

Best Practices for Implementing Multiple Concurrent IT Frameworks

(CMMI, ITIL, Six-Sigma, CobiT and PMBOK)

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Abstract

In an environment where improvement initiatives are typically concurrently implemented throughout the different parts of the organisation, multiple technologies are used to address organisational problems. This results in competition between the different departments within the same organisation for infrastructure support, compliance needs, resourcing requirements etc., and inevitably wastage in cost occurs due to overlapping efforts, eroding the primary objective of most organisations which is cost reduction.

This problem can be mitigated if the departments work together to manage the landscape when it comes to implementing multiple concurrent technologies and processing models. Furthermore organisations are required to have a thorough understanding of the selected IT frameworks and best practices for implementing these frameworks concurrently.

In order to determine the best practices used in South African large organisations within the private sector, three cases have been studied via semi-structured interviews, namely FNB, Accenture and Sun International. Each of these organisations has the experience of implementing IT frameworks, encountering challenges and learning lessons which they have built into their internal IT governance process.

It was concluded that all three organisations have implemented customised frameworks where they have incorporated multiple IT frameworks and customised them to suit their objectives, tying into the organisational goals. A common theme across all case studies was that of behavioural challenges regarding resistance from employees. However, these were handled by proper change management. Another common behaviour was that all organisations only implemented the feature of the IT framework they deemed critical instead of implementing the IT framework holistically. Recommendations based on these key findings have been included in the hybrid of best practices which is intended to make a contribution to the academic community.

Declaration

I, Nirvasha Harryparshad, declare that BEST PRACTICES FOR IMPLEMENTING MULTIPLE CONCURRENT IT FRAMEWORKS (CMMI, ITIL, COBIT AND PMBOK) is my own work. All sources that have been used or quoted have been referenced.

.....

Miss Nirvasha Harryparshad

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Signed at

On the Day of 2011

Dedication and Acknowledgments

This research report is dedicated to my mum and dad, thank you for your love, support and being my pillar of strength. I love you.

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Table of Contents

Abstract.....	ii
Declaration.....	iii
Dedication and Acknowledgments.....	iv
Chapter 1: Orientation	1
1.1. Introduction.....	1
1.2. Purpose and objectives of the study.....	2
1.3. Statement of the problem and sub-problems.....	4
1.4. Delimitations of the study.....	4
1.4.1. Delimitations	4
1.4.2. Assumptions	5
1.5. Significance of the study.....	6
1.6. Conclusion.....	8
Chapter 2: Theoretical Framework	9
2.1. Introduction.....	9
2.2. Information Technology Infrastructure Library (ITIL).....	9
2.2.1. Drivers and risks of ITIL	13
2.2.2. Strengths and weaknesses	13
2.3. Capability Maturity Model Integration (CMMI).....	14
2.3.1. Drivers and risks of CMMI	15
2.3.2. Strengths and weaknesses	16
2.4. Control Objectives for Information and Related Technologies (CobiT)	16
2.4.1. Drivers and risks of CobiT	18
2.4.2. Strengths and weaknesses	19
2.5. Project Management Body of Knowledge (PMBOK)	20
2.5.1. Drivers and risks of PMBOK.....	23
2.5.2. Strengths and weaknesses	23
2.6. Conclusion.....	24
Chapter 3: Literature Review.....	27
3.1. Introduction.....	27
3.2. Considerations for implementing IT frameworks.....	27
3.3. ITIL and CobiT as complementary frameworks	29
3.4. ITIL and CMMI as complementary frameworks	32
3.5. ITIL and PMBOK as complementary frameworks.....	35
3.6. CMMI and COBIT as complementary frameworks	36

3.7.	CMMI and PMBOK as complementary frameworks	38
3.8.	CobiT and PMBOK as complementary frameworks	39
3.9.	Conclusion.....	40
Chapter 4:	Research Methodology	42
4.1.	Introduction.....	42
4.2.	Research problem and sub-problems.....	42
4.3.	Research methodology.....	42
4.4.	Research design.....	44
4.4.1.	Sample	44
4.4.2.	Measurement instrument.....	46
4.4.3.	Administering procedure	49
4.4.4.	Analysis of data and criteria for interpreting the results.....	49
4.5.	Ethical considerations.....	51
4.6.	Limitations	52
4.7.	Conclusion.....	52
Chapter 5:	Research Results	53
5.1.	Introduction.....	53
5.2.	Profile of respondents.....	53
5.3.	Results from the semi-structured interviews	55
5.3.1.	Organisational context.....	55
5.3.1.1.	Accenture	55
5.3.1.2.	FNB.....	56
5.3.1.3.	Sun International	57
5.3.2.	Complementary models	59
5.3.2.1.	Accenture	59
5.3.2.2.	Sun International	60
5.3.3.	Best practices for concurrent usage of the IT frameworks	61
5.3.3.1.	Accenture	61
5.3.3.2.	FNB.....	62
5.3.3.3.	Sun International	63
5.3.4.	Leveraging of multiple IT frameworks concurrently	64
5.3.4.1.	Accenture	64
5.3.4.2.	FNB	65
5.3.4.3.	Sun International	66
5.4.	Validity and reliability of data collection	67
5.5.	Analysis of the data	68
5.5.4.	Organisational context.....	68

5.5.5	Complementary models	70
5.5.6	Best practices for concurrent usage of the IT framework	70
5.5.7	Leveraging of multiple IT frameworks concurrently	71
5.6	Discussion of the results.....	72
5.6.4	Research sub-problem 1: How does each model complement the others? 72	
5.6.5	Research sub-problem 2: What are the best practices for concurrent usage of the IT frameworks?	75
5.7	Conclusion.....	76
Chapter 6: Recommendations and Conclusion		77
6.1.	Introduction.....	77
6.2.	Recommendations for implementing multiple IT frameworks concurrently	77
6.2.1.	Perform detailed analysis	77
6.2.2.	IT framework and business drivers crosswalk	77
6.2.3.	Detailed analysis of the IT frameworks and business drivers	79
6.2.4.	Involve senior management	79
6.2.5.	Prior implementation	79
6.2.6.	During implementation	81
6.2.7.	Post implementation.....	84
6.3.	Recommendations for future research	86
6.4.	Conclusion.....	86
Reference List.....		88
Appendix 1: Communication with Participants.....		99
Appendix 1.1: Initial Email to Participants		99
Appendix 1.2: Email for participants to verify the report.....		100
Appendix 2: Confidentiality letter from the university		101
Appendix 3: Interview Questionnaire		103

Index of Tables

Table 1: Proposed hybrid of best practices	2
Table 2: Versions of IT frameworks used in this research report	5
Table 3: ITIL key features (Xansa et al., 2007)	11
Table 4: ITIL strengths and weaknesses.....	13
Table 5: CMMI strengths and weaknesses	16
Table 6: CobiT strengths and weakness	19
Table 7: PMBOK strengths and weaknesses	23
Table 8: Summary of the theoretical frameworks	25
Table 9: CobiT versus ITIL	31
Table 10: Differences and similarities between ITIL and PMBOK	35
Table 11: Differences and similarities between CobiT and CMMI	37
Table 12: Differences and Similarities between CMMI and PMBOK (Source: Ehsan et al 2010)	38
Table 13: Similarities between CobiT and PMBOK (Source: IT Governance Institute, 2006)	40
Table 14: Summary of Complementary IT Frameworks	41
Table 15: Research Strategies Considered (Source: Leedy and Omrod, 2010)	43
Table 16: Interview Questions addressing Key Research Questions	47
Table 17: Summary of frameworks applicable to the case studies.....	69
Table 18: Complementary frameworks based on the case study	74
Table 19: Comparison of IT frameworks between case studies and literature review ...	74
Table 20: Business drivers per IT framework (Source: IT Governance Institute, 2006) ..	78
Table 21: Risks and risk mitigations per IT framework	80
Table 22: Leveraging the strengths of one model to support the weaknesses of another	82
Table 23: A hybrid of complementary IT frameworks	83

List of Figures

Figure 1: The service life cycle defined in ITIL (Xansa, et al., 2007)	10
Figure 2: CobiT framework (IT Governance Institute, 2007)	17
Figure 3: PMBOK framework (Project Management Institute, 2010).....	22
Figure 4: Integrating CMMI, Six Sigma and ITIL (Source: Dutton, 2010)	33
Figure 5: A high level difference between ITIL and CMMI-SVC (Source: Saxena and Maher, 2011)	34
Figure 6: Comparisons between CobiT and PMBOK (Source: IT Governance Institute, 2006)	39
Figure 7: Analysis Process for interpreting the data collected.....	50
Figure 8: Statistical comparison between the three case studies.....	54
Figure 9: A Typical IT Organisation (Source: Zachar, 2011)	60
Figure 10: Comparison of IT functions between Accenture and Sun International (Adapted from: Cater-Steel, et al., 2006).....	73
Figure 11: Recommendations of the best practice process.....	85

Chapter 1: Orientation

1.1. Introduction

Successful implementation of multiple models requires a thorough understanding of the relationships these models share (Siviy, Penn & Harper, 2005). An entire mapping of a “general case” to an organisation is cumbersome and offers little value, especially if there is overlap between the models. A “general case” should be used for understanding how the models complement each other, thereby providing the organisation with an opportunity to best leverage multiple models, creating a model customised to the organisational need (Siviy, et al., 2005: 14). In the 21st century, it is crucial for organisations to invest in process improvement, not as a compliance initiative, but rather as a way to achieve competitive advantage (Siviy, et al., 2005). It is the responsibility of those involved in process improvement within the organisation to understand the differences and synergies of the various models in order to avoid an initiative overload (Siviy, et al., 2005).

Symons, Cecere, Young & Lambert (2005:4) observed that most IT governance frameworks are complementary to each other, in essence providing these organisations with the “best of both worlds”. It is important for organisations to “map the model to the process, not the process to the model” (Siviy, et al., 2005: 11). There are numerous governance / best practice frameworks available for the different IT operational intents (Cater-Steel, Tan & Toleman, 2006). CMMI, CobiT, PMBOK and ITIL have been chosen for this research report, as the organisations that participated in the research have attempted to implement these frameworks. There is an abundance of literature in terms of complementary IT governance models; however, minimal literature exists on the phenomenon of implementing multiple concurrent governance frameworks (Cater-Steel, et al., 2006).

This research report aims to provide an insight into the implementation of multiple concurrent IT frameworks, and how to best implement each of the chosen frameworks resulting in a hybrid of best practices for implementing multiple concurrent IT frameworks as illustrated in Table 1 below.

Table 1: Proposed hybrid of best practices

Leveraging of multiple IT frameworks concurrently <i>(ITIL, CMMI, Six-Sigma, PMBOK and CobiT)</i>				
	ITIL	CobiT	CMMI	PMBOK
ITIL		?	?	?
CobiT	?		?	?
CMMI	?	?		?
PMBOK	?	?	?	

1.2. Purpose and objectives of the study

With the increase in complexity in terms of IT-related risks, Hardy (2006) recommended that with the effective use of IT best practices, namely IT frameworks, organisations can optimise the use of scarce IT resources and create stakeholder value (PricewaterhouseCoopers, 2006). IT best practices can aid in reducing the occurrence of significant IT risks such as wastage in project investment, project failures, security breaches, and not meeting the requirements of the customer.

PricewaterhouseCoopers (2006) argued that stakeholder value can be created via multiple factors such as cost efficiency, service quality, business alignment, reduced IT risks and ability to adapt to change. Furthermore, Tshinu (2008: 40) mentioned that “the key to success with technology is not the technology per se, but the ability to manage it well”.

Tshinu (2008) went on to illustrate that there are several tools that have been developed to serve best practices relating to the management of IT infrastructure, which could include ITIL, CobiT and CMMI. It is critical for the reader to note that each of these tools are dedicated to specific objectives, namely:

- ITIL is focused on IT Service Management (Array, 2010; Xansa, Hanna, Rudd, Macfarlane, Windebank & Rance, 2007)
- CobiT is focused on prescribing IT governance in general (Radovanovi, Radojevi, Lu-I & Šarac, 2010)
- CMMI is primarily a guideline for process improvement (CMMI Product Team, 2006).

IT within organisations is typically an integrated infrastructure that uses both direct and indirect resources and IT management is influenced by internal and external factors (Tshinu, 2008). According to King III, effective and efficient IT resource management is essential to IT Governance (Liell-Cock, Graham & Hill, 2009). Liell-Cock, et al. (2009) mentioned that a common practice in IT is that of outsourcing and in order to manage outsourcing well, organisations need to ensure governance of the outsourced entity, compliance within the outsourced environment and the capability to interact successfully with the outsource company. Organisations have the option of combining various frameworks to ensure sufficient management practices (Tshinu, 2008). In addition, they enable efficient integration between organisations that share similar governance models.

It is emphasised by Pardo, Pino, García, Piattini & Baldassarre (2011: 1) that organisations “struggle with the complexity and difficulty of understanding and interpreting several models at the same time”. The struggle is primarily due to a lack of understanding of each model in terms of scope, definitions and terminology, processes, approaches etc., thereby creating a problem when organisations attempt to implement multiple approaches (Pardo, et al., 2011).

The primary objective of this research report is to produce a hybrid of best practices empowering the user to use a combination of multiple IT frameworks concurrently, leveraging off the strengths of some frameworks to support the weakness of others.

Secondary objectives of this research report include:

- Overlapping features between the selected IT frameworks, and
- A best practice implementation approach for the hybrid.

1.3. Statement of the problem and sub-problems

How to best implement multiple IT frameworks concurrently.

- How does each model complement the other models?
- What are the best practices for concurrent usage of the IT frameworks?

1.4. Delimitations of the study

1.4.1. Delimitations

- The scope of this research report is restricted to the following frequently mentioned frameworks according to Cater-Steel, et al. (2006). These are contained in the hybrid of best practices by Latif (2010), namely ITIL, CMMI, PMBOK and CobiT.
- The target audience is enterprise architects, who according to Strano and Rehmani (2007) have the role of making order out of chaos. The role of enterprise architects has evolved from being focused on technological architecture to improving on efficiency and effectiveness. This will soon evolve into focusing on strategic planning, policy making, process enhancement, etc. (Strano and Rehmani, 2007).
- This study excludes the combination of IT frameworks that work against or contradict each other.

- This study will not produce a new process improvement framework. Instead it will produce a set of best practices for implementing multiple process improvement frameworks.

1.4.2. Assumptions

- Research was performed on the following models, after the specified year of release.
 - It is assumed that not much literature would exist for the CMMI Version 1.3 which was released in 2010. Therefore CMMI Version 1.2 was used as part of this research report.
 - It is assumed that ample literature will be available for ITIL Version 3, CobiT 4.1 Edition and PMBOK 4th Edition; hence the latest versions will be used as part of this study.
 - A summary of the IT Frameworks used in this research study is illustrated in Table 2.

Table 2: Versions of IT frameworks used in this research report

Framework	Latest version	Previous Version
CMMI	Version 1.3 (2010)	Version 1.2 (2006)
ITIL	Version 3 (2007)	
COBIT	4.1 Edition (2007)	
PMBOK	4 th Edition (2009)	

- It is assumed that Enterprise Architects or leaders of IT governance are familiar with the IT frameworks within the respective organisations.

1.5. Significance of the study

With the increase in organisational focus on performance and productivity of their employees, concerns were highlighted by Florin and Minodora (2007). This included increased growth in company expenditure for IT re-engineering and maintaining of IT systems, increased inconsistencies in design errors, excessive budget overflow and security breaches which resulted in huge monetary losses (Florin and Minodora, 2007). These are some of the factors that contribute to problems with performance, control mechanisms and coordination within the IT systems, which can be alleviated through IT governance (Florin and Minodora, 2007).

According to Heston and Phifer (2009), the biggest challenge companies' face is to get started with an efficient and effective IT framework or governance model. Heston and Phifer (2009) recommended that these organisations should start by building processes which are familiar to people, then move to a broader coverage, finally aiming to fix urgent problems. Heston and Phifer (2009) highlighted challenges which organisations face when implementing governance models. These include a lack of focus on people change management, lack of skill in the models, lack of multidiscipline expertise, a mistaken belief that a copy and paste of existing solutions would solve all of the organisation's problems, and being model-centric rather than focusing on the business objectives (Heston and Phifer, 2009).

IT governance is a well-known phenomenon and is generally accepted by organisations as an instrument that is necessary to add value and manage risks (Kooper, Maes & Lindgreen, 2010). However, limitations of IT governance tools come as a result of organisations implementing IT governance frameworks based on their understanding of the tool (Kooper, et al., 2010). It is fast becoming a common phenomenon for organisations to adopt multiple process improvement frameworks (Cater-Steel, et al., 2006). There are many reasons for this, including cost saving, customer satisfaction, legal compliance, risk mitigation, etc. (Cater-Steel, et al., 2006).

The use of common frameworks encourages team collaborations and reduces the learning curve for new employees. Combining multiple frameworks reduces complexity within organisations or products (Cater-Steel, et al., 2006). The success of this implementation is highly dependent on the effectiveness of the organisation's IT governance, which will be beneficial to the business in terms of reputation, trust, product leadership and cost reduction (Bowena, Cheung & Rohdeb, 2006). Hardy (2006) stressed that the importance of IT frameworks includes:

- The criticality of IT management in terms of the organisation's success. It also defines policies, procedures, internal controls and practices which the organisation needs to follow
- IT frameworks are beneficial when it comes to efficiency, reliability, robustness, error control and increased trusted in IT systems
- Furthermore, best practices help meet regulatory requirements, particularly those of security and privacy, and aids in benchmarking against competitors

The significance of this study is to guide companies into deciding what combination of IT governance frameworks can be combined to best suit their needs, i.e. to increase efficiencies and reduce IT spending. In addition, Cater-Steel, et al. (2006) observed that there is a need for a study to explore the impact of adopting multiple IT governance frameworks concurrently. Gammage, Plummer, Thompson, Fiering, LeHong, Karamouzis, Rold, Collins, Clark, Jones, Smulders, Escherich, Reynolds & Basso (2009) mentioned that information technology investment decisions, such as boosting liquidity and balancing long and short-term financial commitment, are accelerating the trend of greater accountability, transparency, and growth in customer interest.

With the implementation of multiple concurrent governance frameworks, organisations can achieve sustainability and competitive advantage. This report is furthermore intended to make a contribution to the academic community on the phenomenon of implementing multiple concurrent governance frameworks.

1.6. Conclusion

This chapter positioned the outlook of this report. The scope of the research report highlights the focal point for the rest of the report. The benefits illustrated in this chapter are wider than that of the research problem and the sub-problems mentioned, as it is crucial to keep the bigger picture in mind.

Chapter 2 discusses literature that surrounds the phenomenon of how multiple frameworks can work well or not so well together. A summary table is provided at the end of the chapter indicating the frameworks that work well together and those that overlap.

The research methodology used is discussed in Chapter 3, together with the measuring instrument, unit of analysis, and data analysis methodology. This chapter closes with the highlighting of the ethical considerations and limitations of this research report.

