A PERFORMANCE MEASUREMENT FRAMEWORK FOR IT SERVICE MANAGEMENT

Submitted by

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Abstract

The use of Information Technology (IT) has become more pervasive and, progressively, there has been a shift from a technology focus to a service focus in managing IT. The performance measurement of IT service management (ITSM) is a major challenge faced by organisations adopting best practice frameworks. The extensive adoption of ITSM frameworks by organisations may point to the acceptance by IT service managers that best practice frameworks such as Information Technology Infrastructure Library (ITIL®) and standards such as ISO/IEC 20000 can deliver real operational efficiencies, ultimately translating into business benefits. Some organisations implementing ITSM initiatives have reported realisation of benefits in cost savings and standardisations in delivery of IT service.

Despite the appeal and the potential to realise benefits, the implementation of ITSM initiatives is complicated by the complexity in measuring performance. Measurement of the performance of ITSM is critical due to the size of the investment and the crucial importance of IT services to organisations. Few guidelines on the performance measurement of ITSM exist for industry practitioners; and scant academic research has been conducted on the performance measurement of ITSM. The objective of this research is to develop a framework that can be used to measure the performance of ITSM and, hence, contribute to ITSM initiatives in organisations.

To achieve this objective, the study uses a mixed-method and multi-paradigm approach to develop an ITSM performance measurement framework and contingency theory for the performance measurement of ITSM. The study uses a survey of ITSM benefits and performance measurement to identify ITSM performance measurement practices. A survey was conducted on the ITSM performance measurement practices of members of the IT Service Management Forum of Australia (itSMFA). The survey findings were used to identify six ITSM performance measurement exemplar organisations for case study. The case studies provided further insight into ITSM performance measurement practices. The results of the literature review, survey and case studies formed the basis for the design of the ITSM performance measurement framework. The design science approach of Design Science Research Methodology (DSRM) and the design method of Matching

Analysis Projection and Synthesis (MAPS) were used to develop the ITSM performance measurement framework.

The study provides a comprehensive literature review on the performance measurement of ITSM. A review of the existing industry and academic literature showed a gap in theory for performance measurement of ITSM. There was also a lack of a contextualised performance measurement framework for ITSM. The study developed categories for types of organisation level and process level ITSM, and categories for types of ITSM performance metrics. The performance measurement framework developed by the study is structured using the Balanced Scorecard (BSC) and can be used to quantify benefits and link organisational level benefits and metrics with process level metrics. The developed framework includes a consolidated ITSM metrics catalogue structure. The study identified the internal and external organisational factors that influence the selection of ITSM performance metrics and proposes a contingency theory for the performance measurement of ITSM. The study makes theoretical and practical contributions in ITSM performance measurement by extending ITSM performance measurement theory, IS design theory and developing a holistic multi-level ITSM performance measurement framework that can be used by organisations.

This dissertation is a result of a study funded by an Australian Research Council (ARC) linkage project grant in partnership with Queensland Health (QH) and the IT Service Management Forum (itSMF) Australia. The study contributes to the linkage project by addressing the complex interactions of benefits, performance metrics and methods to enable Chief Information Officers (CIOs) and IT service managers to measure the performance of IT service management.

Certification of Thesis

I certify that the ideas, analyses, results, and conclusions contained in this thesis are original and entirely my own effort, except where otherwise acknowledged. I also certify that this work has not been previously submitted for any other award. To the best of my belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

During the course of the research, a number of research papers and a book chapter were published.

I was the primary author of the following co-authored papers:

Gacenga, F., Cater -Steel, A., Toleman, M. & Tan, W-G. 2012, 'A proposal and evaluation of a design method in design science research', *The Electronic Journal of Business Research Methods*, vol. 10, no. 2, pp. 89-100.

Gacenga, F., Cater-Steel, A., Tan, W-G. & Toleman, M. 2012, *Alleviating Design Silence in Design Science Research: a Proposal of a Design Method*, Academic Publishing International, University of Bolton, UK, 28-29 June 2012.

Gacenga, F., Cater-Steel, A., Toleman, M & Tan, W-G. 2012. 'Measuring IT service management performance: a model development', in Belkhamza, Zakariya & Wafa, Syed Azizi (eds.) *Measuring organizational information systems success: new technologies and practices,* Business Science Reference (IGI Global), Hershey, PA, USA, pp. 102-119. ISBN 9781466601703.

Gacenga, F., Cater-Steel, A., Tan, W-G., and Toleman, M. 2011, '*IT service management: towards a contingency theory of performance measurement',* ICIS 2011: International Conference on Information Systems, 4-7 December, Shanghai, China.

Gacenga, F., Cater-Steel, A., Toleman., M & Tan, W-G. 2011, 'Measuring the performance of service orientated IT management', *Sprouts: working papers on information environments, systems and organizations,* vol. 11, no. 162.

Gacenga, F., Cater-Steel, A., Toleman, M & Tan, W-G. 2011, *'Measuring the performance of service orientated IT management',* 2011 SIGSVC Workshop, 29 November, Shanghai, China.

Gacenga, F., Cater-Steel, A. & Tan, W-G. 2011, 'Towards a framework and contingency theory for performance measurement: a mixed-method approach', PACIS 2011: Quality Research in Pacific Asia, 7-11 July, Brisbane, Australia.

Gacenga, F. & Cater-Steel, A. 2011, 'Performance Measurement of ITSM: A Case Study of an Australian University', PACIS 2011: Quality Research in Pacific Asia, 7-11 July, Brisbane, Australia.

Gacenga, F., Cater-Steel, A., Toleman, M & Tan, W-G. 2011, 'Keeping score: measuring ITSM performance', 14th National Conference of IT Service Management Forum (itSMF) Australia , 17-19 August 2010, Perth, Australia. (Unpublished)

Gacenga, F., Cater -Steel, A. & Toleman, M. 2011. 'Cut Once, Measure Twice: A Case Study of Performance Measurement Practices', *Informed Intelligence*, Bulletin of itSMF Australia, Autumn.

Gacenga, F., Cater-Steel, A. & Toleman, M. 2011, 'Measuring the Performance of IT Service Management', 12th Global Information Technology Management Association World Conference, Las Vegas, USA, pp. 208-214.

Gacenga, F, Cater-Steel, A & Toleman, M 2010, 'An International Analysis of IT Service Management Benefits and Performance Measurement', *Journal of Global Information Technology Management* (13:4), Ivy League Publishing, Marietta, pp. 28-63.

Gacenga, F & Cater-Steel, A 2010, 'What's Your PMF Challenge', *Informed Intelligence*, Bulletin of itSMF Australia, Melbourne, Winter pp. 15-17.

Gacenga, F & Cater-Steel, A 2010, 'Delivering Value through IT Service Management Metrics', *Informed Intelligence*, Bulletin of itSMF Australia, Melbourne, Summer pp. 8-9.

I was co-author in the following presentations and publications:

Lepmets, M, Cater-Steel, A, Gacenga, F & Ras, E 2012, 'Extending the IT Service Quality Measurement Framework through a Systematic Literature Review', Challenges and Advances on Service Quality Aspects, the Special Issue of *Journal of Service Science Research*, vol. 4, no. 1, pp. 7-47.

Cater-Steel, A, Kolbe, LM., Marrone, M. & Gacenga, F. 2010, 'Achieving value through IT service management transformation: an international perspective', itSMF Australia, Queensland Branch Seminar, State Library of Queensland, Brisbane, December, <http://www.itsmf.org.au/modules/resource/file.php?id=699>.

________________________________ 17 June 2013

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Endorsement

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Aileen Cater-Steel, Principal Supervisor

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Mark Toleman, Associate Supervisor

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"Ad majorem Dei gloriam".

(To the greater glory of God) - St. Ignatius Loyola

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Table of Abbreviations

Abbreviation	**Description**
ACIS	Australasian Conference on Information Systems
AGIMO	Australian Government Information Management Office
AIS	Association for Information Systems
AMCIS	Americas Conference on Information Systems
ANT	Actor Network Theory
ARC	Australian Research Council
ARC	Australian Research Council
BPMN	Business Process Model and Notation
BSC	Balanced Scorecard
BYOD	Bring Your Own Device
CAB	Change Advisory Board
CEO	Chief Executive Officer
CIO	Chief Information Officer
CMDB	Configuration Management Database
CMMI®	Capability Maturity Model Integration
CMS	Configuration Management System
COBIT	Control Objectives for Information and Related Technology
CPU	Central Processing Unit
CSF	Critical Success Factors
CSV	Comma Separated Values
DESRIST	Design Science Research in Information Systems and Technology
DMAIC	Define, Measure, Analyse, Improve, and Control
ECIS	European Conference on Information Systems
ECRM	European Conference on Research Methodology for Business and Management Studies
EJBRM	Electronic Journal of Business Research Methods

Abbreviation	**Description**
EJIS	European Journal of Information Systems
ERP	Enterprise Resource Planning
GE	General Electric
GFC	Global Financial Crisis
GITMA	Global Information Technology Management Association
GQM	Goal Question Metrics
HDI	Help Desk Institute
HICSS	Hawaii International Conference on System Sciences
HP® ITSM	HP IT Service Management Reference Model
HR	Human Resources
IaaS	Infrastructure as a Service
IBM®	International Business Machines
IBM® SMRM	IBM Service Management Reference Model
ICIS	International Conference on Information Systems
ICSM	Institute of Certified Service Managers
ICT	Information and Communication Technology
IOSM	Institute of IT Service Management
IS	Information Systems
DSRM	Design Science Research Methodology
ISFS	IS Functional Scorecard
ISO 27001	Information security management system (ISMS) standard
ISO/IEC 20000	International Organization for Standardization/International Electrotechnical Commission ITSM standard
ISR	Information Systems Research
IT	Information Technology
ITIL®	Information Technology Infrastructure Library
ITSCM	IT Service Continuity Management
ITSM	Information Technology Service Management

Abbreviation	Description
itSMF	Information Technology Service Management Forum
itSMFA	Information Technology Service Management Forum Australia
itSMFI	Information Technology Service Management Forum International
ITUP	IBM Tivoli Unified Process
JAIS	Journal of Association for Information Systems
JGITM	Journal of Global Information Technology Management
JIT	Journal of Information Technology
JMIS	Journal of Management Information Systems
JSIS	Journal of Strategic Information Systems
KPI	Key Performance Indicator
MAPS	Matching Analysis Projection and Synthesis
MIS	Management Information Systems
MISQ	Management Information Systems Quarterly
MOF®	Microsoft Operations Framework
NRA	Normatively Regulated Activities
OGC	Office of Government Commerce
OH&S	Organisation Health and Safety
OWL	Web Ontology Language
PaaS	Platform as a Service
PACIS	Pacific Asia Conference on Information Systems
PAM	Process Assessment Model
PI	Performance Indicator
PMBOK	Project Management Body of Knowledge
PMF	Performance Measurement Framework
PPPT	People, Process, Partners, Technology
PRINCE	Projects in Controlled Environments
PRM	Process Reference Model

Abbreviation	Description
QH	Queensland Health
RBV	Resource Based View
RFC	Request for Change
ROI	Return on Investment
RQ	Research Question
SaaS	Software as a Service
SACM	Service Asset and Configuration Management
SCM	Service Catalogue Management
SIGSVC	Special Interest Group on Services
SLA	Service Level Agreement
SLM	Service Level Management
SLR	Systematic Literature Review
SOA	Service-Oriented Architecture
SPM	Service Portfolio Management
SPOC	Single Point of Contact
SPSS	Statistical Package for Social Sciences or Statistical Product and Service Solutions
UK	United Kingdom
UML	Unified Modelling Language
US/USA	United States of America
USQ	University of Southern Queensland

Table of Standards

Standard	Description
ISO9000	Quality management systems standards
ISO/IEC 20000	International standard for IT service management
ISO/IEC15504	Information technology — Process assessment standards

Chapter 1 Introduction

1.1 Background to the research

This study aims to develop a performance measurement framework for Information Technology Service Management (ITSM) that can be used by organisations to identify benefits gained from the implementation of ITSM initiatives to help improve Information Technology (IT) service. The study was funded by an Australian Research Council (ARC) linkage grant in partnership with Queensland Health (QH) and had the support of the IT Service Management Forum Australia (itSMFA). The ARC linkage project is based on an existing partnership between USQ and itSMFA. The project presents the first attempt to identify types of benefits gained and ITSM performance metrics used by organisations implementing IT Service Management (ITSM). The project recognises there is a need to transform the management of crucial IT infrastructure in Australian industries by disseminating approaches such as ITSM. The project develops a performance measurement framework for ITSM that may assist ITSM managers and organisation in their IT service improvement initiatives.

This chapter introduces the study and is organised into eight sections. Section 1.1 provides the background to the study. The research problem is described in section 1.2, followed by the justification for the research in section 1.3. The methodology used in the study is introduced in section 1.4. The structure of the dissertation is outlined in section 1.5, followed by an overview of the key definitions used in the study. The delimitations of the scope and key assumptions are provided in section 1.7 and a conclusion of the chapter is presented in section 1.8. The overview and section linkages of this chapter are shown in Figure 1.1.

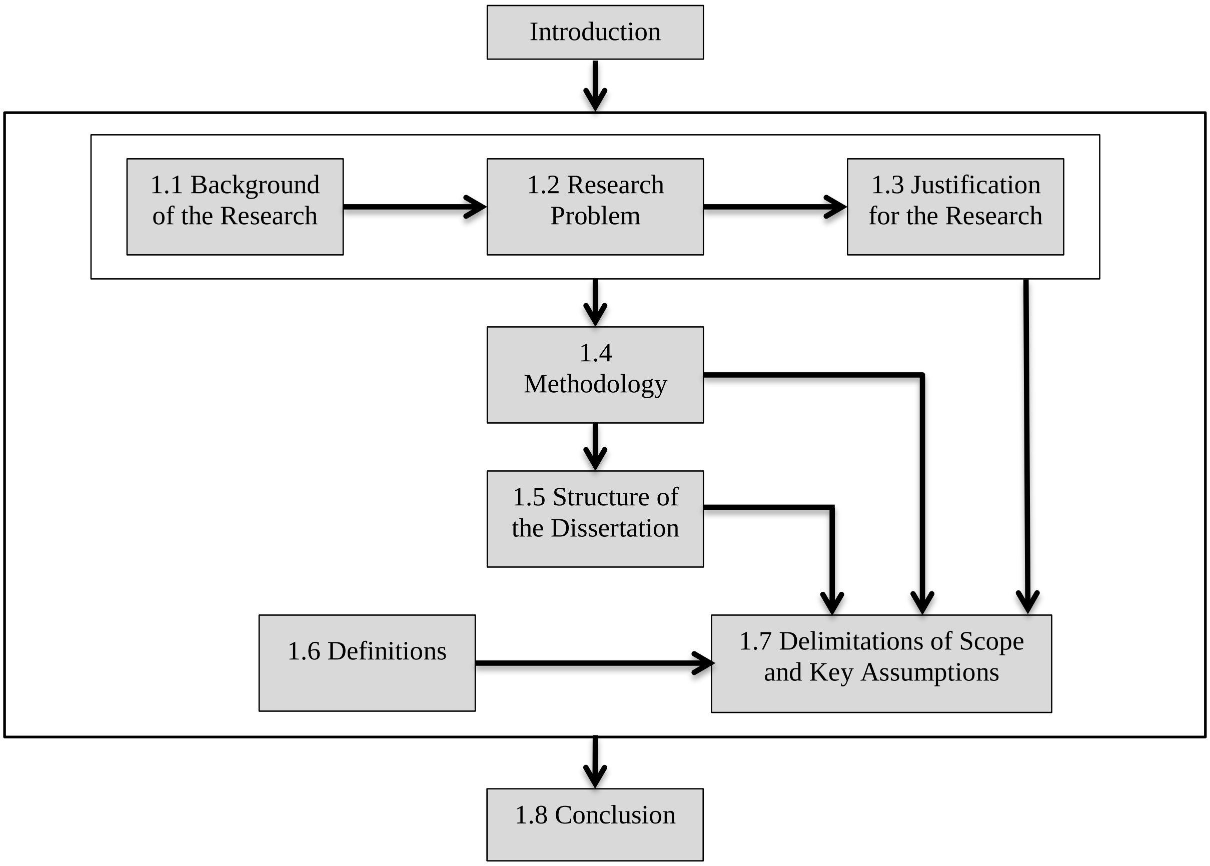

Figure 1.1 Chapter 1 overview and section linkages

The growth of the service economy has resulted in service-oriented thinking as organisations attempt to increase value delivered to their customers. Parallel developments in a variety of disciplines such as Information Systems, Computer Science, Marketing, Economics, Accounting, Finance, and Operations and Supply Chain Management have resulted in a service focus. In Information Systems the service focus is provided in ITSM (2007; Galup, Dattero, Quan & Conger 2009) and, more recently, in what is now labelled Service Science (Bardhan, Demirkan, Kannan, Kauffman & Sougstad 2010; Chesbrough & Spohrer 2006; 2007; Galup et al. 2009; Maglio, Srinivasan, Kreulen & Spohrer 2006; Spohrer & Riecken 2006). In the Computer Science discipline a service focus is evident in Infrastructure as a Service (IaaS), Software as a Service (SaaS), and Service-Oriented Architecture (SOA). The subject of service management in Information Systems is developing in ITSM and Service Science. Service Science is defined in Katzan (2008, p. vii) as “the application of scientific, engineering, and management competencies that a service-provider organisation performs that creates value for the benefit of the client or customer”. This study focuses on ITSM but also includes service science research findings. In an increasingly complex portfolio of capabilities, resources and offerings, organisations are faced with the challenge of no longer managing IT as a technology-focused organisation function but as a collection of services delivered to the customer. Organisations implementing ITSM improvement initiatives face the challenge of measuring the performance of ITSM.

As more organisations embrace ITSM as an approach to manage the operations of their IT functions a number of ITSM frameworks, standards and models have been developed. Some of the common frameworks and models include IT Infrastructure Library (ITIL®), IBM® Service Management Reference Model, Microsoft Operations Framework (MOF®) and HP IT Service Management Reference Model (HPITSM®). ITIL versions 2 and 3 are the most frequently adopted ITSM frameworks. According to Cater-Steel (2009), 'Many IT service departments are adopting IT service management best practice frameworks such as the IT Infrastructure Library (ITIL) to improve the quality of service to customers' (p. 1). Championed by the internationally—active IT Service Management Forum (itSMF), ITIL is widely adopted and recognised for providing best practice guidance on effective management and control of IT service delivery and support (Barafort, DiRenzo & Merlan 2002; Hochstein, Tamm & Brenner 2005c; Hochstein, Zarnekow & Brenner 2005b).

ITSM frameworks and the ISO/IEC 20000 (ISO/IEC 2005) International standard for IT Service Management have been readily adopted by organisations in both the public and private sectors worldwide, including Australia, as a means of providing effective management and control of IT services (Cater-Steel & Tan 2005; Cater-Steel, Tan & Toleman 2007, 2008, 2009b). IT departments are under pressure to deliver IT services that facilitate achievement of organisations' strategic goals.

This research is based on an ARC research proposal. In this study the research problems, questions and objectives are determined by the ARC linkage project. These are used in the study as the basis in the development of a conceptual framework. The results of the literature review are used to revise the conceptual framework. The study's literature review refines the research problem and focuses the research questions into measureable variables addressing gaps identified in the reviewed literature and contributing to the design of an ITSM performance measurement framework. The results of the survey quantitative analysis and statistical tests confirm the conceptual model by quantifying specific attributes of the research variables and statistically testing the relationships between the measured variable attributes. The results of the literature review, case study and confirmed conceptual framework are synthesised in the design of an ITSM performance measurement framework. A summary of the major study inputs, processes and outputs are shown in Figure 1.2.

