Master	Directly deals with business client in terms of product requirements and sometimes takes on a role of product owner in prioritising tasks for deliverables (Jovanovic, Mas, Mesquida & Lalic, 2017).
6.	Business Owner	Understands the business need and scope to be covered. Helps with building a business case (AJAE Consulting LTD., 2017).
7.	Business Analyst	Elicits requirements from business and communicates them through technical specifications with the technical team. Prepares project delivery documentation (Hass, 2005).
8.	System Analyst	Elicits technical requirements using a systems approach by mapping different required systems (Hass, 2005).
9.	Functional Analyst	Produces functional requirements through conceptual diagrams (Hass, 2005).
10.	Solution Specialist	Possesses the overarching knowledge for the architect of business and information technology solutions and enterprise resource planning (Williams, 1997).
11.	Developer	Assists with solution development using specialised skills (Cheng, Li, Li, Zhao & Liao, 2017).
12.	Change Manager	Assists business with adoption and change impact of new product/solution, and benefits realisation measures (Zein, 2010).

4.6 Data collection tool

An interview guide was used to ask purposeful and unambiguous questions that the respondent was willing to respond to. The interview guide helps to gather valid and reliable data relevant to the research (Saunders & Lewis, 2018). Semi-structured interviews that are non-standardised were conducted to cover key questions that could be asked differently per interviewee or omitted based on the context (Saunders

& Lewis, 2018). The interview guide consisted of open-ended question lists that were put across to participants as indicated below.

Table 4.2

Propositions mapped with interview questions

Proposition	**Interview Questions**
1. To evaluate factors for effectively implementing a Hybrid project management methodology considering the stages in the ITMF lifecycle.	1. What is your exposure to Project Management? 2. What is your exposure to Agile project management methodology? 3. How long have you been exposed to both Project Management and Agile? 4. What is your understanding of a Hybrid Project Management Methodology (PMM)? 5. How do you implement a Hybrid PMM in your organisation? Perhaps tell me more about the steps involved in implementing a Hybrid model within your organisation, considering the stages of request, define, build, deploy, and run in the ITMF lifecycle. 6. What would you say is the advantage of implementing a Hybrid PMM? 7. What is the disadvantage thereof? 8. What do you see the future of implementing a Hybrid model being in your current organisation? 9. In your opinion, what is the one thing that should be done to ensure a Hybrid model is implemented effectively such that it makes a difference? 10. In your opinion, should organisations consider Waterfall or Agile or Hybrid as the PMM of the future? Or should they develop a framework

	that will assist them in making a choice of methodology per IT project?
Literature	
(Sommer et. al., 2015; Sirirram, 2017; Cooper & Sommer, 2016; Mahadevan et al., 2015; Jaziri, El-Mahjoub & Boussaffa, 2018; Magistretti, Trabucchi, Dell-Era & Buganza, 2019; Auer & Rosenberger, 2018; Baranauskas, 2018; Copper & Sommer, 2018; Magistrelli et al., 2019; Pollard & Geisler, 2014)	
2. To evaluate the benefits of implementing a Hybrid Project Management Methodology.	11. How do you derive benefits of implementing a Hybrid PMM considering the stages of request, define, build, deploy, and run in the ITMF lifecycle? 12. What are the benefits of implementing a Hybrid PMM? 13. How do you measure the benefits?
Literature	
(Cooper, 2016; Sommer et al., 2015; Conforto & Amaral, 2016; Cooper & Sommer, 2016; Jaziri et al., 2018; Cooper, 2017, p. 49; Cooper & Sommer, 2016a, p. 169; Cooper, 2016; Sommer, 2015; Cram & Marabelli, 2018; Kielgast et al., 2016; Salah et al., 2017; Auer & Rosenberger, 2018; Cooper & Sommer, 2018; Garbie, 2011, p. 203; Pollard & Geisler, 2014)	
3. To evaluate any challenges faced when implementing a Hybrid Project Management Methodology.	14. How do you derive challenges of implementing a Hybrid PMM considering the stages of request, define, build, deploy, and run in the ITMF lifecycle? 15. What are the challenges experienced when implementing a Hybrid PMM? 16. How do you measure the challenges?
Literature	
(Leite & Braz, 2016; Dikert, Paasivaara & Lassenius, 2016; Sommer et al., 2015; Siriram, 2019; Papadopoulosa, 2015; Magistretti et al., 2019; Aurer & Rosenberger, 2018; Baranauskas, 2018; Cooper & Sommer, 2018, p. 25; Cooper, 2016; Salah et al., 2017;	

Cooper & Sommer, 2016b; Jaziri, El-Mahjoub & Boussaffa, 2018; Mahadevan, et al., 2015; Garbie, 2011; Pollard & Geisler, 2014)

The interview guide questions were put across to solicit views and opinions of the participants regarding the research questions on implementing a Hybrid project management methodology. The intention of this is to obtain richer and more detailed content in line with the existing theory (Bryman & Bell, 2015). For this reason, open-ended questions guided a purposeful conversation with the research participants to elicit for detailed opinions and views on the research subject. The use of an interview guide made the process semi-structured as described in the data gathering process in the next section.

4.7 Data collection

The gathering of data involved a collection of primary and secondary data. Primary data was collected by conducting semi-structured interviews and literature reviews. Secondary data was collected from the companies' internal reports. In the interviews, open-ended questions were asked to provide the optimum outcome. Data was triangulated using one method (semi-structured interviews).

According to Creswell (2014), semi-structured interviews are a source of primary data collection when the respondents provide meaningful views about the research enquiry. Hence, in this study, semi-structured interviews were used to collect primary data. These semi-structured interviews permit an interviewer to comprehend themes based on the interviewee's expression of knowledge and experiences about the research subject (Leedy & Ormrod, 2015). The use of interview guides and probing questions during interviews enabled the interviewer to obtain more intricate answers that adequately address the research questions. Invitation to participate was sent to personnel and social media contacts who hold the roles as defined in the population section. All invited participants that responded were screened using a set of questions to make sure they fulfil the requirements of the sample profile. Participant's

responses have been kept confidential by using an identifier representation such as ‘Participant 1’ instead of the actual name.

The interviewer can dig deeper to find more valuable and real information necessary for the research enquiry (Bryman & Bell, 2015). The interview could flow in a less intense manner to allow respondents to give responses in their own use of language and thinking as well as their own terms (Saunders et al., 2016). Immaculately administered semi-structured interviews assist better in meeting the research objectives (Creswell, 2014). The list of open-ended questions is administered in a specific and orderly manner that ensures all the research questions are enquired (Saunders & Lewis, 2018). The interviewer used simple and easy to understand language to enable interviewees to provide adequate answers. Instead of asking leading questions, the interviewer used a series of sub-questions that dealt with the main objectives. All the interviews were recorded and transcribed verbatim to allow for an audit trail as well as repeated and thorough examination of the responses.

To increase the validity of the answers, interview guides were sent in advance so that interviewees could think about and prepare their answers. To ensure a more accurate understanding of the responses, individuals with different roles and responsibilities in the project teams were involved. Confidentiality of the respondents was maintained by ensuring the responses do not bear their names and the responses are presented in a manner that it will not be associated with the identity of a single respondent. Therefore, soon after the interviews were recorded and transcribed, special codes were allocated to them.

Secondary data was gathered through industry related IT-based project reports. Other peer-reviewed journals on the research subject was obtained from invaluable databases. The judgement criteria in selecting secondary data is one by Bryman and Bell (2015) who posited that documents must be credible and authentic showing meaning and representativeness of the research subject.

4.8 Data analysis

The process of doing analysis involves three concurrent sub-processes (Miles & Huberman, 1994). These are data reduction, data display and drawing and verifying conclusions. A data reduction approach was used to produce interview summaries

that simplify parts, or all, of the data collected (Saunders & Lewis, 2018). These summaries were documented, coded and categorised to create a narrative. In evaluating the structure of the literature review, data was analysis by content and thematic analysis since the research method was qualitative. According to Collis and Hussey (2015), qualitative analysis involves the synthesis of data through dismantling, segmenting and reassembling. The data was thus collected and gathered using thematic means after transcribing, categorising and coding the data whilst correcting any possible misinterpretations and mistakes. Thematic analysis technique was also used for data that was quite open-ended and difficult to interpret (Braun & Clarke, 2006).

Common and emerging themes were identified, presented, discussed and analysed meticulously to permit conclusions to be made. With the deductive approach based on existing the theory, it allowed for the data collection process to commence with a well-defined question and set of objectives and a clear framework and propositions derived from the theory being used (Saunders & Lewis, 2018). It also provided the ability to search for key themes and patterns in the data when doing analysis. The main themes were refined and presented into narrative explanations to assist in answering the research questions (Saunders & Lewis, 2018). The analysis used a series of propositions that reflected the nature of the data associated with the case study's data. In addition, Miles and Huberman's (1994) approach of logically linking data to a series of propositions and then interpreting the subsequent information was utilised.

4.9 Data quality and trustworthiness

Quality was measured by the sampling method and the demonstration of saturation and triangulation. Quality controls for qualitative research differ from those of quantitative research in that conformability, dependability, transferability and credibility are important factors in qualitative research (Collis & Hussey, 2015). In other words, Babbie and Mouton (2015), contended that qualitative studies must reflect trustworthiness by ensuring the results are dependable, credible, confirmable and transferable. Therefore, in this study, an audit trail of the research process that includes the entire data gathering and data collection has been maintained for validation purposes. The study ensured accuracy and honesty was maintained

throughout the research process for credibility and dependability purposes. All interviews were recorded and transcribed verbatim and the respondents were given sufficient time to prepare for the interview so that more thought-through answers were provided. The main themes were discussed and triangulated with literature review and secondary data to ensure all data sources converge.

According to Creswell (2014), transferability means the outcome has relevancy to a comparable situation, occurrence, or population. Therefore, the selection of IT-based projects in South African-based companies provided a real setting of what is essentially the effective implementation of a Hybrid project management methodology. Babbie and Mouton (2015) contended that conformability makes sure the results have a degree of neutrality in line with the answers without external interference. The study ensured extensive literature was sought to ensure objectivity in the results and that respondents were knowledgeable and able to articulate the research enquiry.

Validity and reliability of data was considered for accuracy in findings. Noble and Smith (2015) defined validity as the integrity and application of the methods undertaken and the precision in which the findings accurately reflect the data. Reliability is defined as describing consistency within the employed analytical procedures. As a characteristic of validity and reliability, qualitative researchers aim to design and incorporate methodological strategies to ensure the 'trustworthiness' of the findings (Noble & Smith, 2015). Guba and Lincoln (1994) saw the concept of reliability as a criterion by which to judge qualitative research as belonging to the positivist or post-positivist paradigm. This is coupled with a conventional way of treating validity in qualitative research to be the recourse to triangulation. Similarities found among authors specified validity and reliability to be fundamental concerns of the quantitative researcher but seem to have an uncertain place in the repertoire of the qualitative methodologist (Armstrong, Gosling, Weinman & Marteau, 1997). These authors differed when it comes to the certainty of validity and reliability in qualitative research and whether these two phenomena should be replaced with alternatives in qualitative research.

Lincoln and Guba (2000), adapting from their earlier study (Lincoln & Guba, 1985), offered alternative criteria to validity and reliability by demonstrating rigour within qualitative research, namely truth value, consistency and neutrality, and applicability.

Denzin and Lincoln (2017) suggested that terms such as credibility, transferability, dependability, and confirmability replace validity and reliability. “The debates within qualitative methodology on the place of the traditional concept of reliability (and validity) remain confused” (Armstrong et al., 1997, p. 597). “Major risks and threats to validity and reliability are the researcher, the participating subjects, the situation or social context, and the methods of data collection and analysis” (Brink, 1993, p. 35). “Asking the wrong questions actually is the source of most validity errors” (Kirk & Miller, 1986, p. 30). In both quantitative and qualitative research, reliability has only relevance because it is a necessary precondition for attaining validity (Brock-Utne, 1996).

The key measures of quality that were used in the report looked at how the sampling was done and the demonstration of reaching saturation and triangulation. Triangulation is about how the sample has been structured and looking at more than one group of people (Saunders & Lewis, 2018). Data triangulation was demonstrated in the report using one method of data triangulation which involved the researcher using different sources to collect data for the study (Saunders & Lewis, 2018).

The question of ethics arises in qualitative research Roth and von Unger (2018) as "the emergent, dynamic and interactional nature of most qualitative research" (Iphofen & Tolich, 2018, p. 1). Adapting from Beauchamp and Childress (1989) ethics pertains to doing good and avoiding harm (Aluwihare-Samaranayake, 2012), also inferred by the authors (Orb, Eisenhauer & Wynaden, 2001). The researcher demonstrated ethical conduct by ensuring that participation consent was solicited prior to collecting data. Ethics in research must not only consider the protection of human subjects but also consider what constitutes as socially responsible research (Schwandt, 2007). A critical ethical concern is the protection of vulnerable persons (Orb et al., 2001).

According to Roth and von Unger (2018), in some national contexts, institutional ethics reviews are obligatory not only for medical research but also for social science research, which includes qualitative research. Ethical reflexivity is a core feature of qualitative research practice as ethical questions may arise in every phase of the research process (von Unger, 2016). Some of the authors agree the researcher should solicit consent from research participants who should be informed of

confidentiality and anonymity (Orb et al., 2001; Aluwihare-Samaranayake, 2012; Roth & von Unger, 2018).