The results gathered from the case studies will be summarised in Chapter 4 and will be discussed in detail in Chapter 5. Recommendations on how best to implement multiple concurrent frameworks are made in Chapter 6.

Chapter 2: Theoretical Framework

2.1. Introduction

The success of the implementation of multiple models requires one to have a thorough understanding of these models and the relationships they share (Siviy, et al., 2005). This chapter is aimed at providing the reader with a comprehensive understanding of theoretical frameworks of the four selected IT frameworks (ITIL, CobiT, CMMI and PMBOK) whereby objectives, strengths, weaknesses and features were identified. In addition, business cases and risks that drive the decision to adopt a specific model are discussed.

2.2. Information Technology Infrastructure Library (ITIL)

Information Technology Infrastructure Library (ITIL) is a framework of best practices focusing on IT service management (Array 2010; Xansa, et al., 2007). According to Arraj (2010), ITIL confirms that service is the direct value added to customers. The Office of Government Commerce (2010) also mentioned that ITIL incorporates the Deming Cycle of Plan, Do, Check and Act (PDCA) in its service lifecycle. The key principles which make up the ITIL Service Life Cycle by Xansa, et al. (2007) demonstrated in Figure 1 include:

- **Service Strategy:** Provides IT service providers and customers guidelines on building a clear service strategy (Xansa, et al., 2007)
- **Service Design:** Provides guidelines on designing appropriate and innovative services to meet the business' requirements (Xansa, et al., 2007)
- **Service Transition:** Focuses on the implementation of all aspects of a service, particularly operation activities, in the event of failures or errors, or when the services are involuntarily unavailable (Xansa, et al., 2007)

- **Service Operation:** Delivers service level agreements, manages applications and supports the service being offered to the users and the customers, thereby adding value. Balancing of conflicting goals is critical at this stage (Xansa, et al., 2007)
- **Continual Service Improvement:** Maintaining the value created by the service offering for the customer through continuous evaluation and improvement of the quality of service. This combines principles from quality management, change management and capability improvement. Further principles are defined in the figure below (Xansa, et al., 2007)

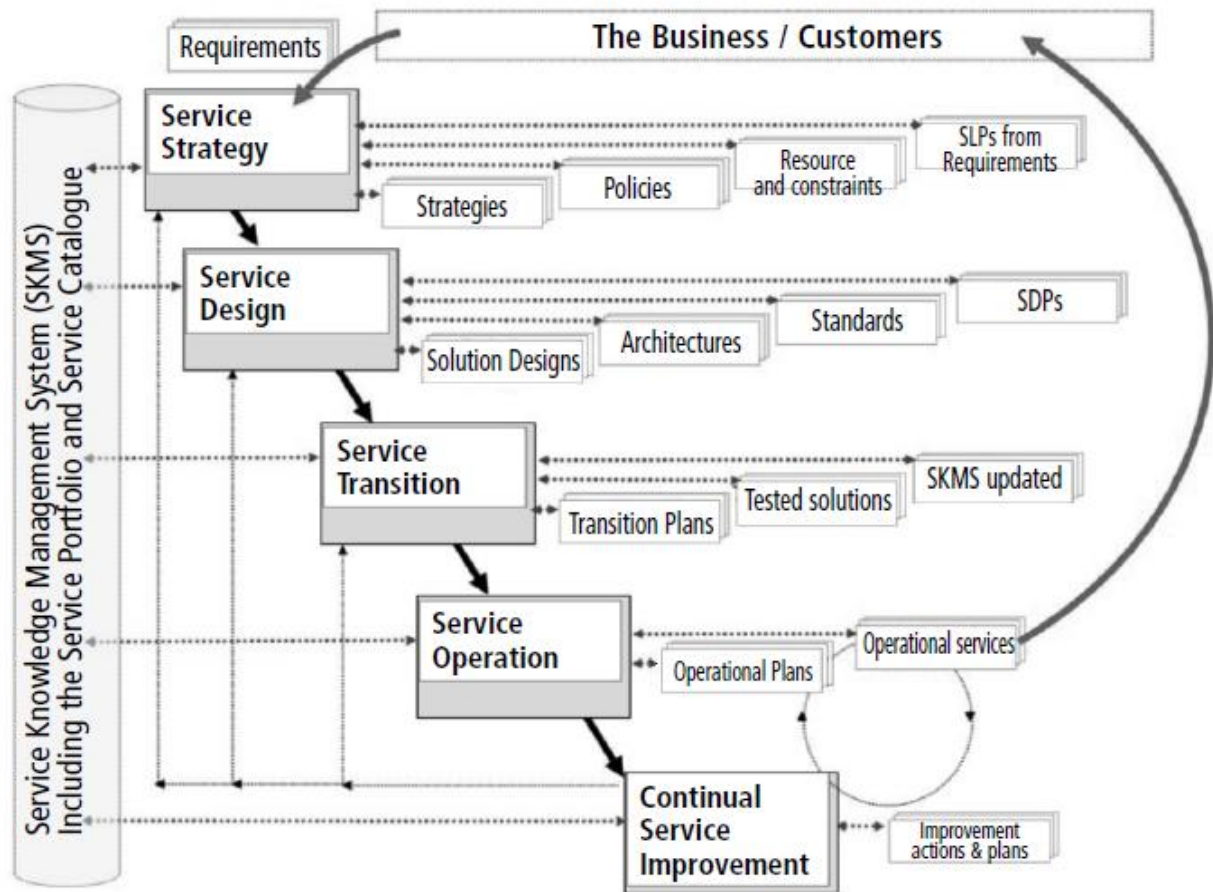


Figure 1: The service life cycle defined in ITIL (Xansa, et al., 2007)

According to Xansa, et al., (2007), each of these principles in the ITIL Service Life Cycle consists of the features defined in Table 3.

BEST PRACTICES FOR IMPLEMENTING MULTIPLE CONCURRENT IT FRAMEWORKS
(CMMI, ITIL, COBIT AND PMBOK)

Table 3: ITIL key features (Xansa et al., 2007)

Service Strategy	Service Design	Service Transition	Service Operation	Continual Service Improvement
<ul style="list-style-type: none"> • Competition and Market Space • Service Value • Service Provider Types • Service Management as a Strategic Asset • Critical Success Factors (CSFs) • Service Oriented Accounting • Service Provisioning Models • Organisation Design and Development • Financial Management • Service Portfolio Management (SPM) • Demand Management 	<ul style="list-style-type: none"> • Service Design Package (SDP) • Service Catalogue Management (SCM) • Service Level Management (SLM) • Capacity Management • Availability Management • IT Service Continuity Management (ITSCM) • Information Security Management (ISM) • Supplier Management 	<ul style="list-style-type: none"> • Change Management • Service Asset and Configuration Management (SACM) • Knowledge Management • Transition Planning and Support • Release and Deployment Management • Service Validation and Testing • Evaluation • Service Transition Stage Operational Activities 	<ul style="list-style-type: none"> • Event Management Process • Incident Management Process • Request Fulfilment Process • Access Management Process • Problem Management Process • Common Service Operation Activities • Service Desk Function • Technical Management Function • Application Management Function • IT Operations Management Function 	<ul style="list-style-type: none"> • 7-Step Improvement Process • Service Measurement • Service Reporting

ITIL cannot be implemented simply as a project without on-going maintenance. In order for organisations to reap the benefits of ITIL, it should be implemented as an ERP solution where the process of ITIL within the organisation is tracked over periods of years rather than months (Worthen, 2005). The main benefits of ITIL, according to Arraj (2010) and Xansa, et al. (2007), are business and IT alignment; improved customer services and customer satisfaction; consistency and efficiency in processes allowing for customer expectations can be set; measurably improved services which can be linked to business profitability and revenue; and a common language across the organisation.

With the majority of organisations using ITIL as their primary IT framework, implementing these best practices creates several challenges within an organisation, such as staff resistance to change, conflicts with tasks and ambiguous orders (Sharifi et al., 2008). Herold (2007) mentioned several ITIL challenges which include, ITIL is time consuming to implement, it requires sufficient skilled resources and support tools, and time and lack of knowledge is a challenge. Sharifi, Ayat, Rahman & Sahibudin (2008) clarified further what other challenges organisations will face when implementing ITIL which these include lack of management commitment, time wastage on complicated process diagrams, no clear work instructions / guidelines, not assigning ownership, too much focus on performance rather than quality, being too ambitious too soon, losing momentum after initiation and creating silos within the different departments.

Marquis (2006) identified traits for the successful adoption of ITIL, namely understanding the politics of ITIL, acknowledging that ITIL is an IT implementation, management commitment, determining the goal, simplifying the implementation, and acknowledging that ITIL is a process. ITIL is not a standalone process either, it needs to be implemented as a project, preparing for the challenges of change and learning how to use ITIL in the organisation.

2.2.1. Drivers and risks of ITIL

ITIL is typically implemented in organisations that have business objectives for defining service processes for the customers of IT and the customers of the organisation, improving the quality of service offered, and centralising the help desk operations (IT Governance Institute, 2006).

One of the main risks associated with the implementation of ITIL, according to the IT Governance Institute (2006), is erroneous support processes due to a lack of awareness.

2.2.2. Strengths and weaknesses

Table 4 highlights a few of the strengths and weaknesses encountered by ITIL users.

Table 4: ITIL strengths and weaknesses

ITIL Strengths	ITIL Weaknesses
<ul style="list-style-type: none">• Reputation and maturity by providing detail in term of quality of the production and operational processes (<i>Wessels and van Loggerenberg, 2006</i>)	<ul style="list-style-type: none">• Failure to address the software development life cycle (SDLC) and quality issues related to operational systems (<i>Wessels and van Loggerenberg, 2006</i>).
<ul style="list-style-type: none">• The continuous feedback throughout the service lifecycle, ensuring optimisation, and business value (<i>Office of Government Commerce, 2010</i>).	<ul style="list-style-type: none">• Governance is the weakest link in the ITIL service sourcing strategy (<i>Office of Government Commerce, 2010</i>).
<ul style="list-style-type: none">• If ITIL is implemented properly, it has the following impact to an organisation:<ul style="list-style-type: none">• Improved quality of service• Increase system uptime• Efficient problem resolution• Improved IT security(<i>Worthen, 2005</i>).	<ul style="list-style-type: none">• The ITIL best practices defined do not offer guidance on the actual application of ITIL within the organisation. The organisation must customise their individual best practices based on ITIL principles (<i>Worthen, 2005</i>).

2.3. Capability Maturity Model Integration (CMMI)

Capability Maturity Model Integration (CMMI) is based on software development principles and has a generic focus, providing guidelines for process improvement within an organisation (CMMI Product Team, 2006). CMMI is made up of a combination of Quality, Standards and Maturity. It is critical to note that “higher CMM levels correlate with fewer software defects ... but the highest CMM rating doesn’t necessarily guarantee the greatest savings for customers” (King, 2003: 50). On the other hand, level 5 CMMI might be excessive (King, 2008). The continuous representation methodology comprises of four capability levels, whereas the staged representation methodology comprises of five maturity levels. The maturity levels of an organisation, used to classify its performance in terms of process improvements, include Initial, Managed, Defined, Quantitatively managed and optimising.

“CMMI is a model, not a process standard” (Glazer, 2008: 14). However there are several challenges which organisations can face when implementing CMMI. These include:

- No official documentation
- Resistance to change primarily due to a lack of knowledge
- The misuse of CMMI as a standard in terms of being auditable, testable, compliance to work processes, acceptable and verifiable in outputs
- Inadequate accurate information with regards to CMMI and its implementation, hence the misuse of the model
- Difficulty in the understanding the terminology in use within the CMMI model, particularly terminologies that have dual meanings. This results in the model being subject to individual interpretation (Cyran and Cusick, 2006; Glazer, 2008)

- Urgency of an organisation to achieve technology maturity results in the organisation losing focus on its performance. This urgency may also result in the wrong standards being imposed and inflexible processes being designed specific to project needs, rather than processes being designed for long-term strategic use (Glazer, 2008)
- Glazer (2008) also highlighted that irrespective of the technology maturity one pursues, the maturity model cannot prevent the effect of an employee's private life on his/her productivity in their job

Lebsanft (2001) mentioned that CMMI does not imply that an organisation must produce piles of documentation. Instead it specifies that the processes and procedures followed by the organisation must be clearly and adequately defined in order to avoid misinterpretation. Investing in achieving a particular level of IT maturity in isolation will not be beneficial to the organisation in the long-term. Goldenson, Gibson & Ferguson (2004) identified seven benefits of CMMI, including process adherence, cost savings, impact on the project schedule, increased productivity, improved quality, increased customer satisfaction and improved return on investment.

2.3.1. Drivers and risks of CMMI

Business drivers for implementing CMMI usually includes assessing the maturity of current business processes, improving processes within organisational structures, the need for benchmarking processes against other organisations, improving productivity thereby decreasing project risks and reducing software defects. The outcome of this is usually customer satisfaction (IT Governance Institute, 2006).

Risks that can be correlated to the implementation of CMMI include ineffective and inefficient approaches for process improvement, inability of benchmarking the organisation against other organisations, and a decrease on project quality primarily due to poorly defined processes (IT Governance Institute, 2006).

2.3.2. Strengths and weaknesses

Table 5 below highlights a main strength and several weaknesses encountered by CMMI users.

Table 5: CMMI strengths and weaknesses

CMMI Strengths	CMMI Weaknesses
<ul style="list-style-type: none">Process improvement across the organisation and is based on maturity and capability models (<i>King, 2003; CMMI Product Team, 2006</i>)	<ul style="list-style-type: none">Too much focus on levels and ratings, not enough focus on measured results and the interpretation of such data (<i>Staples, Niazi, Jeffery, Abrahams, Byatt & Murphy, 2006</i>).
	<ul style="list-style-type: none">Goldenson, et al. (2004) highlighted that one of the most critical dimensions of an organisation which CMMI fails to cover is people issues.
	<ul style="list-style-type: none">CMMI is time consuming and costly to implement for several organisations, however these organisations acknowledge the benefits that CMMI has to offer (<i>Staples, et al., 2006</i>)

2.4. Control Objectives for Information and Related Technologies (CobiT)

According to Radovanovi, et al. (2010), Control Objectives for Information and Related Technologies (CobiT) is an international standard, prescribing IT governance. CobiT incorporates business and IT goals in its monitoring of the information metric system (Radovanovi, et al., 2010). CobiT encompasses 34 key business processes, over 300 IT controls and four main domains. These domains include Planning and Organisation, Acquisition and Implementation, Delivery and Support, and Monitoring and Evaluation (Radovanovi, et al., 2010). CobiT was initially intended to be used by organisations for benchmarking; subsequently it has been used for internal and external auditing of systems (Tuttle and Vandervelde, 2007).

Tuttle and Vandervelde (2007) described the conceptual underlying model for CobiT to meet business needs, which includes seven criteria, namely effectiveness, efficiency, confidentiality, integrity, availability, compliance and reliability. CobiT has a focus on five

primary elements, namely IT functional value, alignment, risk management, performance management and responsibility (Rouyet-Ruiz, 2008). CobiT, similar to the other IT frameworks, consists of several process areas as illustrated in Figure 2 (IT Governance Institute, 2007).

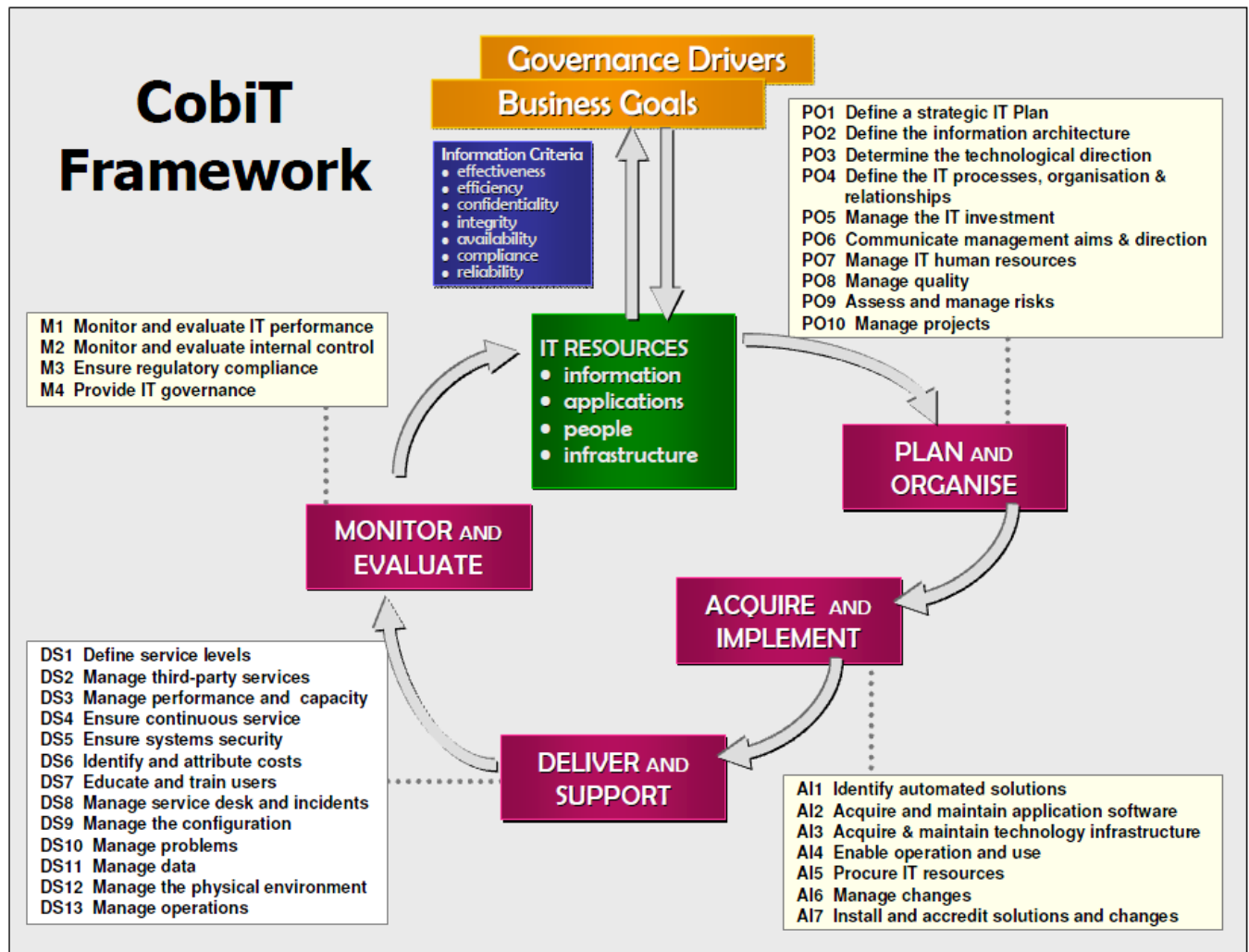


Figure 2: CobiT framework (IT Governance Institute, 2007)

The IT Governance Institute (2007) highlighted some of the benefits of CobiT, which include improved alignment between IT and business, clear ownership and responsibilities, and sharing of a common language between IT and business. Challenges faced by implementing CobiT includes no inter-process relationships

resulting in a silo approach to implementation, not addressing sustainable improvement for future enhancements, setting the expectation of technology to overcome business shortcomings and insufficiently skilled resources (Van Bon and Verheijen, 2006).