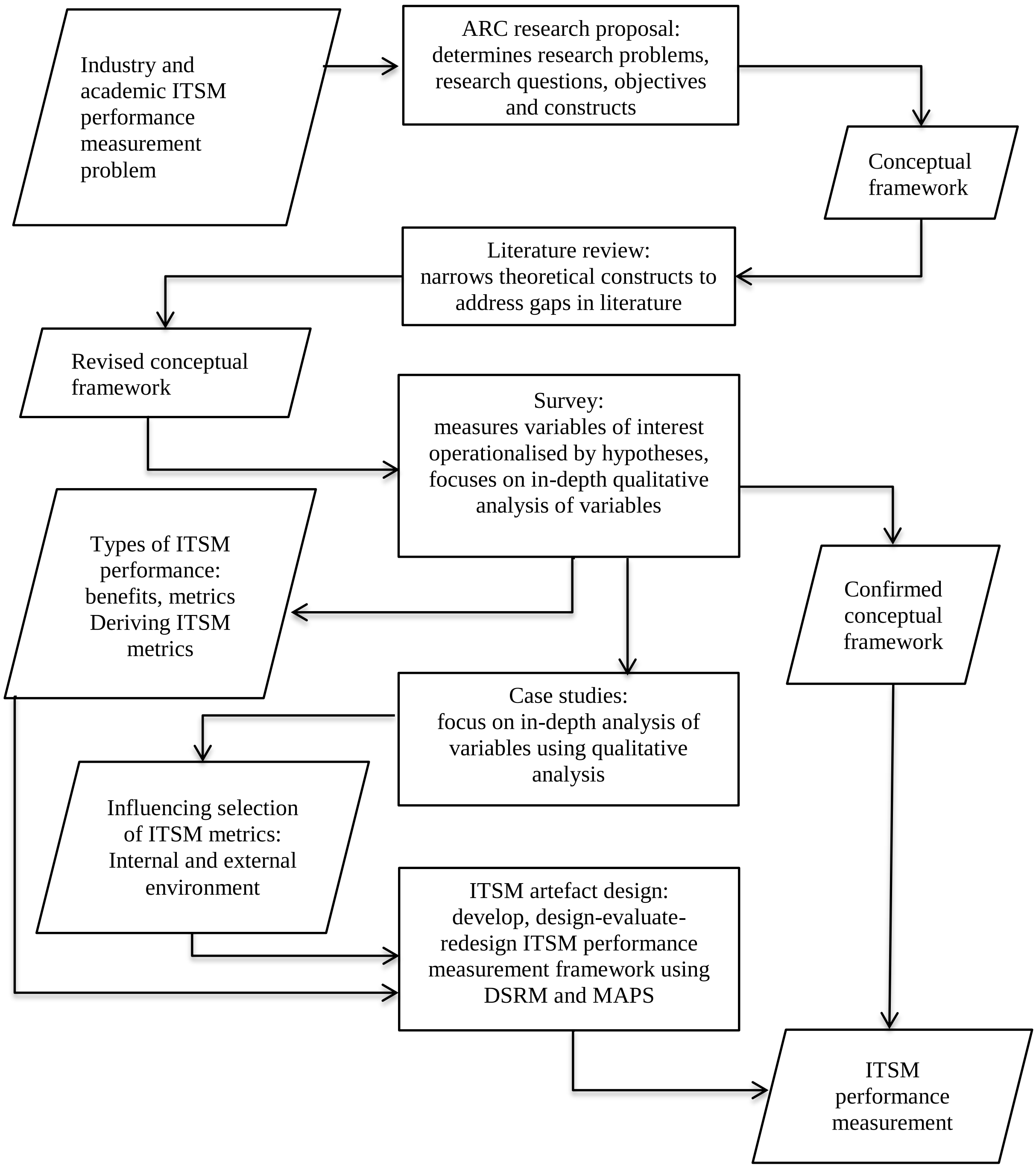

Figure 1.2 Research process flowchart showing major inputs, processes and outputs

1.2 Research problem

The extensive adoption of ITSM frameworks by organisations may point to the acceptance by IT service managers that frameworks such as IT Infrastructure Library (ITIL) and standards such as ISO/IEC 20000 can deliver real operational efficiencies, ultimately translating into revenue-increasing and cost-reducing benefits. Organisations implementing ITSM initiatives report realisation of benefits in cost savings and standardisation in delivery of IT service and support (Cater-Steel, Tan & Toleman 2011). However, despite the appeal and potential to realise benefits, the implementation of ITSM initiatives are influenced not only by the size of the investment required but also by the difficulty in quantifying benefits and linking operational and financial benefits together (Tan, Cater-Steel & Toleman 2010).

There are a number of studies on adoption or implementation of ITSM, but little research has been undertaken to date on the benefits of implementation and performance measurement of ITSM (Marrone & Kolbe 2010).

To address this problem, the following research questions are investigated by the study:

1. *What types of benefits are reported by organisations from ITSM improvement initiatives? (RQ1)*

2. *Which specific metrics can be used to measure ITSM performance? (RQ2)*

3. *How can specific ITSM performance metrics be derived? (RQ3)*

4. *What internal and external environmental factors influence organisations' selection of specific performance metrics for ITSM? (RQ4).*

A conceptual framework of the study is presented in Figure 1.3.

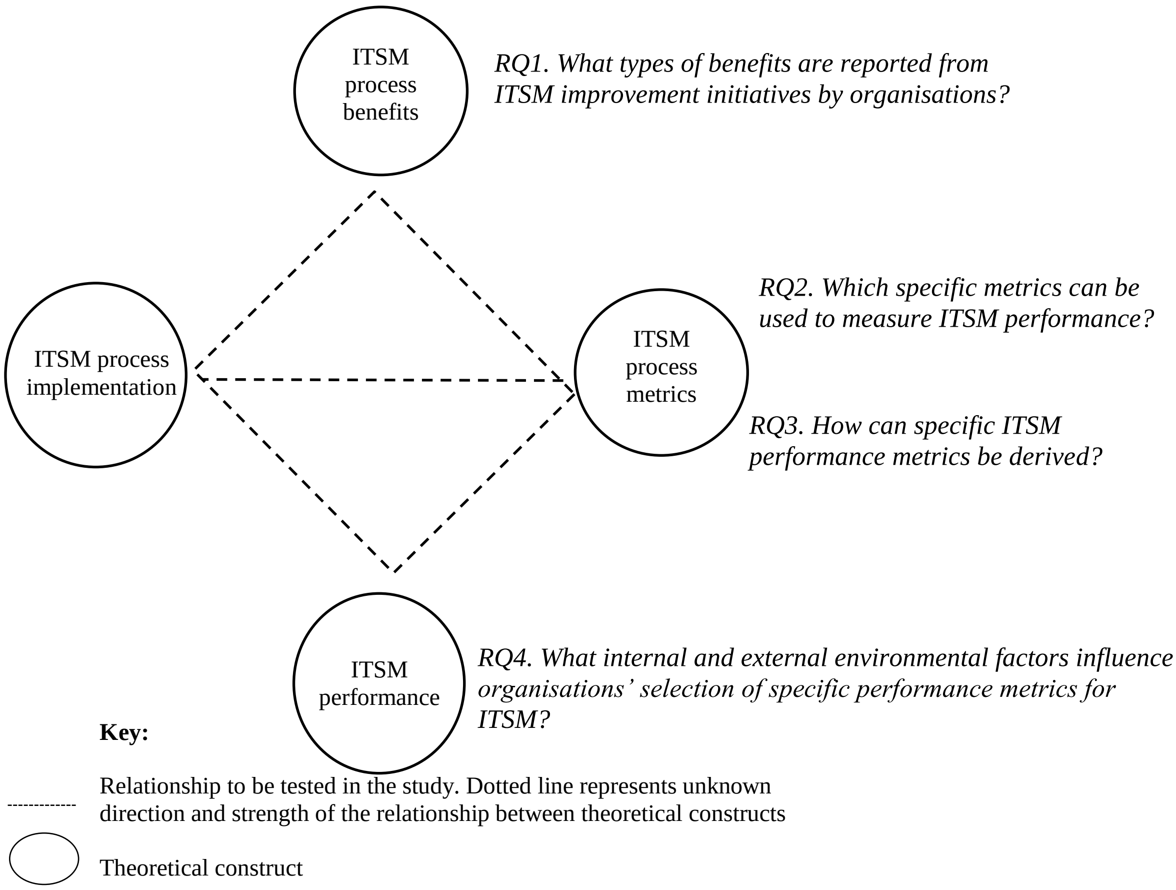

Figure 1.3 Study conceptual framework

In the conceptual framework the direction and strength of the relationship between the theoretical constructs is unknown and not assumed and, hence, is represented by dashed lines.

Answering the research questions provided contributions that are presented in Chapters 4 and 5. In summary, this research makes six contributions:

1. Development of a framework that can be used by organisations to measure and report the performance of ITSM and identify the benefits gained from ITSM initiatives (RQ1), (RQ2), (RQ3), and (RQ4).
2. Development of a framework that can be used by organisations to organise ITSM metrics and aid in the standardisation of ITSM performance measurement (RQ2) and (RQ3).
3. Structuring of the performance measurement framework to facilitate communication with the business by integrating it with the Balanced Scorecard (BSC) to link the metrics and benefits with strategy (RQ1) and (RQ2).

4. Identification of the internal and external organisational factors that influence the selection of performance metrics for ITSM by an organisation (RQ4).
5. Development of a contingency theory for the performance measurement of ITSM (RQ4).
6. Providing a comprehensive review of research on ITSM performance measurement (RQ1), (RQ2), (RQ3) and (RQ4).

1.3 Justification for the research

A number of studies document the problem of measuring and reporting the performance of information systems (Chang & King 2005; DeLone & McLean 1992; Pitt, Watson & Kavan 1995; Scott 1995; Seddon, Graeser & Willcocks 2002) and identify the area of performance measurement of the IT function as being under-researched (Chang & King 2005). This lack of research in the area is also noted by Dehning and Richardson (2002) who report that ‘never before has IT played such an important role in the existence of companies, yet the overall impact of IT on performance remains largely an unexplained puzzle’ (2002, p. 27). They also note that the strategic use of IT is probably the least developed area in examining the relationship between IT and performance.

It is reported that organisations have a large IT expenditure, with IT operations receiving the largest share estimated at 70 percent of the IT budget spent on IT operational expenses (IBM Corporation 2012). The size of global IT spending reached US$3.8 trillion in 2012, with IT services spending reaching US$848 billion (Gartner Inc. 2012). Information Systems (IS) productivity measurement studies show that IS management is a key factor in providing organisations with a competitive advantage. For instance, Weill (1992) established that the quality of firm-wide management and commitment to IT was a significant moderator between strategic IT investment and firm performance. This finding is echoed by Son, Weitzel and Laurent (2005) who note that the control and governance of the IT function is becoming a critical issue for organisations due to significant investment in the IT function.

Measurement problems have plagued evaluation of all types of IT investment for many years and led to the ‘IT productivity paradox’, which is described as ‘little evidence of a link between computer investment and productivity’ (Brynjolfsson &

Hitt 1998). Although it has been claimed that the IT productivity paradox has since been resolved (Brynjolfsson & Hitt 1998; Dedrick, Gurbaxani & Kraemer 2003), a similar challenge in measuring and reporting the benefits of ITSM remains. Aligning IT and business was recently ranked in the top five key management concerns and has been the major concern for IT managers for almost thirty years (Luftman & Ben-Zvi 2011). Luftman and Ben-Zvi (2011) note that alignment continues to be elusive for four reasons, including organisations' tendency to pursue a silver bullet instead of addressing multiple strategic alignment maturity components such as 'IT metrics, communications, partnership, governance, human resources, and technology scope' (Luftman & Ben-Zvi 2011, p. 5). The other three reasons cited are the need for organisations to transcend to the recognition that it is not about how IT is aligned with the business, but how IT and business are aligned with each other; to go beyond a focus on IT infrastructure; and the need for IT leaders to resolve the debate on terms used to describe the alignment conundrum.

Therefore, it is worthwhile to research ITSM performance measurement and develop a performance measurement framework for ITSM to help business and IT managers.

This study is significant because an ITSM performance measurement framework is important to organisations for a number of reasons. Though organisations report benefits from their ITSM implementation, few studies have shown supporting metrics used to derive reported benefits. ITSM performance measurement is also important because of the size of the investment of IT expenditure and the competitive advantage that IT can deliver to an organisation. It is beneficial for organisations to measure the performance of their ITSM and it has been found that investments in IT management are value relevant; that is, they have an impact on the organisation's market value (Dehning & Richardson 2002).

In their paper discussing the importance of non-financial measures, Ittner and Lacker (2003, p. 2) report that 'Companies that adopted non-financial measures with a causal link between those measures and financial outcomes produced significantly higher returns on assets and returns on equity over a five-year period than those that did not'. An ITSM performance measurement framework that includes quantitative and qualitative measures linked with the organisation's strategy will lead to potential gains for an organisation.

The literature review shows that no research project has been conducted at the doctoral level on the performance measurement of ITSM. There is related doctoral research on ‘IT audit systems alignment and effectiveness measures’ (Nicho 2008) and ‘business-driven IT management’ (Bartolini 2009). Related research has been at master’s level (Belo de Oliveira 2009; Botha 2004; Lynge & Schou 2008; Manuel de Oliveira 2007) and bachelor’s degree level (Malcolm 2009; McNaughton, Ray & Lewis 2010). This study proposes to address this research gap by developing a performance measurement framework for ITSM to improve IT service management in organisations.

1.4 Methodology

This study uses a multi-paradigmatic and mixed-methods approach by applying social science and design science paradigms. Mixed-methods research is defined as research which collects and analyses both qualitative and quantitative data, mixes the two forms of data concurrently by combining them, frames the procedures within philosophical worldviews and theoretical lenses, and combines the procedures into specific research designs for conducting the study (Creswell, Clark & Vicki 2011). For this study, a mixed-method approach was selected as phenomena in information systems are complex and comprise both socio-technical and artificial components. The underlying framework for the design of the study is summarised in an adaptation of Creswell’s (2009) model, as shown in Figure 1.4.

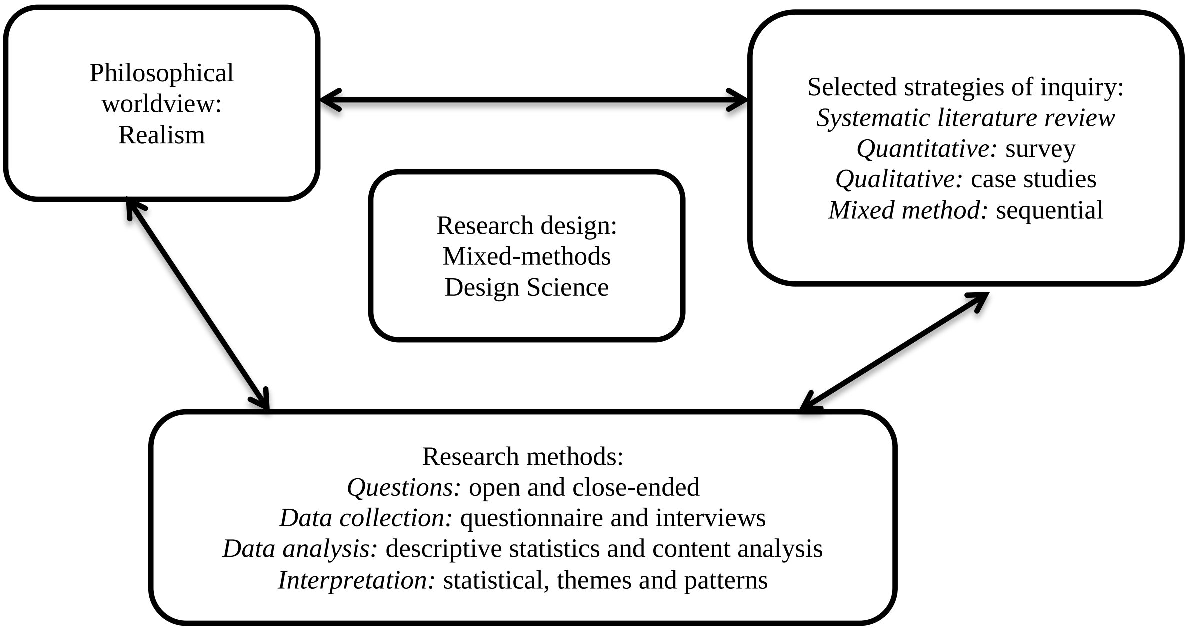

Figure 1.4 The interconnection of worldviews, strategies of inquiry and research methods

The study conducts a survey on ITSM benefits and performance metrics to identify and describe ITSM performance measurement practices as the basis for selecting the case studies used to further explain the factors influencing the selection of ITSM performance metrics. The results of the literature review, survey and case studies are synthesised using design science in the development of an ITSM performance measurement framework. Survey and interview methods are used for data collection, while quantitative and qualitative analysis are used for data analysis. The Design Science Research Methodology (DSRM) framework (Peffers, Tuunanen, Rothenberger & Chatterjee 2008) is used and the design step in the framework is enhanced using Matching Analysis Projection Synthesis (MAPS) (Chow & Jonas 2008).

1.5 Structure of Dissertation

The dissertation is organised into seven chapters. Chapter 1 provides a background to the study and an introduction to the research. Justifications, methodology, definitions and delimitations of the scope of the study are provided.

Chapter 2 uses a systematic literature review to highlight the gaps in literature relating to the performance measurement of information technology service management. Current research is summarised and used to formulate research questions.

In chapter 3 the research approach comprising philosophy, design, and method is described. The multi-paradigmatic and mixed-methods approach is explained and justified. The research design, methods and ethical issues are described. Limitations of the model and theory are discussed, along with the study reference disciplines and unit of analysis.

Chapter 4 describes the results of the survey and case studies. The quantitative and qualitative analysis applied on the survey data is explained. The results of the statistical tests on the survey data, the hypotheses tests, and content and cross-case analysis of the case studies data is described. The results of the analysis are used to answer the research questions.

Chapter 5 focuses on the design of the performance measurement framework and describes the design science steps taken to develop the ITSM performance measurement framework artefact. The results of the design and development, as well as the outcomes of the evaluation and communication, are presented. The development of the ITSM performance measurement framework, contingency theory for the performance measurement of ITSM, and proposed improvement to ITSM performance measurement catalogues are explained.

Chapter 6 presents a discussion on the study's findings. This chapter provides a critical examination of the results and reflection on the meaning of the results.

Chapter 7 summarises the findings of the study in terms of the four research questions. The contribution of research to the body of knowledge is discussed and implications of the research to theory and practice are considered. Then limitations of the study are discussed and recommendations and areas of future research proposed.

Figure 1.5 depicts the research process and the dissertation chapter links.

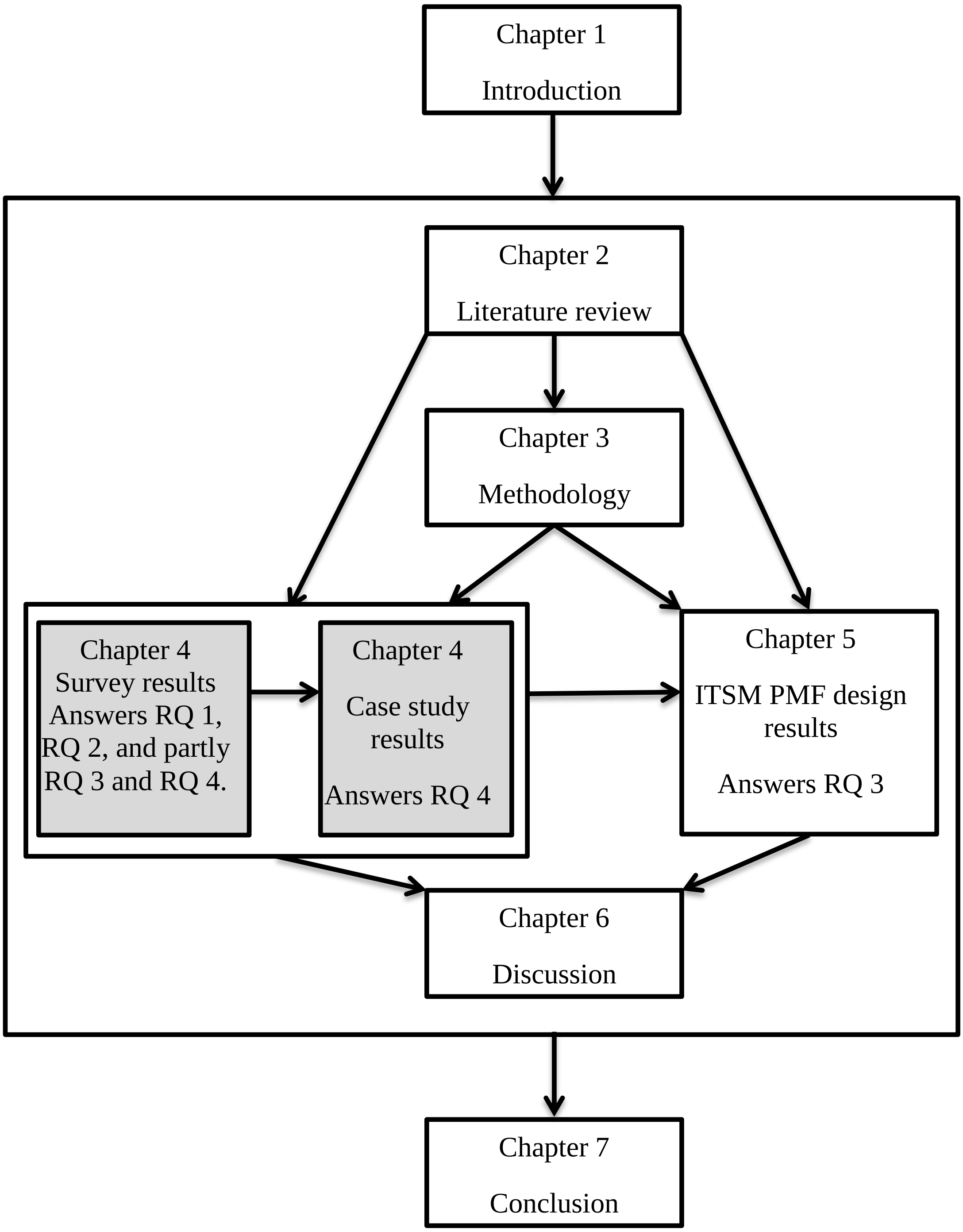

Figure 1.5 Outline of the dissertation

1.6 Definitions

Some of the terms and definitions used in this dissertation may differ from common usage, or are not uniformly defined by other researchers. In this section, key and controversial terms are defined to provide clarity on the positions taken in the study.