“Conducting qualitative research in an area in which the researcher works or is already known, raises several issues and ethical considerations (Orb et al., 2001, p. 96)”. Therefore, the researcher needed to be mindful of possible unethical occurrences and avoid biases. It is stimulating for researchers not to treat ethics as a code but rather a relationship between research and the researcher (Roth & von Unger, 2018). The researcher can use ethics to connect to the research subject in a way that draws them closer to the subject.

4.10 Research limitations

Qualitative research has the risk of being subjective through biases that may be created by the open-ended approach of questions if not narrowed down to the information being gathered (Bryman & Bell, 2015). The nature of questions may also create interviewer and interviewee biases that may limit asking for and obtaining objective feedback (Saunders & Lewis, 2018). This study is limited to events surrounding the implementation of Hybrid project management methodology in South African-based companies from 2015 to date.

The respondents were members of project teams that have been running IT-based projects within South African-based companies and remain in their employment. The use of qualitative data affects the level of rigour since it is more difficult to maintain, assess and demonstrate. The researcher who developed the questions was not experienced in creating open-ended interview questionnaires therefore the input, processes and outputs of the study may be impacted (Agee, 2009).

CHAPTER 5: RESULTS

5.1 Introduction

The purpose of this chapter is to present results derived from literature supported by the semi-structured interview questionnaire. The data was collected using virtual platforms to conduct semi-structured interviews. Alignment between the research questions, literature review, interview questions and data analysis was ensured using a consistency matrix as depicted in Table 5.1. The results provide insights into the effective implementation of a Hybrid project management methodology along with the advantages and disadvantages of such an implementation. These results are structured according to themes that emerged from the analysis of data collected in the semi-structured interviews.

Table 5.1

Consistency matrix

Propositions / Research Questions	**Literature Review**	**Data Collection Tool**	**Analysis**
Research Question 1: How effective is the implementation of a Hybrid Project Management Methodology considering the Information Technology Management Framework (ITMF) lifecycle?	(Sommer et. al., 2015; Siriam, 2017; Cooper & Sommer, 2016a; Mahadevan et al., 2015; Jaziri et al., 2018; Magistretti et al., 2019; Auer & Rosenberger, 2018; Baranauskas, 2018; Copper & Sommer, 2018; Magistrelli et al., 2019)	Semi-structured Interview	Thematic analysis technique, deductive analysis
Research Question 2: What benefits are derived from implementing a Hybrid Project Management Methodology?	Cooper, 2015; Sommer et al., 2015; Conforto & Amaral, 2016; Cooper & Sommer, 2016; Jaziri et al., 2018; Cooper, 2017, p. 49; Cooper & Sommer, 2016a, p. 169; Cooper, 2016; Sommer, 2015;	Semi-structured Interview	Thematic analysis technique, deductive analysis

	Cram & Marabelli, 2018; Kielgast et al., 2016; Salah et al., 2017; Auer & Rosenberger, 2018; Cooper & Sommer, 2018; Garbie, 2011, p. 203)		
Research Question 3: What challenges are derived from implementing a Hybrid Project Management Methodology?	(Leite & Braz, 2016; Dikert, Paasivaara & Lassenius, 2016; Sommer et al., 2015; Siriram, 2019; Papadopoulos, 2015; Magistretti et al., 2019; Aurer & Rosenberger, 2018; Baranauskas, 2018; Cooper & Sommer, 2018, p. 25; Cooper, 2016; Salah et al., 2017; Cooper & Sommer, 2016b; Jaziri et al., 2018; Mahadevan et al., 2015; Garbie, 2011)	Semi-structured Interview	Thematic analysis technique, deductive analysis

The following section of this chapter describes the sample selected for the interviews for data collection, followed by the presentation of the results from the qualitative study.

5.2 Sample description

As defined by Sekaran (2016), a sample is a proportion of a target population which can represent the entire population. Creswell (2014) argued that sample selection should be logical in approach whereas Corbin and Strauss (2017) explained that saturation level is reached when new data becomes redundant to data already gathered. Although the proposed sample was for twelve participants, a sample of thirteen respondents who are key personnel involved in implementing IT-based projects in South African-based companies was regarded to provide data that is

timely, less costly, convenient and shows saturation to accurately answer this study's research questions.

The qualitative data needed to be collected for the study required a larger size of the sample to have in-depth knowledge of the subject. Therefore, the sample in this study was carefully selected as respondents working in various industries with knowledge and experience (not less than two years) working in environments that include IT-based projects, amongst others. Table 5.2 lists the roles of the selected sample which shows a combination of various roles performed when running IT-based projects that are small or large and implemented through a chosen project management methodology. The variety of these roles encompasses the necessary representation of activities performed when delivering IT-based projects using any of the project management methodologies to accurately answer this study's research questions. The entire sample consisted of a combination of thirteen males and females between the ages of thirty-five and fifty years with vast and extensive knowledge and experience working in project environments. The data will be presented without a respondent and company identifiers to maintain confidentiality. Respondents will be represented in numbers and the companies in letters in the analysis and discussion.

Although all participants are South African-based, the interviews were conducted using virtual tools. Twelve of the interviews were conducted using Zoom and one interview through Microsoft Teams. Each participant was sent an email with the details of the meeting invitation along with an attachment of the consent form to be completed prior to the commencement of the meeting. The consent form detailed the purpose of the interview, the subject of study, required time for the interview, confidentiality disclaimer and the contact details of the interviewee and supervisor. The respondents were reminded of the key contents of the consent form at the beginning of the interview and were informed that the interview would be audio recorded if there was no rejection to it. The consent form was to ensure the maintenance of ethical conduct and to be able to clarify any concerns before the interview could be conducted.

Table 5.2

Information of participants and their professional context

Participant Number	Role of Participant	Description of Role	Industry
1	Demand Optimisation Consultant	Provides consulting services in automation IT-based solutions in the energy and oil retail environment	Oil and Gas
2	Programme Director	Provides services in business analytics, project management, program management and change management	Global Computing and Telecoms
3	Portfolio, Programme and Project Management Specialist	Provides consulting services for end-to-end project management	Financial Services
4	Lead ICT and Enterprise Architect	Provides consulting services in IT management with an emphasis on enterprise architecture and ICT strategies	Information and Communication Technology
5	SAP BI/BW Instructor	Provides consulting services for SAP BI/BW solutions and training delivery of the full suite course for anything related to SAP BI/BW/BO	Information and Communication Technology
6	Programme Manager	Manages the programme along with its project managers as well as managing the progress of projects and proactively managing issues and risks that arise from dependencies and interfaces between projects	Rail Transport, Port Management Logistics and Pipeline Management

7	Head of PMO and Group Project Manager	Manages large scale and full lifecycle projects. Leads digitisation and transformational projects and assists in establishing project management offices	Information and Communication Technology
8	Managing Director	Manages projects related to strategic alignment, agility and business improvement. Provides IT consulting services and training in IT and project management	Electrical and Electronic Engineering
9	Senior SAP BO Consultant	Provides consulting services in SAP BO with full lifecycle implementation of SAP BOBJ. Assists with collecting, organising, interpreting and disseminating various types of statistical figures and reporting	Brewing and Beverage
10	Project Manager	Manages the entire project lifecycle and the project team. Manages the interaction between internal and external stakeholders. Assists in maintaining project controls as per the project office	Telecommunication
11	Programme Manager and Head of PMO	Manages the project management office which assists the organisation to identify, prioritise, initiate, manage and track critical projects. Assists in creating effective partnerships across organisational lines and establishes thought leadership around shared organisational challenges	Financial Services

12	Chief Information Officer	Oversees the IT department by providing IT leadership and IT solutions. Helps drive a high-performance culture and drives IT talent development through coaching and mentoring	Financial Services
13	Business Architect and IT Governance Specialist	Provides consulting services that assist the CIO to provide effective IT solutions and services to the business. Assists in proactively managing IT project related risks and implementing internal controls to make sure the IT investment is professionally managed and provides value to the business	Rail Transport, Port Management Logistics and Pipeline Management

The sample size was selected and coded based on the analysis of the primary data collected. Saturation was reached when the rate of new codes declined during the analysis process. Figure 5.1 represents each new code that was recorded.

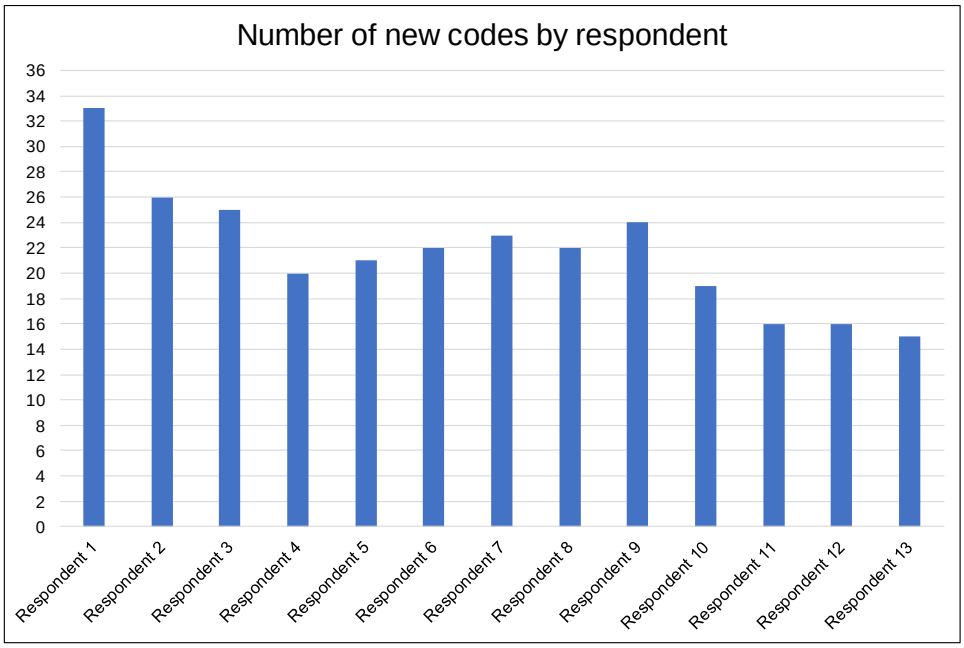

Figure 5.1: Number of new codes by respondent

5.3 Coding and analysis process

The literature and interview guide were reviewed to develop a code book with names and definitions. Transcripts were read through carefully to be able to derive preliminary codes in the appropriate segments of the text. Sub-categories of codes were then created to assist with grouping the ones that relate to each other to form categories. Relationships between categories were created to collect data for writing the preliminary analysis. The steps in the analysis process a) preparation, b) organising, c) review, d) selection, e) coding, f) categorisation, g) relationships, h) presentation, and i) discussion were followed (Cresswell, 2003). The table below presents the number of quotations selected from the transcript data from which codes were created and reduced into categories to formulate themes linking them to theory.

Table 5.3

Quotations with code groups and codes

9 Code Groups	**39 Codes**	**Number of Quotations**	**Respondents Id**
Agile and Waterfall Compared	Comparing agile and waterfall	17	D:1 (2), D:2, D:4, D:8, D:9 (2), D:11, D:12 (9)
	Hybrid methodology of waterfall and agile	8	D:1, D:3, D:4, D:9, D:11 (2), D:12, D:13
Benefits of Hybrid Methodology	Advantages interpreted as hybrid benefits	7	D:1, D:3, D:6, D:9 (2), D:11 (2)
	Advantages of hybrid	17	D:1, D:2 (2), D:3 (2), D:4 (2), D:7 (2), D:8 (2), D:9, D:12 (3), D:13 (2)
Challenges of Hybrid Methodology	Challenges with implementing hybrid	26	D:1, D:2, D:4 (3), D:5 (3), D:6, D:7, D:8, D:9 (2), D:10 (6), D:11, D:12 (2), D:13

	Disadvantages interpreted as hybrid benefits and challenges	6	D:1, D:3, D:4, D:7, D:8, D:11
	Disadvantages of hybrid	10	D:1, D:2, D:3, D:4 (2), D:6, D:7 (2), D:8 (2)
Implementation of Hybrid Methodology	Ensuring hybrid effectiveness	10	D:1, D:2 (2), D:4, D:6 (2), D:7, D:8, D:10 (2)
	Hybrid meaning	17	D:1, D:2, D:3, D:4, D:5, D:6, D:7, D:8 (2), D:9, D:10 (3), D:11, D:12 (2), D:13
	Implementing hybrid	29	D:1, D:2, D:3 (2), D:4 (2), D:5 (4), D:6, D:7, D:8 (2), D:9 (2), D:10 (5), D:11 (4), D:12 (3), D:13
	Informally implementing hybrid	2	D:8, D:13
Fully Agile	All company A projects going fully agile	1	D:1
	All company K projects	1	D:11
	All company B projects going fully agile	1	D:9
	IT based projects going agile only	3	D:1, D:3, D:4
	Understanding of agile	9	D:1, D:3, D:5, D:7, D:9, D:10 (2), D:11 (2)
	Years in agile	10	D:1, D:2, D:3, D:4, D:5 (2), D:6, D:7, D:9, D:11
Future of Hybrid Methodology	Future of hybrid at company A	1	D:1
	Future of hybrid at company B	1	D:9
	Future of hybrid at company E	1	D:2

	Future of hybrid at company G	2	D:4
	Future of hybrid at company M	2	D:8
	Future of hybrid at company V	1	D:13
	Future of hybrid at company N	1	D:6
	Future of hybrid at company O	1	D:10
	Future of hybrid at company S	1	D:7
	Future of hybrid at company U	1	D:3
	Future of hybrid at company T	1	D:5
Hybrid Methodology Benefits Criteria	Deriving hybrid advantages	5	D:1, D:2, D:3 (2), D:6
	Hybrid method success criteria	10	D:2, D:3, D:5 (3), D:9, D:10 (2), D:12, D:13
	Measuring benefits	6	D:8, D:9, D:10, D:11 (2), D:13
Hybrid Methodology Challenges Criteria	Deriving hybrid disadvantages	2	D:1, D:4
Understanding PM Methodology	Company standard PMM	8	D:2, D:7, D:8, D:9 (3), D:10, D:13
	Deciding on future methodology	26	D:1, D:2, D:3 (2), D:4, D:5 (4), D:6 (3), D:7, D:8 (2), D:10 (4), D:11, D:12 (3), D:13 (2)
	Deciding on methodology	14	D:1, D:2 (2), D:3, D:4, D:5 (2), D:6, D:7, D:8, D:10, D:11 (2), D:13
	Influence of PMM on success of project	5	D:5, D:6, D:8, D:10, D:12

	Limited PM exposure	2	D:5, D:9
	PMM balancing act	5	D:2, D:5, D:8 (2), D:11
	Years in PM	12	D:1, D:2, D:3, D:4, D:5, D:6, D:8, D:9, D:10, D:11, D:12, D:13

5.4 Results: Effectiveness of hybrid project management methodology

Research question 1: How effective is the implementation of a Hybrid project management methodology considering the Information Technology Management Framework (ITMF) lifecycle?