2.4.1. Drivers and risks of CobiT

CobiT is usually implemented when there is a business need for IT governance, alignment of IT goals to the organisational goals, standardisation of IT processes, a framework for IT processes to be unified, a need for a quality management system, if there are mergers and acquisitions in progress, to implement cost control within IT, if aspects of IT functions are outsourced or for regulatory compliance (IT Governance Institute, 2006).

However the corresponding risks as a result of CobiT are misalignment within the IT services, poor business support, wastage or missed opportunities, shortfalls between expectations and performance metrics, excessive IT costs, or dissatisfied customers - either business users or external customers (IT Governance Institute, 2006).

2.4.2. Strengths and weaknesses

Several of the strengths and weaknesses of CobiT are discussed in Table 6 below.

Table 6: CobiT strengths and weakness

CobiT Strengths	CobiT Weaknesses
<ul style="list-style-type: none">• CobiT achieves strength in the following elements due to its focus on process improvement and auditing controls:<ul style="list-style-type: none">○ Performance measurement,○ value creation and○ Risk management (<i>Rouyet-Ruiz, 2008</i>)	<ul style="list-style-type: none">• CobiT has strength in alignment between the IT activities and the IT goals. However the weakness in CobiT is that it does not show suitable controls to align business and IT goals (<i>Rouyet-Ruiz, 2008</i>).
<ul style="list-style-type: none">• CobiT focuses on every aspect of IT management and control, ensuring that IT investment maximises the business value obtained (<i>Symons 2006; Wessels and van Loggerenberg, 2006</i>).	<ul style="list-style-type: none">• CobiT guides an organisation to where it wants to be but does not guide the organisation on how to get there (<i>Symons, 2006; Wessels and van Loggerenberg, 2006</i>).
<ul style="list-style-type: none">• CobiT can be audited and complies with regulatory requirements (<i>Symons, 2006; Wessels and van Loggerenberg, 2006</i>).• CobiT is superior in terms of ITIL and ISO 27002 by 69% when it comes to IT audit (<i>Radovanovi, et al., 2010</i>).	<ul style="list-style-type: none">• CobiT fails to address the SDLC and continuous process improvement (<i>Radovanovi, et al., 2010</i>).

2.5. Project Management Body of Knowledge (PMBOK)

The Project Management Institute (PMI) published the Project Management Body of Knowledge (PMBOK) Guide, which identified recognised best practices for project management (Project Management Institute, 2010). Boyce and Milsom (2010) mentioned the intention of PMBOK is not to be a methodology, but rather to be a guide of best practices. PMBOK defines five basic groups, i.e. Initiating, Planning, Executing, Controlling, Monitoring, and Closing. In addition, PMBOK classifies nine main features of PMBOK, namely:

- *Project integration management*: Encompassing the development of a project charter and project plan, managing the project execution, monitoring and controlling the project work, performing integrated change control and closing the project (Project Management Institute, 2010).
- *Project scope management*: This feature includes ascertaining requirements, defining the scope of the project, creating a work break down structure, verifying the scope with the relevant stakeholders and controlling the scope of the project (Project Management Institute, 2010).
- *Project time management*: Involves defining and sequencing the activities of the project, estimating the resource utilisation, developing and controlling the project schedule (Project Management Institute, 2010).
- *Project cost management*: Includes an estimation of the project cost, determining the budget and costs associated to the activities and controlling the costs (Project Management Institute, 2010).
- *Project quality management*: Consists of identifying the quality requirements, ensuring quality assurance, and performing quality control of the activities (Project Management Institute, 2010).
- *Project human resource management*: Identifying the roles and responsibilities of those involved in the project, and acquiring, developing and managing the project team, ensuring adequate skilling (Project Management Institute, 2010).

- *Project communications management*: Covers identifying the project stakeholders and a communication plan, distributing information efficiently, managing expectations and reporting transparent performance (Project Management Institute, 2010).
- *Project risk management*: Determines how to conduct the risk analysis, identify risks which could affect the project by performing the risk analysis both qualitatively and quantitatively, defining a risk mitigation plan, monitoring and controlling the risks (Project Management Institute, 2010).
- *Project procurement management*: Determining the procurement requirements for the project, identifying suitable vendors, and conducting, administering and closing off the procurement (Project Management Institute, 2010).

Details of these PMBOK knowledge management areas are illustrated in Figure 3.

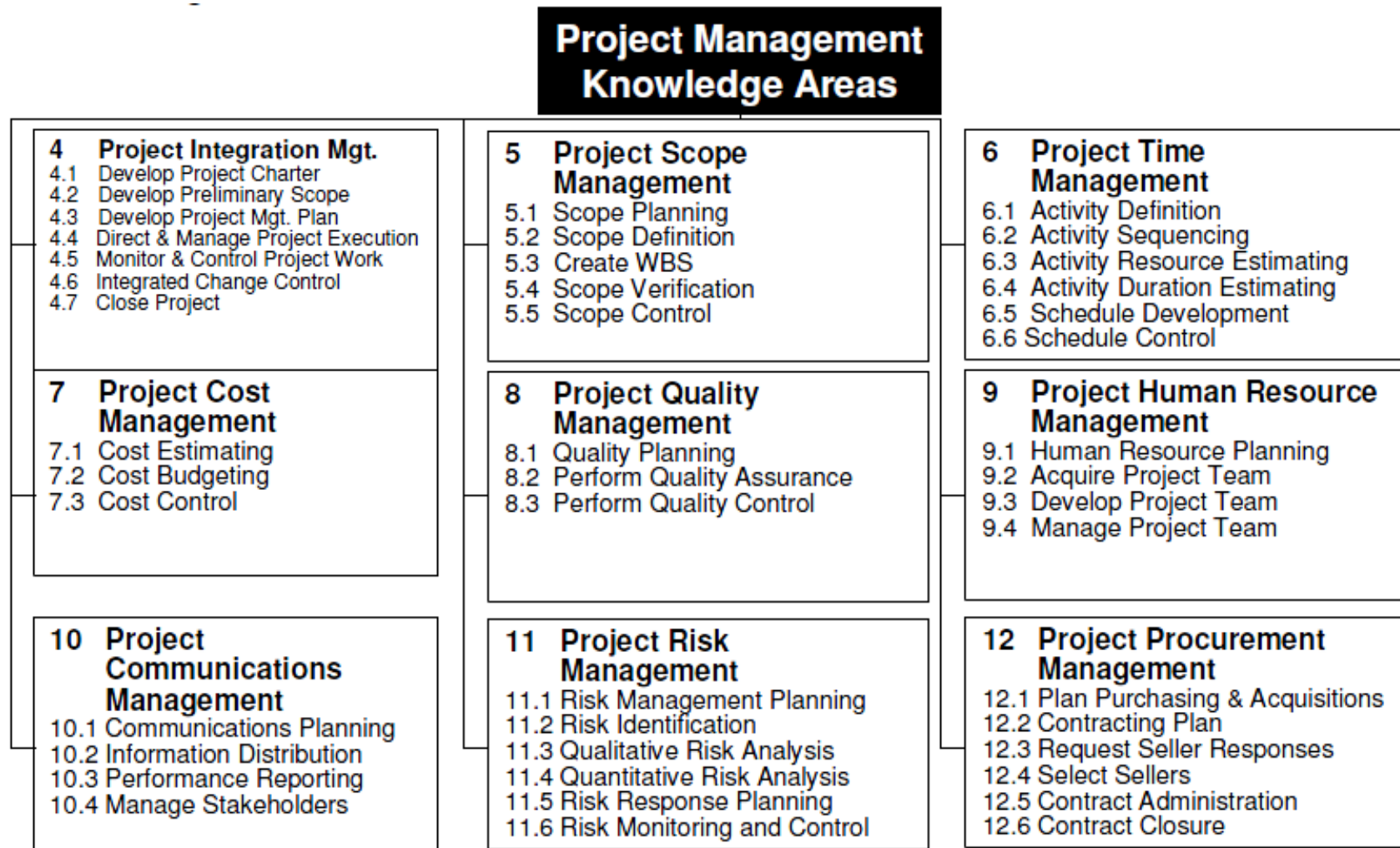


Figure 3: PMBOK framework (Project Management Institute, 2010)

The benefits of PMBOK, according to Boyce and Milsom (2010), are that it creates a standardised set of vocabulary, presents standard definitions, is a combination of all project management knowledge, is easily accessible, and is not prescriptive. This means that the organisations do not need to drastically adjust to accommodate PMBOK. The most common challenge faced by organisations implementing PMBOK is the resistance to change by some employees within the organisation; however this challenge can be overcome if there is support from executive management (Boyce and Milsom, 2010).

2.5.1. Drivers and risks of PMBOK

In order to define data dictionaries for project management and to gain insights into proven best practices, PMBOK should be implemented. However mismanagement of the implementation of PMBOK could result in inconsistent project management practices and an increase in the risk of project failure (IT Governance Institute, 2006).

2.5.2. Strengths and weaknesses

As with the other IT Frameworks, PMBOK has its strengths and weaknesses as defined in Table 7.

Table 7: PMBOK strengths and weaknesses

PMBOK Strengths	PMBOK Weaknesses
<ul style="list-style-type: none">Describes the responsibility of a project manager and interaction with project sponsor (<i>Webber and Webber, 2009</i>).	<ul style="list-style-type: none">PMBOK can become very complex and excessive for small projects (<i>ur Rehman and Hussain, 2007</i>).
<ul style="list-style-type: none">Encourages the use of a monitor process and problem detection process (<i>Webber and Webber, 2009</i>).	<ul style="list-style-type: none">It does not prescribe a specific project lifecycle. Instead it provides the appropriate phases of the lifecycle, thereby creating complexity when it comes to small projects (<i>ur Rehman and Hussain, 2007</i>).
<ul style="list-style-type: none">Details issues surrounding people such as team acquisition, training, recognition (<i>Webber and Webber, 2009</i>)	<ul style="list-style-type: none">Documentation is too generic and needs to be customised by the organisations which could result in misinterpretation (<i>ur Rehman and Hussain, 2007</i>).

2.6. Conclusion

Thus far it can be established that IT frameworks should be selected based on the business drivers, the corresponding risks associated with each implementation, the objectives of the framework, and the set of features aimed at supporting their objectives. However it is important to realise that there are also overlapping objectives and features. This overlap will be discussed in detail in the next chapter. A summary of the theoretical framework is illustrated in Table 8:

BEST PRACTICES FOR IMPLEMENTING MULTIPLE CONCURRENT IT FRAMEWORKS
(CMMI, ITIL, COBIT AND PMBOK)

Table 8: Summary of the theoretical frameworks

Business Drivers	Appropriate IT Framework
<ul style="list-style-type: none"> Defining service processes for the customers of IT and the customers of the organisation Improving the quality of service offered Centralising the help desk operations <p><i>(IT Governance Institute, 2006)</i></p>	<p>ITIL</p> <ul style="list-style-type: none"> Description: A framework which can customer best practices to promote quality computing in the IT industry (Worthen, 2005). Objective: IT Service Management Features: Service Strategy, Service Design, Service Transition, Service Operation, Continual Service Improvement. Risks: Erroneous support processes due to a lack of awareness <p><i>(IT Governance Institute, 2006)</i></p>
<ul style="list-style-type: none"> Business need for IT Governance Alignment of IT goals to the organisational goals Standardisation of IT processes A framework for IT processes to be unified A need for a quality management system If there are mergers and acquisitions in progress A need to implement cost control within IT Aspects of IT functions are outsourced or regulatory compliance <p><i>(IT Governance Institute, 2006)</i></p>	<p>COBIT</p> <ul style="list-style-type: none"> Description: Consists of a set of IT control objectives which assists users with developing and customising appropriate IT governance and control within the organisation (Worthen, 2005). Objective: IT Service Management Levels: Planning and Organisation, Acquisition and Implementation, Delivery and Support, Monitoring and Evaluation Risks: Misalignment within the IT services, Poor business support, Wastage or missed opportunities, Shortfall between expectations and performance metrics, Excessive IT costs, Dissatisfied customers either business users or external customers <p><i>(IT Governance Institute, 2006)</i></p>

BEST PRACTICES FOR IMPLEMENTING MULTIPLE CONCURRENT IT FRAMEWORKS
(CMMI, ITIL, COBIT AND PMBOK)

Business Drivers	Appropriate IT Framework
<ul style="list-style-type: none"> Assessing the maturity of current business processes Improving processes within organisational structures The need for benchmarking processes against other organisations Improve productivity thereby decreasing project risks and reducing software defects. Customer satisfaction <p><i>(IT Governance Institute, 2006)</i></p>	<p>CMMI</p> <ul style="list-style-type: none"> Description: Provides guidelines for improving organisational processes and guidelines on how to manage development, acquisition and maintenance of products or services (Worthen, 2005). Objective: Guidelines for Process Improvement Levels : Initial, Managed, Defined, Quantitatively Managed, Optimising Risks: Ineffective and inefficient approaches for process improvement, Incapability of benchmarking the organisation against other organisations, A decrease on project quality primarily due to poorly defined processes <p><i>(IT Governance Institute, 2006)</i></p>
<ul style="list-style-type: none"> Define data dictionaries for project management To gain insights into proven best practices <p><i>(IT Governance Institute, 2006)</i></p>	<p>PMBOK</p> <ul style="list-style-type: none"> Description: PMBOK is not to be a methodology, rather to be a guide incorporating all the best practices in project management (Boyce and Milsom, 2010). Objective: Project management guidelines Levels: Initiating, Planning, Executing, Controlling and monitoring, Closing Risks: Inconsistent project management practices, An increase in the risk of project failure <p><i>(IT Governance Institute, 2006)</i></p>

Chapter 3: Literature Review

3.1. Introduction

Siviy, Penn & Harper (2005) mentioned that in the understanding of how IT frameworks complement each other, a “general case” should be used. This results in the creation of a customised IT framework. This research study applies a “general case” approach. The literature review details whether or not each of the IT frameworks complement each other and the most appropriate methodology to complement each other. This supports the best practice definition by Bogan and English (1994), which describes a best practice as evolving methodologies that has shown consistent results of superior quality and used as a benchmark within the organisation.

3.2. Considerations for implementing IT frameworks

King III defines IT governance as “the effective and efficient management of IT resources to facilitate the achievement of corporate objectives” (Liell-Cock, et al., 2009: 5). Symons, et al. (2005: 2) adds to the definition of IT governance in that it is simply “the process by which decisions are made around IT investments”.

All organisations have some form of IT governance, however many of these organisations have governance processes that are “ad hoc and informal” due to minimal consistency in their decision making and monitoring of outcomes (Symons, et al., 2005). According to Symons, et al. (2005), good IT governance requires a framework that is made up of three components, namely structure, process and communication. On the contrary, Liell-Cock, Graham & Hill (2009) claimed that measurement, control and direction forms the main framework of IT governance. It is further stated in King III that the organisation’s board is responsible for the IT governance framework that is selected for implementation. In support of King III, Hardy (2006) advised that senior management need to understand IT frameworks in detail, understanding their standards, overlaps, and how they can be used to effectively govern the organisation. By involving senior

executives or management, organisations can avoid a situation whereby the implementation of IT frameworks result in being costly, unfocused on business objectives and treated as a technical guidance (Hardy, 2006).

According to literature, in order to successfully implement any IT framework, the following must also be considered by the organisation as critical success factors:

- Setting up the right tools and techniques for processes for both implementation and future maintenance (Neničková, 2011). In addition, the implementation of these tools and techniques must be aligned to and integrated into the organisation's risk management process and control frameworks (Hardy, 2006).
- Alignment between the business and IT, i.e. connecting between the strategic business objectives and striving towards similar goals (Neničková, 2011).
- Most frameworks provide detailed processes in terms of tracking incidents, identifying problems, etc. However in order for employees to benefit from these processes, they need to follow them. It can be an organisational challenge to change the behaviour of employees to adjust to the respective frameworks (Worthen, 2005). Performance management and tracking to ensure a balance between the outcome which business expects and the outcome which IT expects (Neničková, 2011).
- Transforming the leadership from being a reactive cost into being a proactive, strategic leadership (Neničková, 2011).
- Define clear roles and responsibilities for the implementation process and have a conflict management system in place (Neničková, 2011).
- The implementation of governance frameworks are difficult, can cause disruption in business activities, and has a high risk of failure, particularly if there is a lack of sponsorship, investment and support from senior management (Heston and Phifer, 2009). Commitment and participation of senior management and other stakeholders are crucial, particularly for decision making, management leadership and long term commitment (Neničková, 2011).

- Heston and Phifer (2009) argued that most organisations have limited experience when it comes to implementing governance frameworks. The number of standards that exist is excessive and often redundant, especially as organisations require straightforward frameworks that add value and are effective in terms of delivery and acceptance (Heston and Phifer, 2009).
- Awareness and understanding (such as business purpose and benefits, organisational learning, staff involvement, training and mentoring) of the framework that is being implemented will result in the acceptability of the framework (Neničková, 2011, Hardy, 2006). Furthermore, customising the frameworks to suit the organisational need will make senior management aware of the value IT best practices can contribute to the business (Hardy, 2006).

3.3. ITIL and CobiT as complementary frameworks

Cater-Steel, et al. (2006) argued that CobiT and ITIL are complementary and when combined can provide an organisation with a powerful IT governance and best practices in IT support. The primary reason as to why ITIL and CobiT work well is because ITIL focuses on service management and operations in the IT sector, whereas CobiT focuses on governance and control in the IT space (Cater-Steel, et al., 2006).

CobiT focuses on IT processes based on what organisations need instead of how to achieve what the organisations want. ITIL focuses on best practices on how to get what organisations want by defining comprehensive procedures and processes, i.e. a road map on how to get there (Hill and Turbitt, 2006). ITIL aims to guide the organisation with best practices in aligning business and IT, whereas CobiT aims to guide the organisation in terms of business needs and organisational goals. In addition, CobiT provides management with direction in terms of control, monitoring, benchmarking of critical success factors, key performance indicators and key goal indicators (Hill and Turbitt, 2006).

Implementing governance frameworks are challenging, however transition must be managed via the business priorities (Hill and Turbitt, 2006). According to Hill and Turbitt (2006), ITIL and CobiT are complementary frameworks and can be used concurrently to facilitate management and alignment of the IT and business objectives. A combination of ITIL and CobiT can result in improved quality, better customer services and a cost reduction (Hill and Turbitt, 2006). In a comparison of ITIL and CobiT undertaken by Sahibudin, Sharifi & Ayat (2008), it was noted that ITIL and CobiT are very similar in terms of defined processes.