Service. This study applies the recommendation to abandon the strategy of differentiating services from goods, and replaces it with a strategy of understanding how goods and services are related: 'Goods are not the common denominator of exchange; the common denominator is the application of specialized knowledge, mental skills, and, to a lesser extent, physical labour (physical skills)' (Vargo & Lusch 2004a, p. 8). A further elaboration clarifies the focus on service offerings: 'Customers are not primarily interested in what they buy and consume, but in what they can do with what they have in their possession' (Grönroos 2008). Customers do not buy goods or services; they buy offerings that create value (Gummesson 1999). This is underlined in OGC (2007b, p. 16): 'For various reasons, customers seek outcomes but do not wish to have accountability or ownership of all the associated costs and risks'.

Taking the advice of Vargo and Lusch (2004a), the study excludes the emphasis on goods versus services as the distinction has become increasingly blurred; and this is the case in IS where reference is made to products as services (e.g. software as a service [SaaS], platform as a service [PaaS], infrastructure as a service [IaaS]—cloud computing, servitisation). Physical goods and services are part of the delivery of value and are identified as resources and capabilities in OGC (2007b, p. 39): 'Resources and capabilities are types of assets. Organisations use them to create value in the form of goods and services. Resources are direct inputs for production. Management, organisation, people, and knowledge are used to transform resources. Capabilities represent an organisation's ability to coordinate, control, and deploy resources to produce value'.

There is a variety of definitions of service used in the reviewed literature and the following are a few that are appraised for use in the study. One definition states 'a service is a provider/client interaction that creates and captures value' (Katzan 2008, p. 2). A more detailed definition of service is 'the application of specialised competences (knowledge and skills) through deeds, processes, and performances for the benefit of another entity or the entity itself' (Vargo & Lusch 2004b, p. 2) .

This study adopts the definition provided by the UK's Office of Government Commerce (OGC) (2007b) and Van Bon and Van Selm (2008, p. 15): 'a service is a means of delivering value to customers by facilitating the outcomes that customers want to achieve without the ownership of specific costs and risks'. This definition of service is adopted as it is consistent with the other literature reviewed and is widely used in the ITSM community.

Service management. Service Management is defined differently in other disciplines. One definition is from IT Service Management and the other is from Service Marketing. From ITSM, according to OGC (2007b): ‘Service Management is a set of specialised organisational capabilities for providing value to customers in the form of services’. The study adopts the broader definition of service management from Service Marketing by Albrecht cited in Grönroos (1994, p. 6), ‘Service management is a total organisational approach that makes quality of service, as perceived by the customer, the number one driving force for the operations of the business'.

IT service: The application of specialised competencies through a combination of people, processes and technology. The OGC (2007b, p. 243) defines IT service as ‘a service provided to one or more customers by an IT service provider. An IT service is based on the use of Information Technology and supports the customer’s business processes. An IT Service is made up from a combination of people, Processes and technology and should be defined in a Service Level Agreement (SLA). IT services are conceptualised, designed, built, operationalized, maintained, improved and retired by actors using tools and relying on capabilities’. A service is a provider/client interaction that creates and captures value (IBM Research 2012). For an IT service to be possible the following key elements must all, or in part, come together:

- Actors (suppliers + IT function employees + Customers + Management)
- Tools (Hardware + Software + Data [Customer, IT Function, Supplier])
- Management (Frameworks and standards)
- Capabilities (Tools knowledge, Actor knowledge, Management knowledge)
- Environment—where and how the service comes together (Provider + customer).

IT Benefit. The study applies the definition of benefit espoused by Bradley (2010, p. 23), that is, ‘an outcome of change that is perceived as positive by a stakeholder’.

The study adopts the perspective of an IT benefit provided by Peppard, Ward and Daniel (2007): benefits result from the effective organisational use of IT; benefits arise when IT enables people to perform their roles in more efficient or effective ways; benefits are not outcomes which automatically occur; there is often a lag in benefits accumulation after IT implementation, i.e. a time gap between initial investment and payoff.

Information technology service management. The following are some of the definitions of IT service management from the literature review. A process oriented definition of ITSM is offered by Young cited in Salle (2004, p. 9): 'A set of processes that cooperate to ensure the quality of live IT services, according to the levels of service agreed to by the customer. It is superimposed on management domains such as systems management, network management, systems development, and on many process domains like change management, asset management and problem management'.

A broad definition offering a focus on the organisation as the customer of IT services is seen in Winniford, Conger and Erickson-Harris (2009, p. 153): 'Information Technology Service Management (ITSM) focuses on defining, managing, and delivering IT services to support business goals and customer needs'.

A definition emphasising process and customer orientation is offered by Van Bon and Van Selm (2008, p. 20): 'IT Service Management is the management of all processes that co-operate to ensure the quality of live IT services, according to the levels of service agreed by with the customer'.

A broad definition of ITSM which gives a customer orientation without committing to the mechanics of the organisation is offered by Keel, Orr, Hernandez, Patrocinio and Bouchard (2007, p. 549): 'Information technology service management (ITSM) is a discipline for managing organisations providing information technology (IT) services from a customer's perspective'.

In an attempt to provide an overall integration of ITSM models, standards and frameworks, Black, Draper, Lococo, Matar and Ward (2007, p. 408) define ITSM as being 'about the definition and delivery of IT services and the management of the organisation that provides the service'. This is similar to 'Information Technology

Service Management (ITSM) focuses on defining, managing, and delivering IT services to support business goals and customer needs, usually in IT Operations' (Conger, Winniford & Erickson-Harris 2008, p. 1). An analysis of the ITSM definitions of ITSM shows a variety in focus and emphasis:

- Salle (2004) offers a process-oriented definition;
- Winniford et al. (2009) focus on the organisation as the customer;
- Van Bon and Van Selm (2008) lay emphasis on process and customer orientation;
- Keel et al. (2007) present a broad definition that gives a customer orientation without committing to the mechanics of the organisation; and
- Black et al. (2007) and Conger et al. (2008) give emphasis to the definition, management and delivery of IT services.

Based on these definitions the study defines ITSM as *a customer-oriented approach by IT practitioners to manage IT operations organised around IT services.* IT service management is the planning, design, implementation, operation and improvement of IT services. This definition is similar to the broad definition offered by Keel et al. (2007) which describes ITSM as an approach rather than a discipline. This study identifies Information Systems as the discipline.

Managers taking an ITSM approach typically apply frameworks such as ITIL, Microsoft® Operations Framework (MOF®) (Pultorak, Henry & Leenards 2008), IBM® Service Management Reference Model and HP®ITSM (Van Bon 2007) and, recently, the ITSM International Standard, ISO/IEC 20000 (ISO/IEC 2005). This study's definition of ITSM distinguishes performance measurement from governance and quality assurance. By distinguishing ITSM from IT governance this study applies the advise in Salle (2004) on IT Governance as focused on contributing to ensuring the delivery of value to the business and positioning IT for the future by mitigating risks.

Organisations need both IT governance and ITSM and it is acknowledged that organisations adopting ITSM frameworks concurrently implement governance frameworks such as CobiT® and quality management frameworks and standards such as Six Sigma and ISO9000 (Cater-Steel, Tan & Toleman 2006a). In delimiting the definition of ITSM, it is distinguished from governance and quality assurance. By referring to service offerings the definition includes IT goods and services and places the focus on the customer perspective.

Service performance: The actions taken to make the service possible. In ITSM frameworks such as ITIL the actions are described as activities within processes that are part of life cycle phases.

Performance measurement. A recognised challenge in performance measurement efforts and literature in both academia and industry is the poor definition of terms that leads to a lack of clarity (Tangen 2005). This section outlines definitions of key performance measurement terms that will be used in this study. A definition widely used in production and operations management, accounting and information systems journal articles, and one that will be used for this study for performance measurement, is 'the process of quantifying the efficiency and effectiveness of action' (Neely, Gregory & Platts 2005, p. 1229). Performance measurement should be understood as a broad term that 'covers both overall economic and operational aspects' (Tangen 2005, p. 40), including measures of productivity, profitability and quality.

The following definitions by Sink and Tuttle (1989, pp. 171-2) are adopted: Effectiveness is defined as 'the actual accomplishment of the "right" things, on time, within the quality requirements specified. The operational measure for effectiveness is actual output divided by expected output.' Efficiency means doing things right, defined as 'resources expected to be consumed divided by resources actually consumed'.

The definition of a performance measurement framework is derived from the performance measurement system definition espoused by Neely et al. (2005, p. 1229): 'A performance measurement system can be defined as the set of metrics used to quantify both the efficiency and effectiveness of actions'. A framework is defined as 'a structure composed of parts framed together, especially one designed for enclosing or supporting anything; a frame or skeleton' (OUP 2000). In this study the performance measurement framework will be a framework with accompanying guidance on the selection of specific ITSM performance metrics at the process level and how these link to tactical and strategic level Balanced Scorecard (BSC) objectives. A framework is desirable as it goes beyond addressing underlying performance measurement and addresses the practicalities of making the performance measurement system meaningful to practitioners (Tangen 2004).

Performance metrics. The definition of performance metrics and performance measures is fundamental to this study. A key aspect of the ITSM performance measurement framework developed for the study is the clarification of terms. A performance metric is ‘the definition of the scope, content and component parts of a broadly-based performance measure’ (Neely, Adams & Kennerley 2002, p. xiii). In ITSM, an example of a performance metric would be customer satisfaction. A performance measure can be defined as a ‘parameter used to quantify the efficiency and/or effectiveness of past action’ (Neely et al. 2002, p. xiii). In ITSM, an example of a performance measure would be the number of customers selecting *excellent* for service delivery in a customer survey.

There are different interpretations to the terms metrics and measures and, in some instances, a distinction between the terms is not made. The use of the word *measure* in ITSM, which can be a verb, a noun or an adjective, is seldom elaborated. The Macquarie dictionary (2012) offers a distinction between *measure* as a noun or verb and offers the following definitions for a metric as an adjective relating to the metre or to the system of measures and weights upon which it was originally based.

A metric is defined as ‘a scale of measurement defined in terms of a standard; metrics are a system of parameters or ways of quantitative assessment of a process’ (OGC 2011). Alternatively, a metric is defined as ‘something that is measured and reported to help manage a process, IT service or activity’ (OGC 2009, p. 146). A similar definition states metrics are ‘counted or calculated values that quantify certain characteristics of a process, product or service’ (Chiu & Nouri 2009). An alternative metric definition offered is ‘just another term for a measure’ (Brooks 2006; Smith 2008). A similar definition of metrics is ‘specific indicators that are stated to show progress or achievement; they are based on simple descriptive statistics’ (McNaughton et al. 2010). The study further notes that metrics have the purpose of measuring process benefits and outcomes, rather than monitoring and controlling the process. Applying BSC perspectives, Donko and Traljic (2009) add that ITSM performance can be measured against BSC objectives. They define metrics as ‘quantifiable performance statements that indicate how an initiative is performing relative to its objectives’ (Donko & Traljic 2009). In the ITIL Continual Service Improvement book, the OGC (2011) notes that the purpose of metrics is to support continual service improvement and other ITSM process activities; and that metrics can be used to ‘validate, justify, direct and intervene’. More specifically, metrics help management to ‘steer and control IT in the desired direction’ (Brooks 2006), ‘towards strategic objectives’ (Smith 2008). Additionally, effective metrics help ‘prevent operational risk’ (Steinberg 2006).

This study adopts the definition of a measure, used as noun, as a ‘parameter used to quantify the efficiency and/or effectiveness of past action’ (Neely et al. 2002, p. xiii) that is a part of a metric, which is ‘the definition of the scope, content and component parts of a broadly-based performance measure’ (Neely et al. 2002, p. xiii). Applying a definition that distinguishes between metrics and measures would alleviate some of the practical challenges faced in ITSM performance measurement.

Management: The planning, organising, leading and controlling of resources to achieve objectives for an organisation.

Design: ‘A goal-directed thinking process by which problems are analysed, objectives are defined and adjusted, proposals for solutions analysed, objectives are developed and the quality of those solutions is assessed’ (Roozenburg & Eekels 1995).

IT artefact: ‘IT artefacts are broadly defined as constructs (vocabulary and symbols), models (abstractions and representations), methods (algorithms and practices), and instantiations (implemented and prototype systems)’ (Hevner, March, Park & Ram 2004, p. 2). ‘Design science creates and evaluates IT artefacts intended to solve identified organisational problems’ (Hevner et al. 2004, p. 3).

1.7 Delimitations of scope and key assumptions

The study was limited in terms of geographic location, time and instruments used. This study is a cross-sectional study of organisations in Australia conducted over a three-year period. Though a mixed-methods approach was used, the individual instruments have inherent limitations.

Organisations surveyed and participating in the case studies were drawn from the membership of the itSMFA and, therefore, the study was limited to organisations located in Australia and which are members of itSMFA. The development of the ITSM metrics constituents focuses on three ITSM processes of change, incident and problem management.

1.8 Conclusion

In this chapter, the foundations of the dissertation have been laid out. The research problem was introduced and a justification for the study outlined. The methodology was briefly described and the design and analysis introduced. The limitations of the study were described. On these foundations, the dissertation proceeds with a detailed review of literature relating to the performance measurement of information technology service management.

Chapter 2 Literature Review

2.1 Introduction

Chapter 1 introduced the research problem related to the performance measurement of IT service management (ITSM) and the motivation for undertaking the research. Four research questions relating to the research problem were raised and form the basis of the literature review. The purpose of chapter 2 is to provide the context of the research within the Information Systems (IS) discipline, demonstrate the need for the research, identify the existing gaps in knowledge and justify the literature review approach taken in the study. An overview of the sections and section linkages in this chapter is shown in Figure 2.1.

Section 2.1 provides an introduction and outline to this chapter. Section 2.2 describes the context of the research and then highlights the challenges underlying ITSM performance measurement. Section 2.3 explains the literature review strategy and provides justification for the choice of the literature review method. Section 2.4 describes the literature review protocol. A review of selected theoretical, empirical and artificial literature from academia and industry is presented in section 2.6, section 2.7 and section 2.8. The literature review in these sections progresses from general to specific subject areas, first, examining organisation performance measurement literature, then IS performance measurement literature. Similarly, service management literature is reviewed, followed by IT service management literature. Section 2.5, section 2.6 and section 2.7 focus on the measurement of ITSM performance. Section 2.8 presents literature on performance measurement framework design. The focus of Section 2.5 is on performance measurement levels; while the focal point of Section 2.6 is on performance measurement frameworks. Section 2.7 focuses on performance measurement dimensions. The literature review findings related to RQ1, RQ2, RQ3, and RQ4 are then presented in section 2.9, section 2.10, section 2.11, and section 2.12 respectively. In section 2.13 a conclusion and summary of the results of the literature review is presented.

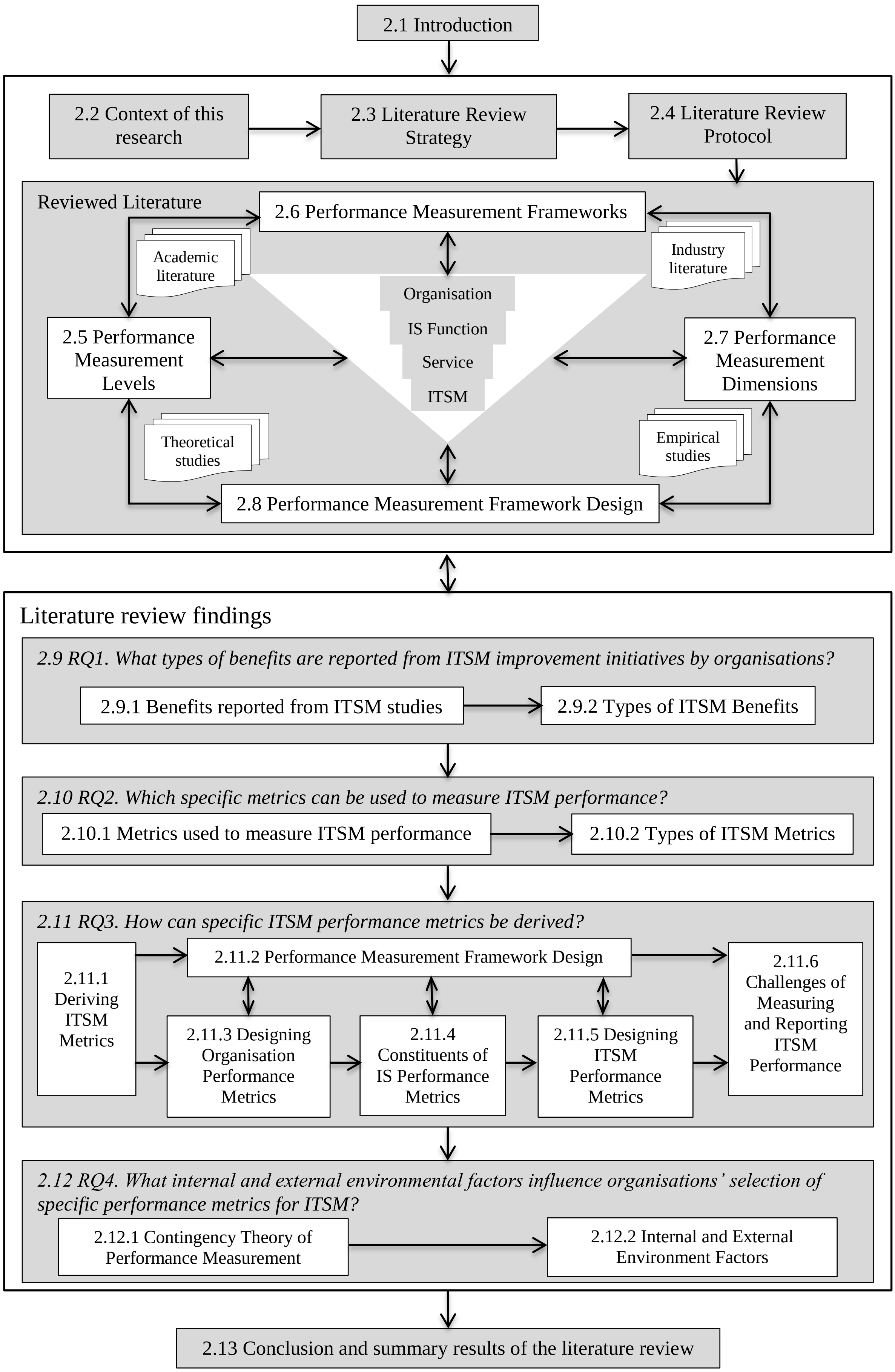

Figure 2.1 Chapter 2 overview and section linkages

The review of the selected empirical and theoretical literature centres on topics addressing the research questions and includes performance measurement, metrics, metrics classification, performance measurement framework design, service and the balanced scorecard (BSC). The review of IS design artefact literature focuses on organisation and ITSM performance measurement definitions, elements, principles and design. The review of empirical and theoretical studies progresses from general to specific subject areas, as depicted in Figure 2.2.