Implementing an effective Hybrid methodology in the context of this study means combining Waterfall and Agile methodologies to successfully deliver a project. The objective of this question was to determine the effectiveness of implementing a combination of two project management methodologies as a Hybrid methodology throughout the stages of the project lifecycle. The Table 5.4 presents the number of respondents who spoke about aspects of implementing a Hybrid project management methodology. The results presented focus on each of the implementation aspects identified by the respondents.

Table 5.4

Overview of the aspects of implementing a Hybrid project management methodology

Ranking	Implementation of a Hybrid methodology	Frequency
1	Hybrid meaning	17
2	Implementing Hybrid	29
3	Informally implementing Hybrid	2
4	Ensuring Hybrid effectiveness	10

5.4.1 Hybrid meaning

Hybrid methodology gets to be practised throughout the project lifecycle by embedding some elements of the Waterfall methodology with Agile methodology practices in a meaningful way.

> *Respondent 1: "Hybrid means obviously a combination of things basically. What I understand by Hybrid is some parts of the methodology will be according to the Agile methodology and other parts will be according to the Waterfall methodology."*
>
> *Respondent 2: "Hybrid project management methodology is a combination of some of the elements of traditional Waterfall, traditional old theory, project management, mixing an app with your new approaches to product delivery within the project management tier. So, mixing as I said, Waterfall with Agile approaches, not necessarily going full on either Waterfall or full on Agile, but basically tailoring the best of both worlds to try and implement a project in the best way possible."*
>
> *Respondent 3: "Hybrid refers to an adoption of different standards of different methodologies to form one that is best suited to either the project or the organisation."*
>
> *Respondent 4: "My understanding is that an organisation can employ both the two methodologies to deliver projects, which means that for certain types of projects, they will go and employ one methodology, let's say for our discussion, Waterfall method. And then for other projects, they will deploy Agile project methodology."*
>
> *"I also understand it to mean that if they've got a big project, they can employ the methodology in certain aspects of a big project that they have made to be a program. So certain aspects of the program can be delivered using a Waterfall method and certain aspects can be delivered using the Agile method."*
>
> *Respondent 6: "Hybrid is where you mix methodologies. You can mix Agile itself and a bit of Waterfall, depending on the type of project or you can mix*

Sigma, like we're doing now and with a bit of Waterfall. That's how I understand it."

Respondent 8: "So in terms of Hybrid currently especially new changes is where we combine the traditional what we call predictive method of planning, called traditional but typically called the predictive planning with Agile methodologies."

Respondent 9: "Hybrid project management methodology, I'm not sure like, what it entails, I mean, the methodologies that I know of project management is the PMBOK, which is the book of knowledge and the Prince2. So, the Hybrid, I'm not going to lie to you, I don't know much about it."

Respondent 10: "You might do all your upfront analysis and design documents and you know stuff like that. But then you might try and break it up into smaller deliverable pieces so you are not really doing like pure sprints, but you might say, ok, let's break this project up into four things and we'll try and deliver these as soon as there is usable working."

Respondent 11: "Hybrid for me would be almost what they call an Agile, meaning that we might necessarily just get all the requirements upfront. Taking your requirements up front and then breaking those requirements and deliver them in pieces. So, it is more on an iterative process."

Respondent 12: "I'm assuming you're talking Agile versus Waterfall. That's what I was talking about because those are the two well-known methods, but there's others as well. There is not a set way of doing the Hybrid."

Respondent 13: "Now, for me, it's a combination, no matter where you took the best of both combination of the Agile and the Waterfall methodology. Because in most cases, when we do a project, we tend to use that in terms of combining the two."

From analysing the responses, it is evident that implementing a Hybrid methodology works effectively with well-defined and practical governance standards that are light enough and easy to follow.

5.4.2 Implementing Hybrid

The most critical aspect in implementing a Hybrid methodology is making sure that the project resources are well trained in both Waterfall and Agile practices and they also fit the culture of working with Hybrid where two systems have to be combined.

> *Respondent 1: "So our Hybrid model currently is that, in terms of the front end loading of the methodology, we still follow the Waterfall methodology, which means a BRS is created, the various approvals according to governance have been followed and it is signed off, the development part of the project then becomes Agile."*
>
> *Respondent 2: "Where we do implement a Hybrid methodology, we would spend time working on the requirements design in the traditional Waterfall approach, where we would sit and have design workshops, requirements workshops and get those signed off. Then once they're signed off, we would then do incremental delivery as opposed to delivery only at the end of the project, this is once we've tested it."*
>
> *Respondent 3: "So if you've had a Hybrid methodology that says, for example, okay, we adopt certain principles of Agile such as having sprints, or we do parts of Scrum where we actually do sprint planning and we release, we make little iterations of releases instead of a big bang."*
>
> *Respondent 4: "So what we find is that one or two people from the business side then becomes the product owner, when the Agile project management methodology is now in full swing. On the Waterfall side, it's more the bigger project more than bigger teams that get together and you know, get the requirements done, analyse the business requirements and go through a process of sign off."*
>
> *Respondent 5: "I would say that the Hybrid is used mostly after the implementation of the project when you are in the support mode. In that case, the Hybrid is used more, but with a pinch of salt of your Agile."*
>
> *Respondent 6: "So what we do is the first few phases of concept phase, where you do a feasibility study and gather requirements and so forth. Those are more on a Waterfall, or they follow the steps of the normal Waterfall*

procedures or processes. When you now get to actual implementation, once a budget has been allocated and the project has been given the go ahead, then you can do your Agile."

"You run it through the scrum process. So, you mix it like that and then at the end once the scrum is done, where you implement, test and deploy then get feedback from the users and you do iterative development like that. In the end, the closing procedures are often done as well on a Waterfall method where you sign off, you do the training, or you do the training phase and then you sign off and then you hand over to the process owner."

Respondent 7: "Our stages for the project lifecycle for company x, like I said we use Prince2, we have projects that we have initiated, which they call it stage 1 and stage 2 is delivery and then we have the close project stage. So how we use the Hybrid method within the Hybrid model if you're using Agile, you will see how you fit in, how you incorporate projects like that into our Prince2 methodology. For example, firstly, you need to define your business requirements. So we'll put it under project start, then from there, if you want project initiation, we'll put it under initiate project but with Agile whereby now you're going to start having your problem statement and you start having the iterations, all of those will fall under delivery. Because with the iterations, you meet with your customers, you go and develop, you present to them which we call 'play it back to them'. If they say yes, then you deploy to production."

Respondent 8: "It's the iterative part of Agile that you go back and forth. So, remember predictive planning says, you plan and then your plan should be so good that it can be executed and then put in place your monitoring controls, your checks and balances while you are executing. So, what we've done now is said, okay, we can still go back to the plan, although we've done a predictive plan which we shouldn't change if we've done it correctly."

Respondent 9: "When you kick off the project, you are going to implement your plan through your project methodologies using things like your contract in terms of guidelines and in terms of ensuring that the project is running on time and the key performance indicators are delivered on time and to see if any impediments are reflected or rather are flagged. Then obviously, with that in place, you will develop the project as required in the business requirements.

Obviously, this is through the interaction with the business users or with the business analyst and then upon successfully delivering the project, you will go live and then hand over the project to its recipient."

Respondent 10: "I don't think I've had any projects that could be regarded even remotely as Hybrid. They've all been very Waterfall-based."

Respondent 11: "So what we do is that we take our projects, we break them a little bit more into smaller chunks and we can say what is the minimum viable product that we need to have. We have our daily stand up where we can drive a project much better. We can start showing value back to business and say, this is what we can come up with within the next I think three months or four months."

"This will start giving you value back to your customer. We can take that prototype and start selling it, we still in the background are continuing with our development and as we add more features that now are adding value to the customer they can start over selling those features and it becomes a much more value add kind of an approach."

Respondent 12: "I am planning using Waterfall that I am going to want you to give me a full picture unlike a week or two weeks, you tell me what you want by giving me the full picture. Then when you get to implement it, we'll go into the detail in terms of what it is. When we implement then we will say customer, do not worry, when we implement this thing, we will implement Agile, we will just do phase one. So that is now adopting elements of Agile into it. We say give us a scope holistically, but not too detailed because the detail you can change. When you want to sign that big scope, we can cost high level and say look, I think this is going to cost about 2 million, it may take us about 12 months to complete. Then we are going to give you in phases, then we come and say look, let us go back into Agile mode or Waterfall but adopting Agile, then decide, of these things which one are you going to need most."

Respondent 13: "Currently Hybrid for me is a new term, it is still new. So, people are still using the old methodology of doing project management and following those old steps where the initialisation step receives more focus without looking at how can you the two methodologies to finish the project."

Analysing the responses provided by the respondents, Waterfall as a structured methodology becomes effective right at the beginning of the project lifecycle when a request is made, and project definition is done. This is when a need for the project is motivated for, goals and objectives are defined and the defined project plans, business requirement specifications and execution plans are also presented to additionally assist with cost containment. All of this is documented, but the document governance is not required to be much detailed when using Hybrid to avoid unnecessary bureaucracy and red tape causing delays and rigidity, but it should be well structured.

The building, deploying and running stages of the project lifecycle is when the Agile practice gets implemented. These stages involve development, testing and transitioning from project owners to business owners for operationalisation of the project. Using Agile practices at this stage allows for incremental deliveries and iterations with business owners consulted throughout the process. This ensures speed of delivery, flexibility, fail-fast-correct process and a successful change over. Project teams with the correct skill levels contribute to the effectiveness of implementing a Hybrid project management methodology.

5.4.3 Informally implementing Hybrid

In some instances, the Hybrid methodology is implemented without the organisation formalising the Hybrid process therefore not labelling it as such. Some members of the project team may choose to incorporate another methodology to the one they had been using during the project delivery process when the need arises, which would mean they are using a Hybrid method which was not necessarily defined or selected at the start of the project. This is to ensure the success of the project.

> *Respondent 8: "So we have not formally said, you know what guys we have a Hybrid method, how is it going to work, it just happened that Agile came in by accident in a predictive planned project."*
>
> *Respondent 13: "I see, we've been doing it not realising or formalising the practices of using the Hybrid methodology. But really, it was not clear as to how do we go about it, then we will be using it not noticing that we are using Hybrid."*

Most of the respondents use Hybrid in their organisations not by default but by having to plug in a secondary methodology to their standard methodology for various reasons such as involving a service provider that uses a different method or on the realisation of requiring a different way to the process of delivery.

5.4.4 Ensuring Hybrid effectiveness

The main themes from the respondents for ensuring the effectiveness of implementing a Hybrid methodology are around training, governance, project requirements, organisational culture, technical support, awareness campaign and change management.

Training

Training of the project team is important. If the team is not trained and aligned in their thinking of implementing Hybrid, there are bound to be misalignments and problems with delivery. People must be constantly trained on how to incorporate a new methodology into the existing one in order to formulate and implement an effective Hybrid model, therefore the right level of technical and management training becomes key.

Governance

The governance elements of Hybrid need to be standard and clearly understood across the organisation.

Project requirements

Requirements should be tightly specified upfront with little opportunity to change to avoid back and forth delays from customers constantly changing their mind.

Organisational culture

The issue of culture in terms of how the organisation is being run is critical to effecting a change like that of a project management methodology and bringing in a new solution.

Technical support

Technical support is where the crux of the matter is. Information technology specialists or back-end developers need to be right on top of things. They need to

communicate make sure that whatever they release to the customer or end-user at that particular time, has been thoroughly tested as the iterative approach is being done. Product delivery should be carefully constructed in the product development stage. The next stage is to allow a business to run various tests on the usage of the new or improved product by trying to break the product as much as possible to ensure it is built accordingly and delivers the expected results before it can be productionised.

Awareness campaign

Awareness sessions with all stakeholders including end-users, sponsors and process owners should be conducted, just to give them feedback or background information on what Hybrid is and why this approach. This continues through to project delivery and beyond.