According to Hill and Turbitt (2006), the CobiT framework can be used as an integrator between practices and strategic business objectives. Due to the generic nature of the processes defined in CobiT, additional specific processes and standards can be easily attached to the CobiT framework, thereby creating a chain of guidance (Hill and Turbitt, 2006). The CobiT framework enables organisations wanting to adopt ITIL to have an effective IT governance framework for the successful implementation of ITIL. In addition, CobiT has the capability to measure the organisation's performance in terms of its people, processes and technology (Hill & Turbitt, 2006).

Wessels and van Loggerenberg (2006) discussed the theoretical benefits of ITIL and CobiT, including:

- Decreased risks, improved efficiency, more control, best practice, clear allocation of roles and responsibilities of IT functions
- Effective management, increased control and standards, lower IT-related costs, prioritised IT initiatives, assurance of expected IT benefits
- Improved product or service quality, more satisfied clients, shareholders' contentment with the organisation's success
- Alignment between IT and business strategies, return on investment, increased organisational success and value and competitive advantage

Regardless of the long list of theoretical benefits identified by Wessels and van Loggerenberg (2006), in practice, organisations could only identify with a handful of these benefits which the materialised at the end of the implementation. It appears that organisations tended to implement IT frameworks with the aim of solving specific problems rather than as a strategic, long-term IT objective to prevent failures (Wessels and van Loggerenberg, 2006).

According to the IT Governance Institute (2006) there are several features of CobiT that are addressed in ITIL. ITIL addresses these features from a “how/who” perspective, whereas CobiT addresses the “what” aspect. These features are illustrated in Table 9.

Table 9: CobiT versus ITIL

CobiT (“what” factor)	ITIL (“how/who” factor)
Plan and Organise <ul style="list-style-type: none"> • PO3 Determine technological direction • PO4 Define the IT processes’ organisation and relationships • PO5 Manage the IT investment 	Service Support <ul style="list-style-type: none"> • Incident management • Problem management • Configuration management • Change management • Release management
Acquire and Implement <ul style="list-style-type: none"> • AI4 Enable operation and use • AI6 Manage changes • AI7 Install and accredit solutions and changes 	Service Delivery <ul style="list-style-type: none"> • Service level management • Financial management for IT services • Capacity management • IT service continuity management • Availability management
Deliver and Support <ul style="list-style-type: none"> • DS1 Define and manage service levels • DS2 Manage third-party services • DS3 Manage performance and capacity • DS4 Ensure continuous service • DS5 Ensure systems security • DS6 Identify and allocate costs • DS8 Manage service desk and incidents • DS9 Manage the configuration • DS10 Manage problems • DS11 Manage data 	

3.4. ITIL and CMMI as complementary frameworks

Ehsan, Malik, Shabbir, Mirza & Bhatti (2010) admitted that CMMI and ITIL clearly differ from each other; however they are not mutually exclusive. For example, they differ in that CMMI focuses on continuous improvement and software process maturity, whereas ITIL focuses on infrastructure development (Ehsan, et al., 2010). On the other hand, they are similar in that they are both built for continuous improvement and follow a structured approach (Ehsan, et al., 2010). ITIL and CMMI can complement each other by implementing the elements of capacity, service level management and release management for hardware from ITIL and elements such as Release management for software from CMMI. CMMI does not address the hardware lifecycle, which is a feature of ITIL version 2 (Ehsan, et al., 2010).

Although ITIL and CMMI are very similar in nature, they can still be integrated, providing organisations with an optimal solution (Ehsan, et al., 2010). For example, Ehsan, et al. (2010) suggests that organisations should have ITIL as a framework in areas which ITIL does well, such as service management, while in other areas where ITIL is weaker, organisations can build CMMI into these processes, such as release management.

This notion is further supported by Dutton's (2010) three driving principles to improve performance, namely to focus on the problems and performance objectives of the organisation, involve the owners of the process and the project, and implement improvements at the speed of business. Based on these principles, Dutton (2010) suggested that Six-Sigma be incorporated into stable CMMI processes which have been implemented. After this, Six Sigma can be used in the CMMI process to ensure efficiency and quality. This can however be a costly and time consuming process; hence the most appropriate approach will be to incorporate CMMI and Six Sigma only when the organisation is at high maturity, i.e. CMMI level 4 or 5 (Dutton, 2010).

Dutton (2010) mentioned that the best practices for ITIL v3 should be incorporated into CMMI for services. However several pitfalls of ITIL have been identified by Dutton (2010), such as guides for improving on infrastructure which is weak in ITIL v3; the framework of ITIL v3 does not provide a basis for long term process improvement as the certification standard in ITIL v3 is out-dated and does not provide guidance for continuously improving the IT service management. These pitfalls can be overcome by features in CMMI, hence integrating these two complementary frameworks. Dutton's (2010) proposal of how to integrate CMMI, ITIL and Six Sigma is demonstrated in the model defined in Figure 4.

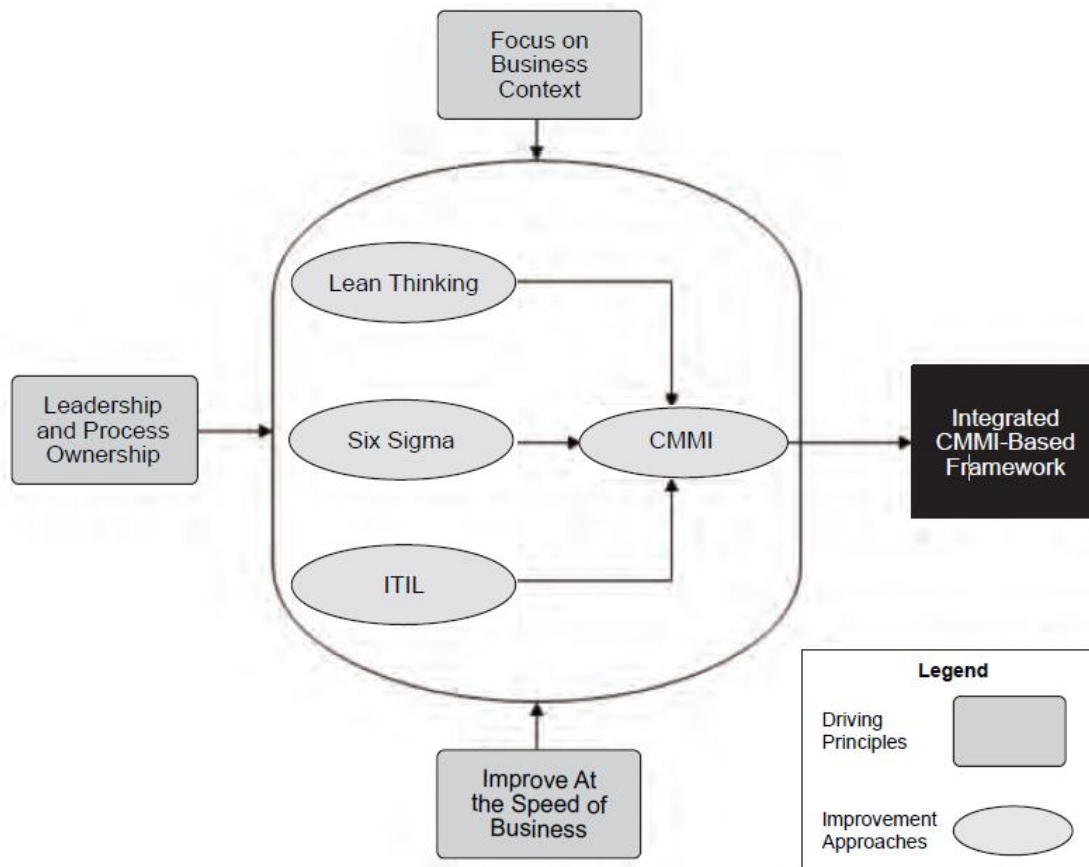


Figure 4: Integrating CMMI, Six Sigma and ITIL (Source: Dutton, 2010)

In a recent white paper by Saxena and Maher (2011), it was concluded that CMMI together with ITIL can offer organisations an improved management focus, a detailed service cycle and an effective implementation. This was based on the differences between ITIL and CMMI as shown in Figure 5.

	ITIL	CMMI-SVC
Scope	• IT services only	• Any type of service
Model	• Collection of good practices	• Well-defined model
Architecture	• 5 Books covering IT Service lifecycle • 4 functions • Roles and responsibilities	• Has 5 Generic Goals with Generic Practices, 24 Process Areas with Specific Goals and Specific Practices
Maturity Model	• Some discussion of Process Maturity Framework	• Embodies Process Maturity Framework
Institutionali-zation	• Not addressed	• Addressed through Generic Goals and Practices
Improvement	• Continual expected; not defined	• Expected, benchmarked through Capability and Maturity Levels
Project Management	• Addresses through reference to other sources: PRINCE 2, PMBOK, etc.	• Explicitly addresses in process areas

Figure 5: A high level difference between ITIL and CMMI-SVC (Source: Saxena and Maher, 2011)

It was suggested that organisations which combine CMMI and ITIL will fulfil their organisational goals (Saxena and Maher, 2011). Saxena and Maher (2011) presented three ways in which CMMI and ITIL can be combined to optimise value obtained from these implementations. These options are discussed below:

- **Option 1:** Use ITIL as the base framework whereby roles, policies etc. are used from ITIL, while process, project and work management processes are used from CMMI-SVC. In addition, the best practices for improvement and evolution should be adopted from CMMI-SVC (Saxena and Maher, 2011).
- **Option 2:** Use CMMI-Dev as the base where the project and work management from CMMI is included and the service processes from ITIL are included (Saxena and Maher, 2011).

- **Option 3:** This option includes both CMMI and ITIL as a base, where service functions are extracted from ITIL and CMMI is used for addressing process improvement (Saxena and Maher, 2011).

3.5. ITIL and PMBOK as complementary frameworks

Budiman (2008) described the complementary relationship that exists between ITIL and PMBOK. Despite ITIL and PMBOK being complementary, Budiman (2008) mentioned some of the differences and similarities between ITIL and PMBOK which are indicated in Table 10.

Table 10: Differences and similarities between ITIL and PMBOK

	ITIL	PMBOK
DIFFERENCES	<ul style="list-style-type: none">• Continuous Service Management	<ul style="list-style-type: none">• Temporary until projects are delivered
	<ul style="list-style-type: none">• Runs till the end of life	<ul style="list-style-type: none">• Services are definitive as projects have a lifespan
	<ul style="list-style-type: none">• Operation	<ul style="list-style-type: none">• Project aimed at achieving defined objectives
SIMILARITIES	<ul style="list-style-type: none">• Service Strategy	<ul style="list-style-type: none">• Initiating
	<ul style="list-style-type: none">• Service Strategy	<ul style="list-style-type: none">• Planning
	<ul style="list-style-type: none">• Service Design	<ul style="list-style-type: none">• Executing
	<ul style="list-style-type: none">• Service Transition	
	<ul style="list-style-type: none">• Service Operation	
	<ul style="list-style-type: none">• Continuous Improvement	<ul style="list-style-type: none">• Monitoring and Control
		<ul style="list-style-type: none">• Closing

Ehsan, et al. (2010) concluded that ITIL and PMBOK share tools and techniques, and both have introductory and advanced certifications. However, PMBOK certifications have strong educational and experience requirements, unlike ITIL (Ehsan, et al., 2010). Furthermore, Ehsan, et al., (2010) mentioned that ITIL and PMBOK are similar in that they are both aimed at professionalising their respective fields, both are prescriptive rather than descriptive, both are generally well accepted by organisations, both contain a people aspect, and both are scalable and adaptable. The differences between PMBOK and ITIL include the fact that ITIL is focused on service management and operations whereas PMBOK is focused on project management, PMBOK has an explicit code of ethics unlike ITIL, and ITIL places an emphasis on process maturity whereas PMBOK does not (Ehsan, et al., 2010).

As mentioned previously, ITIL should be implemented as a project where PMBOK is the project management approach leveraging off its code of ethics and guidelines, whereas ITIL is the continuous service improvement project (Marquis, 2006; Ehsan, et al., 2010). Furthermore, the project selection and change management guidelines can be elicited from PMBOK whereas operational and service management guidelines can be elicited from ITIL (Ehsan, et al., 2010).

3.6. CMMI and COBIT as complementary frameworks

Praeg and Spath (2011) stated that CMMI for services and CMMI for acquisitions are complementary to CobiT, in that these aspects are not adequately covered by CobiT. Both CMMI and CobiT include a maturity model, however the CMMI standards include goals and procedures which are not part of the CobiT maturity model (Praeg and Spath, 2011).

Table 11 defines the aspects that are common between CobiT and CMMI. CMMI covers these aspects in detail, even though it is focused on system development having limited coverage of IT governance and management issues (IT Governance Institute, 2006).

Table 11: Differences and similarities between CobiT and CMMI

CobiT	CMMI
Plan and Organise <ul style="list-style-type: none"> PO7 Manage IT human resources PO8 Manage quality PO9 Assess and manage IT risks <i>(IT Governance Institute, 2006).</i>	Process management <ul style="list-style-type: none"> Organisational process focus Organisational process definition Organisational training Organisational process performance Organisational innovation and deployment <i>(IT Governance Institute, 2006).</i>
Acquire and Implement <ul style="list-style-type: none"> AI2 Acquire and maintain application software AI6 Manage changes AI7 Install and accredit solutions and changes <i>(IT Governance Institute, 2006).</i>	Project Management <ul style="list-style-type: none"> Project planning Project monitoring and control Supplier agreement management Integrated project management for IPPD (or integrated project management) Risk management Integrated teaming Integrated supplier management Quantitative project management <i>(IT Governance Institute, 2006).</i>
Deliver and Support <ul style="list-style-type: none"> DS7 Educate and train users. DS9 Manage the configuration. DS10 Manage problems. DS11 Manage data. <i>(IT Governance Institute, 2006).</i>	
Monitor and Evaluate <ul style="list-style-type: none"> ME1 Monitor and evaluate IT performance <i>(IT Governance Institute 2006).</i>	Engineering <ul style="list-style-type: none"> Project planning Project monitoring and control Supplier agreement management Integrated project management for IPPD (or integrated project, management) Risk management, integrated teaming Integrated supplier management Quantitative project management <i>(IT Governance Institute, 2006).</i>

CobiT	CMMI
	Support <ul style="list-style-type: none"> • Configuration management • Process and product quality assurance • Measurement and analysis • Organisational environment for integration • Decision analysis and resolution • Causal analysis <i>(IT Governance Institute 2006).</i>

3.7. CMMI and PMBOK as complementary frameworks

Ehsan, et al. (2010) compared PMBOK and CMMI with each other. Table 12 below demonstrates the similarities and differences according to Ehsan, et al. (2010).

Table 12: Differences and Similarities between CMMI and PMBOK (Source: Ehsan et al 2010)

CMMI	PMBOK
<ul style="list-style-type: none"> • Addresses project management of engineering endeavours. Addresses larger organisations composed of engineering projects 	<ul style="list-style-type: none"> • Address project management without addressing the type of project or directly addressing the larger organisations
<ul style="list-style-type: none"> • CMMI supports organisational process improvement for achievement of maturity/capability models 	<ul style="list-style-type: none"> • PMBOK supports training project manager for PMP certifications
<ul style="list-style-type: none"> • Requirement management / Scope control 	<ul style="list-style-type: none"> • Requirement management / Scope control
<ul style="list-style-type: none"> • Project planning 	<ul style="list-style-type: none"> • Project planning
<ul style="list-style-type: none"> • Managing and controlling project execution 	<ul style="list-style-type: none"> • Managing and controlling project execution
<ul style="list-style-type: none"> • Quality assurance 	<ul style="list-style-type: none"> • Quality assurance
<ul style="list-style-type: none"> • Supplier management 	<ul style="list-style-type: none"> • Supplier management
<ul style="list-style-type: none"> • Risk management 	<ul style="list-style-type: none"> • Risk management
<ul style="list-style-type: none"> • Measurement 	<ul style="list-style-type: none"> • Measurement
<ul style="list-style-type: none"> • Grey areas in CMMI • Human Resource management 	<ul style="list-style-type: none"> • Grey areas in PMBOK • Configuration Management • Casual analysis

- Generic practices

According to Ehsan, et al. (2010), the recommendations of how PMBOK can supplement CMMI are detailed below:

- The Project Charter can be used in CMMI projects.
- Guidance on planning, time management, performance and control, change control management, HR planning, skilling of employees, risk management, procurement management can be adapted from PMBOK into CMMI processes.

Conversely, Ehsan, et al. (2010) provided recommendations on how CMMI can supplement PMBOK:

- The engineering best practices for organisations, process management, data management and decision analysis from CMMI can be incorporated into PMBOK processes.

3.8. CobiT and PMBOK as complementary frameworks

According to the IT Governance Institute (2006), PMBOK defines best practices and techniques for sound project management, however its focus is primarily on IT related projects. In addition, PMBOK does not cover aspects of IT management and IT governance. CobiT and PMBOK cannot be directly related as there are not many similar objectives, as illustrated in Figure 6 below:

Figure 12—PMBOK Processes Mapped to High-level COBIT Processes													
COBIT 4.0 Processes and Domains	1	2	3	4	5	6	7	8	9	10	11	12	13
Plan and Organise	-	-	-	-	-	-	-	-	0	+			
Acquire and Implement	-	0	-	-	0	-	0						
Deliver and Support	-	-	-	-	-	-	-	-	-	-	-	-	-
Monitor and Evaluate	0	-	-	-									

- (+) Significant match (more than one process was fully mapped to a CoBiT process)
 (o) Minor match (more than five processes were partially mapped to a CoBiT process)
 (-) Unrelated focus (less than five processes were partially mapped to a CoBiT process)
 (i) CoBiT control process does not exist.

Figure 6: Comparisons between CobiT and PMBOK (Source: IT Governance Institute, 2006)

Only a handful of features are common between CobiT and PMBOK. According to the IT Governance Institute (2006), PMBOK address these features of CobiT relatively well as illustrated below.

Table 13: Similarities between CobiT and PMBOK (Source: IT Governance Institute, 2006)

CobiT	PMBOK
Plan and Organise <ul style="list-style-type: none">• PO5 Manage the IT investment• PO8 Manage quality• PO9 Assess and manage IT risks• PO10 Manage projects <i>(IT Governance Institute, 2006)</i>	Knowledge Areas <ul style="list-style-type: none">• Project integration management• Project scope management• Project time management• Project cost management• Project quality management• Project human resource management• Project communications management• Project risk management• Project procurement management <i>(IT Governance Institute, 2006)</i>
Acquire and Implement <ul style="list-style-type: none">• AI5 Procure IT resources <i>(IT Governance Institute, 2006)</i>	

3.9. Conclusion

In the analysis performed between ITIL, CobiT, PMBOK and CMMI, it is apparent that all the frameworks are complementary. Arraj (2010) acknowledged that ITIL can be used in conjunction with CobiT, Six-Sigma, Togaf or ISO 27000. Even though CMMI and ITIL are strong in software and hardware development respectively, organisations still face the challenge of inconsistencies, integration, overlap and conflicting demands when implementing the two models (Ehsan, et al., 2010).