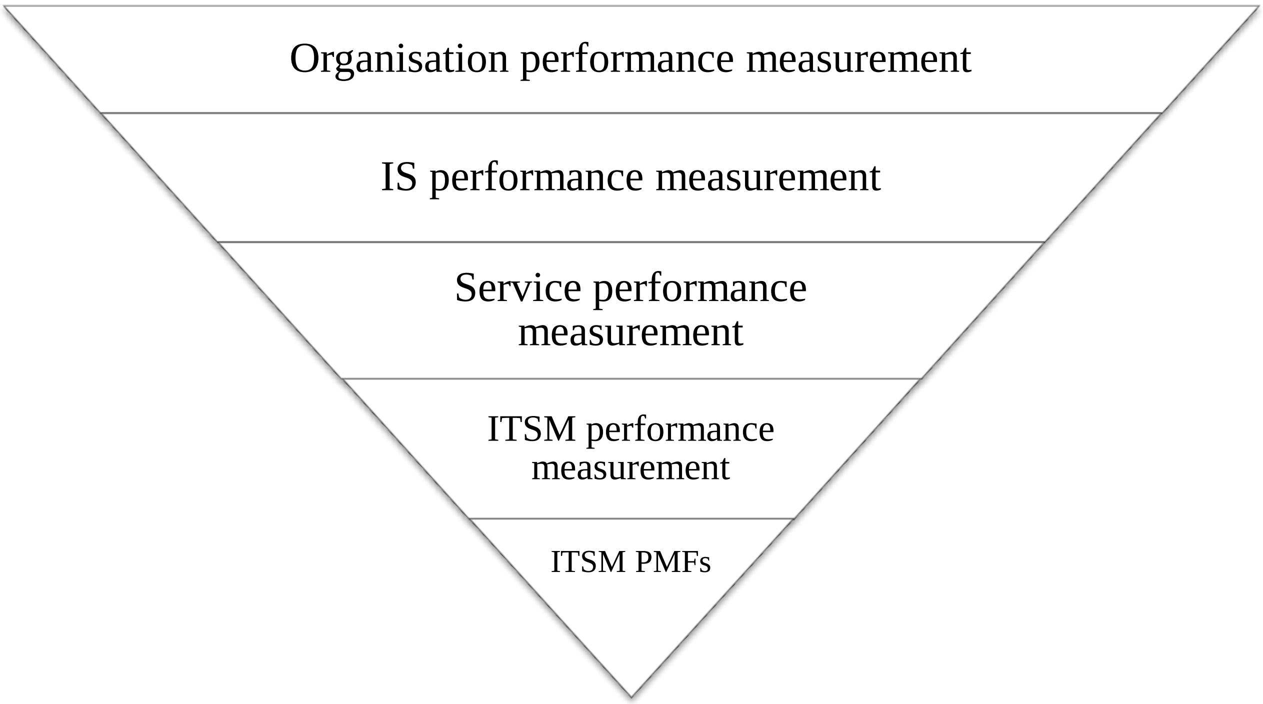

Figure 2.2 Overview of literature review

2.2 Context of this research

The measurement of performance of IT service management is an ongoing challenge for academics and practitioners. In an effort to achieve service-oriented management of their IT/IS operations, organisations adopt ITSM frameworks such as IT infrastructure library (ITIL®) (OGC 2007a). ITIL is the most commonly adopted of the ITSM frameworks and is recognised as providing effective management and control of IT service delivery and support (Barafort et al. 2002). Organisations have difficulty justifying the benefits of investing in IT service improvement initiatives (Cater-Steel 2009). An independent review of the Australian Government Information Management Office (AGIMO) policy found that ‘agency governance is weak on Information and Communication Technology (ICT) efficiency and there needs to be adequate capability for organisations to realise benefits from ICT projects' (Reinecke 2010, p. 10). The AGIMO policy review finds a lack of formal means to assess agencies' capability to commission, manage and realise benefits from ICT projects. Among other factors, challenges in measurement and reporting of the performance of IT service management (ITSM) hinder the effective application of IT services.

This study is motivated by the potential to realise benefits from IT service orientation through performance measurement of ITSM initiatives. Organisations adopting ITSM frameworks aim to achieve service orientation leading to improved organisation benefit realisation. The IS literature in the subject areas of performance management and service management is preceded by organisation management and service marketing literature. Studies in IS tend to apply theories and concepts from organisation management and service marketing literature. IS studies investigating performance measurement and service management employ research methods from behavioural science, artificial science and natural science paradigms. IS studies also range from pure to applied research.

ITSM has been of interest to industry since the 1970s, evidenced by early publications on the subject by IBM and the OGC in the 1980s; and followed by further industry publications in the area and the formation of communities of practice such as the itSMF (IT Service Management Forum) in 1997. Academia has gained interest in ITSM, preceded by industry (a high volume of publications on ITSM can be found from industry).

The context of this research study is formed by the nature of the research problem requiring academic research and an IS design artefact solution for industry, the critical importance of IT to business, the traditions of IS, and the state of ITSM research in industry and practice.

The study reviewed literature at two levels: literature informing the subject area and literature informing the methodology. The subject area literature review strategy is presented in section 2.3; the methodology literature review strategy is described below.

The choice of methodology to use for the study was pre-determined during the ARC funding proposal stage. The methodology keywords include: contingency theory, IS survey, content analysis, quantitative analysis, research methods, case study method, literature review, statistics, and research philosophy. The study supervisory team, study mentors, doctoral consortium mentors, and contemporary USQ and Australian research norms during the period of the study primarily influenced the choice of literature used in the methodology.

The table serves the purpose of identifying the research methodology literature reviewed, as the selection for the literature was different to that used for the ITSM and performance measurement subject literature described in sections 2.2 and 2.3.

The research methodology is fully described and applied in Chapter 3, Chapter 4 and Chapter 5 and is not included in the next sections of this chapter. The remaining sections in this chapter describe the subject literature review.

2.3 Literature review strategy

This study adopts the definition of literature review offered by Cooper (1984): A literature review uses primarily written documents that may be theoretical, empirical, critical or analytical, or methodological in nature. This study achieves synthesis of the literature reviewed by describing, summarising, evaluating, clarifying and/or integrating the content of the primary reports as advised by Cooper (1984). A *systematic literature review* was undertaken following the advice of Kitchenham, Brereton, Budgen, Turner, Bailey and Linkman (2009, p. 8): ‘The aim of a systematic literature review is not just to aggregate all existing evidence on a research question; it is also intended to support the development of evidence-based guidelines for practitioners’. A systematic literature review is defined as ‘a means of identifying, evaluating and interpreting all available research relevant to a particular research question, or topic area, or phenomenon of interest’ (Kitchenham 2004, p. 1). The systematic literature review method was chosen as it provided a means by which current best evidence and a synthesis of best quality scientific studies on a specific topic or research question from research can be integrated with practical experience (Kitchenham et al. 2009). The study incorporates the advice by Webster and Watson (2002) on applying a concept-centric structure of the literature review by organising the literature review into ITSM performance measurement and study research questions focused sections. By having a concept-centric structure the study aims to help maintain a focus on the key argumentation of the dissertation and aid in achieving synthesis of ITSM performance measurement literature. The goals of the literature review were to locate the best evidence on measuring the performance of IT service management from academic and practitioner literature, as well as sharpen the focus of the research questions.

2.4 Literature review protocol

The literature review protocol specified the research questions being addressed, methods used to perform the review, the search strategy, inclusion and exclusion criteria, information to be obtained from each primary study, and quality criteria by which to evaluate each primary study. The review protocol presented in Table 2.1 was used to enhance the outcomes of the literature search.

Table 2.1 Systematic literature review (SLR) protocol

SLR feature	Research criteria applied
Research questions being addressed	*RQ1 What types of benefits are reported from IT service management (ITSM) improvement initiatives by organisations?* *RQ2 Which specific metrics can be used to measure ITSM performance?* *RQ3 How can specific ITSM performance metrics be derived?* *RQ4 What internal and external environmental factors influence the organisations selection of specific performance metrics for ITSM?*
Method used to perform the review	Primarily used online searches of bibliographic online databases and library catalogues
Search Strategy	Keyword searches in ITSM and performance measurement domains. Searches performed on Google Scholar, Association of Information Systems (AIS) basket of eight journals, Decision Sciences, Science Direct, Elsevier, Journal of Production and Operations Management, Service Science journals and AIS conferences
Search terms	ITIL, IT Infrastructure Library, ITSM, IT service management, ITSM performance measurement, ITIL performance measurement, IT service, ITIL metrics, ITSM metrics, ITSM benefits, ITIL benefits, ITIL value, ITSM value, ITSM performance, ITIL performance, IT performance, IS performance, performance measurement design, performance measurement frameworks, BSC, Balance scorecard, Service management, Contingency theory
Target information	ITSM performance metrics and ITSM performance measurement challenges from survey results, case studies, literature reviews, concept papers, theories and industry practitioner reports.
Quality criteria for evaluating primary study	Academic books, peer reviewed journal articles, conference papers, technical reports and electronic articles. Industry books, whitepapers and reports.
Inclusion and exclusion criteria	Included: academic publications: books, peer reviewed journal articles and conference papers, and technical reports. Included: industry publications: books, journal articles, white papers and technical reports Included: time period limited to 1980 to 2012 Excluded: opinion pieces

The literature review progressed from general areas of organisation performance measurement and ITSM to the specific area of ITSM performance measurement.

Using the literature review protocol, a review covering ITSM benefits and performance was conducted on academic and industry publications. The review was performed on empirical, theoretical and design studies. The review primarily used online searches of bibliographic online databases and library catalogues. Literature searches were performed on Google Scholar and Association of Information Systems (AIS) basket of eight journals: *European Journal of Information Systems* (EJIS), *Information Systems Journal* (ISJ), *Information Systems Research* (ISR), *Journal of AIS* (JAIS), *Journal of Information Technology* (JIT), *Journal of MIS* (JMIS), *Journal of Strategic Information Systems* (JSIS) and *MIS Quarterly* (MISQ), as well as service science journals. Literature searches were also performed on AIS conferences, including International Conference on Information Systems (ICIS), European Conference on Information Systems (ECIS), Americas Conference on Information Systems (AMCIS), Pacific Asia Conference on Information Systems (PACIS), Australasian Conference on Information Systems (ACIS), Design Science Research in Information Systems and Technology (DESRIST), and Hawaii International Conference on System Sciences (HICSS). The articles captured in the search were reviewed and literature addressing performance measurement, IS, ITIL and ITSM performance measurement was further analysed. Literature from academic and industry press was reviewed. Articles from peer reviewed academic publications were supplemented with industry press books, white papers and web pages. Literature from 1980 to 2012 on performance measurement and ITSM was considered. This period is described as *the second phase of performance measurement* which resulted in a move towards integrated performance measurement incorporating non-financial measures (Gomes, Yasin & Lisboa 2004). A choice was made to include literature up to 2012, although this overlaps the period of the study. The scarcity of academic studies and academic publications on the subject area of performance measurement of ITSM necessitated the inclusion of quality literature on the subject from industry press. The industry press literature is more frequently produced and as the field of ITSM is still developing, new literature such as OGC publications in 2011 was included in the study. A list of the frequencies of the selected literature by year is shown in Table 2.2 and a detailed list of the literature shown in Table A.1 in Appendix A.

Table 2.2 Summary of selected literature: pre and post study

Period	**Year**	**Count of selected literature**	**Percent**
During study (2009-2012)	2012	6	3%
	2011	9	4%
	2010	13	6%
	2009	27	12%
Pre-study (before 2009)	2008	21	9%
	2007	16	7%
	2006	17	8%
	2005	12	5%
	2004	17	8%
	2003	9	4%
	2002	12	5%
	2001	3	1%
	2000	9	4%
	1977-1999	53	24%
Total	**1977-2012**	**224**	**100%**

The majority of the literature (75%) selected and used was published prior to the commencement of the study. During the study, new literature was monitored and articles (25%) that focused mainly on ITSM performance measurement and design science were selected.

The journal articles reviewed were mainly from IS journals, with the *Journal of Management Information Systems* (JMIS) and *Management Information Systems Quarterly* (MISQ) leading the journal article count. Five of the AIS basket of eight journals (24% of the study literature) contributed articles to this study. A detailed distribution of the journals is shown in Table A.2 in Appendix A.

2.5 Measuring ITSM performance - measurement levels

2.5.1 Organisational level performance measurement

Measuring organisational performance is described as the ultimate question in organisational analysis (Hall 1980) and as an effectiveness assessment tool (Henri 2004). Performance measurement is ‘the process of quantifying the efficiency and effectiveness of action’ (Neely et al. 2005, p. 1229). At the organisational level the challenge of measuring performance is recognised and performance measurement frameworks proposed include SERVQUAL (Parasuraman, Zeithaml & Berry 1985), Sink and Tuttle model (Sink & Tuttle 1989), results and determinants framework (Fitzgerald, Johnston, Brignall, Silvestro & Voss 1994), balanced scorecard (BSC)

(Kaplan & Norton 1992), performance pyramid (Lynch & Cross 1993) and the performance prism (Neely et al. 2002). An extensive review of performance measurement systems concludes that though various performance measurement frameworks and methods exist, ‘little work, however, has been completed on the process of actually designing measurement systems’ (Neely, Mills, Platts, Richards, Gregory, Bourne & Kennerley 2000). There are challenges in designing and implementing organisation performance measurement systems.

The review identifies a number of performance measurement frameworks and the current direction in organisation performance measurement. Organisation level performance measurement frameworks aim for a balance in quantitative and qualitative measures, internal-focused and external-focused measures. The organisation performance measurement frameworks reviewed measure performance along the business value chain considering the input resources, organisation processes and process outputs—as well as business outcomes and goals. At the organisational level, as well as in ITSM studies, the BSC is widely used and provides four perspectives that facilitate organisations to achieve a balance of performance measures.

2.5.2 IS function level performance measurement

The challenge of measuring the performance of IS at the organisational and functional level has preoccupied both practitioners and academics. The challenge of measuring IS performance is expressed by Chang and King (2005) as: ‘the IS function is usually believed to be an integral part of achieving organisational success yet the overall performance of the IS function has proved difficult to conceptualise and measure’. A useful definition of IS performance measurement is offered by Son et al. (2005, p. 221): ‘IT performance management is an ongoing and consistent process used to evaluate the outcomes of IT activities, practices and processes at all levels of the IS organisation’. Approaches to resolving the challenge of measuring the performance of IS are evident in many forms, for example, IS success (DeLone & McLean 2003), IS productivity (Dedrick et al. 2003; Weill 1992), IS quality (Chang & King 2005; Pitt et al. 1995), IS effectiveness (Scott 1995; Seddon et al. 2002) and IS performance (Marchand & Raymond 2008; Martinsons, Davison & Tse 1999; Myers, Kappelman & Prybutok 1997; Saunders & Jones 1992; Son et al.

2005; Van der Zee & de Jong 1999). These approaches resolve aspects of the challenges in measuring the performance of IS and may also be useful in solving challenges in measuring the performance of ITSM.

In the IS performance literature reviewed, performance measurement and benefits measurement are not clearly demarcated. A distinction between individual measures of performance and organisational measures of performance has been found to be critical in developing frameworks. The BSC is useful at the IS level, and the IS BSC can be used to link the IS level with the BSC at the organisational level.

At the IS level there is no agreement on performance dimensions and currently multiple taxonomies exist for organising performance measurement. IS performance can be measured in terms of improvements in effectiveness and efficiency.

2.5.3 Service performance measurement

A widely-used service quality measurement tool, SERVQUAL (Parasuraman et al. 1985), has been adapted for service performance measurement in SERVPERF (Cronin Jr & Taylor 1992), IS service quality (Jiang, Klein & Carr 2002; Kettinger & Lee 1994) and service-oriented IT SERVQUAL (Hochstein 2004). SERVQUAL measures perceptions of individual end-user satisfaction with service. SERVQUAL is described as 'the most popular and ubiquitous service quality instrument' and has the following seven dimensions: service quality, system quality, information quality, user involvement, usefulness, user self-sufficiency, and user satisfaction (Landrum, Prybutok, Zhang & Peak 2009, p. 18). SERVQUAL has been revised (Parasuraman 2004), however, questions remain regarding the appropriateness of its use, as identified by Landrum et al. (2009, p. 19): 'Some researchers question the appropriateness of using SERVQUAL in an IS or IT context; others disagree about whether the service quality should be the difference between expected and perceived service'.

The SERVPERF challenges SERVQUAL's use of gap theory in measuring the perception of quality and proposes that 'service quality should be measured as an attitude' and proposes a performance-based scale SERVPERF (Cronin Jr & Taylor 1992, p. 64). These authors suggest that 'managers may need to emphasize total customer satisfaction programs over strategies centring solely on service quality'

(Cronin Jr & Taylor 1992). SERVPERF uses five of SERVQUAL's dimensions: service quality, system quality, information quality, user involvement and usefulness. Additional dimensions such as individual impact, workgroup impact and organisational impact, described by Myers et al. (1997), have been identified by Landrum et al. (2009) as influencing system success. This research study heeds the advice of Landrum et al. (2009) on avoiding the theoretical and practical criticisms on SERVQUAL by discarding the expectations portion in the SERVQUAL model and employing SERVPERF or performance only (excludes SERVQUALs user self-sufficiency and user satisfaction) instrument in place of the gap measurement approach. In using the SERVPERF subset of SERVQUAL, Landrum et al. (2009, p. 31) suggest 'that companies should focus relatively more of their service quality efforts on the reliability and responsiveness dimensions'.

In proposing a service-oriented IT SERVQUAL it is asserted that 'SLAs are contracts and are not able and not meant to provide indications of IT service quality as perceived by the customer' (Hochstein 2004, p. 2). The traditional IT SERVQUAL adopted by Kettinger and Lee (1994) which focuses on IT functional performance is adjusted by Hochstein (2004) to measure IT services and cater for variations in services delivered by an IT function.

Four IS perspectives of service have been proposed: IT-reliant work systems, co-creation of value, outputs of IT-based tools and services computing (Alter (2008).

An IT service results in the automation, transformation or provision of information for organisation actions (Zuboff 1988).The classification of information functions offerings of *automate*, *informate* and *transformate* offered by Zuboff (1988) provides a customer-value oriented categorisation useful in grouping the service offering of the IS function that complements the performance measurement dimensions and service perspectives identified in the literature review.

2.5.4 IT service management performance measurement

A literature search on academic and industry publications of empirical and theoretical ITSM studies was conducted. Early use of the term ITSM dates back to the 1980s (Salle 2004), whereas performance measurement has been of interest since the late 1880s (Gomes et al. 2004). The performance measurement and ITSM literature reviewed were published from 1980 to 2012.

ITSM is an area with many publications in the industry press and it was, therefore, necessary to include industry publications. While academics tend to stress rigour, practitioners stress relevance. In combining academic and practitioner publications this study views theory as the continuum proposed by Schneberger, Pollard and Watson (2009), which has the actions of 'academics who tend to stress scientific rigour in hypothesis measurement and analysis' at one extreme and the actions of 'practitioners who might use "hunches" as hypothesis, use "seat of the pants" assessments, and focus solely on the situation at hand' at the other extreme.

The literature review specific to ITSM benefits and performance measurement is grouped into two general categories of empirical and theoretical studies. This classification is necessary for organising the studies, as well as comparing them and integrating common themes to understand the benefits and performance measures of ITSM.

2.5.4.1 ITSM empirical studies

The literature review showed a trend in research on ITSM starting with ITSM adoption and implementation studies, followed by ITSM benefits research and then studies on ITSM performance measurement. It was observed that the studies dealing with adoption and implementation also covered aspects of benefits and performance measurement, and overlaps were evident.