Change management

A change management should be in place to help bring about the change in methodology to a Hybrid methodology in a professional manner. This will enable and facilitate easy buy-in and adoption from all stakeholders involved.

5.5 Results: Benefits of hybrid project management methodology

Research question 2: What benefits are derived from implementing a Hybrid project management methodology?

In the study, advantages are interpreted as benefits. Hybrid benefits reflect on how quick delivery can be achieved whilst still meeting the necessary project governance standards and requirements. The objective of this question was to determine what the benefits of implementing a Hybrid project management methodology are and whether the advantages can be interpreted as benefits in this instance. The results presented provide input from the respondents on what the criteria used to derive benefits, along with the success and measurement criteria and what those benefits entail.

5.5.1 Deriving Hybrid advantages

Stakeholder communication

A change in management needs to be incorporated right from the beginning of a project where stakeholders can be brought along as the delivery process is progressing. This involves communication by keeping all stakeholders continuously informed on progress made and decisions taken.

Flexibility

Having flexibility is also key. Understanding that things may not work the first time that they are adopted, plans might need to be adjusted along the way to be able to realise benefits later.

Customer feedback

Getting constant feedback from the business from the iterative process helps set realistic expectations of the benefits to be realised once the solution has been operationalised.

Project team

How the project team handles ad hoc requests or scope creeps also influences the potential benefits of the project. Having the right level of skilled resources pulling towards the same direction helps derive benefits of implementing a Hybrid methodology.

5.5.2 Hybrid method success criteria

One of the key success criteria is the speed of delivery to the client. The quicker they are happy to sign off on certain pieces of code or pieces of a system that has been developed, then the sooner they are able to get paid. This is because at that point invoicing to the client can be done. Their customers can start realising benefits where they can start seeing a system and, in some instances, they can even start using the system.

5.5.3 Measuring benefits

Benefits of implementing a Hybrid methodology can be measured by the time it takes to deliver the solution, whether the solution is comparable into the production environment, and the quality and cost of the solution in the production environment.

5.5.4 Advantages interpreted as Hybrid benefits

The positive elements established during the implementation of a Hybrid method highlight the advantages before project completion, which already suggests the anticipated benefits to be realised at the end of the project. Using a Hybrid methodology provides the customer the with opportunity to participate in the development process which helps them to get a feel of what the anticipated product will look like instead of waiting until the end. As well as the iterative development process allows them to provide inputs for improving or shaping the end product and they get to start testing the product much earlier.

5.5.5 Advantages of Hybrid

The benefits of implementing a hybrid project management methodology are outline in Figure 5.2 below.

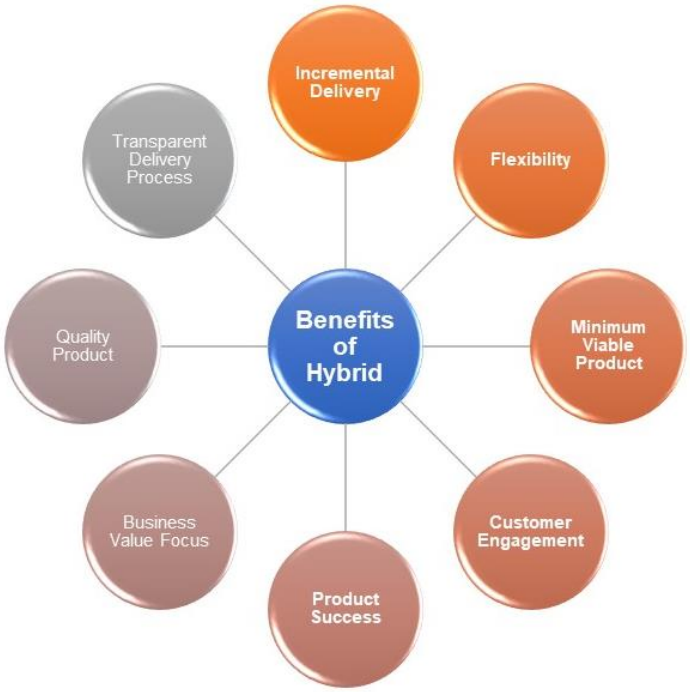

Figure 5.2: Benefits of Hybrid

Hybrid allows for quicker incremental delivery of a minimally viable product so that the customer can provide meaningful feedback that can be incorporated into the following development initiatives. This method of delivery enables quality work and

transparency throughout the process. Development faults can be picked up well in time to correct them. Another element is the improved focus on the business value as the customer is continuously engaged in the delivery process. Not having a lot of planning and communication sessions allows the flexibility of learning on the job and taking away delays that could have otherwise been caused by numerous meetings for planning.

5.6 Results: Challenges of hybrid project management methodology

Research question 3: What challenges are derived from implementing a Hybrid project management methodology?

In the study, disadvantages are interpreted as challenges. Implementing a Hybrid methodology brings in challenges where the combination of Agile and Waterfall methodologies is structured in such a way that Agile practices are embedded from the planning and scoping phases of the project lifecycle where the documentation may be leaner than what it would have been using the Waterfall methodology. The leaner documentation is intended to make things easier and to move quicker with the project. However, documents like the project plan and business case often lack the necessary detail which eventually necessitates a back and forth to try and gather this information during the running of the project.

The objective of this question was to determine what the disadvantages of implementing a Hybrid project management methodology are and whether the disadvantages can be interpreted as challenges in this instance. The analysis of the results from the respondents mainly depict the disadvantages being interpreted as challenges and benefits of implementing a Hybrid method. The respondents refer to the criteria used to derive disadvantages and the disadvantages of implementing a Hybrid method.

5.6.1 Deriving Hybrid disadvantages

<u>Communication</u>

Lack of information being shared amongst team members can work against the success of the project, which can lead to more human errors and wrong decisions.

This will affect the effective implementation of the Hybrid methodology throughout the project lifecycle.

Hybrid formulation

The two methods of Waterfall and Agile, if not carefully combined, may bring in an element of re-work which delays project completion and may cause the project to fail.

5.6.2 Disadvantages interpreted as benefits and challenges

Just like with the benefits of implementing Hybrid, the negative elements established during the implementation of a Hybrid method highlight the disadvantages before project completion, which already suggests the anticipated challenges to be experienced at the end of the project.

Cost implication

Customers changing their minds on the details of the scope during project delivery brings cost implication as a challenge. Once a customer has signed off on the requirements and scope of work with the related costs, it becomes difficult to amend the scope without affecting the cost element. Another cost element, which can be problematic if not committed upfront, is the tools used for the selected methodology. Should there be a realisation or need to modify the methodology along the project lifecycle, this may necessitate deploying a different tool that comes at a cost which was not initially catered for.

Switching methodologies

There is the challenge that any of the project team members may have decided to switch to the Hybrid methodology during project delivery because it suits their expected output of deliverable. This could be done informally without informing the project manager or project lead which may risk the successful delivery of the project.

Customer feedback and system disruption

Because Hybrid methodology allows for customers to have visibility of the project progress, customers may give negative feedback prematurely without the consideration that the product is being developed incrementally using an iterative process. Another challenge is that the iterative development process may cause a

lot of disruptions to the uptime of the production system with the continuous back and forth testing that is required.

5.6.3 Disadvantages of Hybrid

The challenges of implementing a hybrid project management methodology are outline in Figure 5.3 below.

Figure 5.3: Challenges of Hybrid

Training

If the people delivering a project are not well trained in implementing a Hybrid methodology, this may have major repercussions to the effectiveness of the methodology in the project lifecycle. This creates the responsibility of making sure that the team is carefully formulated and have the necessary skills and using the right structures for implementing a Hybrid methodology.

Culture change

For an organisation that is used to implementing a single method, be it traditional or Agile, it becomes a challenge having to change the culture to that of using a combination or a Hybrid method to deliver on a project. Often, people are resistant

to change because of having to learn a new skill which is perceived to be adding to their workload.

Multiple vendors

A problem comes in when an organisation like company S, identified as a company that one of the respondents works for, uses a number of vendors to deliver on their projects whereby these vendors come in with their various project management methodologies which they try to embed to the standard organisational methodology to create a Hybrid method and end up causing project failures from 'plugging and playing'.

Project teams

The defined financial model may not cater to having dedicated resources as required when implementing a Hybrid method. At the core of implementing a Hybrid method successfully, is the formulation of project teams with human resources dedicated fully to the project at hand.

Stakeholder buy-in

Adding to the challenges is a lack of buy-in from all relevant stakeholders who are required to be fully committed to fulfilling the requirements of the project in any form that may arise. If any of the stakeholders chooses to pull towards a different direction at any point of delivery, this poses a threat to the successful delivery of the project.

5.7 Data analysis

5.7.1 Research questions with code groups and codes

The table below shows the mapping of the study's research questions to the applicable code groups and codes.

Table 5.5

Code groups in relation to research questions

Research Questions	Theme	Meaning
RQ1	Agile and Waterfall Compared	1. Comparing agile and waterfall 2. Hybrid methodology of waterfall and agile
RQ2	Benefits of Hybrid Methodology	1. Advantages interpreted as hybrid benefits 2. Advantages of hybrid
RQ3	Challenges of Hybrid Methodology	1. Challenges with implementing hybrid 2. Disadvantages interpreted as hybrid benefits and challenges 3. Disadvantages of hybrid
RQ1	Implementation of Hybrid Methodology	1. Ensuring hybrid effectiveness 2. Hybrid meaning 3. Implementing hybrid 4. Informally implementing hybrid
RQ1	Fully Agile	1. All company A projects going fully agile 2. All company Bullet projects going fully agile 3. IT based projects going agile only 4. Understanding of agile 5. Years in agile
RQ1	Future of Hybrid Methodology	1. Future of hybrid at company A 2. Future of hybrid at company B 3. Future of hybrid at company E 4. Future of hybrid at company G 5. Future of hybrid at company M 6. Future of hybrid at company N 7. Future of hybrid at company O 8. Future of hybrid at company S 9. Future of hybrid at company T 10. Future of hybrid at company U

RQ2	Hybrid Methodology Benefits Criteria	1. Deriving hybrid advantages 2. Hybrid method success criteria 3. Measuring benefits
RQ3	Hybrid Methodology Challenges Criteria	1. Deriving hybrid disadvantages
RQ1	Understanding PM Methodology	1. Company standard PMM 2. Deciding on future methodology 3. Deciding on methodology 4. Influence of PMM on success of project 5. Limited PM exposure 6. PMM balancing act 7. Years in PM

The table below shows the absolute frequencies of how many times the thirty-nine codes were mentioned across thirteen documents. Looking at the code with the highest frequency of seventy-two mentions “Understanding project management methodology”, only D:1, D:3, D:4, and D:7 used the code less than five times when compared to the rest of the documents who talk more about understanding project management methodology. It can be discerned from the trend that seventy percent of the respondents had more of an understanding and exposure of project management methodology and also had more to say about it.

Table 5.6

Code frequencies

MBA Research														
Report created by Nobi on 2020/11/30 15:03:20														
	D:1	**D:2**	**D:3**	**D:4**	**D:5**	**D:6**	**D:7**	**D:8**	**D:9**	**D:10**	**D:11**	**D:12**	**D:13**	**Totals**
Advantages interpreted as hybrid benefits	1	0	1	0	0	1	0	0	2	0	2	0	0	7
Advantages of hybrid	1	2	2	2	0	0	2	2	1	0	0	3	2	17

All Company A projects going fully agile	1	0	0	0	0	0	0	0	0	0	0	0	0	1
All Company K projects going fully agile	0	0	0	0	0	0	0	0	0	0	1	0	0	1
All Company Bullet projects going fully agile	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Challenges with implementing hybrid	1	1	0	3	3	1	1	1	2	9	1	2	1	26
Company standard project management methodology	0	1	0	0	0	0	1	1	3	1	0	0	1	8
Comparing agile and waterfall	2	1	0	1	0	0	0	1	2	0	1	9	0	17
Deciding on future methodology	1	1	2	1	4	3	1	2	0	4	1	3	3	26
Deciding on methodology	1	2	1	1	2	1	1	1	0	1	2	0	1	14
Deriving hybrid advantages	1	1	2	0	0	1	0	0	0	0	0	0	0	5
Deriving hybrid disadvantages	1	0	0	1	0	0	0	0	0	0	0	0	0	2
Disadvantages interpreted as hybrid benefits and challenges	1	0	1	1	0	0	1	1	0	0	1	0	0	6
Disadvantages of hybrid	1	1	1	2	0	1	2	2	0	0	0	0	0	10
Ensuring hybrid effectiveness	1	2	0	1	0	2	1	1	0	2	0	0	0	10
Future of hybrid at Company A	1	0	0	0	0	0	0	0	0	0	0	0	0	1

Future of hybrid at Company B	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Future of hybrid at Company E	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Future of hybrid at Company G	0	0	0	2	0	0	0	0	0	0	0	0	0	2
Future of hybrid at Company M	0	0	0	0	0	0	0	2	0	0	0	0	0	2
Future of hybrid at Company V	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Future of hybrid at Company N	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Future of hybrid at Company O	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Future of hybrid at Company S	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Future of hybrid at Company T	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Future of hybrid at Company U	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Hybrid meaning	1	1	1	1	1	1	1	2	1	3	1	2	1	17
Hybrid method success criteria	0	1	1	0	3	0	0	0	1	2	0	1	1	10
Hybrid methodology of waterfall and agile	1	0	1	1	0	0	0	0	1	0	2	1	1	8
Implementing hybrid	1	1	2	2	4	1	1	2	2	5	4	3	1	29
Influence of PMM on success of project	0	0	0	0	1	1	0	1	0	1	0	1	0	5
Informally implementing hybrid	0	0	0	0	0	0	0	1	0	0	0	0	1	2
IT based projects going agile only	1	0	1	1	0	0	0	0	0	0	0	0	0	3
Limited project management exposure	0	0	0	0	1	0	0	0	1	0	0	0	0	2

Measuring benefits	0	0	0	0	0	0	0	1	1	1	2	0	1	6
Project Management Methodology balancing act	0	1	0	0	1	0	0	2	0	0	1	0	0	5
Understanding of agile	1	0	1	0	1	0	1	0	1	2	2	0	0	9
Years in agile	1	1	1	1	2	1	1	0	1	0	1	0	0	10
Years in project management	1	1	1	1	1	1	0	1	1	1	1	1	1	12
Agile and waterfall compared	3	1	1	2	0	0	0	1	3	0	3	10	1	25
Benefits of hybrid methodology	2	2	3	2	0	1	2	2	3	0	2	3	2	24
Challenges of hybrid methodology	3	2	2	6	3	2	4	4	2	9	2	2	1	42
Fully agile	4	1	3	2	3	1	2	0	3	2	4	0	0	25
Future of hybrid methodology	1	1	1	2	1	1	1	2	1	1	0	0	1	13
Hybrid methodology benefits criteria	1	2	3	0	3	1	0	1	2	3	2	1	2	21
Hybrid methodology challenges criteria	1	0	0	1	0	0	0	0	0	0	0	0	0	2
Implementation of hybrid methodology	3	4	3	4	5	4	3	6	3	10	5	5	3	58
Understanding project management methodology	3	6	4	3	10	6	3	8	5	8	5	5	6	72
Totals	42	38	40	44	50	32	30	48	44	66	46	52	32	564

In the analysis effort, the outcome from using Atlas. Ti Software for coding the respondents' data was mapped together to display the relationship between the themes that were created, and the responses related to those themes. The results are depicted in the table below.