Thus far from the literature review, it can be concluded that integrating multiple IT frameworks can be beneficial to organisations in terms of efficiency and waste reduction (Cater-Steel, et al., 2006), however it is in the integration of multiple IT frameworks

where organisations experience difficulties with the complexity and interpretation of these models (Pardo, et al., 2011: 1).

Below is a summary of the complementary IT frameworks:

- ITIL and CobiT can be integrated as ITIL focuses on service management and operations in the IT sector, whereas CobiT focuses on governance and control in the IT space (Cater-Steel, et al., 2006).
- ITIL and CMMI can be integrated by implementing the elements of capacity, service level management and release management for hardware from ITIL and elements such as Release management for software from CMMI (Ehsan, et al., 2010).
- ITIL and PMBOK can be integrated where PMBOK is the project management approach and ITIL is the continuous service improvement project (Marquis, 2006; Ehsan, et al., 2010).
- Similarly, PMBOK can be integrated with CMMI (Ehsan, et al., 2010).
- A summary of the complementary IT Frameworks are illustrated in Table 14.

Table 14: Summary of Complementary IT Frameworks

Leveraging of multiple IT frameworks concurrently <i>(ITIL, CMMI, Six-Sigma, PMBOK and CobiT)</i>				
	ITIL	CobiT	CMMI	PMBOK
ITIL	-	✓	✓	✓
CobiT	✓	-	✓	✓
CMMI	✓	✓	-	✓
PMBOK	✓	✓	✓	-

Chapter 4: Research Methodology

4.1. Introduction

This chapter details precisely how the research was conducted in order to resolve the problem stated earlier. The problem is reiterated in this chapter to illustrate the intent of the research. The research design is described in detail, i.e. the methodology used and why. The detail of the study in terms of population, sample size, measurement instrument, administrative procedure and analysis of data, is provided in the methodology section. This chapter ends with the limitations and ethical issues which were considered as part of this research.

4.2. Research problem and sub-problems

How to best implement multiple IT frameworks concurrently.

- How does each model complement the other models?
- What are the best practices for concurrent usage of the IT frameworks?

4.3. Research methodology

Leedy and Omrod (2010) defined qualitative research as research that entails looking at the qualities/characteristics of the variables of analysis which cannot be easily reduced to numbers. According to Lee (1999), the four main underlying themes of qualitative research design includes:

- Occurrence in natural setting
- The participant's perspective
- The designs are flexible and reflexive
- Methods of data extraction and analysis are not standard

Furthermore, Lee (1999: 38) discussed when qualitative research is most applicable, which is when the research is aimed at “describing, interpreting, and explaining”.

This study is aimed at describing the phenomena of multiple IT frameworks, interpreting the options for implementing multiple concurrent IT frameworks and then explaining the best practices which organisations should follow when implementing this phenomena.

Leedy and Omrod (2010) stated that the most suitable qualitative research design for learning more about inadequately understood phenomena is? The following qualitative research design strategies were considered in determining the most appropriate research design.

Table 15: Research Strategies Considered (Source: Leedy and Omrod, 2010)

Research Design	Objective	Suitability
Case Study	Evaluation of a rare phenomenon or understanding a situation in detail.	Suitable This research report is aimed at studying a rare phenomenon of best practices for implementing multiple IT frameworks concurrently.
Ethnography	Evaluation of a group that shares common culture.	Not Suitable The objective of this approach is to study how the behaviour of people reflects in their culture.
Phenomenology	Understanding an individual's perspective of an experience / relationship as opposed to the event as it exists.	Not Suitable This research understands the proxy's perspectives of the existing IT frameworks within the respective organisations in conjunction with lessons learnt and challenges faced.
Grounded Theory	Natural iterative data collection, it typically starts with the data and then using the data a theory is developed.	Not Suitable The research study started from understanding literature and then gathering data to guide the best practices.

Research Design	Objective	Suitability
Content Analysis	Aimed at identifying specific characteristics or a systematic analysis of the contents of a theme.	Not Suitable The characteristics initially were not clear from the start. Defining these characteristics was part of the data to be gathered.

This resulted in the case study approach being selected as being the most suitable for this research study. Yin (1981) mentioned three different types of case study research, namely exploratory, descriptive and explanatory. The five critical components which are essential for case studies are the research question, applicable propositions, the unit/s of analysis, the logical linking of the data to the applicable propositions and the criteria for interpreting the results (Yin, 1994; Lee, 1999). These five components will be discussed in detail in the design section below.

The main advantage of case studies is that they provide detailed information by enabling the researcher to present the data collected, via multiple methods, to detail a complete story (Noor, 2008). As with any research methodology, there are a few limitations associated to case studies such as the length of case studies due to the in-depth detail, as well as the lack of scientific rigour and reliability (Noor, 2008; Yin, 1981).

4.4. Research design

4.4.1. Sample

According to Diamantopoulos and Schlegelmilch (2004: 10), “the totality of entities in which we have an interest” is often referred to as the population. In South Africa, large enterprises employ more than 200 workers, have a turnover of more than R64 million (US\$9 million) and have a gross asset value of more than R23million (US\$3.3million) (Ogbor, 2009). The population, i.e. the total entities relevant to this research study, includes:

- Large organisations that fall within the South African Private Sector, based in Johannesburg, irrespective of the industry.
- Organisations that use IT strategically to achieve organisational goals rather than organisations that view IT as a support only function.
- Organisations that have some kind of process when delivering IT projects or initiatives, irrespective of whether their defined process is global best practice or customised processes based on experience and historical learning's.

The sample unit will be organisations. Large organisations where the researcher established a point of contact, participated in this research. Hence a non-probability sampling method was used where the selection of the organisations was left at the discretion of the researcher and no explicit scientific model was used to determine the sample. These organisations fell within the South African Private Sector (Diamantopoulos and Schlegelmilch, 2004). Enterprise architects were used as the proxies into these organisations.

For the purposes of this research, organisations that had implemented IT frameworks were given the opportunity to participate. This resulted in organisations being selected with a specific objective in mind, hence a purposive sample was the type of non-probabilistic sampling procedure used (Diamantopoulos and Schlegelmilch, 2004).

According to Leedy and Omrod (2010), a collection of case studies is suitable for a detailed understanding about a phenomenon. Only three organisations volunteered to participate in this research study, resulting in the final sample size being three large organisations in the South African private sector.

4.4.2. Measurement instrument

Collis and Hussey (2009) indicated that one of the methods to collect data from selected participants is through interviews. The researcher selected interviews as the method of data collection, as they are typically used when the researcher has the objective of understanding a concept, opinions, attitudes and feelings on a phenomenon (Collis and Hussey. 2009). The researcher chose semi-structured interviews as the measurement instrument due to the following considerations:

- Questions are planned prior to the interview, however the sequence of the questions asked may not necessarily be the same for all cases (Runeson and Höst, 2009).
- Semi-structured interviews allow for “improvisation and exploration” of the phenomena (Runeson and Höst, 2009).
- Semi-structured interviews are considered as reliable in terms of being structured with standardised questions, thereby decreasing the variability amongst the interviews (Hersen, Turner & Beidel, 2007).

Table 16 discusses the list of interview questions which were developed by the researcher and further elaborates how these questions addressed the key research questions. In order to ensure validity of the interview, the questionnaire was piloted in two independent large organisations resulting in a few minor adjustments.

BEST PRACTICES FOR IMPLEMENTING MULTIPLE CONCURRENT IT FRAMEWORKS
(CMMI, ITIL, COBIT AND PMBOK)

Table 16: Interview Questions addressing Key Research Questions

Key Research Question Addressed	Corresponding Interview Question/s
Gaining context of the Organisation <p>It is important to understand the organisational environment in terms of the IT frameworks that are currently in use.</p> <p>Furthermore, understanding the reason for selecting the chosen IT framework will illustrate whether or not the organisation chose the right model for the right reason or whether there were other motives for the model of choice.</p>	<p>Q 1. What are the current IT frameworks utilised within the organisation?</p> <ul style="list-style-type: none"> a. Why did the organisation select the respective framework? b. What did the organisation want to achieve by implementing this framework? c. Was the organisation successful? <p>Q 2. Does the organisation have multiple IT frameworks? If so, list them.</p> <p>Q 3. Were multiple IT frameworks implemented concurrently? Or were these frameworks implemented individually at different times? (If yes, then ask questions 4 and 5; If no, then ask questions 6, 7, 14)</p>
How does each model complement the other model? <p>In the case where multiple frameworks were implemented, their approach will be beneficial in terms of best practice.</p>	<p>Q 4. Did the organisation find duplication / overlap or contradictions in the methodologies and processes defined?</p> <ul style="list-style-type: none"> Q 4.1. How was the duplication / overlap or contradictions handled? OR Q 4.2. Do you think implementing multiple IT frameworks is a good idea or not? Why? <p>Q 5. What do you recommend in terms of using multiple IT frameworks concurrently?</p>

BEST PRACTICES FOR IMPLEMENTING MULTIPLE CONCURRENT IT FRAMEWORKS
(CMMI, ITIL, COBIT AND PMBOK)

Key Research Question Addressed	Corresponding Interview Question/s
<p>What are the best practices for concurrent usage of the IT Frameworks?</p> <p>If organisations have implemented any IT frameworks, understanding the challenges they faced, lessons learnt, their experience in terms of single or multiple frameworks, the approach they followed and how they dealt with challenges will contribute to the best practices.</p>	<p>In terms of current frameworks implemented in the organisation:</p> <p>Q 6. Highlight the main challenges faced and how where they dealt with.</p> <p>Q 7. Highlight the main lessons learnt.</p> <p>Q 8. Did the organisation face any people challenges?</p> <p>Q 9. If you have to redo the exercise, what would be done differently?</p> <p>Q 10. In the opinion of the organisation, what best practices would the organisation apply with the implementation of IT frameworks?</p>
<p>How to best leverage of multiple IT frameworks concurrently?</p> <p>One of the researcher's approaches into determining how to best implement the IT frameworks was to use the strengths of each model to support the weaknesses of the other models. Finally, the researcher would like to understand whether or not the organisations would consider the implementation of multiple IT frameworks. If this is not an option, it is important to understand why the organisation has that view. This will inform the research as to whether or not the contribution will make an impact to the selected organisations or not.</p>	<p>Q 11. Do you (the enterprise architect) believe that the strengths of a model support the weaknesses of another? What is your (the architect's) opinion of this concept?</p> <p>Q 12. If "No" for 3, will the organisation consider implementing multiple frameworks at the same time? Why?</p> <p>Q 13. Who will be the primary stakeholders of this decision?</p> <p>Q 14. If Yes for 14, how would the organisation implement these frameworks concurrently?</p>

4.4.3. Administering procedure

- The target audience was approached via email and given insight into the nature of the research, the extent of their involvement, a guarantee that all responses would be treated with confidentiality, and a confidentiality letter from the researcher's institution.
- Contact details to facilitate communication between the participant and the researcher were included in the initial email.
- Once the participant had agreed to participate in the study, a semi-structured interview was arranged and conducted. The interview questions were shared with the interviewee prior to the interview, to aid in the interviewee preparation.
- Upon completion of the interviews, the data was analysed and reports of these case studies for the participating organisations were generated.
- The participants were then given a copy of the summary of the interview and any conclusions made by the researcher after the interview, and were requested to confirm that the objectiveness of the information was displayed according to the interviewee's intention.

4.4.4. Analysis of data and criteria for interpreting the results

According to Runeson and Höst (2009), the main objective of the analysis is to formulate conclusions from the data collected where the reader is able to follow the path taken to derive these conclusions. Yin (1994) suggested that analysis of data in the case of a case study consists of examining, categorising and tabulating the data to address the initial problem. The analysis must be performed in a manner that is not biased towards the results (Tellis, 1997). Analytical techniques such as pattern matching can be used in the analysis of the data (Yin, 1994; Tellis, 1997).

Leedy and Omrod (2010) mentioned the steps which are typically followed when analysing data obtained from case studies, namely:

- Organisational details regarding the case, i.e. the facts about the case within the organisation.
- The outcome of the interview is transcribed and categorised into meaningful groups.
- Interpretation of the data, i.e. the meaning of the data and the factors that contributed to the case.
- Identification of patterns, trends, etc. by determining the underlying themes within and across the participating organisations.
- Synthesis and generalisations are made by drawing conclusions. This is typically performed by triangulation where the same conclusion can be made via the different case studies.

The procedure followed for analysing the data obtained from the semi-structured interviews was as illustrated in the figure below.

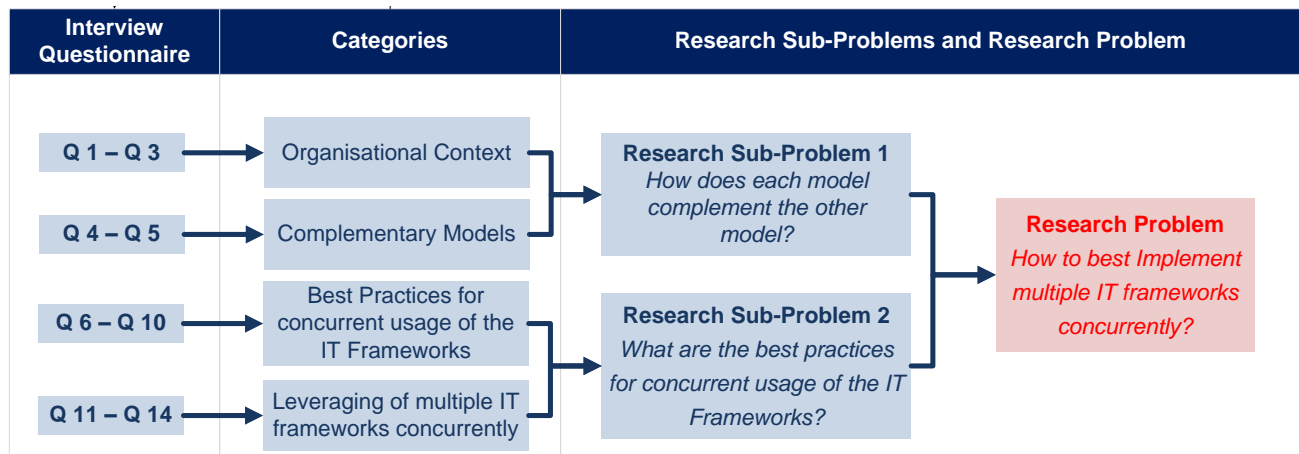


Figure 7: Analysis Process for interpreting the data collected

4.5. Ethical considerations

Leedy and Omrod (2010) discussed four categories of ethical issues which needed to be considered as part of this research. These four categories, namely protection from harm, informed consent, right to privacy and honesty with professional colleagues, were considered as part of this research (Leedy and Omrod, 2010).

Some of the ethical factors mentioned by Runeson and Höst (2009) included:

- **Informed Consent:** The participants of this research explicitly agreed to participate in this study.
- **Confidentiality:** The confidentiality of the responses from the participants is of the utmost importance, especially in terms of reputational risk. This risk was mitigated by following the principles defined by Leedy and Omrod (2010) in the initial communication to the participants. The initial communication covered the following aspects:
 - The nature of the research.
 - The extent of the participants' involvement.
 - A clause stating that "participation is voluntary and can be terminated at any time, without penalty" (Leedy and Omrod, 2010: 102).
 - A guarantee that all responses would be treated with confidentiality and anonymously. A confidentiality letter from the researcher's institution was included in the communications.
 - Contact details to facilitate communication between the participant and the researcher.
 - Contact details in the event of any queries.
 - The opportunity to confirm conclusions made by the researcher after the interview via a summarised version of the results.
 - In addition, the interview was conducted in a manner that portrays the values of respect for the organisation, the participant and the results.

- **Feedback:** Feedback was provided to the participants of this research before being included in this research report. It was requested that the participants verify the contents to ensure the validity of the case study.

4.6. Limitations

Interviews, like any other methodology, have their limitations. These include the cost of the procedure to the researcher, potential interviewer bias, the candidate is not able to respond in too much detail, a fair amount of preparation is involved and the questions need to be carefully worded (Covington, 2008; Tellis, 1997).

Organisations in the vicinity of Johannesburg were reluctant to participate in this research as they were anxious about disclosing confidential information regarding their internal governance processes; they were wary of jeopardising their competitiveness.

The Accenture frameworks discussed are implemented for their clients, however Accenture makes use of proprietary frameworks internally which are aligned to these and other leading practice industry frameworks. Due to confidentiality between Accenture and their clients, specific client references have not been disclosed (Zachar, 2011).

4.7. Conclusion

The study used a qualitative research approach which contributed towards achieving the aim of the study, i.e. to describe, interpret and explain the phenomena of multiple concurrent IT frameworks. The case study methodology was used and semi-structured interviews facilitated data collection. Purposive sampling was considered when organisations were approached and only organisations that could be affiliated to the defined IT frameworks of this study were considered. The procedure of data analysis was defined which will result in the best practices being determined.

Chapter 5: Research Results

5.1. Introduction

This chapter examines the sample data collected through the personal interviews. Initially, the participating organisations were profiled and compared to each other in terms of revenue and number of employees. The interviews were transcribed in the results section. Thereafter, the research methodology defined in the previous chapter was used to analyse the data. This chapter concludes with a discussion of the results obtained from the interviews.

5.2. Profile of respondents

Three large organisations volunteered to participate in this research study, namely Sun International, Accenture and First National Bank. These organisations are global organisations, operating in the South African Private Sector. However each organisation functions in different industries.

Globally, Sun International operates in the hotel, resort and casino industry, netting an annual revenue of more than R7 000 million. Approximately 84% of their revenue is generated in South Africa (Annual Report, 2010). Globally they employ more than 10 000 employees, and nationally approximately 7 900 employees. Sun International exists across South Africa, Chile, Swaziland, Botswana, Zambia and Namibia (Annual Report, 2010).

First National Bank (FNB) is a division of First Rand Limited and is one of the largest banks in Southern Africa, servicing more than 6 million customers nationally (FNB Website, 2011). Nationally, FNB employs more than 28 510 employees, is accessible to their customers via their 374 branches, agencies and mobile branches, as well as 6 311 retail ATMs and mini-ATMs, whilst annually FNB nets more than R3 300 million in revenue (FNB Website, 2011).

The third case study was Accenture, a global management consulting, technology services and outsourcing company, which nets an annual revenue of more than \$21 billion. Globally, they employ more than 223 000 employees across Africa, Asia, America, Europe and the Middle East. Accenture offers its services across 19 industries in five operating groups as illustrated below (Taylor, 2011). In South Africa, Accenture employs more than 1 600 employees, spans 17 industries across the five operating groups and nets approximately R15 400 million annually (Taylor, 2011).