A case study of a government agency in South Africa finds that both customer satisfaction and operational performance improve as the activities in the ITIL framework increase. The study uses SERVQUAL in a quantitative survey that includes qualitative questions, service centre call statistics and management interviews (Potgieter, Botha & Lew 2005). This case study identifies the overall benefits from the ITSM implementation. Similar findings are reported from case studies of six German organisations by Hochstein et al. (2005c) that identify three benefits from ITIL: client/service orientation and the quality of IT services; efficiency due to standardisation, optimising of processes and process automation; and transparency and comparability through process documentation and process monitoring. These case studies identify process-specific benefits from the ITSM implementations.

Research conducted by Hochstein et al. (2005c); (2005b) was replicated in fifteen organisations in Australia, United Kingdom and New Zealand; and ITSM process specific benefits were identified by Cater-Steel and McBride (2007); Cater-Steel and Tan (2005); Cater-Steel et al. (2006a); Cater-Steel, Tan and Toleman (2009a); Cater-Steel and Toleman (2009); Cater-Steel, Toleman and Tan (2006b). The case study method adopted by Hochstein et al. (2005c); (2005b) is also replicated in research undertaken by Pollard and Cater-Steel (2009), an ITSM adoption study which focuses on the critical success factors (CSFs) of ITIL implementation in Australia and the US. Based on interviews with five Australian IT service managers, it was concluded that the benefits realised by ITIL include improved focus on IT service management, more rigorous control of testing and system changes, more predictable infrastructure, improved consultation with IT groups within the organisation, smoother negotiation of service level agreements, reduced server faults, seamless end-to-end service, documented and consistent IT processes across the organisation, an effective change advisory board, and consistent logging of incidents (Cater-Steel et al. 2006a).

Another ITSM process-specific benefits study using a case study of a German organisation describes the advantages of the introduction of an ITIL-based business process framework focusing on the change management process (Koch & Gierschner 2007). As well as confirming ITIL benefits identified by Hochstein et al. (2005c) and Cater-Steel et al. (2006a)—improved alignment by staff, partners and suppliers by a common sense of purpose, processes and terminology—Koch and Gierschner (2007) add cost reduction to the list through transparent processes; compliance with the Service Level Agreements; and improved quality and consistency of service.

In a similar study on process-specific benefits, ITIL implementation at a large UK-based financial institution resulted in a 65 percent reduction of service outage over four years, fewer incidents and problems, a 30 percent reduction in staff, and improved customer satisfaction (Cater-Steel & McBride 2007). Their finding of reduced costs as an ITIL benefit confirms the findings of Potgieter et al. (2005).

Similarly, in a survey identifying ITSM process benefits of mainly UK and US organisations, Marrone and Kolbe (2010) summarise the ITIL benefits identified by Potgieter et al. (2005), Hochstein et al. (2005c) and Cater-Steel et al. (2008). Their survey covers adoption, usage, implementation, maturity, effectiveness of processes and realised benefits. They conclude 'that as the level of maturity increases, so does the number of realised benefits, and on later levels of maturity, between defined and optimised, companies concentrate more on using metrics and on showing the realised benefits to the business'. These studies identify process-specific benefits of the implemented ITSM framework.

A slightly different focus is taken by the following studies, which describe measurement of overall ITSM benefits or process-specific benefits of the ITSM implementation. Discussing how a performance measurement system may be designed and implemented with the purpose of monitoring and improving the IT function in a case study at the European Central Bank, Son et al. (2005) extended the work of Martinsons et al. (1999). A performance measurement system for the IT function at the European Central Bank is described, based on the IT Balanced Scorecard (IT BSC). Some insight into developing a performance management system for an organisation using ITIL is provided. The case study at the European Central Bank shows how a performance measurement system, described in their article, was implemented in a financial institution.

In a survey of IT management in both the public and private sector in the Czech Republic, measuring the overall ITSM benefits, the question of how to measure and how to improve the effectiveness of IT services is explored. The study finds that 'it is difficult to provide a single recommendation about how to measure and what metrics to use because business executives have very different goals for IT and the context in which IT operates is a key factor that should be considered' (Šimková & Basl 2006, p. 424). The paper suggests the use of several financial approaches to measure the benefits of ITIL, which are categorised into comparative and cost benefit. Examples of comparative approaches given are comparisons of costs or the economic value added for two projects. The cost benefit approach examples include net present value, return on investment and total cost of ownership. Šimková and Basl focus exclusively on financial measures in determining the value of ITIL.

Two case studies focus on public sector organisations. In a case study of an Australian government department a 'benefits realisation plan to track and communicate tangible and intangible benefits of the project' is identified as critical to the successful implementation of ITIL (Tan et al. 2010, p. 1066). Customer satisfaction improved for support, availability, responsiveness and expertise, as well as system performance, functionality and quality. The department incorporates key metrics into their Balanced Scorecard (BSC) to track whether the implemented processes are meeting their intended targets. This case study demonstrates the use of the BSC to measure the benefits of an ITIL implementation project. A case study of a government-owned Croatian finance sector organisation outlines direct and indirect benefits from ITIL implementation by comparing Key Performance Indicators (KPIs) before and after the implementation of specific ITIL processes (Spremic, Zmirak & Kraljevic 2008). The benefits identified include improved quality of IT services provided to customers; improved daily work procedures; enhanced employee satisfaction; and changed organisation culture. This article extends the use of the BSC in ITSM to link the benefits and metrics in measuring the performance of ITSM.

A case study of General Electric (GE) shows how Six Sigma can be used to improve ITSM implementation at GE (Chan, Durant, Gall & Raisinghani 2008). The paper notes there is scant research that is explicitly ITSM related, although there is increasing research on isolated aspects of operations management. The paper concludes that Six Sigma should be used to ensure that ITSM is aligned with the customer and provides the mechanism to deliver and monitor all the ITSM processes. Similar findings were reported by Aazadnia and Fasanghari (2008).

The review of empirical studies shows the interest and importance of ITSM performance measurement and demonstrates various attempts at understanding the implementation, benefits and performance measurement of ITSM.

2.5.4.2 ITSM theoretical studies

There are a small number of published theoretical research studies on ITSM benefits and performance measurement. A process reference model (PRM) and process assessment model (PAM) for ITIL service support and service delivery processes was developed in Luxembourg by Barafort, DiRenzo, Lejeune, Prime and Simon

(2005). The PRM and PAM architecture are based on the international standard for process assessment ISO/IEC 15504 and include development of the process performance and process capability indicators for ITIL v2 processes.

The Actor Network Theory (ANT) is used by Cater-Steel and McBride (2007) in explaining the adoption of ITSM; and in further application of theory to ITSM performance measurement the Resource Based View (RBV) and Normatively Regulated Activities (NRA) theories are used in addition to the BSC. A case study applying the Resource Based View (RBV) to ITIL finds that the ITIL framework can be seen under a RBV lens based on ‘learning loops to master the use of resources, create efficient work practices, and develop patterns of activity among the human capital of a firm which embed the knowledge acquired by the learning processes’ (Wagner 2006, p. 8). The theory of Normatively Regulated Activities (NRA) has been associated with basic ITSM activities by Donko and Traljic (2006, p. 116). They explain, ‘Normatively regulated activities are characterised by precise objectives or purpose, participation of actors as role-holders, and norms and rules that govern the performance of these activities’. Donko and Traljic (2006) propose that NRA measures of action performance used in planning and performance of activity are associated with ITSM processes. The performance measures describe the criteria of quality: efficiency of the realisation; effectiveness of the realisation; and regularity of the action.

To classify previous theoretical studies on ITSM benefits and performance measurement, the taxonomy of IS theory developed by Gregor (2006) is applied. IS theories are classified into five types: theory for analysing; theory for explaining; theory for predicting; theory for explaining and predicting; and theory for design and action. The taxonomy of IS theory developed by Gregor (2006) informs the conceptualisation of design theory in this study, described in Chapter 3, and the definition of theoretical contributions of the design artefact in this study presented in Chapter 5.

Although a phenomenal rate of adoption of ITSM frameworks, particularly ITIL, is observed, it is not accompanied by standardisation of ITSM performance measurement. A standardised performance measurement framework is required and this research project is an important step in addressing that need. To improve IT service management, it is necessary to measure and evaluate process performance. Processes must be measurable in order to be controlled and improved (Praeg & Schnabel 2006). It is critical that the measurement framework is rigorously defined. A sense of the challenge of ITSM performance measurement is captured by Yixin and Bhattacharya (2008, p. 208) who state: ‘As today’s IT service providers have very little visibility on their entire value network, it is hard to gauge the impact of singular process improvements’.

A methodology to assess the business value from IT service management similar to that espoused by Praeg and Schnabel (2006) and Šimková and Basl (2006) is proposed by Yixin and Bhattacharya (2008). The methodology provides business value estimates on the change management process in the context of specific product capabilities and complexity-based quantitative metrics. They illustrate their methodology using the change management process of IBM Tivoli Unified Process (ITUP). Their performance measurement method comprises four steps: identify process context, prepare baseline quantification, estimate process improvement, and estimate business value.

An evaluation catalogue for an IT service cachet of 48 assessment criteria was developed by Praeg and Schnabel (2006) to evaluate the quality of outsourced IT services. The term cachet refers to a container or encasement of an ‘integrated aspect in the IT-service level of the IT-service performance framework developed to audit service providers concerning the quality of their offers and IT-services from a customers’ point of view in the IT-service procurement process’ (Praeg & Schnabel 2006, p. 4). The development of the IT service cachet places importance on value-based management using economic value-added measures similar to Šimková and Basl (2006). The IT service cachet extends the concepts of the BSC and SERVQUAL and is presented in 10 dimensions of IT service performance quality indicators. The framework is divided into four levels: strategic level, business process level, IT service level, and tool level.

In a framework with multiple levels similar to that of Praeg and Schnabel (2006), the use of financial loss functions to estimate the impact of IT Service Level Agreements was proposed by Moura, Sauve, Jornada and Radziuk (2006b). They used an organising framework based on BSC concepts to firstly tie those functions to business processes, and then measure the impact of service levels on business performance before finally eliciting investment targets. The outcome of their paper is a quantitative approach for ‘allocating IT investments to reduce potential financial loss’. The framework developed by Moura et al. (2006b) consists of three layers: IT services, business processes, and business. A trial of the model conducted on a drugstore chain in Brazil resulted in the top management of the store considering the model useful for improving decision-making. The BSC and the framework developed by Moura et al. (2006b) are applied by Donko and Traljic (2009) to the efficiency and effectiveness measurement of service operation as part of the ITIL life cycle. The authors propose an IT service effectiveness framework aligned to an organisation’s strategic plan with metrics developed. The paper uses the BSC to establish a linkage between IT and business processes. After a detailed analysis of the incident management process the paper develops quantifiable performance objectives using the BSC perspectives to ask key ITIL performance questions. Their framework proposes that service degradation at the IT services layer leads to poor performance at the business process layer, resulting in business loss at the business layer. KPIs developed along the BSC perspective are then shown to ultimately contribute to three types of possible loss: financial, user trust and credibility.

An ontology for assisting ITSM service providers is proposed by Valiente, Garcia-Barriocanal and Sicilia (2012). Their study aims to assist ‘service providers add semantics to their service management process models and detect semantic ambiguities, uncertainties and contradictions’ (Valiente et al. 2012, p. 76). Their study extends the work of Black et al. (2007) and Brito e Abreu, de Braganca, Freitas and Costa (2010); and applies web ontology language (OWL) on the ITIL incident management process to establish a systematic method that enables the implementation of ITIL-based processes in a straightforward and well-defined manner. The two ITSM studies focusing on ontology are at the ITSM activity level, which is the lowest level of ITSM performance within an ITSM continuum that ranges from ITSM service, ITSM lifecycle phase, ITSM function, ITSM process, and ITSM activities. The hierarchy promoted in ITIL postulates that ITSM services comprise ITIL lifecycle phases made up of ITIL functions and processes that consist of activities.

The review of theoretical studies shows the application of theory from other disciplines outside IS is used in gaining an understanding of ITSM performance measurement. The ITSM theoretical studies show a predominant focus in explaining ITSM adoption, though some theoretical studies focus on ITSM performance measurement. The use of the BSC in performance measurement in ITSM adoption is reported and guidance on its application in IS and ITSM provided.

2.5.4.3 Conclusion on ITSM performance measurement literature review

There is a deficit of empirical research into ITSM benefits and performance measurement. The literature review yielded only thirteen studies published in academic journals specifically dedicated to ITSM performance measurement frameworks and eight studies investigating benefits from ITSM implementation. There is also a lack of a comprehensive framework for performance measurement for IT service management. The study did not find any empirical research on the relationship between ITSM metrics and ITSM benefits; or the relationship between ITSM metrics and implemented performance measurement frameworks.

The popularity of ITSM frameworks is not matched by measurement of benefits and performance and there is little research quantifying the benefits and performance measurement of ITSM implementation.

The literature review established that despite the proliferation of ITSM metrics, ITSM practitioners are faced with challenges in measuring performance and the majority do not use a structured performance measurement framework. The literature review identified a lack of a definitive list of ITSM benefits and performance metrics.

2.6 Measuring ITSM performance - measurement frameworks

Academics and practitioners recognise the challenge of measuring performance at the organisational level and performance measurement frameworks, and metrics have been proposed. A number of studies report the significance of performance measurement at the organisational level. Underlining this significance ‘organisational effectiveness is the ultimate question in any form of organisational analysis’ (Hall 1980). An enhanced perspective on performance measurement is introduced by Henri (2004, p. 94): ‘In essence, organisational effectiveness represents the outcome of organisational activities while performance measurement consists of an assessment tool to measure effectiveness'. This refinement is important, as performance measurement is the perspective given emphasis in this study. Both Henri (2004) and Hall (1980) recognise the significance and challenge of performance measurement to researchers and practitioners.

A classification of approaches to organisational effectiveness shows:

1. a goal model which defines effectiveness as the degree to which an organisation realises its goals; and
2. a resource acquisition model which defines effectiveness of an organisation as the ability to exploit its environment in the acquisition of scarce and valued resources to sustain its functioning (Hall 1980).

An extended classification offers five organisational effectiveness categories (Henri 2004):

1. Goal models—focused on the achievement of the organisations goals
2. System models—consider the resources and processes necessary to attain goals
3. Strategic constituencies model—the powerful constituencies gravitating around the organisation
4. Competing values model—the values on which the evaluation of effectiveness are grounded
5. Ineffectiveness model—the absence of ineffectiveness factors as a source of effectiveness.

In an associated classification, performance measurement models are grouped into two views: cybernetic views—whereby performance measurement is based mainly on financial measures and considered a component of the planning and control cycle; and holistic views—based on multiple non-financial measures where performance measurement acts as an independent process integrated in a broader set of activities (Henri 2004). In this view, performance measurement plays a key role in the development of strategic plans and evaluation of the achievement of organisational objectives. The organisational effectiveness models and performance measurement models are useful in classifying the performance measures and frameworks used in ITSM.

2.6.1 Organisational level performance measurement frameworks

2.6.1.1 The balanced scorecard (BSC)

The BSC, developed by Kaplan and Norton (1992), is one of the most widely-adopted performance management methodologies (Praeg & Schnabel 2006). The BSC approach provides a common language for metrics and a bridge between IT and business since many senior business managers are familiar with the BSC (Van der Zee & de Jong 1999). It is reported that performance metrics can easily be linked to higher-level organisation objectives by using a BSC approach. The BSC approach recognises the limitations of purely financial measurement and is based on four dimensions: customer, financial, internal business, and innovation and learning (Kaplan & Norton 1992). BSC provides a mix of financial and non-financial indicators for performance measurement and assists management to plan, execute and monitor business strategies. The BSC can be used to align departmental goals to overall business strategy. Each BSC perspective has goals and measures. A paper discussing the importance of non-financial measures reports that companies 'that adopted non-financial measures with a causal link between those measures and financial outcomes produced significantly higher returns on assets and returns on equity over a five-year period than those that did not' (Ittner & Lacker 2003).

The BSC has been applied in ITSM theoretical studies. Donko and Traljic (2009) used the BSC for performance estimation of ITIL processes; Moura, Sauve, Jornada and Radziuk (2006a) applied the BSC perspectives to group business processes to facilitate IT-business personnel communication; and Praeg and Schnabel (2006) implemented the BSC to provide a multi-perspective approach for measuring IT-service performance. Using two case studies, Van der Zee and de Jong (1999) demonstrated that a balanced business scorecard is a valuable contributor to the implementation of an integrated business and IT planning and evaluation process. The benefits of using the BSC approach for IT management arise from 'an integrated planning and evaluation cycle…business and IT management can use the same performance measurement language' (Van der Zee & de Jong 1999, p. 144). The BSC and CobiT are proposed as supporting mechanisms to help organisations develop balanced Service Level Agreements (SLAs). Objective and subjective metrics as facilitated by a BSC should be used in SLAs to avoid 'furious and endless discussions between the service provider and the organisation' (Van Grembergen, De Haes & Amelinckx 2003, p. 2). Like many of the other studies, the study by Šimková and Basl (2006) also identifies the BSC as an important and often used performance measurement method. The BSC is used as an organising framework by Moura et al. (2006b) to tie functions to business processes and then to measure the impact of service levels on business performance before finally eliciting investment targets. The BSC and the framework developed by Moura et al. (2006b) are applied by Donko and Traljic (2009) to the efficiency and effectiveness measurement of service operation as part of the ITIL life cycle.

To ensure the specific metrics developed are easily linked to higher-level organisation objectives, this study uses a BSC approach. Strategic measures can be viewed, as advocated by Kaplan and Norton (2004), not as performance indicators in four independent perspectives, but as a series of cause-and-effect linkages among objectives in the four BSC perspectives. Drawing a cause-and-effect linkage helps integrate the four perspectives.

The practical value of the BSC for organisations is enhanced through understanding the process of populating the framework (Neely et al. 2000). The balanced scorecard is widely applied at the strategic level of organisations and is adapted for performance measurement of the IS function in a study by Martinsons et al. (1999) with the following perspectives: business value, user orientation, internal process (focused on efficiency), and future readiness. In an application of the BSC to IS performance measurement, Van der Zee and de Jong (1999, p. 138) advise that 'trying to align distinct and separate business and IT management processes is just not enough'. They propose that IS functions use an integrated balanced business scorecard approach. They assert 'organisations need fluid management processes, performance goals, and feedback mechanisms, covering both business goals and the potential role of IT, and need to include them in an integrated set of balanced business scorecards that cover both' (Van der Zee & de Jong 1999). They contend that in integrating IT into business management processes the management of IT infrastructure should be excluded and left to IT technical specialists.

2.6.2 IS function level performance measurement frameworks

In a study by Scott (1995) it is advised that IS effectiveness should measure inter-organisational impact from IS and intermediate outputs that are more easily related to IS, for example, time-based, quality-based, and flexibility-based operational performance, rather than measuring financial performance. An input-process-output classification of IS effectiveness measures that map to resource acquisition, information systems effectiveness and organisational performance is presented by Scott (1995).

It has been identified that 'not all IT portfolios, projects and applications, and IT functions are being systematically evaluated' (Seddon et al. 2002, p. 25). A study carried out by Seddon et al. (2002) categorises IS success and IS effectiveness measures into two groups: individual-as-stakeholder (e.g. individual productivity, user satisfaction, information quality, and perceived usefulness) and interests and opinions of management (return on investment, return on management, cost savings, sales growth, and system availability). They propose three categories of IS benefits to be evaluated: 'benefits from the overall portfolio of IT investments, benefits from investments in specific IT projects and applications, and the performance of the IT function' (Seddon et al. 2002, p. 25). It is noted that difficulties with IT effectiveness measurement have led to organisations seeking more effective techniques for IT performance evaluation (Seddon et al. 2002). The deficiency of empirical studies in IS function performance measurement is observed by Chang and King (2005, p. 88): 'Only a few studies directly address the comprehensive evaluation of the performance of the IS function. No one has developed a validated metric'. A basis for developing performance measurement information systems is proposed by Marchand and Raymond (2008). In developing a performance measurement information system, Marchand and Raymond (2008) consider previous definitions of performance, dimensions of performance and performance logic. They propose a definition for a performance measurement information system: 'An information system based on a holistic (multidimensional/ balanced/integrated) view of organisational performance, as conceptualised through a performance model, in support of executive decision-making and strategic management, by producing information in a manner that reflects the performance logic (determinants/results) of the organisation' (Marchand & Raymond 2008, p. 674). Along with performance measurement dimensions it is proposed that 'any discussion of performance management frameworks needs to feature the role played by performance indicators' (Son et al. 2005, p. 220). They identify performance indicators classed as ‘instrumental and social measurements’, ‘lead and lag indicators’, and ‘diagnostic and interactive controls’.