Table 5.7

Data analysis overview

Data Collection Themes	**Meaning**
Agile and Waterfall Compared	1. Comparing agile and waterfall 2. Hybrid methodology of waterfall and agile
Benefits of Hybrid Methodology	1. Advantages interpreted as hybrid benefits 2. Advantages of hybrid
Challenges of Hybrid Methodology	1. Challenges with implementing hybrid 2. Disadvantages interpreted as hybrid benefits and challenges 3. Disadvantages of hybrid
Implementation of Hybrid Methodology	1. Ensuring hybrid effectiveness 2. Hybrid meaning 3. Implementing hybrid 4. Informally implementing hybrid
Fully Agile	1. All company A projects going fully agile 2. All company Bullet projects going fully agile 3. IT based projects going agile only 4. Understanding of agile 5. Years in agile
Future of Hybrid Methodology	1. Future of hybrid at company A 2. Future of hybrid at company B 3. Future of hybrid at company E 4. Future of hybrid at company G 5. Future of hybrid at company M 6. Future of hybrid at company N 7. Future of hybrid at company O 8. Future of hybrid at company S 9. Future of hybrid at company T 10. Future of hybrid at company U

Hybrid Methodology Benefits Criteria	1. Deriving hybrid advantages 2. Hybrid method success criteria 3. Measuring benefits
Hybrid Methodology Challenges Criteria	1. Deriving hybrid disadvantages
Understanding PM Methodology	1. Company standard PMM 2. Deciding on future methodology 3. Deciding on methodology 4. Influence of PMM on success of project 5. Limited PM exposure 6. PMM balancing act 7. Years in PM

5.8 Evidence of the themes

Nine respondents out of the thirteen that were interviewed agree to agile being a methodology that assists in the speed of project delivery and ensuring customer involvement throughout the delivery process so they can take ownership of the project. The rest of the respondents state that agile lacks document governance that guides and ensures processes of the entire project lifecycle have been followed and fulfilled. Whereas the waterfall methodology provides structure and the level of detail required to fulfil all the project lifecycle processes. In the study advantages are interpreted as benefits. Hybrid allows benefits to be showcased on how quick delivery can be achieved whilst still getting the necessary project governance and requirements being met.

Hybrid allows for quicker incremental delivery of a minimum viable product so that the customer can provide meaningful feedback that can be incorporated into the following development initiatives. This method of delivery enables quality work and transparency throughout the process. Implementing a hybrid methodology brings in challenges where the combination of agile and waterfall methodologies is structured such that agile practices are embedded from the planning and scoping phases of the project lifecycle where the documentation may be leaner than what f would have been using the waterfall methodology. The leaner documentation is intended to make things easier and to move quicker with the project but documents like the project plan

and business case often lack the necessary detail which eventually necessitates a back and forth to try and gather this information during the running of the project. Another challenge is the cost implication associated with customers changing their minds on the details of the scope during project delivery.

Deciding on which methodology is more suitable for a project is based more on the requirements rather than the size or cost of the project. Most respondents' view is that organisations should develop a framework that helps them decide which methodology to use for each IT-based project between waterfall, agile or hybrid. The framework will assist in ensuring the right methodology is used which has a great influence on the success of a project. Limited exposure to project management methodologies may inhibit the effective implementation of a hybrid method in that there is a bigger risk of struggling to understand how to combine the two methodologies and at which stage in order to get the balancing act correct. On average the respondents have been exposed to managing projects for fifteen years.

5.9 Conclusion

Future of Hybrid Methodology

60% of the respondents agree to Agile being a methodology that assists in the speed of project delivery and ensuring customer involvement throughout the delivery process so they can take ownership of the project. 40% of the respondents specified that Agile lacks document governance that guides and ensures that the processes of the entire project lifecycle have been followed and fulfilled. Especially compared to the Waterfall methodology which provides structure and the level of detail required to fulfil all the project lifecycle processes.

As most organisations are introducing digitisation at tactical, operational and strategic levels, they tend to do this by going fully Agile in these three levels of management as they make the organisation smaller, easier and more flexible. Most of the respondents share a view that going fully Agile would not be feasible for most organisations as they will need to do a lot of structural changes to allow for effective Agile implementation including the fact that Agile requires more of dedicated resources working on a project at a point in time. The nature of some projects makes pure Agile to not be the best methodology to implement.

Agile works well where work can be done simultaneously, especially in different parts of the development. Project delivery can be incremental by delivering a minimally viable product whilst operational work continues in parallel as decisions also get made at a team level. Therefore, customers get to experience quick turnaround times. With being fully Agile the organisation needs to be matured enough to get buy-in or adoption from all stakeholders. Additionally, team member roles should be clearly defined to take away potential ambiguities and the team should be co-located for easy access and decision making. Agile expects execution of activities to be completed at the set time, whilst appreciating the ability to go back and improve on what has already been completed.

When in Agile mode, business involvement becomes critical. There needs to be a dedicated business resource that will be involved in daily stand-up meetings to give and receive progress status, assist with quick decision making, feeding back and to provide approval. The Agile methodology re-enforces teamwork and improves the relationships between project teams and business, extending to external service providers. On average the respondents have been exposed to implementing the Agile methodology for six years.

Some organisations have a project management office that becomes a custodian of project governance, standards and tools to be used. Usually, this office prescribes that a project management methodology to be used in the organisations and might have a policy that allows for other methodologies to be combined with the standard one. Most of the organisations have a traditional project management methodology such as Waterfall as their base methodology whereby Agile can be embedded to it if required.

Deciding on which methodology is more suitable for a project is based more on the requirements rather than the size or cost of the project. Most respondents' view is that organisations should develop a framework that helps them decide which methodology to use for each IT-based project between Waterfall, Agile or Hybrid. The framework will assist in ensuring the right methodology is used which has a great influence on the success of a project. Limited exposure to project management methodologies may inhibit the effective implementation of a Hybrid method in that there is a bigger risk of struggling to understand how to combine two methodologies and at which stage in order to get the balancing act correct. On average the respondents have been exposed to managing projects for fifteen years.

With many organisations informally implementing a Hybrid methodology when running their projects, there is an opportunity for Hybrid practices to be used more formally. Most companies are already using Hybrid methodologies without realising it. They implement the Waterfall method in delivering on capital projects and implement Agile in IT-based projects. Therefore, the majority of respondents have expressed that implementing Hybrid as the method of the future would speed up delivery, provide more effectiveness throughout the lifecycle of a project and enhance project success.

CHAPTER 6: DISCUSSION

6.1 Introduction

This section of the study discusses the results derived from the data analysis of the semi-structured interviews in Chapter 5. The results are compared with the current literature to get new insights that contribute to the anecdotal research to date of the promising new approach that combines two project management methodologies to form a Hybrid methodology. The study investigates the effective implementation of this promising approach, its benefits and challenges towards the success of a project. The purpose of this section is to establish how relevant the results are to the current project management body of knowledge literature.

6.2 Discussion of the effectiveness of hybrid project management methodology

6.2.1 Hybrid meaning

Thirteen quotations from the interviewees capture the meaning of a Hybrid methodology to be combining Waterfall and Agile methodologies to deliver a project with its practices and elements implemented throughout the project lifecycle in a meaningful way. Given how the traditional Stage-Gate, in this instance Waterfall and Agile models, work independently, the Agile-Stage-Gate Hybrid model brings them together where the need to act faster and to be more flexible during product development is required. This is while still maintaining the idea-to-launch process in a form of a rapid design cycle that provides for changes in client needs and earlier client validations (Cooper & Sommer, 2016b). Magistretti et al. (2019), drawing from Karlstroem and Runeson (2005), reported the results of the study of the feasibility of using Agile methods in traditional Stage-Gate project management environments. It has been found that despite there being management resistance to such an attempt, it is possible to use Agile methods in such environments. Out of the thirteen respondents, six of them have been exposed to implementing Hybrid methods as a combination of Waterfall and Agile. They called it ‘Agile’ where the two methodologies are not necessarily used fully but rather taking certain elements from each and tailoring the best of both worlds to try and implement a project in the best

and quickest way possible. Four of the respondents know Hybrid to be a combination of any of the traditional methodologies, such as Prince2, with Agile. Their organisations have defined a standard methodology as a base in which Agile can be embedded by taking some elements from each of the methodologies and combining them to create a Hybrid method for product delivery. The remaining three respondents have not been directly involved with implementing a Hybrid methodology but have been working in project teams where a combination of Waterfall and Agile practices have been implemented informally as product delivery is underway. In this case, combining two methodologies would not have been decided at the beginning of the project, but rather team members deciding as the project is in progress to implement Hybrid in pursuit of delivering a successful product quicker.

6.2.2 Implementing Hybrid

Siriram (2017) argued that the success of Hybrids lies on Agile practices being used at operational and tactical levels, whereas the Stage-Gate model is used at the strategic level. The respondents specified that most organisations are introducing Agile practices at tactical, operational and strategic levels, as they make the organisation smaller, easier and more flexible.

Mahadevan et al. (2015) observed the isolation of development teams as a critical success factor for Hybrids. This permitted the continuing of project deliverables without interruption of work. The respondents concur that at the core of implementing a Hybrid method successfully, is the formulation of project teams with human resources dedicated fully to the project at hand. However, the defined financial model may not cater to having dedicated resources as required. Despite this, Jaziri et al. (2018) contend development team isolation can lead to further isolation of the department from the entire company. However, in contrast to this, Magistretti et al. (2019) proposed integration through the interface of Agile development teams using the requirements of the gates model. Auer and Rosenberger (2018) contended that this interface of development teams, assists in managing change and attitudes of department members. Of which the respondents share a similar view in that a clear definition of team member roles eliminates potential ambiguities and co-location allows for easy access for team members to be able to make decisions swiftly.

A study by Magistretti et al. (2019) found that for the successful implementation of Hybrid methods, an organisation needs ambidextrous design, dedicated assets, heterogeneous staffing, continuous learning, and modularisation. Auer and Rosenberger (2018) argued that though Agile-Stage-Gate Hybrid methods are regarded as suitable in all development projects; empirical evidence is growing on better benefits being realised in more uncertain and ambiguous conditions. The respondents argued that if the choice of implementing a Hybrid method is based on the requirements of a project rather than size or cost, there should not be problems experienced from a methodology perspective. The only problem is that limited exposure to project management methodologies may inhibit the effective implementation of a Hybrid method, in that there is a bigger risk of struggling to understand how to combine two methodologies, and at which stage, in order to get the balancing act correct.

Mapongwana (2016) explored the integration of traditional software development methodology into Agile software development methodology, relating to this study, by combining two project management methodologies (traditional and Agile) to exploit the benefits that come from using the best of both worlds. In the current study, this integration culminates into a Hybrid project management methodology, seeking similar benefits when implemented effectively. Implementing a Hybrid model reduces re-work through flexibility to allow changes to be implemented timeously throughout the project (Sommer et al., 2015). On the contrary, if the two methods of traditional and Agile are not carefully combined to formulate a Hybrid model they may bring in an element of re-work which delays project completion and may cause the project to fail according to the views shared by the respondents.

According to Cooper and Sommer (2016); Conforto and Amaral (2016); Jaziri et al. (2018); Cooper and Sommer (2018); and Magistretti et al. (2019), no one methodology can be regarded as the best in achieving excellent project performance and this has led to a proposition of using a balanced approach that combines Agile and Stage-Gate into a singular Hybrid method to achieve success in the consistently evolving business environment. Therefore, latest research posits that Hybrid project management methodology can be used in small and large organisation, across industries, in software and hardware product development, including manufacturing companies, for IT and non-IT projects be it small or large. Most of the respondents have expressed that implementing Hybrid as the method of the future would speed

up delivery, provide more effectiveness throughout the lifecycle of a project, and enhance project success. They, therefore, advocate for a combination of two methods to be able to get the best of both methods by applying certain elements from each method throughout the project lifecycle, rather than implementing a single method that may not be suitable or effective.