Of the organisations that participated in this research, the researcher observed that FNB had the largest number of employees, however achieved the lowest annual returns when compared to Accenture and Sun International. On the other hand, Accenture operated in the widest range of industries and produced the highest annual revenue, even though their head count was the least amongst the three participants. These differences are illustrated in the pie charts below.

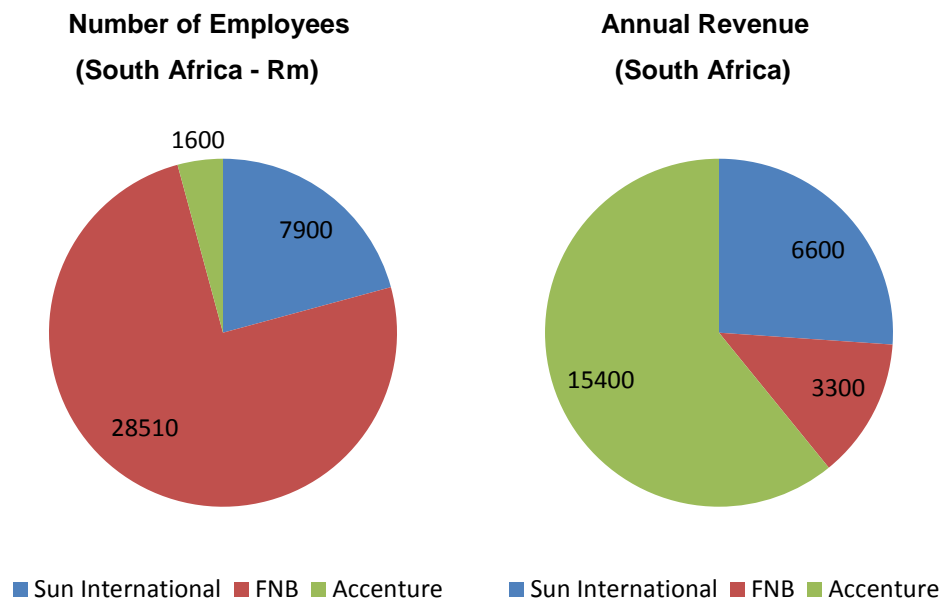


Figure 8: Statistical comparison between the three case studies

5.3. Results from the semi-structured interviews

This section transcribes the results from the semi-structured interviews and observations made during the interview process. The questions were designed to gain further insights into the participants' use of IT frameworks and how they use these models within the organisations. The transcription of the results have been categorised into four main categories, namely:

- Organisational Context
- Complementary Models
- Best Practices for concurrent usage of the IT frameworks
- Leveraging of multiple IT frameworks concurrently

5.3.1. Organisational context

5.3.1.1. Accenture

Accenture is made up of several businesses, namely management consulting, technology consulting and Technology Growth Platform (TGP). TGP includes integration and outsourcing systems. Accenture uses an internal methodology, namely, Accenture Delivery Methods (ADM) which includes a project management methodology. This methodology is the culmination of Accenture's collective experience across its global activities and hence departs from vanilla methodologies such as PMBOK. Accenture Global Delivery centres make use of the ADM methodology and have achieved a CMMI maturity level of 3 to CMMI level 5. Accenture has an internal governance structure in place which is aligned to CobiT. ITIL is used in the Accenture outsourcing space, particularly for infrastructure outsourcing, application outsourcing and help desk outsourcing. These areas are fully ITIL compliant. Accenture has a strong focus on efficiency, processes and back office functions, but their delivery model is consulting and outsourcing, hence Six-Sigma features in the back office support functions and is not part of their usual delivery structures (Zachar, 2011).

Accenture believes that CMMI brings a certain level of rigour and industrialisation to their development process, i.e. throughout the SDLC phases starting with the planning phase and culminating in deployment. This maturity ensures end result predictability. Accenture has an off-shoring resource model in place where development happens in a different country (and time zone) to that of the end customer organisation. Being CMMI compliant ensures that business requirements are documented accurately, at the right level and can be correctly interpreted - particularly when sent to off-shore delivery centres for development. The quality of these documents contributes to the predictability of the delivery. However Accenture believes that implementing processes at a CMMI level 4-5 can at times be unnecessary in smaller organisations where all the development teams are co-located. Therefore Accenture deems that the investment and rigour of CMMI becomes essential when an off-shoring model is employed (Zachar, 2011).

5.3.1.2. FNB

First National Bank (FNB) will only consider IT frameworks in event of a problem or a business need. “If it ain’t broke we don’t try to fix it” is the approach by FNB Commercial towards IT frameworks. Software Development Lifecycles (SDLCs) were only formalised when problems were being experienced regarding the vagueness of the business requirements, resulting in inaccuracy of the relevant designs (Hassem, 2011).

FNB hosts a partial implementation of ITIL in its environment. PMBOK, Six-Sigma, CobiT and CMMI are not implemented within IT environments. For example, FNB’s opinion of CMMI is that it is a tool for determining what processes and documentation an organisation has in place and provides the organisation with the ability to gauge the probability of delivering a particular project. FNB believes they are maturity level 2 or 3, however they have a much higher delivery rate, particularly when they compare themselves to CMMI Level 5 companies.

FNB also believes that these models are competitive, subjective and academically well defined, however from a practicality perspective, these models are impractical and infeasible. Implementing multiple frameworks concurrently is not an option for FNB, as frameworks are only considered in the event of a problem (Hassem, 2011).

There is no central project office within FNB, resulting in the project managers using non-standardised mechanisms for performing their tasks. The project managers within FNB are viewed as project administrators and the key deliverables of project managers such as, according to PMBOK, stakeholder analysis and needs analysis, are defined by the business owner. Approximately 80% of the projects within FNB are executed in this manner, whereby the business owner ultimately drives the deliverables. The remaining 20% of the projects that span across the organisation are executed in a formal manner where the processes of the customised FNB Project Management Process align to PMBOK (Hassem, 2011).

5.3.1.3. Sun International

In 2004 Sun International's IT Department (SunIT) went through a restructure, where the drive was to change the relationship between SunIT and the rest of the business from being a support function to being more strategic, i.e. a valued business partner delivering operational excellence. Restructuring of SunIT included enhancing the skills within the IT division to include, amongst other, process management skills, individuals with specific business analyst skills, stronger project management and stronger architecture skills (Van den Heever, 2011).

With the appointment of specialists into the newly created positions, these specialists brought industry best practice and knowledge of the various frameworks available. These frameworks were then driven and implemented based on the specific specialist's focus to implement that specific framework. To a certain extent, the more passion a specialist had for a model / framework, the more that particular framework was driven to implementation.

This resulted in a situation where the various properties, who were on the receiving end of the implementations of the various frameworks, were forced to decipher how these different frameworks integrated into their day-to-day activities. Eventually SunIT decided to develop a customised IT framework called SunIT Maturity Framework, which was specific to its business needs. The objective of the SunIT Maturity Framework was to ensure consistent implementation of the 'SunIT way of working' and to facilitate communication between head office and its properties (Van den Heever, 2011).

IT frameworks that contributed to the SunIT Maturity Framework were determined based on the experiences and knowledge of the specialists in each of the areas. In addition, the SunIT Framework needed to be linked to organisational goals and target specific maturity levels. Maturity includes the softer aspects of the organisation, for example the willingness to adapt and habitually use the new implementation, i.e. becoming the 'SunIT way of working'. The SunIT Maturity Framework comprises of the following frameworks: CobiT, ITIL, Togaf, PMBOK, BABOK, King III, Zachman and SDLC (Van den Heever, 2011).

The implementation of the Sun IT Maturity Framework began in 2007 and is still in progress. This time lag is due to projects taking higher priority than the maturity framework initiative. This framework was intended to create consistency across the organisation whilst incorporating best practice, improving on the quality of service and optimising the value offering to the business divisions, i.e. the Gaming and the Resorts divisions. The SunIT Maturity Framework was implemented as an IT initiative rather than a best practice initiative across the organisation (Van den Heever, 2011).

The maturity levels which Sun IT targeted with the implementation of the SunIT Maturity Framework was achieved in certain areas. For example, within the SunIT Maturity Framework, certain ITIL areas were implemented successfully in terms of change management, problem management, incident management, configuration management, and release management. An external company rated these 5 ITIL processes and Sun International scored an average of 3.5. Other ITIL areas are still in the implementation

process. The remaining processes of ITIL, such as availability and capacity management, are not actively managed (like the previously mentioned 5 processes), however reporting of these processes occur ensuring sufficiency and efficiency. The project management methodology within the Sun IT Maturity Framework has been successfully implemented for IT Projects, including infrastructure and application types of projects (Van den Heever, 2011).

A limitation of the Sun IT Maturity Framework is that the framework is not maintained. The primary reason for this is that other projects take priority over the maintenance of their IT framework. This framework has been implemented to support the current operating maturity and operational requirements of SunIT (Van den Heever, 2011).

5.3.2. Complementary models

5.3.2.1. Accenture

The illustration below highlights IT frameworks that are typically used in IT organisations. This highlights that each model works in different capabilities of the IT organisation. In addition, Accenture utilises vendors to perform certain aspects of the SDLC, which is part of their off-shoring resource model. Implementing IT frameworks is dependent on what the organisation wants to achieve. For example, if the organisation wants to implement end-to-end governance, governance processes, governance forums, when and where they meet and how the decisions are made, then CobiT will be the IT framework to achieve this goal. CobiT is ideal when an organisation wants to get better control of the IT organisation instead of looking for efficiencies. These frameworks are typically implemented concurrently when they are done across the board naturally in an operating model transformation (Zachar, 2011).

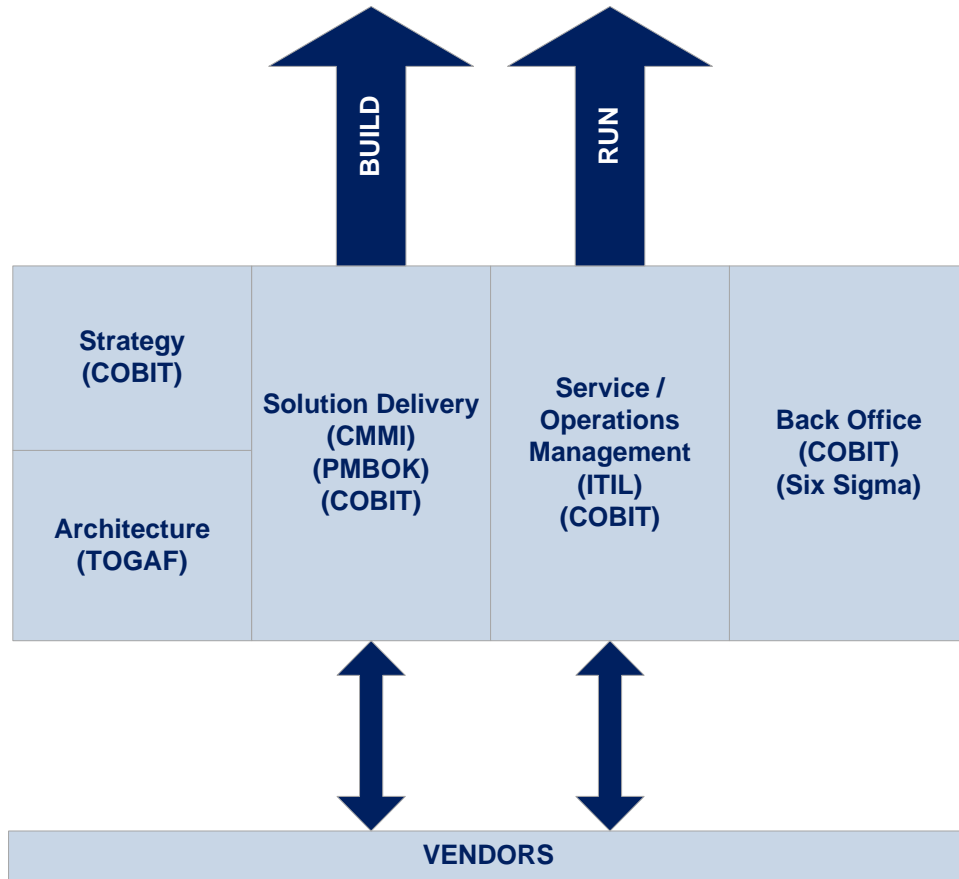


Figure 9: A Typical IT Organisation (Source: Zachar, 2011)

5.3.2.2. Sun International

CobiT was used as the foundation of the Sun IT Maturity Framework as the SunIT Exco believed that CobiT covered the largest scope of IT functions. SunIT Exco viewed CobiT as the “what” of IT Governance and the other frameworks as the “how” of IT Governance. Thereafter, ITIL was positioned against CobiT primarily for its service management and service support functionality. In the architectural space, Togaf was inherited. In the project management and business analysis areas, PMBOK and BABOK (IIBA) were implemented respectively. In addition to these frameworks, the Sun IT Maturity Framework includes these additional IT frameworks, namely King III, Zachman and SDLC. Internal audits governed the compliance and maturity of the Sun IT Maturity Framework (Van den Heever, 2011).

The Sun IT Maturity Framework was implemented with the aim of achieving specific business objectives. Clearly defining the business objectives and the intent of each framework utilised in the Sun IT Maturity Framework helped eliminate overlaps, duplication and alignment of the different specialists across the frameworks utilised (Van den Heever, 2011).

5.3.3. Best practices for concurrent usage of the IT frameworks

5.3.3.1. Accenture

Many the clients experience change fatigue, i.e. they have seen so many frameworks being implemented historically that they have reached a point where they are unable to absorb any more change. When transformation of an operating model occurs, one is essentially changing the way employees perform their duties. If there is no buy-in or acceptance from the employees in terms of the benefits they could reap from the change, they will reject the change and revert to the historical procedures. This is the primary result of change fatigue. Therefore change management is critical within the organisation when implementing such significant changes. Part of the change management process is to link these changes to employees' performance metrics, thereby forcing employees to adopt these changes. In summary, it is important to consider the following aspect in terms of change management:

- Performance metrics
- Governance of these changes
- The rapidness of the change and its impact on the client
- The risks associated with the change and how best to mitigate these risks (Zachar, 2011).

Strategy usually contains roles and responsibilities, with processes being defined in an operating model. However, it is the tools, assets and the frameworks which support the strategy within the operating model. An operating model transformation will occur when the organisation is being reshaped and restructured to align to a certain set of standards. However organisations may also decide to only focus on one part of the organisation and implement multiple frameworks (Zachar, 2011).

5.3.3.2. FNB

Irrespective of the path taken to implement an IT framework within FNB, they face a dilemma when it comes to the financial investment versus the unquantifiable return on investment (ROI). Despite this dilemma, FNB achieved success in the partial implementation of ITIL. The aspects of ITIL which were considered to be beneficial to FNB's Service Delivery business unit included Change Management and Problem Management, which were implemented due to a business gap in the organisation. However adopting a maturity model or attempting to achieve the next level of maturity requires investment in several areas such as people, training and processes. This investment could result in IT "putting the business on the back foot, whilst IT tries to catch up", resulting in less buy-in from senior management as the cost of the investment cannot be justified or be directly related to a business deliverable (Hassem, 2011: personal interview).

The biggest challenge which FNB faces when implementing IT processes is resistance from staff. Initially it is resistance to the process, then it is accepting the training and gaining the skills to the right level of granularity. In some instances where teams need to be restructured, this creates insecurities amongst employees. However behavioural change in people can be fast tracked if they are measured against the process in terms of their key performance areas (KPA's) (Hassem, 2011).

Across FNB, the mainframe is the most mature business environment. Here, the furthest that was explored in terms of IT frameworks was the customised SDLC, where the processes are more acutely defined. However one of the main challenges encountered by the mainframe business unit was a decrease in the rate of delivery. This was primarily due to the increased number of gatekeepers in the SDLC process. The increase in the number of gatekeepers means more people looking at what risks there may be, i.e. slowing the process down. There is no governance office or business unit within FNB that governs usage of the IT processes, as each business owner is responsible for their own business unit processes (Hassem, 2011).

Other challenges include the inability to consistently maintain the high-levels of service that are demanded by the business whilst concurrently implementing best practices. The one factor that is demanded from IT at FNB is to deliver functionality faster and of highest quality. FNB believes that IT frameworks do not contribute to this (Hassem, 2011).

The primary lesson learnt by FNB is that each implementation must have a business benefit, especially as IT is deployed in the business unit therefore each deliverable must have business benefit (Hassem, 2011).

5.3.3.3. Sun International

The biggest challenge SunIT encounters is that of the organisational mindset and culture. The culture in Sun International is to rather focus on initiatives where the ROI can be realised earlier and more directly, than on initiatives where the ROI is more strategic and takes longer to realise. Introducing new practices and new frameworks requires management and employees to change this mindset, where they have to focus on initiatives that bring longer-term, service delivery improvements. Sun International business was dissatisfied with the IT service delivery; hence one of the objectives of the SunIT Maturity Framework was to improve the quality of service offered to the business areas. Upon the success of improving the quality of service to the business, the business is now willing to engage with IT on a strategic level. Another challenge is that Sun IT is unable to quantify the return on their investment in the SunIT Maturity Framework (Van den Heever, 2011).

One of the main lessons learnt with the implementation of the Sun IT Maturity Framework is that of communication before, during and post the implementation process. Other lessons include performance management, where metrics linked to the implementation are linked to individual KPAs (Van den Heever, 2011).

5.3.4 Leveraging of multiple IT frameworks concurrently

5.3.4.1 Accenture

When defining an operating model, organisations need to consider the pieces of the framework that they believe will be beneficial to them. Furthermore, they need to be implemented in the right spaces in order to optimise return. For example, CobiT can be implemented as a governance model to gain control and visibility of the SDLC, however it will not improve the way the SDLC functions. CMMI, for example, will carry out this function. It should be noted that Accenture recommends that these frameworks are adapted to the organisation's specific requirements. This will also assist in minimising the disruption that these implementations tend to cause (Zachar, 2011).

Deciding the best way to implement these frameworks is not dependant on a top-down approach or a bottom up approach, although each has its pro's and con's. In any implementation, the overall operating model should be considered as this typically serves as the guiding "north star" for the way in which an organisation runs. It is not recommended to use these best practices as stock standard as none of these IT frameworks have been designed in an implementable format. Rather, they have to be adapted to suit the organisational needs (Zachar, 2011).

Accenture believes that the best way to implement any framework is starting from your strategy and your vision and moving down. A good approach would be:

- Senior management agree on a maturity gap that needs to be addressed within the organisation.
- Senior management then decides their target maturity.
- Processes, roles and responsibilities are then determined at an organisational and a divisional level. The roles and responsibility aspect is critical and can be part of change management where the job descriptions are enhanced, thereby driving employees to adopt the new changes (Zachar, 2011).