2.6.3 IT service management performance measurement frameworks

Previous literature on ITSM has mainly focused on ITSM adoption and benefits. To date, few studies have addressed the area of performance measurement of ITSM. In fact, the researcher in this study did not locate any ITSM studies focused on factors that influence the selection of performance metrics.

Topics ranging from performance metrics, IT service performance and quality measures, business value, process capability and organisation maturity are covered in ITSM literature. ITIL performance metrics are proposed in studies by Barafort et al. (2005), Brooks (2006), Smith (2008), Steinberg (2006) and Van Grembergen et al. (2003). IT service performance and quality measures are proposed by Hochstein (2004) and Praeg and Schnabel (2006). The business value of ITIL is considered in publications by itSMF Germany (2008), Moura et al. (2006a), Šimková and Basl (2006) and Yixin and Bhattacharya (2008). ITIL process capability and maturity assessment is covered in itSMF International (2008) and Valdés, St-Jean, Renault, Picard, Cortina, Betry and Barafort (2009). One study developed software for measuring ITIL process performance (Lahtela, Jäntti & Kaukola 2010) and two studies proposed evaluation frameworks for ITIL (Hochstein, Zarnekow & Brenner 2005a; McNaughton et al. 2010).

None of these reviewed studies specifically address the internal and external environmental factors influencing the selection of ITSM performance metrics. A challenge faced by organisations is a lack of a performance measurement framework that would help organisations in selecting contextualised ITSM performance metrics.

The efforts so far identified from prior studies have mainly focused on developing ITIL performance metrics, quality measures and financial metrics (Akatsu 2007; Barafort et al. 2005; Bartolini, Salle & Trastour 2006; Chan et al. 2008; Donko & Traljic 2006; Lahtela et al. 2010; Potgieter et al. 2005; Spremic et al. 2008; Tiong, Cater-Steel & Tan 2009; Van Grembergen et al. 2003; Yixin & Bhattacharya 2008). The review found four studies that focus on developing ITIL performance measurement systems, frameworks or models (Donko & Traljic 2009; Hochstein

2004; McNaughton et al. 2010; Praeg & Schnabel 2006). A meta-analysis of the four studies that have developed ITIL performance measurement frameworks is summarised in Table 2.3. None of the four ITSM performance measurement framework studies use a mixed method approach. Two of the studies identify the deficiency of performance measurement at the IS functional level and propose a focus on measuring service quality; with Hochstein (2004) proposing measuring functional quality of individual services and Praeg and Schnabel (2006) proposing measuring service quality for outsourced IS services. The performance measurement instruments developed in the two studies do not measure the performance of ITSM, but aspects of it. A framework to measure the quality of service focusing at the ITSM activity level was developed by Donko and Traljic (2009). A framework developed by McNaughton et al. (2010) focuses on the evaluation of benefits and value derived from ITSM adoption.

Table 2.3 Meta-analysis of ITIL performance measurement studies

Authors	**Research Approach**	**Underlying Theory/ Model**	**Measurement Focus**	**Research Variable(s)**
Hochstein (2004)	Qualitative (Case Study)	SERVQUAL and IT SERVQUAL	Quality of IT individual services	IT service quality
Findings: Performance measurement at the functional level is not sufficient. Functional quality of individual services should be measured.				
Praeg and Schnabel (2006)	Theoretical (literature review), market acceptance survey	Value based management SERVQUAL, BSC	IT services procurement	IT service and process quality
Findings: The proposed instrument allows determining functional quality of individual services by generating one performance score for the procurement process.				
Donko and Traljic (2009)	Theoretical (Literature review)	BSC, activity diagrams	Quality through variation in service level and business loss, number of transitions of activity	Service effectiveness, quality
Findings: Performance indicators calculated based on service activity features and weighting factors. Service portfolios used with the BSC to estimate business performance and loss.				
McNaughton et al. (2010)	Design science	IS SERVQUAL and IS Reverse SERVQUAL	Benefits and value	Efficiency, effectiveness and capability
Findings: Artefact: A framework that may be used to evaluate ITIL improvement efforts.				

Performance measurement frameworks at the organisational level have been designed and used to monitor productivity, profitability, quality, speed, delivery and flexibility. The performance measurement frameworks used in IS are adopted from organisational level performance measurement frameworks. In the context of ITSM performance measurement there is no industry standard ITSM performance measurement framework. Organisations measure the performance of their ITSM using a wide variety of means ranging from not using any measure, to using a variety of metrics, to applying well-organised performance frameworks with 'only a third claimed to have a general methodology for IT benefits computation' (McNaughton et al. 2010, p. 219).

2.7 Measuring ITSM performance - measurement dimensions

The updated DeLone and McLean IS success model notes that considering use and user satisfaction: 'IS quality has three major dimensions: information quality, systems quality, and service quality. Each should be measured—or controlled for—separately, because singularly or jointly, they will affect subsequent use and user satisfaction' (DeLone & McLean 2003, p. 23). They emphasise IS success is a multidimensional and interdependent construct—and that it is therefore necessary to study the interrelationships among, or to control for, those dimensions. They conclude that 'more field-study research should investigate and incorporate "net benefits" measures' (DeLone & McLean 2003, p. 27) and concur with the statement, 'Examining satisfaction and usage measures is not an acceptable alternative to measuring performance' (Yuthas & Young 1998, p. 121). This research study heeds the advice and focuses on performance measurement.

IS managers have traditionally focused on quantitative operational performance measures such as turnaround time, machine reliability, ability to meet project deadlines, cost savings, return on investment, and system availability logs that are inadequate for evaluating many soft qualitative benefits that defy straightforward measurement, such as providing the organisation with a stronger strategic advantage, improved decision making, or added flexibility (Saunders & Jones 1992). A study by Saunders and Jones (1992) lists ten performance dimensions: IS impact on strategic direction, integration of IS and corporate planning, IS operational efficiency, integration with related technologies across other organisational units, adequacy of system development practices, quality of information outputs, IS contribution to organisation's financial performance, user/management attitudes, IS staff competence, and IS personnel development. To include the emerging IS success dimensions (Parasuraman et al. 1985) and provide a comprehensive method to organize IS success, Myers et al. (1997, p. 20) state that 'the dimensions critical to the success of the IS function are service quality, systems quality, information quality, use, user satisfaction, individual impact, workgroup impact and organisational impact'. The study by Myers et al. (1997) updates the earlier IS success models and DeLone and McLean (1992); Saunders and Jones (1992).

Extending the BSC promoted by Kaplan and Norton (1992) in managing the IS organisational unit, Martinsons et al. (1999) developed a balanced scorecard for the IS function that measures and evaluates IS activities from the perspectives of business value, user orientation, internal process, and future readiness. Martinsons et al. (1999) study proposes metrics that can be used in each of the perspectives to measure IS function activities. The study by Martinsons et al. (1999) does not make reference to earlier IS function performance measurement studies, but refers to IS productivity measurement focused literature such as Brynjolfsson and Hitt (1995) and concludes that the perspectives proposed cover effectiveness and efficiency of IS function activities.

In a study extending earlier IS performance measurement frameworks (DeLone & McLean 2003; Pitt et al. 1995; Saunders & Jones 1992) and applying SERVQUAL dimensions (Parasuraman et al. 1985), Chang and King (2005) offered three IS performance measurement dimensions: systems performance, information effectiveness and service performance: 'Measures of systems performance assess the quality aspects of systems and the various effects that IS have on the user's work. Measures of information effectiveness assess the quality of the information provided by IS as well as the effects of the information on the user's job. Measures of service performance assess each user's experience with the services provided by the IS function in terms of the quality and flexibility of the services' (Chang & King 2005, pp. 91-2). The IS performance measurement dimensions identified in the reviewed studies are listed and assimilated in Table 2.14.

An examination of the IS function performance measurement dimensions from the studies presented in Table 2.14 shows a focus on measuring the IS function performance along technology product, as well as service dimensions.

Table 2.4 Literature on IS function performance measurement dimensions

IS Function PMF	***IS Function Performance Measurement Dimensions*** **Sample metrics**		
(IS) Functional Scorecard (lSFS) (Chang & King 2005)	*Systems performance:* Impact on job Impact on external constituencies Impact on internal processes Impact on knowledge and learning Systems usage characteristics Intrinsic systems quality	*Information effectiveness:* Intrinsic quality of information Reliability of information Contextual quality of information Presentational quality of information Accessibility of information Flexibility of information Usefulness of information	*Service performance:* Responsiveness of services Intrinsic quality of service provider Interpersonal quality of service provider IS training Flexibility of services
IS Balanced Scorecard (Martinsons et al. 1999)	*Business value:* Cost control Sales to third parties Business value of an IT project Risks Business value of the IT department functional area *User orientation:* Being the preferred supplier for applications and operations; Establishing and maintaining relationships with the user community; Satisfying end-user needs.	*Internal process:* Planning Development Operations *Future readiness:* IS specialist capabilities Applications portfolio Research into emerging technologies	
IS Assessment Model (Myers et al. 1997)	*System quality* *Information quality* *Service quality:* Use User satisfaction Individual impact Workgroup impact Organisational impact		
IS Function Performance Evaluation Model (Saunders & Jones 1992)	IS impact on strategic direction Integration of IS and corporate planning IS operational efficiency Integration with related technologies across other organisational units Adequacy of system development practices Quality of information outputs IS contribution to organisation's financial performance User/management attitudes IS staff competence IS personnel development		

For example, a technology focus is seen in Chang and King (2005) systems performance dimension, a product focus is observed in Chang and King (2005) information system effectiveness, information quality in Myers et al. (1997) and quality of information outputs in Saunders and Jones (1992). A process focus is evident in the study by Chang and King (2005) relating to interpersonal quality of service provider, and IS training; in Martinsons et al. (1999) internal process and future readiness perspectives; and IS operational efficiency, user/management attitudes, IS staff competence and IS personnel development measures in research by Saunders and Jones (1992).

The IS function studies selected also show an initial focus on IS function service performance, for example, service performance (Chang & King 2005); business value and user orientation (Martinsons et al. 1999); service quality (Myers et al. 1997) and IS service performance metrics (Saunders & Jones 1992). Following further examination of the IS function service performance metrics in the studies, the research study summarises them into the following types of metrics that are service oriented and customer focused: service impact, service quality and business value. A summary of the metric types from the IS function performance measurement studies is provided in Table 2.15.

Table 2.5 Types of IT service performance metrics from IS function studies

Metric Type	**Internal customer**			**External customer**
	Organisation	***Workgroup***	***Individual***	
Service impact	IS contribution to an organisation's financial performance (Saunders & Jones 1992)			Being the preferred supplier for applications and operations, establishing and maintaining relationships with the user community (Martinsons et al. 1999)
Service quality	Organisational impact (Myers et al. 1997)	Workgroup impact (Myers et al. 1997)	Individual impact (Myers et al. 1997)	Responsiveness of services, Intrinsic quality of service, flexibility of service (Chang & King 2005) User satisfaction (Myers et al. 1997) Satisfying end user needs (Martinsons et al. 1999)
Business value	Cost control (Martinsons et al. 1999)	Business value of an IT project, Business value of the IT department functional area (Martinsons et al. 1999)		Sales to third parties (Martinsons et al. 1999)

In this section the performance measurement dimensions from previous literature were identified. Key IS performance measurement dimensions of system performance, information effectiveness, service performance, business value, internal process, user orientation, future readiness, system quality, information, and service quality were identified. These IS dimensions can be summarised into service, system, information, process, user, and quality dimensions. This section also identified the key metric types of service impact, service quality, and business value. The metric types can also be organised into internal customer and external customer dimensions with the internal customer dimension metric types further classified into organisation, workgroup and individual metric types.

2.8 Performance measurement framework design

The complexity of performance measurement is recognised by Tangen (2005, pp. 39-40) as an ‘issue that normally incorporates at least three different disciplines: economics, management and accounting. It includes almost any objective of competition and manufacturing excellence whether it is related to cost, flexibility, speed, dependability or quality’. In developing the dimensions of ITSM performance metrics a number of performance measurement frameworks described in Tangen’s (2005) study are considered, as shown in Table 2.6 and Table 2.7. Conceptual dimensions and constructive variables of modern performance measurement systems identified by De Toni and Tonchia (2001) were used to compare performance measurement systems. The comparison was performed to identify frameworks suitable for an ITSM performance measurement framework that would facilitate communication between the business and IT.

Some of the performance measurement architecture dimensions identified by De Toni and Tonchia (2001) are represented in Table 2.6.

Table 2.6 Comparison of performance measurement frameworks

Performance Measurement Framework (Author) ***Purpose of Framework – Measures performance of?***	**A: Balanced scorecards (Architecture Balanced)** **B: Frustum (Architecture Vertical and Balanced)** **C: Internal and External (Architecture Balanced and Horizontal by process)** **D: Value Chain Based (Architecture Horizontal)**			
	A	**B**	**C**	**D**
Balanced Scorecard (Kaplan & Norton 1992) *Organisation*	✓	✓	✓	
Tableau de Bord (Chiapello & Lebas 1996) *Organisation*	✓			
IS Balanced Scorecard (Martinsons et al. 1999) *IS Function*	✓			
IS Functional Scorecard (ISFS) (Chang & King 2005) *IS Function*	✓			✓
Performance Prism (Neely, Adams & Crowe 2001) *Organisation*		✓		
Performance Pyramid (Lynch & Cross 1993) *Organisation*		✓		
Sink and Tuttle model (Sink & Tuttle 1989) *Organisation*				✓
Theory of Constraints (Goldratt 1990) *Organisation*				✓
Intangible Asset Monitor (Sveiby 1997) *Organisation*	✓			
Skandia Navigator (Edvinsson 1997) *Intellectual Capital of the Organisation*	✓			
Goal Question Metrics (GQM) (Basili, Caldiera, Rombach & Marciniak 1994) *Software*	✓			
SERVQUAL (Parasuraman 2004) *Service Organisation*				✓
Results and Determinants framework. (Fitzgerald et al. 1994) *Organisation*	✓	✓	✓	✓
Medori and Steeple (Medori & Steeple 2000) *Organisation*	✓			

Performance measurement frameworks and their purpose are listed in the first column. The second column (A) is the balanced scorecard dimension where several separate performances are considered independently corresponding to diverse perspectives. The third column (B) relates to a synthesis of low-level measures into more aggregated indicators. The fourth column (C) checks frameworks that distinguish between internal and external performances. Lastly, the fifth column (D) identifies frameworks that distinguish the horizontal flow of resources across the organisation highlighting internal relationships of customer and supplier (De Toni & Tonchia 2001).

Some of the frameworks shown in Table 2.6 have been used in the performance measurement of IS, as well as the performance measurement of ITSM. The BSC and the results and determinants framework have the advantage of ‘making explicit the links between the different dimensions of business performance’ (Neely et al. 2000), as shown by having ticks in all the columns in Table 2.6. The Sink and Tuttle model (Rolstadås 1998) provides seven performance criteria and includes most of those found in the BSC, performance pyramid and performance prism. Table 2.6 compares a number of performance measurement frameworks, some of which have already been applied to ITSM, to identify appropriate performance measurement dimensions that can be used to structure the proposed ITSM performance measurement framework. Similar comparisons of performance measurement frameworks have been performed by other researchers (Anderson & McAdam 2004).

In order to identify completeness, eliminate unnecessary perspectives and find natural dimensions, performance measurement frameworks were classified along perspectives. The consideration of perspectives handled by the performance measurement framework is similar to the analysis by Abran and Buglione (2003). Abran and Buglione (2003) state that ‘a key objective of a BSC is to tell the story of the organisation’s strategy. Three criteria help in determining whether or not this objective has been achieved: cause-and-effect relationship, performance drivers and link to financial indicators’. This classification of performance measurement frameworks is shown in Table 2.7. Similar comparisons of performance measurement frameworks have been performed by other researchers, for example, Anderson and McAdam (2004).

Table 2.7 Comparison of performance measurement frameworks along their perspectives

Financial	**Non-financial**	**Results and Determinants: Inputs, Process, Output, Outcomes and Goals**
Performance measurement matrix (Keegan, Eiler & Jones 1989)		
Cost external	Non-cost external; Non-cost internal	
Balanced scorecard (Kaplan & Norton 1992)		
Financial perspective	Customer perspective; Innovation and learning perspective; Internal business perspective	
Results and determinants model (Fitzgerald et al. 1994)		
Financial performance	Quality of service; Flexibility; Resource utilisation; Innovation	*Results:* financial performance, competitiveness *Determinants:* quality of service, flexibility, resource utilisation, innovation
Measures for time based Competition (Azzone, Masella & Bertelè 1991)		
Internal configuration		
Performance Pyramid (SMART) (Lynch & Cross 1993)		
Objectives and measures, financial	External effectiveness; Internal efficiency; Objectives and measures: market	
Skandia navigator Skandia AFS (Edvinsson 1997)		
Financial focus	Customer focus; Human focus; Process focus; Renewal and development focus	
Performance measurement Framework (Brignall & Ballantine 1996)		
Core elements, Non-core elements	Core elements; Non-core elements	
Brown's inputs, processes, outputs, outcomes framework (Brown 1996)		
Outputs, financial results		*Inputs:* employees, customer needs, raw materials, capital *Process:* processing systems *Output:* products, services *Outcome:* customer response *Goals:* repeat business
Performance prism (Neely et al. 2001)		
Stakeholder satisfaction	Stakeholder satisfaction; Strategies; Processes; Capabilities; Stakeholder contribution	
Sink and Tuttle model (Sink & Tuttle 1989)		
Budget ability/ profitability	Quality; Quality of work life; Innovation; Productivity	
IS Functional Scorecard (ISFS) (Chang & King 2005)		
		Inputs: resources *Process:* IS function performance *Output:* IS function outputs *Outcome:* business process effectiveness *Goals:* organisational performance
Theory of Constraints (Goldratt 1990)		
Net Profit, ROI and Cash flow		
Intangible Asset Monitor (Sveiby 1997)		
	Peoples competence; Internal structure; External structure; Value creation modes: growth renewal; Utilisation efficiency	*Results:* Risk reduction/ stability
SERVQUAL (Parasuraman 2004)		
Tangibles	Reliability; Responsiveness; Assurance; Empathy	
Medori and Steeple (Medori & Steeple 2000)		
Competitive priority e.g. Cost	Competitive priorities e.g. quality, flexibility, time, delivery; Future growth	

In classifying ITSM performance metrics, four dimensions of quality, time, cost and flexibility proposed by Neely, Gregory and Platts (2005), as well as De Toni and Tonchia (2001), were used. The results and determinants framework, based on a study of performance measurement in the service sector, groups performance measures into those that relate to results (competitiveness, financial performance), and measures that focus on the determinants of the results (quality, flexibility, resource utilisation and innovation). An additional benefit of the results and determinants framework is that ‘it highlights the fact that the results obtained are a function of past business performance with regard to specific determinants—i.e. results are lagging indicators, whereas determinants are leading indicators’ (Neely et al. 2000). Consequently, the measurement perspectives categorisation of financial, non-financial, and results and determinants (inputs, process, output, outcomes and goals) are applied in Table 2.7. The three dimensions used are extracted from a widely-cited and extensive review of performance measurement study performed by Neely et al. (2005).

At the organisational level, performance measurement frameworks have been designed and used to monitor *productivity*, *profitability*, *quality*, *speed*, *delivery* and *flexibility*. The performance measurement frameworks used in IS are adapted from organisational level performance measurement frameworks. The literature reviewed shows that there is no standardised ITSM performance measurement framework. Organisations measure the performance of their ITSM using a wide variety of means ranging from not using any measure, to applying a range of metrics, to employing well-organised performance frameworks.

Tangen (2004, 2005) describes a number of performance measurement frameworks that are considered in this study in developing the dimensions of ITSM performance metrics. The conceptual dimensions and the constructive variables of modern performance measurement systems identified by De Toni and Tonchia (2001) are used to compare performance measurement systems. Sections 2.11.3 and 2.11.4 review literature on the design of performance measurement framework studies focused at the organisational IS function and IS service levels respectively.