6.2.3 Informally implementing Hybrid

The respondents agree that in some instances, the Hybrid methodology is implemented without the organisation, formalising the Hybrid process, and not labelling it as such. Some members of the project team may choose to incorporate another methodology to the one they had been using during the project delivery process when the need arises, which would mean they are using a Hybrid method which was not necessarily defined or selected at the start of the project. This is to ensure the success of the project.

Most of the respondents use Hybrid in their organisations, not by default, but by having to plug in a secondary methodology to their standard methodology for various reasons. These include involving a service provider that uses a different method or on the realisation of requiring a different way to the process of delivery.

6.2.4 Ensuring Hybrid effectiveness

With the project methodology, customisation and utilising a Hybrid form, comparison can be done in a common way that seeks to exploit the strength of both Agile and Traditional methods (Mahadevan et al., 2015). According to Papadopoulos (2018), ITMF permits methodology comparison on similar concepts and standardised information. However, the ITMF is non-prescriptive and is based on a mixed model philosophy to be customised to fit the culture and unique challenges faced by the organisation (Pollard & Geisler, 2014), whereby it consolidates the various phases of project lifecycle management into five simplified phases. These are: request; define; build; deploy; and run. The respondents have identified five themes for ensuring the effective implementation of a Hybrid methodology throughout the project lifecycle while considering the five phases in the ITMF. According to the respondents, the themes listed as training, governance, project requirements, organisational culture, technical support, awareness campaign, and change

management should be considered and ensured in the applicable stages project lifecycle as defined by the ITMF. The overall five phases as explained by Pollard and Geisler (2014) are as follows:

1. The request stage, which presents the project goals and objectives motivating the need for change.
2. The define stage, which presents the project plans, specifications, requirements, and execution.
3. The build stage, also known as the implementation stage, delivery construction is done through the project resources procurement.
4. The deployment stage comprises of delivery integration, testing and running at business level and within the actual environment it will be used. This fits well in the verification and testing stages within the System Development Life Cycle (SDLC) methodology.

The run stage consists of transitioning from the project owners to the business owners. In addition, full support is given in the operationalisation and adoption processes after project delivery.

The respondents agree that at the request and define stages, the governance elements of Hybrid need to be standard and clearly understood across the organisation. Requirements should be tightly specified upfront with little opportunity to change to avoid back and forth delays from customers constantly changing their mind. Training of the project team is key, if the team is not trained and aligned in their thinking of implementing Hybrid, there are bound to be misalignments and problems with delivery. People have to be constantly trained on how to incorporate a new methodology into the existing one in order to formulate and implement an effective Hybrid model, therefore the right level of technical and management training becomes key.

Technical support is where the crux of the matter is. When building and deploying a solution, information technology specialists or the back-end developers need to be right on top of things. They need to communicate and be able to make sure that whatever they release to the customer or end-user at that particular time, has been thoroughly tested as the iterative approach is being done. Product delivery should be carefully constructed in the product development stage. The next stage is to allow a business to run various tests on the usage of the new or improved solution by trying

to break the solution as much as possible to ensure it is built accordingly and delivers the expected results before it can be productionised.

Lastly, when the solution gets handed over and is fully operational, it is important to run initiatives that will socialise the organisation to the implemented solution. Change management is required for user adoption and managing the organisational culture towards the change. Therefore, the loop of culture change to the implementation of a new Hybrid model gets closed at the run stage.

The implementation of this cross-platform methodology empowers organisations to successfully implement a stable, adaptive reporting matrix at a strategic management level. The methodology provides timely monitoring and control along with the project lifecycle change from inception to beyond execution. Therefore, the ITMF can be a Hybrid framework that blends various methodologies and models to form a single delivery-oriented ICT environment that helps IT to deliver change at the speed of business (Pollard & Geisler, 2014).

In contrast, a study by Cooper and Sommer (2018) found the critical factors for successful Hybrid methods as resolving inconsistencies, addressing management scepticism, finding resources, defining sprint deliverables and matching projects to processes. Respondents assert that awareness sessions with all stakeholders including end-users, sponsors and process owners should be continuously conducted through to project delivery and beyond, just to give them feedback or background information on what Hybrid is and why this approach. This process facilitates stakeholder buy-in and adoption.

6.3 Discussion of the benefits of hybrid project management methodology

Research question 2: What benefits are derived from implementing a Hybrid project management methodology?

The purpose of this question was to determine what the benefits of implementing a Hybrid project management methodology are and whether the advantages can be interpreted as benefits in this instance

According to Cooper (2015), Hybrid methods bring improved morale and communication, better responses, and faster product release. The respondents have found that stakeholder communication and customer feedback are important

elements that lead to the advantages of implementing a Hybrid methodology. According to Jaziri et al. (2018), Hybrid models are considered to reduce uncertainties and risks, including the increase of stakeholder's feedback. The respondents specified that change management needs to be incorporated right from the beginning of a project where stakeholders can be consulted and informed on the project progress status and decisions to be taken.

6.3.1 Deriving Hybrid advantages

Flexibility and customer feedback

The Agile-Stage-Gate Hybrid model allows for design flexibility; having dedicated teams; reduces delivery cycle times; allows for proactive and continuous engagement to address the changing customer needs (Cooper & Sommer, 2016b). The respondents have found that being flexible and Agile is vital to the understanding that things may not work the first time that they are adopted, plans might need to adjust along the way to be able to realise benefits later.

Project team

According to Conforto and Amaral (2016), the integration into Hybrid methods permits improved communication in the project team resulting in more team control and improvements and more visible management intuitive progress metrics, such as burndown charts. However, respondents shared that how the project team handles ad hoc requests or scope creeps also influences the potential benefits of the project. Having the right level of skilled resources pulling towards the same direction helps derive benefits of implementing a Hybrid methodology. The benefits of Hybrid methods are to achieve more efficient planning, clear document resolution, improved attitude, avoiding inflexible, fixed plans that lead to delays on important features and "requirements cramming" at the end of development (Cooper & Sommer, 2016).

6.3.2 Hybrid method success criteria

A Hybrid model that brings together Agile and Stage-Gate processes where the need to act faster and to be more flexible during product development is required, whilst still maintaining the idea-to-launch process, in a form of a rapid design cycle that provides for changes in client needs, and earlier client validations (Cooper &

Sommer, (2016). One of the key success criteria found by respondents is the speed of delivery to the client, whereby the quicker they are happy to sign off on certain pieces of code or pieces of a system that has been developed, then the benefit is the organisation being able to get paid sooner because at that point invoicing to the client can be done. Their customers can start realising benefits where they can start seeing a system and, in some instances, they can even start using the system.

6.3.3 Advantages interpreted as Hybrid benefits

The positive elements established during the implementation of a Hybrid method highlight the advantages before project completion, which already suggests the anticipated benefits to be realised at the end of the project. Using a Hybrid methodology provides the customer with the with opportunity to participate in the development process which helps them to get a feel of what the anticipated product will look like instead of waiting until the end and also the iterative development process allows them to provide inputs for improving or shaping the end product and they get to start testing the product much earlier.

Furthermore, in the Stage-Gate model, project completion may take up to twelve months to delivery or launching of which the objective of the requirements may have changed over the period due to a shift in the business outlook, making the delivery to no longer be relevant (Cooper & Sommer, 2016a). The introduction of Agile methods in projects deals with these issues using adaptive planning and iterative delivery methods (Cooper & Sommer, 2016b). Hence the respondents have pointed out to the benefit that Hybrid allows for quicker incremental delivery of a minimum viable product so that the customer can provide meaningful feedback that can be incorporated into the following development initiatives.

This method of delivery enables quality work and transparency throughout the process. Development faults can be picked up well in time to correct them. Another element is the improved focus on the business value as the customer is continuously engaged in the delivery process. Not having a lot of planning and communication sessions allows the flexibility of learning on the job, taking away delays that could have otherwise been caused by numerous meetings for planning.

6.4 Discussion of the challenges of hybrid project management methodology

Research question 3: What challenges are derived from implementing a Hybrid project management methodology?

The purpose of this question was to determine what the challenges of implementing a Hybrid project management methodology are and whether the disadvantages can be interpreted as challenges in this instance.

6.4.1 Deriving Hybrid disadvantages

The respondence have found that challenges of implementing a Hybrid methodology can emanate from a lack of communication and the way in which the Hybrid method is formulated. According to Papadopoulo (2015), integrating Agile into a current Stage-Gate system is difficult. Various challenges and issues are encountered as a result.

6.4.2 Communication

The pitfalls of Hybrid methods is having poor communication, underestimated deadlines, inability to recognise the essential details and inattentive management (Aurer & Rosenberger, 2018). To the point of poor communication, respondents have found that lack of information sharing amongst team members can work against the success of the project and this is experienced through making human errors and wrong decisions that affect the effective implementation of the Hybrid methodology throughout the project lifecycle.

6.4.3 Hybrid formulation

The opposing assumptions and principles of Agile and traditional methods create conflicts and unavoidable adjustments (Leite & Braz, 2016). When a company uses Hybrid methods, these challenges are more evident and similar when a traditional organisation adapts Agile project management (Dikert et al., 2016). Business conflicts, people conflicts, and process conflicts develop when a traditional company adopts Agile methods (Sommer et al., 2015). Hence the respondence state that the

two methods of Waterfall and Agile if not carefully combined, may bring in an element of re-work which delays project completion and may cause the project to fail.

6.4.4 Disadvantages interpreted as Hybrid challenges

The respondents pointed to the negative elements established during the implementation of a Hybrid method which suggests the anticipated challenges to be experienced at the end of the project. These elements include cost implications, switching of methodologies, customer feedback and system disruption, training, culture change, multiple vendors, project teams, and stakeholder buy-in.

Negative cost implication

The respondents have found that although the use of traditional project methodologies has been highlighted as a major cause for inefficiency, lack of process optimisation and high cost runs in South African companies have led to implementing a Hybrid methodology to also bears challenges that are cost-related. Implementing a Hybrid model should result in better project performance through reduced costs, thus achieving high success rates through improved information accuracy, leadership and commitment (Salah et al., 2017). However, respondents shared that customers changing their minds on the details of the scope during project delivery brings cost-related challenges. Once a customer has signed off on the requirements and scope of work with the related costs, it becomes difficult to amend the scope without affecting the cost element. Another cost element, which can be problematic if not committed upfront, is the tools used for the selected methodology. Should there be a realisation or need to modify the methodology along the project lifecycle, this may necessitate deploying a different tool that comes at a cost which was not initially catered for.

Switching methodologies informally

Resistance against the Hybrid methods is high in big companies because of status quo challenges that lead to differences in capabilities and competencies (Baranauskas, 2018). Cooper and Sommer (2018) argued that: “the biggest problem of Hybrid models is the acquisition of dedicated resources and management scepticism that resist the model to work” (p. 25). The respondents agree that sometimes resistance demonstrated by management to the use of a different methodology or a combination thereof leads some of the team members to informally

change or embed another methodology during project delivery. Once a person realises that they can deliver successfully on a certain milestone using a Hybrid method, for example, they then opt to do that without going through the formal processes. This may be a risk for the model to work.

Customer feedback and system disruption

Business conflicts, people conflict and process conflicts develop when a traditional company adopts Agile methods (Sommer et al., 2015). The respondents shared some of the conflicts that arise as lack of understanding by customers as to how the Hybrid model works. Hybrid methodology allows for customers to have visibility of the project progress and this may lead to customers giving negative feedback prematurely without the consideration that the product is being developed incrementally using an iterative process. Another challenge is that the iterative development process may cause a lot of disruptions to the uptime of the production system with the continuous back and forth testing that is required, and this can make the environment unsettled by extending the customer as well.

Insufficient training

Resistance against Hybrid methods is high in big companies because of status quo challenges that lead to differences in capabilities and competencies (Baranauskas, 2018). The respondents assert that organisations should ensure enough and relevant training opportunities to the people delivering on projects. If the people delivering a project are not well trained in implementing a Hybrid methodology, this may have major repercussions to the effectiveness of the methodology in the project lifecycle. It has to be made sure that the team is carefully formulated and have the necessary skills and using the right structures for implementing a Hybrid methodology.

Culture change resistance

“The biggest problem of Hybrid models is the acquisition of dedicated resources and management scepticism that resist the model to work” (Cooper & Sommer, 2018, p. 25). As argued by Cooper (2016), the challenge in Hybrids is that dedicated teams may be isolated from others. This results in long-range planning being sacrificed in favour of current sprint. In this way, resistance and conflicts remain between Agile managers failing to give up their control during the development process (Salah et al., 2017). Contrary to what the scholars have argued, the respondents have found

the main challenge to be resistance to change. They refer to the difficulty experienced when a new method such as the Hybrid model must be implemented and how people in the organisation express resistance by the unwillingness to adopt the change citing reasons such that of additional workload. Therefore, the culture of the organisation contributes to the effectiveness of implementing a Hybrid model.