The other approach of implementing IT frameworks is through a bottom-up approach, which implies that organisations will be performing functional changes on a continuous basis, resulting in incremental change and incremental benefits but at a very slow pace. Relooking the organisation's operation model is only applicable if the organisation wants to implement significant changes. However, once an organisation has a fully functional operating model, it is about the continuous improvement of that operating model as opposed to a complete redefinition (Zachar, 2011).

5.3.4.2 FNB

FNB has a customised SDLC in place which is based on the Waterfall, Incremental and Agile approaches. This customised model contributes to the versatility of FNB in terms of delivering requirements within minimal time, thereby always having a business benefit (Hassem, 2011).

While FNB considers IT frameworks, they only implement the aspects or modules that are beneficial to the organisation rather than the entire framework. According to Hassem (2011), the biggest problem with adopting these frameworks is that organisations need to be restructured to incorporate IT frameworks, which is impractical and unfeasible for large organisations

In deciding which frameworks to implement, FNB only considers the best offering from each model, i.e. they consider the strengths of each model. For example, if FNB is only interested in implementing a particular aspect of Six-Sigma they will adopt that aspect. However FNB, will not be Six-Sigma compliant as they did not implement all of the components Six-Sigma. In other words, FNB's model is a conglomeration of IT frameworks (Hassem, 2011).

Since FNB is a federated model, the maturity of each business unit varies. For example the more mature the business unit, the more they recognise the value of processes and IT frameworks. It is largely dependent on the business unit to decide which IT framework they plan to adopt and the reason for adopting this framework (Hassem, 2011).

FNB believes that social media is becoming the way in which people measure the organisation's level of service. IT frameworks introduce time lags which contribute negatively to their customer's perception of fast and high quality. FNB's view is that IT frameworks are process intensive and will soon be under threat due to advances in the monitoring paradigm via social media. These frameworks will work for some organisations, but since FNB is customer facing, they have to employ various different strategies (Hassem, 2011).

5.3.4.3 Sun International

Sun International does believe that the strengths of one model can be used to leverage against the weaknesses of another, however one must consider the practicality of such an implementation. Theoretically, frameworks can be linked to one another, but with an organisational specific implementation, one needs to consider the entire organisational context. This context reveals which frameworks can be used when and to what extent (Van den Heever, 2011).

The objectives defined were IT specific goals where there was a relationship between the IT goals and the business goals. At the time of defining the SunIT framework, there was a link between the IT goals and the business goals. It was only after the improvement of the quality of service offered by IT that the business started to involve IT from a strategic perspective. Presently, Sun IT is reviewing their goals to best align it to the organisational goals for Sun International (Van den Heever, 2011).

Additional best practices for implementing multiple frameworks include loyalty, job satisfaction, supporting creativity amongst employees, support from senior management, and a balance between IT deliverables and business deliverables where a framework deliverable is always off the back of a business deliverable (Van den Heever, 2011).

At present, Sun International is in the process of implementing King III. Also, a lot more focus is being placed on the implementation of stronger and more strategic Enterprise Architecture practices. Future prospects include the consideration of Business Process Management (BPM), however it will be a while before it is implemented due to the culture in Sun International not being mature enough for the implementation of BPM (Van den Heever, 2011).

5.4 Validity and reliability of data collection

The interviews were conducted in a real-time setting where the interviewee was questioned systematically, thereby ensuring the validity and reliability of the study. A respondent validation was performed, where a summary and a conclusion was sent to the participant to confirm if they agreed or not, thus ensuring validity (Leedy and Omrod, 2010).

Triangulation provides internal validity of the phenomena being researched by considering different angles of the phenomena (Runeson and Höst, 2009; Leedy and Omrod, 2010). In addition, it was mentioned by Runeson and Höst (2009) that the significance of triangulation is to increase the accuracy of the research.

Srnka and Koeszegi (2007) mentioned that one of the criteria for ensuring reliability in qualitative research is to involve multiple individuals to perform independent quality checks on the questionnaire. The interview questions defined have been quality checked by individuals in different organisations, compared to the participants of the research. This further ensures that there is no bias in terms of the interview questions.

5.5 Analysis of the data

5.5.4 Organisational context

Models internal to the participating organisations: All three organisations have implemented customised frameworks. Accenture has the ADM, FNB has a customised SDLC and Sun International has the Sun IT Maturity Framework. FNB and Sun International have implemented customised frameworks due to the problems they experienced within the respective organisations. These problems were experienced due to a lack of communication and understanding between the business requirements and the actual product being delivered. As a result there is a mismatch between the deliverable and the requirements defined. Accenture implemented the customised model based on improving their back office efficiency and service delivery.

IT Frameworks Applicable:

- Accenture, FNB and Sun International have customised project management methodologies, which are not necessarily PMBOK but are aligned to PMBOK. These methodologies are utilised for specific aspects of the organisations, such as in Sun International the project management methodology was considered for the implementation of infrastructure projects, while in FNB the project management methodology was only used for the projects that spanned across the business instead of projects that were executed within a business unit. In Accenture, the ADM is a completely customised methodology which uses aspects of PMBOK.
- Accenture is the only organisation amongst the three participants that has implemented CMMI. They are of the opinion that CMMI introduces a certain level of rigour and industrialisation ensuing end result predictability. In addition, being CMMI compliant ensures that business requirements are documented accurately, at the right level and can be correctly interpreted - particularly when sent to off-shore delivery centres for development.

- Accenture and Sun International base their IT governance frameworks on CobIT as they believe that it spans across multiple IT functions.
- All the participants utilise different aspects of ITIL, however all focus on the similar IT functions, i.e. in the service delivery space.
- Six-Sigma is implemented in Accenture's back offices, however this was not deemed to be feasible for FNB and Sun International.

The table below illustrates a summary of the frameworks applicable to the three participants.

Table 17: Summary of frameworks applicable to the case studies

	Accenture	First National Bank	Sun International
ITIL	✓	✓	✓
CobIT	✓	x	✓
CMMI	✓	x	x
PMBOK	✓	x	✓

Main IT Focus in the Organisation: Accenture has a strong focus on efficiency and processes in their back office functions, whereas both FNB and Sun International are focused on high delivery rates and business deliverables.

Limitations: FNB only deals with frameworks when they face business problems. Similarly, Sun International has implemented their maturity IT framework which has taken a lower priority regarding maintenance.

5.5.5 Complementary models

Both Sun International and Accenture acknowledge that all the IT frameworks have different capabilities within the organisation. In addition, these participants believe that whilst each framework has different objectives, the organisation must have an understanding of the organisational goals and ensure that these IT frameworks fit into the organisational goals, thereby achieving specific business objectives. Sun International further stated that the definition of clear goals and intentions of IT frameworks help eliminate overlaps and duplications across multiple frameworks.

5.5.6 Best practices for concurrent usage of the IT framework

The participants in this research study all experienced employee and client behavioural challenges. This was due to change fatigue where the turnover of IT frameworks was high and rapid for the users to adjust to, there was resistance from staff where there was a sense of insecurity amongst the employees, and a change in mindset where the staff had initially focused on financial benefits and adjustment challenges to focus on best practices. Other challenges which these organisations faced was to get buy-in from senior management in terms of organisational benefits, and the unquantifiable return on investment and communication pre and post the implementation of the IT frameworks.

These challenges were handled through change management programmes implemented by the organisations. It is interesting to note that all organisations link these changes to individual performance metrics in order to fast track these changes. According to Accenture, the best way to implement these models is through the transformation of the organisation's operational model, which is where FNB mentioned that restructuring of an operational model is impractical and infeasible. This feeds into Accenture's note that operating models that work well for an organisation should be enhanced via continuous improvement rather than by restructuring.

5.5.7 Leveraging of multiple IT frameworks concurrently

It was common across all the participants of this research to consider the aspects of the framework which are beneficial to the organisation and only implement those particular aspects rather than the entire framework. This approach aids in optimising the return on the investment. As mentioned by FNB, “If it ain’t broke don’t fix it”, Accenture and Sun International share the same view, where they believe that if an operating model is working for the organisation, it should not be changed but should rather be improved. In addition, the best way to leverage multiple frameworks concurrently is to ensure that these frameworks are utilised for their primary capabilities or their main objectives or intentions. Furthermore, no framework should be used out of the box; each framework should be customised and adjusted to suit the organisational needs before being implemented. The implementation should also include a business deliverable, thereby increasing the return on investment. Loyalty, job satisfaction, supporting creativity amongst employees, support from senior management, and a balance between IT deliverables and business deliverables are aspects which contribute to the successful implementation of IT frameworks.

Accenture is of the opinion that organisations that have their IT teams co-located do not have to consider implementing CMMI, as it is excessive in terms of processes and detailed documentation. FNB and Sun International share similar opinions. FNB believes that CMMI is a tool for determining what processes and documentation an organisation has in place and provides the organisation with the ability to gauge the probability of delivering a particular project, whereas Sun International believes that CMMI is theoretically feasible however impractical to implement.

FNB’s focus is on the delivery rate rather than the competitiveness and the subjectiveness of these frameworks. In addition, FNB believe that social media is becoming the way in which people measure the organisation’s level of service. IT frameworks introduce time lags which contribute negatively to their customer’s perception of fast and high quality.

FNB's view is that IT frameworks are process intensive and will soon be under threat due to advances in the monitoring paradigm via social media. These frameworks will work for some organisations, but since FNB is customer facing, they have to employ various different strategies. The one factor that is demanded from IT at FNB is to deliver functionality faster and of high quality, and FNB believes that IT frameworks do not contribute to this need.

5.6 Discussion of the results

5.6.4 Research sub-problem 1: How does each model complement the others?

The complementing of multiple models is apparent in Accenture and Sun International, however is only vaguely relevant in FNB. Accenture uses CobiT as part of their IT strategy in terms of IT governance. This is used in conjunction with PMBOK and CMMI in the Solution Delivery Space, i.e. where the actual development and delivery of the solution occurs. PMBOK is specifically aimed at introducing best practices regarding project management while CMMI is targeted at achieving rigour within the SDLC in the solution delivery space. Sun International has also implemented CobiT in conjunction with PMBOK. These two case studies illustrate that PMBOK and CobiT are complementary as they can work in conjunction with each other with minimal conflict. However Accenture is the only participant that has implemented CMMI which is primarily due to their off-shoring resource model. All three participants are in agreement that CMMI is overkill for IT teams that are co-located.

ITIL is the only common IT framework across all the participants in this research study. Accenture uses ITIL in the outsourcing space, particularly for infrastructure outsourcing, application outsourcing and help desk outsourcing, whereas the Sun IT Maturity Framework has implemented change management, problem management, incident management, configuration management, and release management. FNB, on the other hand, only considers change and problem management. Accenture and Sun International have both implemented ITIL on a CobiT foundation.

Accenture views the implementation of Six-Sigma as a back office task while FNB declared that they implement only beneficial aspects of Six-Sigma, hence they will never be Six-Sigma compliant. Yet again, Accenture implemented Six-Sigma where CobiT was used to govern the back office implementations.

It can also be determined that the Accenture and Sun International's IT functions are similar to the IT functions defined by Cater-Steel, et al. (2006). These similarities are illustrated below:

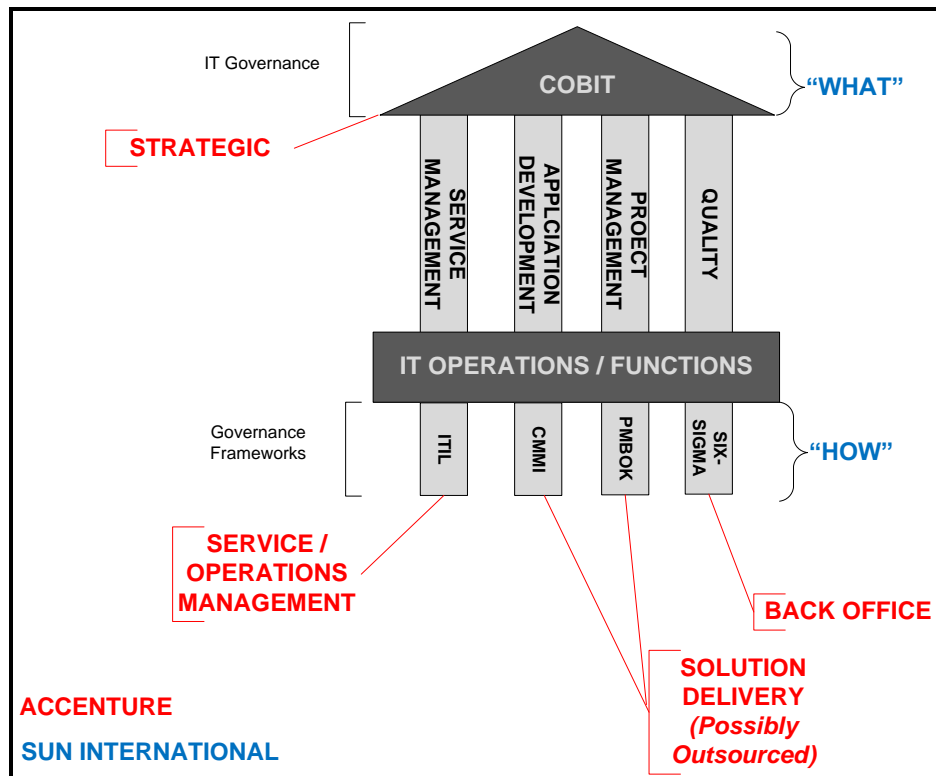


Figure 10: Comparison of IT functions between Accenture and Sun International (Adapted from: Cater-Steel, et al., 2006)

According to the case studies, the following models are complementary to each other:

Table 18: Complementary frameworks based on the case study

Complementary Models according to the Case Studies (Legend: A – Accenture, F – FNB, S – Sun International, X – Insufficient Evidence)				
	ITIL	CobiT	CMMI	PMBOK
ITIL	✓ (F)	✓ (A, S)	✗	✗
CobiT	✓ (A, S)	-	✓ (A)	✓ (A,S)
CMMI	✗	✓ (A)	-	✓ (A)
PMBOK	✗	✓ (A,S)	✓ (A)	-

In comparison between the case studies and the literature review, aspects of the literature review which contained insufficient evidence regarding the co-implementation of the various frameworks, have been viewed as complementary by the participants of the case study.

Table 19: Comparison of IT frameworks between case studies and literature review

Leveraging of multiple IT frameworks concurrently (Legend: CS – Case Study, LR – Literature Review, X – Insufficient Evidence)				
	ITIL	CobiT	CMMI	PMBOK
ITIL	-	✓ (LR, CS)	✓ (LR)	✓ (LR)
CobiT	✓ (LR,CS)	-	✓ (CS)	✓ (CS)
CMMI	✓ (LR)	✓ (CS)	-	✓ (LR, CS)
PMBOK	✓ (LR)	✓ (CS)	✓ (LR, CS)	-

5.6.5 Research sub-problem 2: What are the best practices for concurrent usage of the IT frameworks?

Information Technology has to fit in with the business in terms of goals, strategy and deliverables. It was common across all participants of this research study that ITs main focus is on high delivery rates, where each deliverable contains business deliverables, thereby increasing the return on investment. There were few IT projects or initiatives which were not linked to a business deliverable. In deciding which IT frameworks to implement, it was noted that organisations must perform analyses whereby they associate the objectives of the IT frameworks to the organisational goals. This aids with the elimination of overlap, duplication and alignment of the different roles.

Customisation of the respective IT frameworks within each organisation was necessary in order to facilitate their successful implementation. Customisation was based on historical experiences within these organisations, lessons learnt, previous challenges faced and research performed by leading organisations. None of the participants utilised any of the frameworks 'out of the box'. It was further noted that all participants of this research only considered the aspects of the respective frameworks which they presumed were beneficial to the organisation, contributing to the customisation of the framework within the organisation.

Behavioural challenges were faced by all three organisations, particularly at the time of an IT implementation. However these organisations implemented change management which encompassed performance metrics linked to individuals, thereby fast tracking the adoption of change. Behavioural challenges which were faced included resistance to change, insecurity amongst employees, changes in cultural mindsets, lack of buy-in from senior management, and poor communication and miscommunication during the processes. Loyalty to the organisation, job satisfaction, supporting creativity amongst employees, support from senior management, and a balance between IT deliverables and business deliverables are all aspects which contributed to the successful implementation of IT frameworks.

Continuous improvement through IT frameworks is suggested for operating models that are fully functional and work well for the organisation. It is important that organisations understand the practicality and feasibility of the IT frameworks in their current operating models when performing continuous improvements. It was interesting to see how social media contributes to the maturity of organisations as compared to the maturity of IT frameworks. FNB, for example, believe that IT frameworks will soon be threatened by social media sites due to the rapidness of their growth and their increasing accessibility.

5.7 Conclusion

Semi-structured interviews were performed at the selected organisations; FNB, Accenture and Sun International. Accenture and Sun International were the only participants that had implemented aspects of all the IT frameworks in scope. FNB, on the other hand, have only implemented part of ITIL, primarily due to problems they have experienced. In terms of challenges and lessons learnt, all three organisations experienced similar behaviours from their employees and customers and all used performance metrics to manage their change.

Chapter 6: Recommendations and Conclusion

6.1. Introduction

The final chapter for this research report consist of the recommendations for the research problem, '*How to best implement multiple IT frameworks concurrently?*' The main objective of this research study is to produce a hybrid of best practices, enabling the user to implement a multiple of IT frameworks concurrently. The secondary objective is to advise the user how to deal with overlapping features between the selected IT frameworks. These best practices will be detailed in this chapter based on the literature review and the outcome from the case studies.

6.2. Recommendations for implementing multiple IT frameworks concurrently

6.2.1. Perform detailed analysis

A combination of the case studies and literature review revealed that there must be business deliverables with any IT implementation, in other words a business objective is partially or fully accomplished. It was noted from the case studies that the key starting point for organisations to determine what IT frameworks they opted to customise was based on a detailed analysis which was performed based on the business needs. It is recommended that the first step in the implementation of any IT framework is to perform a detailed analysis of the business needs/drivers/wants and the practicality and the feasibility of their needs.

6.2.2. IT framework and business drivers crosswalk

Once the business drivers are established, the following crosswalk is recommended to determine the most appropriate IT framework which can be used to achieve the relevant objectives (IT Governance Institute, 2006). The mapping defined in the table below is not clear cut, resulting in multiple IT frameworks being selected.