2.9 Types of benefits reported from ITSM improvement initiatives by organisations

An important aspect of performance measurement is the determination of measurable benefits. A measurable benefit is defined by Ward and Daniel (2006) as 'one where either measures exist or can be put in place that will enable the improvement in performance to be determined after the event'. It is expected that implementing ITSM should produce benefits such as improved performance. The benefits identified from the ITSM literature review are presented in Table 2.16.

Table 2.8 ITSM benefits identified from empirical studies

Focus of Study	Method	ITSM Benefits Identified from empirical studies	Authors
ITSM adoption and benefits measurement	Surveys and Case studies	Improved focus on ITSM, more rigorous control of testing and system changes, more predictable infrastructure, improved consultation with IT groups within the organisation, smoother negotiation of service level agreements, reduced server faults, seamless end-to-end service, documented and consistent IT processes across the organisation, an effective change advisory board and consistent logging of incidents.	Cater-Steel and Tan (2005); Cater-Steel et al. (2007); (2008, 2009b)
ITIL benefits – effectiveness	Case study	Customer satisfaction and operational performance	Potgieter et al. (2005)
ITIL - benefits, costs and CSFs	Case Study	Client/service orientation, increased quality of it services, efficiency due to standardisation, optimising of processes and process automation; and transparency and comparability through process documentation and process monitoring.	Hochstein et al. (2005c)
Measuring value of IT services	Case study	Business IT alignment.	Šimková and Basl (2006)
ITIL implementation – performance measurement	Case Study	Improved alignment by staff partners and suppliers by a common sense of purpose, processes and terminology, cost reduction through transparent processes, compliance with the service level agreements and improved quality and consistency of service.	Koch and Gierschner (2007)
ITIL adoption using Actor Network Theory (ANT).	Case Study	Reduction of service outage over four years, fewer incidents and problems, 30 percent reduction in staff, and improved customer satisfaction.	Cater-Steel and McBride (2007)
ITIL performance measurement	Case Study	Improved quality of IT services provided to customers, improved daily work procedures, better employee satisfaction and changed organisation culture.	Spremic et al. (2008)
ITIL measurement – using Six Sigma	Case Study	Reducing cost by minimising "potential downtime and the adverse effects of system, network, and application failures, improving decision-making ability by facilitating access to information throughout the organisation, and by enabling the enterprise wide use of outputs and improving IT service levels by creating operational efficiencies.	Chan et al. (2008)
ITIL benefits realisation	Case Study	Customer satisfaction improved for support availability, responsiveness and expertise, and System performance, functionality and quality	Tan et al. (2010)
ITIL Adoption – benefits and maturity	Survey	As the level of maturity increases, so does the number of realised benefits.	Marrone and Kolbe (2010)

ITSM benefits extracted from ITIL v3 lifecycle phase benefits (OGC 2009) are shown in Table A.3; and ITIL v3 process benefits in Table A.4 in Appendix A.

The research study will use the ITSM benefits identified in the literature review and summarised in four tables as the basis for answering the research questions. The ITSM benefits identified from empirical studies are summarised in Table 2.16; ITSM performance measurement frameworks identified from empirical studies are summarised in Table 2.9; ITSM benefits identified from theoretical studies are summarised in Table 2.18; and ITSM performance measurement frameworks identified from theoretical studies are summarised in Table 2.11. The study builds a performance measurement framework showing the relationship between ITSM benefits and performance metrics. Table 2.16 provides a list of empirical studies, their focus, methodology and the ITSM benefits extracted. The purpose of the list of extracted benefits from the ITSM empirical studies was to inform the development of the survey used to answer: *RQ1. What types of benefits are reported from IT service management (ITSM) improvement initiatives by organisations?*

None of the empirical studies provided a definitive list of ITSM benefits. All the studies provided open-ended lists and did not cross-reference or consolidate the list of benefits from previous studies. None of the studies identified a list of unique benefits and listed benefits in some cases could be reclassified, for example, Cater-Steel and Tan (2005) and Cater-Steel et al. (2007), 2008; 2009a) suggest the ITSM benefit ‘consistent logging of incidents’ can be re-classified as a sub-benefit of an earlier listed benefit ‘documented and consistent IT processes across the organisation’.

The ITSM benefits list from the reviewed literature did not group the benefits into categories. The majority of benefits listed are concentrated on improvements in IT processes, with a few focusing on customer service and alignment with the business. A listing of ITSM performance measurement frameworks and metrics identified from empirical studies is provided in Table 2.9. The purpose of extracting the ITSM performance measurement frameworks and metrics used in the empirical studies was to inform the development of the survey used to answer *RQ2: Which specific metrics can be used to measure ITSM performance?*

Table 2.9 ITSM performance measurement frameworks and metrics identified from empirical studies

Focus of Study	**Method**	**ITSM Performance Measurement Frameworks and Metrics Identified**	**Authors**
ITIL Benefits – effectiveness	Case study	SERVQUAL.	Potgieter et al. (2005)
Measuring value of IT services	Case study	Comparative approach metrics: comparisons of costs or the economic value added for two projects. Cost benefit approach metrics: net present value, return on investment and total cost of ownership. Using company output, business results and intermediate performance.	Šimková and Basl (2006)
IT Performance Management	Case Study	IT BSC with 4 perspectives and 24 performance metrics.	Son et al. (2005)
ITIL implementation – performance measurement	Case Study	Increased service levels measured by mean time to repair, Mean time between failures, and aggregate downtime.	Koch and Gierschner (2007)
ITIL performance measurement	Case Study	List of key performance indicators (KPIs) for ITIL processes representing company goals.	Spremic et al. (2008)
ITIL Measurement – using Six Sigma	Case Study	Six Sigma: Define, Measure, Analyse, Improve, and Control (DMAIC).	Chan et al. (2008)
ITIL Benefits realisation	Case Study	BSC and CSFs extracted from literature on Enterprise Resource Planning (ERP) implementation.	Tan et al. (2010), Pollard and Cater-Steel (2009),
ITIL Adoption – benefits and maturity	Survey	More metrics used at later levels of maturity between defined and optimised.	Marrone and Kolbe (2010)

The empirical studies primarily used the case study method. The empirical studies reviewed provided brief lists of metrics and none of the lists were definitive and all were open-ended. There was no cross-referencing of the lists by the studies—each list of metrics appears to have been developed as a stand-alone list that did not make reference to earlier developed lists. The BSC was used to organise the perspectives for measuring ITSM performance. Key performance indicators and critical success factors were identified as important aspects of ITSM performance measurement. The studies focus more on approaches to performance measurement rather than listing ITSM metrics or types of metrics.

A list of benefits extracted from theoretical studies is presented in Table 2.18.

Table 2.10 ITSM benefits identified from theoretical studies

Purpose of Theory	**Research Approach**	**ITSM Benefits Identified**	**Authors**
Analysing	Conceptual: Resource Based View of ITIL	Master the use of resources, create efficient work practices, and develop patterns of activity among the human capital of a firm, which embed the knowledge acquired by the learning processes.	Wagner (2006)
Explaining	Conceptual: Process Assessment Model (ISO 15504) for ITIL	An improvement of the service quality, more reliable business support, a clearer view of current IT capability, a better information on current services, a greater flexibility for the business through improved understanding of IT support, enhanced customer satisfaction.	Barafort et al. (2005)
	Quantitative: Process Complexity Analysis to estimate the value of ITIL	Labour cost reduction, service fulfilment savings, service quality improvements.	Yixin and Bhattacharya (2008)
	Conceptual: Theory of NRA applied to ITIL	To assist activity actors to achieve more efficiency and effectiveness, to help in the realisation of regular activities.	Donko and Traljic (2006)
	Conceptual: CobiT and BSC on SLM	Clearly defined service levels.	Van Grembergen et al. (2003)
Design and action	Conceptual framework for IT service performance management using the BSC	Improved service quality, customer satisfaction.	Praeg and Schnabel (2006)
	Quantitative approach to BSC on ITIL	Providing efficient and cost effective service.	Moura et al. (2006b)
	Quantitative approach to BSC on ITIL	Service improvement along the four BSC perspectives	Donko and Traljic (2009)
	ITIL Evaluation Framework using Design Science	Alignment of IT services with current and probable future business needs, improved quality of IT services, and a reduction in the long term costs of service provision.	McNaughton et al. (2010)

The purpose of the list was to inform the development of the survey used to answer: *RQ1. What types of benefits are reported from IT service management (ITSM) improvement initiatives by organisations?*

Similar to the benefits identified from the empirical studies, the ITSM benefits extracted from theoretical studies do not provide a categorical inventory of ITSM benefits. There was some cross referencing of benefits identified from previous studies, for example, the study by Moura et al. (2006b) references Donko and Traljic (2006). The benefits listed in the theoretical studies were primarily customer focused and quality oriented. Efficiency and cost reduction were also common ITSM benefit themes. A listing of ITSM metrics identified from theoretical studies is provided in Table 2.11.

Table 2.11 ITSM performance measurement frameworks and metrics identified from theoretical studies

Purpose of Theory	**Research Approach**	**ITSM Performance Measurement Frameworks and Metrics Identified**	**Authors**
Analysing	Conceptual: Resource Based View of ITIL	Using incident management Resource Based View (RBV)	Wagner (2006)
Explaining	Conceptual: Process Assessment Model (ISO 15504) for ITIL	ISO/IEC 15504 and ITIL Process Reference Model (PRM) and Process Assessment Model (PAM).	Barafort et al. (2005)
	Quantitative: Process Complexity Analysis to estimate the value of ITIL	Using the ITUP change management process Value estimates quantifying process baseline with typical task execution time and underlying complexity.	Yixin and Bhattacharya (2008)
	Conceptual: Theory of NRA applied to ITIL	Using service level management SLA efficiency of the realisation, effectiveness of the realisation and regularity of the action.	Donko and Traljic (2006)
	Conceptual: CobiT and BSC on SLM	Using service level management metrics based on CobiT and BSC	Van Grembergen et al. (2003)
Design and action	Conceptual framework for IT service performance management using the BSC	Cachet of 48 assessment criteria based on modified SERVQUAL and the BSC	Praeg and Schnabel (2006)
	Quantitative approach to BSC on ITIL	Using service level management Measurement of investment of IT using the IT loss function by measuring at three layers: IT services layer; business processes layer; and business layer.	Moura et al. (2006b)
	Quantitative approach to BSC on ITIL	Loss caused by service degradation measured by loss of financial, user trust and credibility	Donko and Traljic (2009)
	ITIL Evaluation Framework using Design Science	Using incident management Effectiveness, capability and efficiency using the BSC.	McNaughton et al. (2010)

The purpose of extracting the ITSM performance measurement frameworks and metrics used in the theoretical studies was to inform the development of the survey used to answer: *RQ2 Which specific metrics can be used to measure ITSM performance?*

The theoretical studies primarily focused on the performance measurement of specific ITSM processes, mainly ITIL service level management. The theoretical studies reviewed provided brief lists of metrics and none of the lists were definitive and were all open-ended. There was no cross-referencing of the lists by the studies. There was a focus on measuring the efficiency and effectiveness for ITSM performance. A number of identified approaches to ITSM performance measurement include the resource-based view, use of ISO/IEC 15504 process assessment, SERVQUAL, BSC and the IT loss function. The studies focus on approaches to performance measurement as opposed to listing ITSM metrics or types of metrics.

2.10 Specific metrics used to measure ITSM performance

2.10.1 Metrics used to measure ITSM performance

Using the systematic literature review protocol described in section 2.4, a total of 224 research papers were selected for review. Ten of the 18 ITSM studies directly addressed the subject of metrics used to measure ITSM performance and are tabulated in Table 2.12.

Table 2.12 Sample ITSM performance metrics identified in selected literature

Publication Type, Authors	**ITSM Process**	**ITSM metrics**
Book, (OGC 2007a, 2011)	Change management Incident management Problem management	Alignment to single channel Incidents resolved within target time Percentage of repeated problems over time
Book, (Smith 2008)	Change management Incident management Problem management	Outages during changes Average call time with no escalation Number of incidents resolved by known error
Book, (Brooks 2006)	Change management Incident management Problem management	Percentage of failed changes Percentage of incidents resolved by 1st line support Number of problems closed
Book, (Steinberg 2006)	Change management Incident management Problem management	Total changes implemented Total number of incidents Number of repeat incidents
Journal, (McNaughton et al. 2010)	Release management Release management	Problem free releases Help desk calls per release
Journal, (Donko & Traljic 2009)	Change management Incident management Problem management	Number of problems created Time spent on resolution by function Number of problems resolved
Conference, (Spremic et al. 2008)	Change management Incident management Problem management	Percentage of released changes not approved Average time for solving incidents Number of major problems
Conference,(Van Grembergen et al. 2003)	Service level management (SLM) SLM	Number of failures to attend scheduled account meetings SLM educational budget as percentage of total IT budget
Conference, (Moura et al. 2006b)	Using Service Level Management	Measurement of investment of IT using the IT loss function by measuring at three layers: IT services layer; business processes layer; and business layer.
Web page, (Chiu & Nouri 2009)	Change management Incident management Problem management	Percentage of emergency changes Mean and median time of resolution Mean and median days to identify root cause

An analysis of the selected literature identified publications that described ITSM performance metrics: two journal articles and three conference papers from academia; and four books and one web page from the industry press. The study identified many specific ITSM performance metrics—samples of these are listed in Table 2.12; a list of ITIL v3 process metrics extracted from the OGC ITIL foundation texts (OGC 2007a, 2011) is provided in Table A.5 and ITIL v3 function metrics are provided in Table A.6 in Appendix A.

The literature, predominantly the books on ITSM performance metrics, provides definitions, purpose, types and examples of metrics. The classifications of metrics and identification of examples of metrics now follow.

2.10.2 Classifications and types of metrics

The study did not find a definitive classification or typology of ITSM metrics that is widely adopted. Different studies, ITSM texts and ITSM tools used a variety of ITSM metric classifications. In all the literature reviewed no explanation was offered on the categorisation used. There is variation in the classification of metrics offered and these include *technology metrics, process metrics, service metrics, tension metrics, organisational metrics*, *performance, compliance, quality* and *value metrics* (OGC 2011). An alternative metrics classification includes key goal indicators, critical success factors, key performance indicators, key performance metrics and key fact metrics (Smith 2008). Another typology classifies metrics into operational, key performance indicators, tolerances, critical success factors, dashboards, outcomes, what-ifs, analytical, and other (Steinberg 2006). Metrics at the process level are classified into effectiveness, capability and efficiency metrics (McNaughton et al. 2010). Process activity metrics are classified into *goals* and *indicators* by Donko and Traljic (2009). In developing an IT services performance management system Praeg and Schnabel (2006) classify metrics into strategic level critical success factors, business process level key performance indicators, IT service level process metrics, and tool level metrics. Further advice is provided when measuring the performance of services from external providers, that 'it is important to take the objective metrics (the numbers) as well as the subjective metrics (such as the perception of the end user group)' (Van Grembergen et al. 2003). The purpose for measuring outsourcing vendor performance is to 'validate outcomes, encourage right behaviour, discourage poor performance and align with business objectives' (Chiu & Nouri 2009).

2.11 Deriving Specific ITSM performance metrics

This section reviews literature that was employed to inform the development of the survey used to answer *RQ3. How can ITSM performance metrics be derived?* The section also reviews literature on the development of performance measurement frameworks at the organisational and IS functional levels. In section 2.11.1 a review of the literature on deriving specific ITSM performance metrics is presented, followed by a review of performance measurement framework design in section 2.11.2. In section 2.11.3 a review of literature on designing organisation performance metrics is presented. Literature on metrics constituents is reviewed in section 2.11.4. A review of the literature on designing ITSM performance metrics is presented in section 2.11.5, followed by literature on challenges of measuring and reporting ITSM performance in section 2.11.6.

2.11.1 Deriving specific ITSM performance metrics

Faced with the challenge of measuring and reporting ITSM performance, ITSM managers seek metrics from ITSM tools, forums, websites and books. It is advocated that 'the documentation within a metrics catalogue is also a pre-requisite to determine and communicate the content, frequency, and layout of IT performance reports. In addition, a metrics catalogue enables a detailed understanding of the individual metrics and supports the awareness campaign with an IT department' (Son et al. 2005, p. 222).

2.11.2 Designing organisation performance metrics

A recommended approach to designing performance measurement frameworks incorporates the structure of the framework as well as guidance on the selection of metrics. According to Neely et al. (2000, p. 1121), 'The process of deciding which measures of business performance to adopt is a valuable one, not least because it forces management teams to be very explicit about their performance priorities and the relationship between them, thereby exposing, and offering an opportunity to resolve, any hidden differences of opinion'.

Following the advice of Neely et al., a ‘metric refers to more than simply the formula used to calculate the measure. For a given performance measure to be specified it is necessary to define, among other things, the title of the measure, how it will be calculated (the formula), who will be carrying out the calculation, and from where they will get the data’ (Neely et al. 2005, p. 1256). An ITSM performance metric can be characterised as a measurement of the degree that any IT service performance attribute belongs to IT service (people, process, resources [partner, technology] and product). Some ITSM examples of metrics would be:

- System availability
- Incident response
- Service fulfilment

A variety of ITSM metric definitions are offered that would provide a starting point for organisations measuring ITSM performance. However, none of the ITSM metric definitions offered distinguish between metrics and measures. Some of the definitions equate metrics to measures (Brooks 2006; Smith 2008). The distinction between metrics and measures is considered important in performance measurement. This study applies to ITSM the performance measurement distinction between a metric and a measure made by Neely et al. (2002) and reported in section 2.5.4 of Chapter 2. An ITSM performance measure (noun) can be defined as an IT service parameter used to quantify the efficiency and/or effectiveness of past action. Some ITSM examples of performance measures that quantify the ITSM performance metric example provided earlier would be:

ITSM Metrics	**ITSM Measures**
System availability	System downtime is a measure of the time the system has been unavailable
Incident response	Mean time to restore a service is a measure of time taken to restore a service
Service fulfilment	Number of service level agreements with target met

2.11.3 Constituents of IS performance metrics

In developing a framework for measuring Internet performance metrics, Paxson (1996, p. 2) specifies that the term 'metric implies the use of standardised units when quantifying the metric' and quantified values of metrics are termed measures. Metric constituents offered by Paxson (1996) are listed in Table 2.13. According to Paxson (1996), the three key notions for any measurement framework are: metric—the fundamental property we wish to measure; method—the way to attempt to measure the property; and measurement—the result of a specific application of the method. In a study on IS performance Son et al. (2005, p. 225) offered a different set of metric constituents which are listed in Table 2.13. The importance of maintaining a metrics catalogue is noted: 'Furthermore, the metrics catalogue dictionary made the stakeholders involved more aware of the performance management system' (Son et al. 2005). Clearly defining metric constituents assists in measuring performance, as well as in engaging stakeholders.

Table 2.13 List of Internet and IS metric catalogue attributes

Catalogue Type	**Metric attribute (Type)**
Internet catalogue metric attributes (Paxson 1996) Internet	Name of metric
	Standard unit of measurement
	Underlying construct that the metric intends to measure, expressed as a composition of more basic metrics
	General measurement issues
	Cross reference to corresponding method definitions
	Known problems with the definition
	Discussion of related metrics
IT/ catalogue metric attributes (Son et al. 2005) IT	Critical success factors (Description)
	Source of information e.g. tools (Formula)
	Measurement objective (Target / Target Ranges)
	Escalation procedures (Frequency of measurement)
	Graphical presentation (Frequency of review)
	Further drill down (Performance metric owner)
	Performance metric recipient (Specifics and comments)
	Status: active/future/retired (Metric last revised)

2.11.4 Designing ITSM performance metrics

Using common elements from existing frameworks, an evaluation framework for ITSM improvement efforts with particular focus on ITIL version 2 was developed by McNaughton et al. (2010, pp. 6, 23). They state that their goal is 'a holistic, prescriptive, multi-dimensional framework with both objective and subjective means of assessing ITIL benefits from a variety of perspectives'. They designed a framework by combining common elements from potential evaluation frameworks for ITIL such as itSMF/OGC ITIL assessment tool (itSMF International 2008), IS adapted SERVQUAL (Kettinger & Lee 1999), IT service capability maturity model, IT BSC (Van Grembergen 2000), stakeholder process approach and criteria catalogue method, and expanding some elements to make them more prescriptive and specific to ITIL. After assessing, testing and expert evaluation they conclude that their framework 'aids in performance assessment, benefits realisation, finding areas for IT service improvement, and directing resources'. The metric dimensions offered in ITSM performance frameworks and systems are compared in Table 2.14.