Multiple vendors, project teams and stakeholder complexity

The Danish study by Sommer et al. (2015) also revealed that in Hybrid methods there are delays because it is not easy to find dedicated team members, link project teams with the entire organisation, match reward systems with Scrum requirements and dealing with system bureaucracy. Although the scholars have found that a lack of dedicated project teams and the ability to link them with the rest of the organisation, along with dealing with red tape, creates a challenge for the successful implementation of a Hybrid model. The respondents have alluded to those challenges that could be caused by multiple factors. Among those factors are the use of multiple vendors who come in with their own methodology in an environment that is already working through a different methodology.

Although they concede that not having dedicated teams may be to the detriment of implementing a Hybrid model, the organisation may not be catering for dedicated resources in their financial model, which makes it difficult to dedicate resources to a specific project at a time. Respondents have also found stakeholder buy-in to be at the heart of successfully implementing a Hybrid model. Stakeholders need to be taken in confidence right from the beginning as to how the Hybrid model works, the possible benefits and challenges, and what kind of commitment is required from project teams and business teams. This awareness or communication initiative should continue throughout the process of the project lifecycle.

6.5 Conclusion and findings

The interview questions were based on the three research questions as set out in Chapter 3. Looking at the effective implementation of a Hybrid methodology, which starts by defining what a Hybrid model is and how this model can be implemented in a project environment considering the stages in the project lifecycle, as summarised in the ITMF. This was to see to it that project delivery becomes successful. The second question addressed the benefits derived from implementing a Hybrid

methodology by looking at the flexibility it brings to the process of project delivery through iterative adjustments. The implementation of a Hybrid method provides the opportunity for constant feedback to customers on the progress of the project and continued consultations for decision making. The third question addressed the challenges faced with implementing a Hybrid methodology. This is because of the cost-related issues, in terms of having to budget for dedicated resources upfront and allowing for enough contingency that will take care of costs associated with changing delivery methods and tools along the way as an example. Organisational culture and lack of training are also highlighted as factors that bring resistance to change, making it difficult for the Hybrid model to be effective.

CHAPTER 7: CONCLUSION AND RECOMMENDATIONS

7.1 Introduction

This study intended to evaluate the factors involved in implementing a Hybrid Project Management Methodology and to determine what benefits and challenges present themselves on implementation. Using Agile or traditional methodologies has become the customary way of handling products, and software development projects. However, combining Agile and Stage-Gate such as waterfall to form Hybrid or Modified Methodologies are now gaining popularity (Cooper, 2016). With many researchers (Auer & Rosenberger, 2018; Baranauskas, 2018; Cooper, 2016; Cooper & Sommer, 2016b; Jaziri et al., 2018; Mahadevan et al., 2015) proposing Hybrid Method usage, limited empirical evidence exists in companies to explain how these Hybrid Methods can be used effectively, resulting in the need to explore factors involved in implementing these Hybrid Methods and the benefits and challenges thereof in contributing to a successful project delivery.

7.2 Primary findings

The main findings of the study are that combining two project management methodologies to form a Hybrid Methodology is feasible in any environment where the necessary project management elements have been considered. This includes carefully planned resourcing, well defined governance standards, skills training of project teams, and organisational awareness campaigns. The implementation of a Hybrid Method provides the opportunity for customers to be actively involved throughout the delivery process, inclusive organisational culture, effective cost containment measures, reduced opportunities of scope creeps, and an Agile and flexible environment. These findings are presented in Figure 7.1 illustrating their relationship to the project lifecycle stages executed through the implementation of a Hybrid Project Management Methodology.

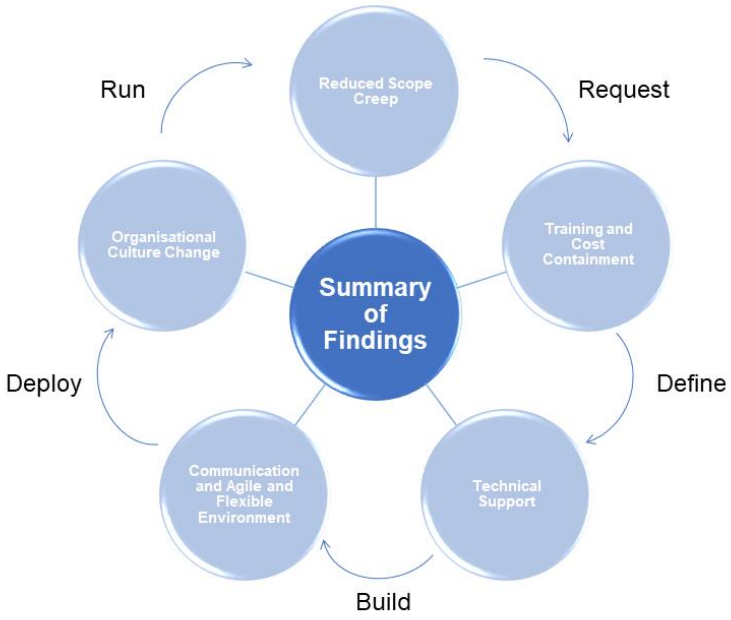

Figure 7.1: Summary of findings in relation to the project lifecycle

7.1.1 Implementing a Hybrid Methodology

The research study indicates what participants have found to be the aspects of the effective implementation of a Hybrid Method. The main aspects are understanding the meaning of a Hybrid Method, manner of execution, and ensuring effectiveness. Although the Waterfall and Agile models work independently, the Agile-Stage-Gate Hybrid Model brings them together where the need to act faster and to be more flexible during product development is required. In some instances, a need arises where a secondary methodology is embedded to the current method somewhere along the project lifecycle stages to ensure project delivery success.

7.1.2 Benefits of a Hybrid Methodology

In the study, participants have highlighted the importance of identifying benefits of implementing a Hybrid Method. The participants' focus was the basis of the benefits, what the benefits are and their measurement criteria. The key aspects of deriving benefits are working in a flexible and Agile environment, providing continuous customer feedback, and the collaboration efforts of project teams. Speed of delivery to the client is used to measure success. With the number of advantages that

culminate into benefits, there's a realisation of improved focus on the business value as the customer is continuously engaged in the delivery process.

7.1.3 Challenges of a Hybrid Methodology

The study found challenges of implementing a Hybrid Method to be based on how the Hybrid Method is formulated and the health of communication amongst project team members, and how issues such as cost, switching methodologies, customer feedback and system disruption, training, culture change, multiple vendors, project teams, and stakeholder buy-in can cause challenges in implementing Hybrid. If the two methods of Waterfall and Agile are not carefully combined, they may bring in an element of re-work and lack of information sharing among team members which delays project completion and may cause the project to fail. Cost becomes a large factor that if not carefully planned, the entire project may collapse. A choice of methodology, tool, vendor, and training has cost implications on the project, therefore a comprehensive financial model that takes everything into account is required right from the beginning.

7.3 Implications for organisations

This research study has provided insights on the aspects of effectively implementing a Hybrid Project Management Methodology, and what can be of benefit or a challenge from implementing Hybrid. The study highlights areas that can be improved to ascertain the effectiveness of implementing a Hybrid Method that will contribute immensely to the success of project delivery:

7.3.1 Integrating the right elements of Waterfall and Agile methods in the applicable stages of the project lifecycle.

7.3.2 Deploying project teams that are highly skilled in various project management methods.

7.3.3 Building financial models that have enough buffer to allow for the flexibility and agility of securing project resources as required.

7.4 Limitations of research

Qualitative research has the risk of being subjective through biases that may be created by the open-ended approach of questions if not narrowed down to the information being gathered (Bryman & Bell, 2015). The nature of questions may also create interviewer and interviewee biases that may limit asking for, and obtaining objective feedback (Saunders & Lewis, 2018). This study is limited to events surrounding the implementation of Hybrid Project Management Methodology for IT-based projects in South African-based companies from 2015 to date.

It is envisaged that the respondents are members of project teams that have been running IT-based projects within South African-based companies and remain in their employ. The use of qualitative data affects the level of rigour since it is more difficult to maintain, assess, and demonstrate. The researcher developing the questions is not experienced in creating open-ended interview questionnaires therefore the input, processes, and outputs of the study may be impacted (Agee, 2009).

7.5 Suggestions for future research

The following areas of future research are suggested based on the insights presented by this research:

- Magistretti et al. (2019) found that it is possible to effectively integrate Agile into a traditional Stage-Gate project management environment where there is no experience of management resistance. However, it is not yet known the level of influence management resistance has to the ineffective integration of the two project management methods (Waterfall and Agile) forming a Hybrid Methodology.
- How can the roles of Agile such as product owner, be effectively integrated with those of traditional Stage-Gate (Waterfall) such as business owner, when implementing a Hybrid Project Management Method?
- What is the feasibility of building a framework that guides the decision whether an organisation should be implementing a traditional, Agile, or Hybrid Project Management Methodology?
- Quantification of the benefits and challenges of implementing a Hybrid Project Management Methodology.

7.6 Conclusion

Existing literature posits it is feasible to integrate Waterfall and Agile to form a Hybrid Project Management Methodology that can be implemented in a project environment effectively, however there is limited empirical evidence on how this can be achieved for IT-based projects in South African organisations. Implementing a Hybrid Method is a newly explored concept in the project management field, yet it has already displayed advantages that add value to the success of a project and the business. This has created an impression in project-based environments within organisations, to explore and exploit the opportunity of implementing such a method. Many organisations have been stuck with implementing methodologies that lead to inefficiencies and unprofitability of the business mainly because of the way they have been implemented. Hybrid has offered a chance to correct this by providing an option to optimise project processes.

The findings of this study when compared to literature have indicated how taking certain elements of Agile practices and combining them with some elements of Waterfall result in an effective Hybrid Model that can be implemented at various stages of the project lifecycle defined in the ITMF, to deliver a successful project. Contrary to combining all elements of Agile and Waterfall methods thoughtlessly.

As provided in the problem statement and literature review, understanding the factors of effectively implementing a Hybrid Methodology provides companies with the opportunity to explore project execution through this Hybrid Model, to be flexible, adaptable, and to respond speedily in the competitive and fast-changing business environment of South Africa.

Findings emanating from this research study can inform companies on the opportunity to effectively implement a combination of two approaches, Agile and traditional, to form a Hybrid model and discover its benefits. Although the Hybrid model does present some challenges, these can be overcome by ensuring adherence to the project life-cycle stages as discussed in the summary of findings in Figure 7.1. This can be a motivation for companies that still implement a single methodology to adjust their standard to that of Hybrid, which will see their customer service level improve, gain optimal project performance, and realise business profitability.

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ANNEXURE A: INTERVIEW CONSENT FORM

Letter of Informed Consent

Dear Participant,

I am currently a student at the University of Pretoria's Gordon Institute of Business Science and completing my research in partial fulfilment of an MBA.

I am conducting a qualitative study on the implementation of a Hybrid Project Management Methodology (combining traditional and Agile methods) for IT-based projects in South African based-companies.

Our interviews are expected to last forty-five minutes to an hour. **Your participation is voluntary, and you can withdraw at any time without penalty**. All data will be reported without identifiers. If you have any concerns, please contact my supervisor or me. Our details are provided below.

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Samantha Swanepoel
samanthaswanepoel1@gmail.com
+27 82 387 3029

Signature of participant: _____

Date: _____

Signature of researcher: _____

Date: _____

ANNEXURE B: INTERVIEW SCHEDULE

Participant Job Role:

Interview Date: _____ Start Time: _____ End Time: _____

Thank you for agreeing to do the interview, please see below the Zoom meeting details and find attached a copy of the consent form to be signed and sent back to me prior to our meeting tomorrow.

Nobayeni Getyengana is inviting you to a scheduled Zoom meeting.

Topic: MBA Research Study
Time: Oct 29, 2020 11:30 AM Harare, Pretoria

Join Zoom Meeting
https://us04web.zoom.us/j/4602086017?pwd=NXh1TWtWTDR6cHI1QkloQU9ZQ1JZQT09

Meeting ID: 460 208 6017
Passcode: fgL1hT

Thank you for making time to do the interview. I am just going to quickly read through what is in the consent letter, which you have already signed, and have indicated to me thank you very much for that. Just to make sure that we are both on the same page, this interview I have requested so that you can assist me in collecting data for my research study that I am doing in partial fulfilment of my MBA. I am conducting an in-depth study on the implementation of a Hybrid Project Management Methodology, that is combining a traditional method like Waterfall with Agile for IT-based projects in South African organisations. Our interview will not last longer than 45 minutes to an hour, and your participation is voluntary, you can withdraw at any time without penalty. Please note that all data that will be collected in this interview will be reported without any identifiers. So, if you have any concerns or queries, you can contact my supervisor as well, Samantha Swanepoel, her details are on the consent letter. Also, please note that this interview is being recorded.

I am ready for us to start:

Question 1: Tell me, what is your exposure to project management?

Question Elaboration: What have you done in project management or anything in relation to project management, like being in the project team, how have you been exposed to project management?

Question 2: How long have you worked in project teams for?

Question Elaboration: So, where you do project related work, how long have you been exposed to such an environment?

Question 3: Thank you. What is your exposure to Agile Project Methodology?

Question 4: How long have you been exposed to Agile?

Question 5: Tell me, what is your understanding of a Hybrid Project Management Methodology?

Question 6: Would you say that in the organisations that you have worked for previously, including your current organisation, there is some form of Hybrid

being implemented as a Project Management Methodology? Maybe it is not defined as Hybrid but there is a combination of use of methodologies in some form or the other?

Question 7: Looking at Hybrid as a combination of the two methods, a traditional method like Waterfall, combining it with Agile, how do you implement Hybrid in your current organisation?