BEST PRACTICES FOR IMPLEMENTING MULTIPLE CONCURRENT IT FRAMEWORKS
(CMMI, ITIL, COBIT AND PMBOK)

Table 20: Business drivers per IT framework (Source: IT Governance Institute, 2006)

Business Drivers	Appropriate IT Framework
<ul style="list-style-type: none"> • Definition of service processes for the customers of IT (including the customers of the organisation) • Improving the quality of service offered • Centralising the help desk operations <p><i>(IT Governance Institute, 2006)</i></p>	ITIL
<ul style="list-style-type: none"> • Business need for IT governance • Alignment of IT goals to the organisational goals • Standardisation of IT processes • A framework for IT processes to be unified • A need for a quality management system • If there are mergers and acquisitions in progress • A need to implement cost control within IT • Aspects of IT functions are outsourced or regulatory compliance <p><i>(IT Governance Institute, 2006)</i></p>	COBIT
<ul style="list-style-type: none"> • Assessing the maturity of current business processes • Improving processes within organisational structures • The need for benchmarking processes against other organisations • Improve productivity thereby decreasing project risks and reducing software defects • Customer satisfaction <p><i>(IT Governance Institute, 2006)</i></p>	CMMI
<ul style="list-style-type: none"> • Define data dictionaries for project management • To gain insights into proven best practices <p><i>(IT Governance Institute, 2006)</i></p>	PMBOK

6.2.3. Detailed analysis of the IT frameworks and business drivers

Within each of these models there exists key areas, within which the models have key features. Each of these features has specific objectives, for example within the ITIL framework, Service Operation is a key area, and within this key area problem management is a feature that has specific objectives. Understanding the objectives of the various different features within these frameworks is crucial for the user to determine which feature will assist them in achieving their defined objective/s.

6.2.4. Involve senior management

Marquis (2006) highlighted the significance of management commitment when it comes to investment in IT frameworks, hence performing the preceding steps is recommended before getting senior management buy-in. The preceding steps will provide senior management with ample information, empowering them to make knowledgeable decisions around their commitment to the investment of IT frameworks (Neničková, 2011).

6.2.5. Prior implementation

All projects / implementations have associated risks (Graham and Englund, 2004). It is recommended that these risks are understood in detail to enable them to be mitigated. Understanding the risks of the IT frameworks prior to implementation will help senior management with their commitment decision. The following is recommended as mitigation to the risks associated with the selected IT frameworks:

BEST PRACTICES FOR IMPLEMENTING MULTIPLE CONCURRENT IT FRAMEWORKS
(CMMI, ITIL, COBIT AND PMBOK)

Table 21: Risks and risk mitigations per IT framework

IT Framework	Risk/s Associated with Each Framework	Response to Risk
ITIL	<ul style="list-style-type: none"> Erroneous support processes due to a lack of awareness (<i>IT Governance Institute, 2006</i>) 	<ul style="list-style-type: none"> Create awareness via educational sessions (<i>Neničková, 2011; Hardy, 2006</i>)
COBIT	<ul style="list-style-type: none"> Misalignment within the IT services Poor business support Wastage or missed opportunities Excessive IT costs Shortfall between expectations and performance metrics Dissatisfied customers either business users or external customers (<i>IT Governance Institute, 2006</i>) 	<ul style="list-style-type: none"> It is strongly recommended that IT's objectives are aligned to the organisational objectives to avoid the productivity paradox (<i>Neničková, 2011</i>) Hardy (2006) advised that senior management is involved from the beginning in order to avoid minimal business support, wastage or missed opportunities and excessive IT costs One of the main driving principles for performance metrics is that objectives and expectations must be clearly defined (<i>Ehsan, 2010; Dutton, 2010</i>) Setting customer expectations prior can help management customer satisfactions (<i>Arraj, 2010; Xansa, et al., 2007</i>)
CMMI	<ul style="list-style-type: none"> Ineffective and inefficient approaches for process improvement Incapability of benchmarking the organisation against other organisations A decrease on project quality primarily due to poorly defined processes (<i>IT Governance Institute, 2006</i>) 	<ul style="list-style-type: none"> Thoroughly assessing the current business processes, the need for benchmarking processes against other organisations can help mitigate the risks posed by CMMI (<i>IT Governance Institute, 2006</i>)
PMBOK	<ul style="list-style-type: none"> Inconsistent project management practices An increase in the risk of project failure (<i>IT Governance Institute, 2006</i>) 	<ul style="list-style-type: none"> Clearly defined management processes across the organisation can alleviate this risk (<i>IT Governance Institute, 2006</i>)

6.2.6. During implementation

It is recommended that the organisation creates awareness and understanding of the implementation pre, during and post the implementation. This will aid in the employees accepting the framework as opposed to resisting the change. (Neničková, 2011; Hardy, 2006). In addition to the awareness and understanding, clear roles and responsibilities must be defined in order to avoid conflict (Neničková, 2011). CobiT, ITIL and PMBOK can be used to help organisations to clearly define roles and responsibilities (Wessels and van Loggerenberg, 2006; Project Management Institute, 2010).

Thompson, et al. (2008) mentioned that understanding the strengths and weaknesses are important in order to understand the health of an organisation. The application of this concept to IT frameworks guides organisations in understanding the strengths and weaknesses of the relevant frameworks. In addition, organisations have the opportunity to combine frameworks where the strength of one framework can be used to support the weaknesses of another. It is recommended that organisations consider this approach in order to get the optimal solution out of their implementation. The following table demonstrates how the strength of one model can be used to support the weaknesses of another.

BEST PRACTICES FOR IMPLEMENTING MULTIPLE CONCURRENT IT FRAMEWORKS
(CMMI, ITIL, COBIT AND PMBOK)

Table 22: Leveraging the strengths of one model to support the weaknesses of another

ITIL	CobiT	CMMI	PMBOK
<p>ITIL Weakness: Software development life cycle (SDLC) (Wessels and van Loggerenberg, 2006).</p> <p>CMMI Strength: Addresses the software lifecycle only and not the hardware lifecycle (Ehsan, et al., 2010)</p> <p>Recommendation: A combination of ITIL and CMMI will result in a lifecycle which addresses the software and hardware side of an organisation.</p>	<p>CobiT Weakness: Does not show suitable controls to align business and IT goals (Rouyet-Ruiz, 2008)</p> <p>ITIL Strength: Business and IT alignment (Arraj, 2010; Xansa, et al., 2007)</p> <p>Recommendation: A combination of CobiT and ITIL will result in the business and IT goals being aligned when the organisational interest is IT governance.</p>	<p>CMMI Weakness: Too much focus on levels and ratings, not enough focus on measured results and the interpretation of such data (Staples, et al., 2006)</p> <p>CobiT Strength: Performance Measurement such as Critical Success Factors, Key Performance Indicators and Benchmarking (Sahibudin, Sharifi & Ayat, 2008; Hill and Turbitt, 2006; Rouyet-Ruiz, 2008)</p> <p>Recommendation: Combining CobiT and CMMI will result in additional focus to performance metrics.</p>	<p>PMBOK Weakness: Very complex and overkill for small projects (ur Rehman and Hussain, 2007).</p> <p>CMMI Strength: Addresses the software lifecycle encompassing project management (Ehsan, et al., 2010)</p> <p>Recommendation: Projects that are considered as small, medium and large should have specific traits within the organisation. For smaller projects the project management process should be simple as compare to the large projects. Combining CMMI and PMBOK will help the organisation categorise these project types and then defined specific processes for each type of project.</p>

A combination of the literature review and the outcome of the case studies resulted in a hybrid being defined below.

BEST PRACTICES FOR IMPLEMENTING MULTIPLE CONCURRENT IT FRAMEWORKS
(CMMI, ITIL, COBIT AND PMBOK)

Table 23: A hybrid of complementary IT frameworks

	ITIL	CobiT	CMMI
CobiT	CobiT can be used to define “what” the organisation wants to achieve whereas ITIL can be used at the tool to achieve the organisational objectives (IT Governance Institute, 2006).		
CMMI	CMMI and ITIL can be combined to optimise value obtained from these implementations by either implementing ITIL as the base framework to use the processes from CMMI-SVC. The other option is to implement CMMI-Dev as the base and include the service processes from ITIL. The third option is to use both CMMI and ITIL as the base (Saxena and Maher, 2011).	When it comes to implementing CMMI and CobiT concurrently, CobiT provides the guidance as to what the organisation to do, whereas CMMI defined the goals and procedures for achieving the ‘what’ of the organisation (Praeg and Spath, 2011).	
PMBOK	It is recommended that ITIL be implemented as a project where PMBOK is the best practice tool (Marquis, 2006; Ehsan, et al., 2010).	PMBOK covers aspects that are specific to IT related projects. However there are crucial aspects which are not available in PMBOK which one can leverage from COBIT such as IT governance and IT management (IT Governance Institute, 2006).	PMBOK and CMMI can supplement and complement each other; hence it is recommended that CMMI projects are implemented projects where PMBOK is PM guidelines (Ehsan, et al., 2010).

It is recommended that the chosen IT frameworks are customised to suite the organisational requirements. It is not recommended that these frameworks be utilised straight out of the box.

6.2.7. Post implementation

Proper change management is recommended when implementing IT frameworks. ITIL defines detailed change management guidelines which include KPIs for employees. In addition it was recommended by the participants of this research study that there is transparency with the implementation of the frameworks, resulting in improved communication between the stakeholders.

As previously mentioned by Neničková (2011) it is recommended that processes are implemented in a manner that is maintainable in future. Therefore including these tools in the organisational risk management framework is crucial for maintainability (Hardy, 2006).

Below is a summary of these recommendations in a process diagram.

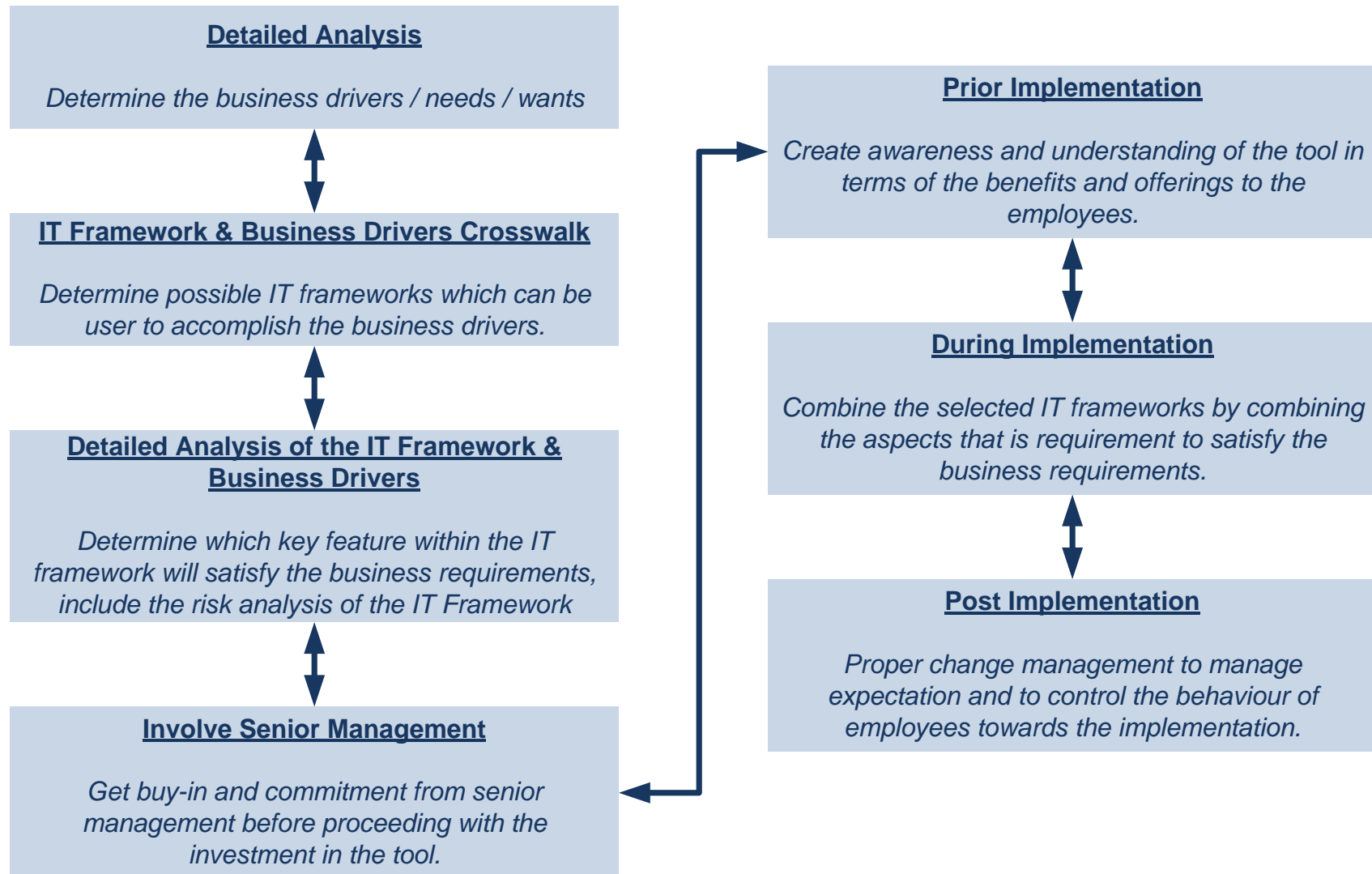


Figure 11: Recommendations of the best practice process

6.3. Recommendations for future research

The following is recommended for future research:

- Conduct a qualitative study to determine whether or not IT frameworks are under threat by the rapidly evolving concept of social media.
- Conduct a quantitative study that ascertains whether organisations implement IT frameworks in support of their organisational goals instead of primarily for the certification.
- Extend this study to include the behavioural qualities versus awareness that have an impact, both positively and negatively, on the implementation of IT frameworks.

6.4. Conclusion

The implementation of multiple process improvement models can be challenging to the employees of an organisation in terms of stress, morale and productivity, therefore selecting the right framework for the right reasons is crucial (Cater-Steel, et al., 2006). The challenges IT managers face when it comes to implementation of concurrent process improvement models include resistance to change and operational challenges if too many employees are involved in the change management. Another significant challenge is duplication of work, effort and time as argued by Cater-Steel, et al., 2006) who highlighted that overlapping between the various models could result in this challenge.

These challenges are addressed in the hybrid defined as a result of this research report, which contains best practices for combining multiple concurrent IT frameworks. The best practices include leveraging the strengths of one framework to support the weaknesses of another; guidance on how these frameworks can best be integrated; business drivers, risks and risk mitigations associated with each framework when combining it with other frameworks, and organisational best practices for implementing IT frameworks concurrently.

Siviy, et al. (2005) mentioned that in order to successfully implement multiple IT frameworks, organisations need a thorough understanding of these models and their relationships. The hybrid of best practices defined as a result of this research report is aimed to contribute to the detailed understanding of implementing multiple concurrent IT frameworks.

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Appendix 1: Communication with Participants

Appendix 1.1: Initial Email to Participants

Hi,

I am currently pursuing my final year of study in my Masters in Business Leadership (MBL) at the University Of South Africa (UNISA). As a deliverable for the completion of my degree, I am required to conduct a research exercise.

I am required to interview someone who is familiar with IT governance and the IT frameworks mentioned below. The interviewee will need to know about the implementation of some of these IT frameworks within the organisation. The interview will be confidential and not take longer than 1 hour. The summary of the interview will be shared with the interviewee for verification before being used in the final report. The final report will only contain a summary of the interview with verification by the interviewee. I have decided to analyse how best to implement multiple IT frameworks concurrently. CMMI, CobiT, PMBOK and ITIL have been chosen for this research study.

Should you require a non-disclosure agreement signed or a letter of registration from Unisa, please advise and I will arrange for the relevant documentation.

Thank you in advance for your assistance in this regard. Please feel free to contact me or UNISA should you have any queries. Please confirm your participation for the study by 13 September 2011.

Thanking you for your time.

Regards,

Nirvasha Harryparshad

Email: nirvashah@gmail.com

Cell: 082 564 8983

Appendix 1.2: Email for participants to verify the report

Hi there

Trust you are well.

Please find attached a documented report for my MBL Research Report. Can you please review and verify the content.

Furthermore, please find attached a confidentiality letter from Unisa. Please advise if this letter will suffice for using the organisation name in my research report.

I would appreciate it if you could please feedback to me by no later than 12 October 2011.

Thank you kindly.

Nirvasha Harryparshad
(082 564 8983)

Appendix 2: Confidentiality letter from the university



Ref: Ms Talana Lebelo

Tel: + 27 11 6520352

E-mail: TLebelo@sbleds.ac.za

Web: www.sblunisa.ac.za

2011-09-23

TO WHOM IT MAY CONCERN

This letter serves to confirm that Miss N Harryparshad, student number 72218738, is a registered final year student at the Graduate School of Business Leadership for 2011. The student will be doing a Research Report (**MBLREP-P**) as part of the requirements to obtain the MBL postgraduate degree.

The MBL provides highly professional management development at postgraduate level - with particular emphasis on the theory as well as the practice of management in the education process. It also strives to offer a practical learning experience and an opportunity for the development of leadership qualities.

The Business School will observe any confidentiality requirements regarding information availed to the student in assisting with this study. The content of research reports may not be used by the author, the SBL, or any other person without the permission of the Research Report Provider, further the disclosure of the Company Names being

researched, will be kept anonymous (upon request), in order to protect the confidentiality clause of your organisation.

On behalf of the Business School and Miss N Harryparshad, we thank you for your cooperation.

Yours sincerely



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Nirvasha Harryparshad (082 564 8983)

MISS N HARRYPARSHAD

STUDENT

Appendix 3: Interview Questionnaire

<p>Q 1. What are the current IT frameworks utilised within the organisation?</p> <ul style="list-style-type: none">a. Why did the organisation select the respective framework?b. What did the organisation want to achieve by implementing this framework?c. Was the organisation successful? <p>Q 2. Does the organisation have multiple IT frameworks? If so, list them.</p> <p>Q 3. Were multiple IT frameworks implemented concurrently? Or were these frameworks implemented individually at different times? (If yes, then ask questions 4 and 5; If no, then ask questions 6, 7, 14)</p>
<p>Q 4. Did the organisation find duplication / overlap or contradictions in the methodologies and processes defined?</p> <p style="padding-left: 40px;">Q 4.1. How was the duplication / overlap or contradictions handled?</p> <p style="text-align: center;">OR</p> <p style="padding-left: 40px;">Q 4.2. Do you think implementing multiple IT frameworks is a good idea or not? Why?</p> <p>Q 5. What do you recommend in terms of using multiple IT frameworks concurrently?</p>
<p>In terms of current frameworks implemented in the organisation:</p> <p>Q 6. Highlight the main challenges faced and how where they dealt with.</p> <p>Q 7. Highlight the main lessons learnt.</p> <p>Q 8. Did the organisation face any people challenges?</p> <p>Q 9. If you have to redo the exercise, what would be done differently?</p> <p>Q 10. In the opinion of the organisation, what best practices would the organisation apply with the implementation of IT frameworks?</p>
<p>Q 11. Do you (the enterprise architect) believe that the strengths of a model support the weaknesses of another? What is your (the architect's) opinion of this concept?</p> <p>Q 12. If "No" for 3, will the organisation consider implementing multiple frameworks at the same time? Why?</p> <p>Q 13. Who will be the primary stakeholders of this decision?</p> <p>Q 14. If yes for 14, how would the organisation implement these frameworks concurrently?</p>