Question Elaboration: Perhaps tell me more about the steps that would be involved in implementing a Hybrid model within the organisation by looking at the phases of the project lifecycle, your request, plan, build, test run. What steps would you take if you're using a Hybrid model, or how would you then implement sort of like a Hybrid Model?

Question 8: Looking at the framework of project lifecycle, if we just look at five phases of request, plan, build, test, run, where would you place Waterfall and where would you place Agile if you're working on an IT project and you have to run it through those five stages of the project lifecycle?

Question Elaboration: Where would you put Waterfall and where would you put Agile to combine the two to formulate a Hybrid Model.

Question 9: In your current organisation, how do you decide which methodology to use for any IT-based project and at which point of the project do you decide on the choice of methodology?

Question Elaboration: In other words, do you choose a methodology at the start or whilst in the middle of the project you are able to switch over from one methodology to the next.

Question 10: Where you have used a Hybrid Method and what would you say you have seen to be the advantages or the benefits if you may call them of implementing a Hybrid Method?

Question 11: Tell me what would then be the disadvantages or challenges faced with implementing a Hybrid Method?

Question 12: In realising those advantages or benefits, so to speak, how do you get to that realisation?

Question Elaboration: Do you have a certain criterion that you use to measure the benefits?

Question 13: Tell me in your current organisation, is there a place to continue with Hybrid as the method of the future?

Question 14: Thank you. So, tell me in your opinion, if you are going to go Hybrid, what is the one thing that you think should be done to ensure that the Hybrid Method is implemented effectively?

Question 15: Do you think that having a good technical support in place will ensure that the Hybrid Method has a positive impact on the entire project lifecycle or some parts of the project lifecycle?

Question 16: I have just about three or so more questions for you. In your opinion again tell me, do you think that for any organisation, Hybrid should be

the method of the future or should it be Agile, or rather stick to traditional methods such as Waterfall?

Question 17: In addition to that question, or as a follow up to that question, do you think an organisation should have a framework in place that guides them to decide on which methodology to use?

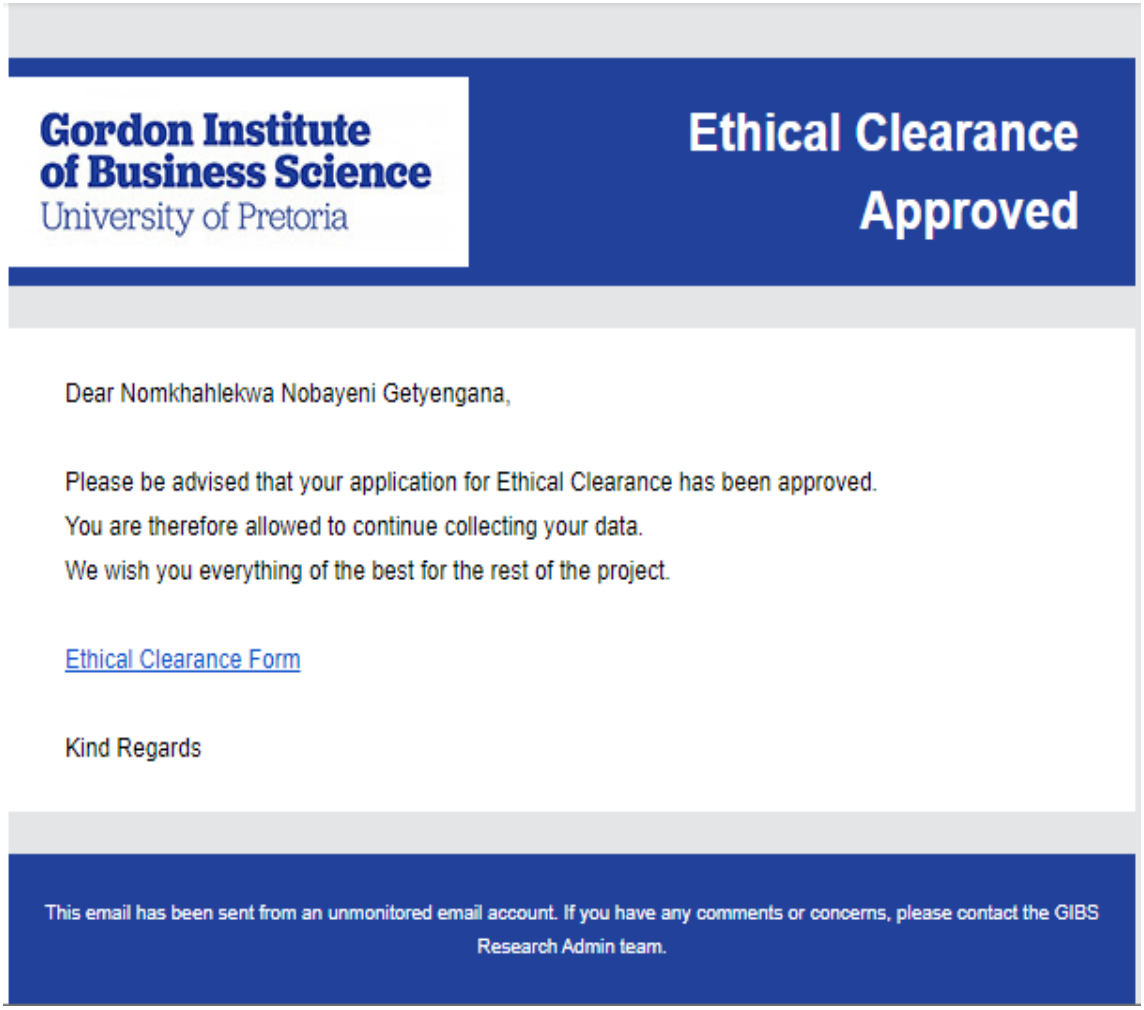
Question 18: Okay, do you think that the framework should be based more on the size of the project or the requirements of the project?

Question Elaboration: Yes. Do you think the framework can be built around project elements that will help you decide which methodology to use? Do you think that the framework, or some aspects of the framework should focus more on the size of the project or the requirements of the project?

Question 19: Okay, great. Thank you, one more question for you. I would really like you to give me an in-depth response on this question as the final question. Do you think in your view that selecting the right methodology contributes to the success of a project?

Okay, great. Thank you so much for the insights that you have provided me. I think you have given me some depth, around the subject of Hybrid or your understanding of Hybrid, and how it is currently run in your organisation, and opinions thereof. So, thank you so much for your time.

ANNEXURE C: ETHICAL CLEARANCE



Gordon Institute of Business Science
University of Pretoria

Ethical Clearance Approved

Dear Nomkhahlekwa Nobayeni Getyengana,

Please be advised that your application for Ethical Clearance has been approved.
You are therefore allowed to continue collecting your data.
We wish you everything of the best for the rest of the project.

Ethical Clearance Form

Kind Regards

This email has been sent from an unmonitored email account. If you have any comments or concerns, please contact the GIBS Research Admin team.

ANNEXURE D: ATLAS.TI CODEBOOK

Individual codes

Respondents Id	Responses Related to Themes (39 Codes)	Number of Quotations
D:1, D:2, D:4, D:8, D:9 (2), D:11, D:12 (9)	Comparing agile and waterfall	17
D:1, D:3, D:4, D:9, D:11 (2), D:12, D:13	Hybrid methodology of waterfall and agile	8
D:1, D:3, D:6, D:9 (2), D:11 (2)	Advantages interpreted as hybrid benefits	7
D:1, D:2 (2), D:3 (2), D:4 (2), D:7 (2), D:8 (2), D:9, D:12 (3), D:13 (2)	Advantages of hybrid	17
D:1, D:2, D:4 (3), D:5 (3), D:6, D:7, D:8, D:9 (2), D:10 (6), D:11, D:12 (2), D:13	Challenges with implementing hybrid	26
D:1, D:3, D:4, D:7, D:8, D:11	Disadvantages interpreted as hybrid benefits and challenges	6
D:1, D:2, D:3, D:4 (2), D:6, D:7 (2), D:8 (2)	Disadvantages of hybrid	10
D:1, D:2 (2), D:4, D:6 (2), D:7, D:8, D:10 (2)	Ensuring hybrid effectiveness	10
D:1, D:2, D:3, D:4, D:5, D:6, D:7, D:8 (2), D:9, D:10 (3), D:11, D:12 (2), D:13	Hybrid meaning	17
D:1, D:2, D:3 (2), D:4 (2), D:5 (4), D:6, D:7, D:8 (2), D:9 (2), D:10 (5), D:11 (4), D:12 (3), D:13	Implementing hybrid	29
D:8, D:13	Informally implementing hybrid	2
D:1	All company A projects going fully agile	1
D:11	All company K projects	1
D:9	All company B projects going fully agile	1

D:1, D:3, D:4	IT based projects going agile only	3
D:1, D:3, D:5, D:7, D:9, D:10 (2), D:11 (2)	Understanding of agile	9
D:1, D:2, D:3, D:4, D:5 (2), D:6, D:7, D:9, D:11	Years in agile	10
D:1	Future of hybrid at company A	1
D:9	Future of hybrid at company B	1
D:2	Future of hybrid at company E	1
D:4	Future of hybrid at company G	2
D:8	Future of hybrid at company M	2
D:13	Future of hybrid at company V	1
D:6	Future of hybrid at company N	1
D:10	Future of hybrid at company O	1
D:7	Future of hybrid at company S	1
D:3	Future of hybrid at company U	1
D:5	Future of hybrid at company T	1
D:1, D:2, D:3 (2), D:6	Deriving hybrid advantages	5
D:2, D:3, D:5 (3), D:9, D:10 (2), D:12, D:13	Hybrid method success criteria	10
D:8, D:9, D:10, D:11 (2), D:13	Measuring benefits	6
D:1, D:4	Deriving hybrid disadvantages	2
D:2, D:7, D:8, D:9 (3), D:10, D:13	Company standard PMM	8
D:1, D:2, D:3 (2), D:4, D:5 (4), D:6 (3), D:7, D:8 (2), D:10 (4), D:11, D:12 (3), D:13 (2)	Deciding on future methodology	26
D:1, D:2 (2), D:3, D:4, D:5 (2), D:6, D:7, D:8, D:10, D:11 (2), D:13	Deciding on methodology	14
D:5, D:6, D:8, D:10, D:12	Influence of PMM on success of project	5
D:5, D:9	Limited PM exposure	2

D:2, D:5, D:8 (2), D:11	PMM balancing act	5
D:1, D:2, D:3, D:4, D:5, D:6, D:8, D:9, D:10, D:11, D:12, D:13	Years in PM	12

Code groups

9 Code Groups	Number of Quotations	Respondents Id
Agile and Waterfall Compared	17	D:1 (2), D:2, D:4, D:8, D:9 (2), D:11, D:12 (9)
	8	D:1, D:3, D:4, D:9, D:11 (2), D:12, D:13
Benefits of Hybrid Methodology	7	D:1, D:3, D:6, D:9 (2), D:11 (2)
	17	D:1, D:2 (2), D:3 (2), D:4 (2), D:7 (2), D:8 (2), D:9, D:12 (3), D:13 (2)
Challenges of Hybrid Methodology	26	D:1, D:2, D:4 (3), D:5 (3), D:6, D:7, D:8, D:9 (2), D:10 (6), D:11, D:12 (2), D:13
	6	D:1, D:3, D:4, D:7, D:8, D:11
	10	D:1, D:2, D:3, D:4 (2), D:6, D:7 (2), D:8 (2)
Implementation of Hybrid Methodology	10	D:1, D:2 (2), D:4, D:6 (2), D:7, D:8, D:10 (2)
	17	D:1, D:2, D:3, D:4, D:5, D:6, D:7, D:8 (2), D:9, D:10 (3), D:11, D:12 (2), D:13
	29	D:1, D:2, D:3 (2), D:4 (2), D:5 (4), D:6, D:7, D:8 (2), D:9 (2), D:10 (5), D:11 (4), D:12 (3), D:13
	2	D:8, D:13
Fully Agile	1	D:1
	1	D:11
	1	D:9
	3	D:1, D:3, D:4
	9	D:1, D:3, D:5, D:7, D:9, D:10 (2), D:11 (2)
	10	D:1, D:2, D:3, D:4, D:5 (2), D:6, D:7, D:9, D:11

Future of Hybrid Methodology	1	D:1
	1	D:9
	1	D:2
	2	D:4
	2	D:8
	1	D:13
	1	D:6
	1	D:10
	1	D:7
	1	D:3
	1	D:5
Hybrid Methodology Benefits Criteria	5	D:1, D:2, D:3 (2), D:6
	10	D:2, D:3, D:5 (3), D:9, D:10 (2), D:12, D:13
	6	D:8, D:9, D:10, D:11 (2), D:13
Hybrid Methodology Challenges Criteria	2	D:1, D:4
Understanding PM Methodology	8	D:2, D:7, D:8, D:9 (3), D:10, D:13
	26	D:1, D:2, D:3 (2), D:4, D:5 (4), D:6 (3), D:7, D:8 (2), D:10 (4), D:11, D:12 (3), D:13 (2)
	14	D:1, D:2 (2), D:3, D:4, D:5 (2), D:6, D:7, D:8, D:10, D:11 (2), D:13
	5	D:5, D:6, D:8, D:10, D:12
	2	D:5, D:9
	5	D:2, D:5, D:8 (2), D:11
	12	D:1, D:2, D:3, D:4, D:5, D:6, D:8, D:9, D:10, D:11, D:12, D:13