Table 2.14 Comparison of ITSM metric catalogue/dictionary attributes/elements

Author(s), (year)				
Brooks (2006)	**Smith (2008)**	**Steinberg (2006)**	**McNaughton et al. (2010)**	**OGC (2011)**
Description	Perspective/ theme	Operational metrics	Metric name	Opportunity number
Specification	Measure number or name	Tolerance level	ITIL process	Date raised
Justification	Process owner	KPI	Perspective (management, technology)	Size (small, medium, large)
Constraints	Goal	CSF	Type (effectiveness, capability, efficiency)	Timescale (short, medium, long)
Audience	Objective	Dashboards	Definition	Description
Danger value	Description	Outcomes	Example	Priority/urgency
Target value	Lag/lead	What-ifs	Target set by management	KPI metric
Possible value	Frequency	Analytical		Justification
	Unit Type	Other		Raised by
	Polarity			To be actioned by
	Danger value			Date required by
	Target value			Qualitative KPIs
	Low/High			Measure
	Threshold actions			Metric
	Formula			Quality goal
	Data source			Lower limit
	Data quality			Upper limit
	Data collector			Process/ function
	Baseline			KPI/ description
	Target			Type
	Target rationale			Progress indicator
	Initiatives			
	Comments/ notes			

The OGC (2009) advises that for the design of ITSM performance measurement systems and metrics selected they need to reflect the goals and objectives of the process being measured. The process measurements need to be appropriate to the level of capability and maturity of the processes being measured. Measurements drive organisational behaviour and should be carefully selected and, where possible, metrics need to be driven by organisational goals and developed to operate in a hierarchical way, using a tool such as the BSC, so that:

- detailed technical metrics, at the lowest levels, can be aggregated and reported at a higher level to demonstrate service performance against SLAs; and
- then aggregated to a management dashboard for an overall picture on performance; and then
- used at a higher level to demonstrate performance against organisational goals and objectives.

2.11.5 Challenges of measuring and reporting ITSM performance

The challenges of measuring and reporting ITSM benefits were aggregated from the literature and categorised together, as shown in

Table 2.15. The ITSM performance challenges are grouped into stakeholders, goals, resources, data, process, tools and communication. The study develops the categories in Table 2.26 from aggregating the measuring and reporting challenges extracted from existing literature. The main categories of challenges identified from the literature are stakeholders, goals, resources, data, process, tools and communication. Stakeholder challenges include lack of management commitment, resistance to changes, supplier management, and lack of education and training. Goal challenges include unclear or lack of ITSM measurement and reporting goals, metrics not aligned to organisational goals, and drastic reactions to poor performance. Data challenges to measuring and reporting ITSM include incorrect level of detail, difficulty in obtaining input, manipulation, accuracy, reliability, and accessibility. Process challenges include lack of mature service management processes and lack of standards. Tools challenges include diverse tools, complexity and implementation and maintenance costs. Communication challenges include poor relationships, lack of cooperation between IT and business and inability to justify ITSM initiatives to stakeholders.

Table 2.15 Challenges of measuring and reporting ITSM performance

Category	**Measuring and reporting challenges**	**Publication type, author(s)**
Stakeholders	Lack of management commitment, resistance to change, poor supplier management, poor supplier performance. Lack of commitment from IT staff and management, undefined, lack of education and training, resistance to change.	Book, (OGC 2007a, 2011) Book, (Brooks 2006; Smith 2008)
Goals	Lack of goals. Metrics not aligned with organisational goals, unclear, inexistent, not regularly reassessing objectives, wrong target levels, and drastic reactions to poor performance. What to measure to achieve business outcomes.	Book, (OGC 2007a, 2011) Book, (Brooks 2006; Smith 2008) Web page, (Chiu & Nouri 2009)
Resources	Inadequate budget and time; lack of knowledge management, over-commitment of resources with an associated inability to deliver. Takes too long to demonstrate benefits, irregular measuring and reporting. Investing in process implementation instead of business problem solutions, poor management decision-making, and resistance to using metrics. Cultural resistance to formal measures, wrong behaviour caused by metrics.	Book, (OGC 2007a, 2011) Book, (Brooks 2006; Smith 2008) Book, (Steinberg 2006) Web page, (Chiu & Nouri 2009)
Data	Wrong level of detail, difficulty obtaining input, manipulation, accuracy, reliability, accessibility. Data collection, metrics can easily be manipulated.	Book, (Brooks 2006; Smith 2008) Web page, (Chiu & Nouri 2009)
Process	Lack of mature service management process, lack of standards.	Book, (OGC 2007a, 2011)
Tools	Diverse and disparate, lack, complexity, costly to implement and maintain. Inadequate, lacking. Reliance on manual processes to measure and report.	Book, (OGC 2007a, 2011) Book, (Brooks 2006; Smith 2008) Web page, (Chiu & Nouri 2009)
Communication	Poor relationships, lack of cooperation between IT and business. Inability to justify ITSM initiatives to business management and stakeholders	Book, (OGC 2007a, 2011) Book, (Steinberg 2006)

This study will address the challenges of measuring the performance of ITSM through empirical research on ITSM metrics and performance measurement using survey and case study. The study also addresses the ITSM measurement and reporting challenges by designing a framework that helps in linking organisational level goals with ITSM operational level metrics, as well as proposing a structure for ITSM metric constituents.

The survey will collect data on the current ITSM measuring and reporting challenges faced by ITSM practitioners and, hence, confirm or update the list found in the literature. The survey will test for relationships between benefits and metrics, ITSM metrics and performance measurement frameworks in an attempt to understand the nature of ITSM performance measurement challenges. The case study will consider the factors influencing the selection of metrics and thus improve the understanding of the ITSM performance measurement stakeholder relationship.

The ITSM performance measurement framework designed in this study attempts to lessen the challenges of measuring and reporting ITSM performance by providing a potential solution for communication of ITSM performance measurement to different levels of the organisation, tying organisational goals with ITSM metrics and providing a guide on the levels of ITSM performance measurement detail at each organisational level.

2.12 Internal and external environmental factors that influence an organisations' selection of specific performance metrics for ITSM

2.12.1 Internal and external organisation environment factors

Early work on contingency theory is found in Luthans and Stewart (1977) study, providing a definition of the general contingency theory of management and identifying internal and external environmental factors influencing organisation management. A critique of the use of the contingency theory in the field of IS is provided by Weill and Olson (1989) and their advice on effective use and pitfall avoidance is adopted in this study . A study by Raymond (1990) applied the contingency theory in IS success to identify important factors resulting in the success of information systems in an organisation. The contingency theory is used by Saunders and Jones (1992)—and later extended by Myers et al. (1997)—to study the performance measurement of information systems. Research by Umanath (2003) proposes a clarification of the concept of contingency and its use in IS. An application of the contingency theory on factors influencing the design of performance measurement systems is provided by Rejc (2004).

2.12.2 Contingency theories of performance measurement

This section presents the results of the literature review on contingency theory. Previous studies on the performance measurement of ITSM have failed to consider factors that influence the selection of ITSM performance metrics.

The majority of organisations implementing ITSM frameworks are perceived to be at a low level of maturity and therefore claim not to be at the stage of systematic performance measurement (Cater-Steel et al. 2011; Marrone & Kolbe 2010). As the process capabilities of organisations implementing ITSM frameworks improve, and as the level of maturity of the organisations increases, it is critical that factors which influence selection of ITSM performance metrics are understood.

Extending the findings on IS performance measurement to ITSM performance measurement, refinements of measures of performance are badly needed (Saunders & Jones 1992). It is further advised that cross-sectional studies on measures being used 'can be examined to determine what organisational and environmental contexts and groups of dimensions and measures actually seem to work best. These studies would be complemented by the use of in-depth interviews and content analysis of organisational documents' (Myers et al. 1997, p. 20). Focusing on ITSM performance measurement, this study applies the advice from prior studies that used contingency theory. In the application of advice from prior studies, this study recognizes the IT advances and changes (e.g. Internet usage, Cloud Computing, Service-Oriented Computing) that have occurred and continue to occur and that have necessitated the shift by IT departments to a customer instead of a technology focus. A report on public sector organisations in Australia found that 'there is no evidence that current investment approval processes include any rigorous and objective methodology for assessing the organisational capability of an agency seeking funding for ICT-enabled projects during the budget process' (Gershon 2008). This finding was recently confirmed by Reinecke (2010) who established that 'there was no formal means of assessing whether agencies had the capability to commission, manage and realise benefits from ICT projects'. Poor choice of metrics could lead to difficulty in aligning and integrating the IS function with the organisation. Lack of metrics may result in failure of IS and business operational systems and jeopardise achievement of corporate goals. ITSM frameworks such as ITIL prescribe best practice founded on the concept of continual improvement, which must be based on performance measurement.

There are a number of reasons why contingency theory was selected for the study. Contingency theory 'enables a researcher to relax assumptions underlying theoretical propositions and/or systematically introduce factors to explain or predict expected phenomena' (Umanath 2003). Services, including IT services, are created and consumed simultaneously and, in many services, the customer is a co-creator (Grönroos 2000; Normann 2000). It is, therefore, important to understand how the environment influences the management of IT as a service. Contingency theory is based on the premise that there is no universally appropriate performance measurement system that applies equally to all organisations in all circumstances. Using contingency theory may lead to a better understanding of ITSM performance measurement by enabling the identification of 'specific aspects of a performance measurement system that are associated with certain defined circumstances' (Rejc 2004).

Previous studies on ITSM adoption, benefits and performance measurement have used a variety of theories such as actor network theory (Cater-Steel & McBride 2007), institutional theory (Cater-Steel et al. 2009a), resource based view (Wagner 2006), and theory of normatively regulated activity (Donko & Traljic 2006) but, to date, none of the studies have used the contingency theory of management. A meta-analysis of theories used in previous ITSM studies that have developed ITIL performance measurement frameworks is summarised in Table 2.16.

Table 2.16 Analysis of ITSM performance measurement studies

Authors	**Research Approach**	**Underlying Theory/ Model**	**Study main purpose**
Hochstein (2004)	Qualitative (Case Study)	SERVQUAL and IT SERVQUAL	Quality of IT individual services
Praeg and Schnabel (2006)	Theoretical (literature review), market acceptance survey	Value based management SERVQUAL, BSC	IT services procurement
Donko and Traljic (2009)	Theoretical (Literature review)	BSC, activity diagrams	Explaining measuring quality through variation in service level and business loss, number of transitions of activity
McNaughton et al. (2010)	Design science	IS SERVQUAL and IS Reverse SERVQUAL	Building a framework for measuring benefits and value of ITIL

Contingency theory has been used in previous studies that focused on IS. Using contingency theory, Saunders and Jones (1992) provided a model of important dimensions and measures for evaluating IS performance. According to (Saunders & Jones 1992, p. 80), ‘As the IS function matures, measures likely change from a structured focus on operational efficiency and user satisfaction to a more unstructured concern for IS impact on strategic direction’. Their work was extended by Myers et al. (1997) to assess the quality and productivity of the IS function. The two studies identified the following internal and external organisational factors influencing the selection of performance dimensions:

> Internal environment factors: mission, size, goals, top management support, IS executive hierarchical placement, maturity of IS function, size of IS function, structure, management philosophy/style, evaluator perspective, culture and IS budget size.
>
> External environment factors: industry, competitive environment, culture, economy, availability of resources, and climate.

In an earlier study on the organisational context of IS success, Raymond (1990) proposed a contingency approach relating organisational factors to user satisfaction and system usage. This study applies contingency theory in the ITSM context which focuses on IT services and applies the factors identified in a previous IS function study by Myers et al. (1997).

This research study addresses the criticisms levelled at contingency theory application in Management Information Systems (MIS) and uses case studies, content analysis and a mixed methodology and subsequently follows the advice of Weill and Olson (1989): ‘A generally more subjectivist, less functional, less un-reflexive and less deterministic approach is needed...An increasing use of case study methodologies, longitudinal research and ethnographic approaches is suggested’.

The case studies investigate the contingent environmental factors, such as organisation size, industry sector and strategy that influence selection of performance metrics for ITSM.

According to Luthans and Stewart (1977) the formulation of a general contingency theory of management ‘must start with a sound construct of the organisation system’.

They identify environmental variables as factors beyond the control of the organisation's resource managers that impact the organisation. They distinguish between external factors, defined as outside the organisational system, and internal factors, which are outside the control of the specific manager (in this context the ITSM manager), but within the organisation.

2.13 Conclusion and summary results of the literature review

The literature review shows there is scant research on the performance measurement of ITSM and there is a lack of theory-based ITSM performance measurement frameworks. The literature review found limited research studies on the performance measurement of ITSM, with previous IT service management (ITSM) studies primarily focusing on ITSM adoption and benefits. None of the studies reviewed addressed factors influencing the selection of ITSM performance metrics. Although organisations find this challenging, ITSM performance measurement should be conducted from a variety of perspectives. Breaking down metrics into their constituents enables performance measurement and engagement with stakeholders.

Based on the reviewed literature, it is critical to distinguish between individual level and organisation level service performance measurement, as well as to distinguish between performance of the management of the service from performance of the service. SERVQUAL's unit of analysis is individual person performance measurement.

A balanced performance measurement framework should be multi-dimensional with the following integrated perspectives: financial/non-financial, quantitative/qualitative, operational/strategic, internal/external and organisation horizontal/vertical. A distinction should be made between metrics and measures.

Chapter 3 Research Methodology

3.1 Introduction

Chapter 2 provided the context of this research within Information Systems (IS) and demonstrated the need for the research. Chapter 2 also identified the existing gaps in ITSM performance measurement research. There is a lack of an ITSM performance measurement framework that can be used to standardise the ITSM performance metrics and measurement practice. The literature review shows that there is little research on the performance measurement of ITSM and there is a lack of theory-based ITSM performance measurement frameworks.

The aim of this chapter is to describe the research approach: philosophy, design and methods. The selected research design enables the collection of data to address the research questions raised in Chapter 1. An explanation of the research approach, including the paradigm and methods, is presented and justified.

The research approach is introduced in sections 3.1 and 3.2, followed by an explanation of the research philosophy in section 3.3. A description of the research design and mixed methods is provided in section 3.4. The survey method is described in section 3.5, followed by the case study approach description in section 3.6. The ITSM performance measurement framework design approach is provided in section 3.7. A discussion of the methodologies of the reference disciplines is provided in section 3.8. The unit of analysis is explained in section 3.9, with a summary and conclusions outlined in section 3.10.

Figure 3.1 depicts a graphical overview of the chapter and its various sections.

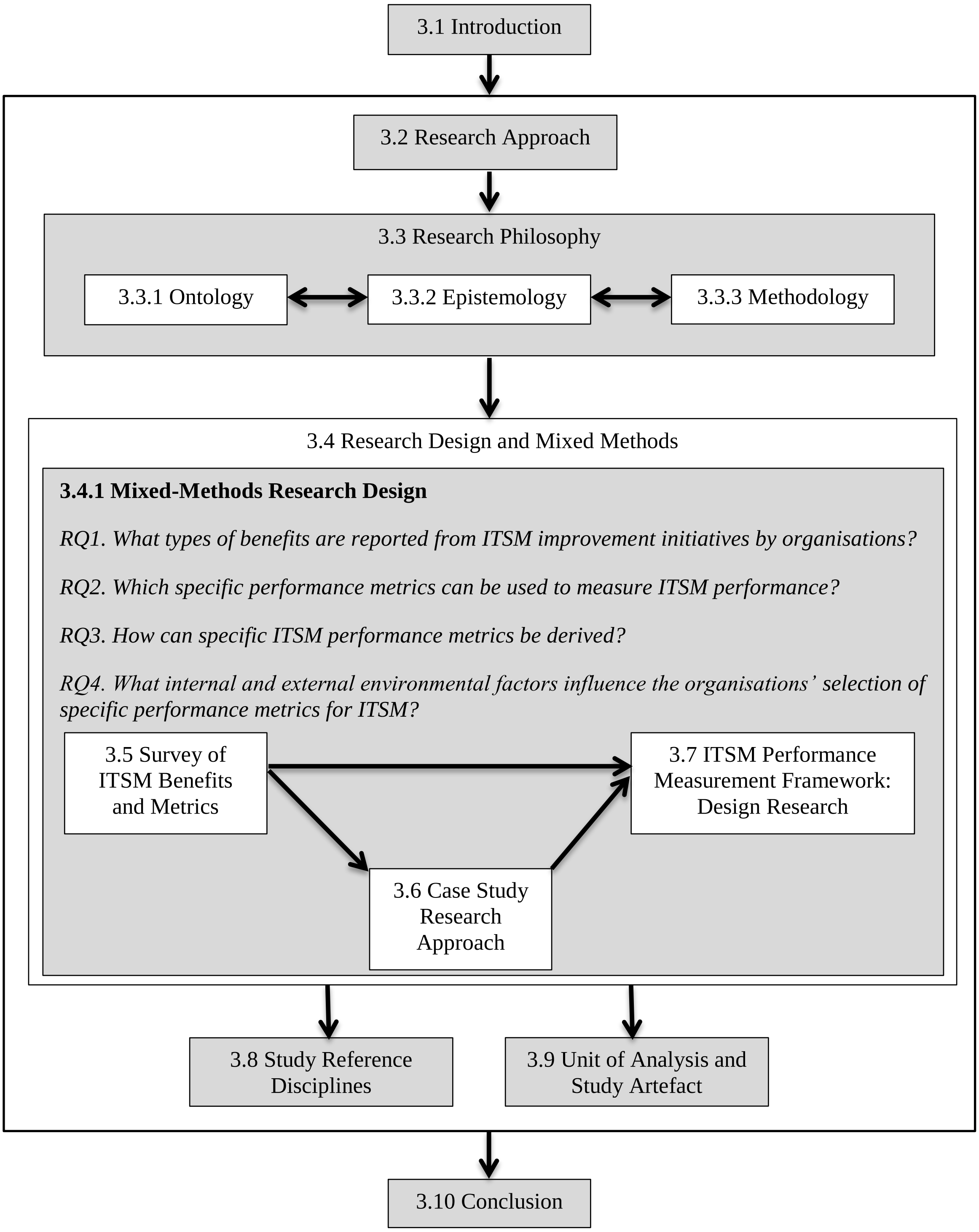

Figure 3.1 Chapter 3 overview and section linkages

3.2 Research approach

This section describes the approach taken to conduct the study and presents a depiction of the interrelation of the philosophical view, strategies of inquiry and research method, and how these elements support the research design. The research approach can be described at different levels of detail and using a variety of classifications. Research can be described based on its purpose as pure or applied. Pure research explains basic phenomena and relationships between objects, whereas applied research focuses on the application of knowledge to solve practical problems (Bhattacherjee 2012). The study uses a mix of both pure and applied research as it explains ITSM performance measurement and then develops a performance measurement framework that can be used to measure ITSM performance. The study conducts primarily inductive research, as the goal is to infer theoretical concepts and develop a solution for measuring ITSM performance from the observed data. There is limited research on the performance measurement of ITSM. The purpose of research can be exploratory, descriptive or explanatory. The study survey is predominantly exploratory as it seeks to identify the ITSM performance measurement practices and identify cases for further study. The survey is also descriptive as it provides 'observations and detailed documentation of a phenomenon of interest' (Bhattacherjee 2012, p. 6). The case study design is explanatory as it seeks clarification on the factors influencing selection of ITSM performance metrics. A rationale for selection of the research approach is provided based on previous literature.

This study uses a multi-paradigmatic and mixed-methods approach. The social science and design science paradigms are used in applying mixed methods. A multi-paradigmatic approach is taken to cater for the research and design components of the study. Mixed-method research is defined as one which collects and analyses both qualitative and quantitative data, combines the two forms of data concurrently, frames the procedures within philosophical worldviews and theoretical lenses, and combines the procedures into specific research designs for conducting the study (Creswell et al. 2011). The study uses a mixed-method approach as phenomena in information systems are complex and comprise both socio-technical and artificial components. The mixed-method approach is sequential with the survey, followed by case studies, then ITSM artefact design and evaluation. The study aims to develop a performance measurement framework for IT service management (ITSM). The approach taken in the study is depicted in Figure 3.2 adopted from Creswell (2009).

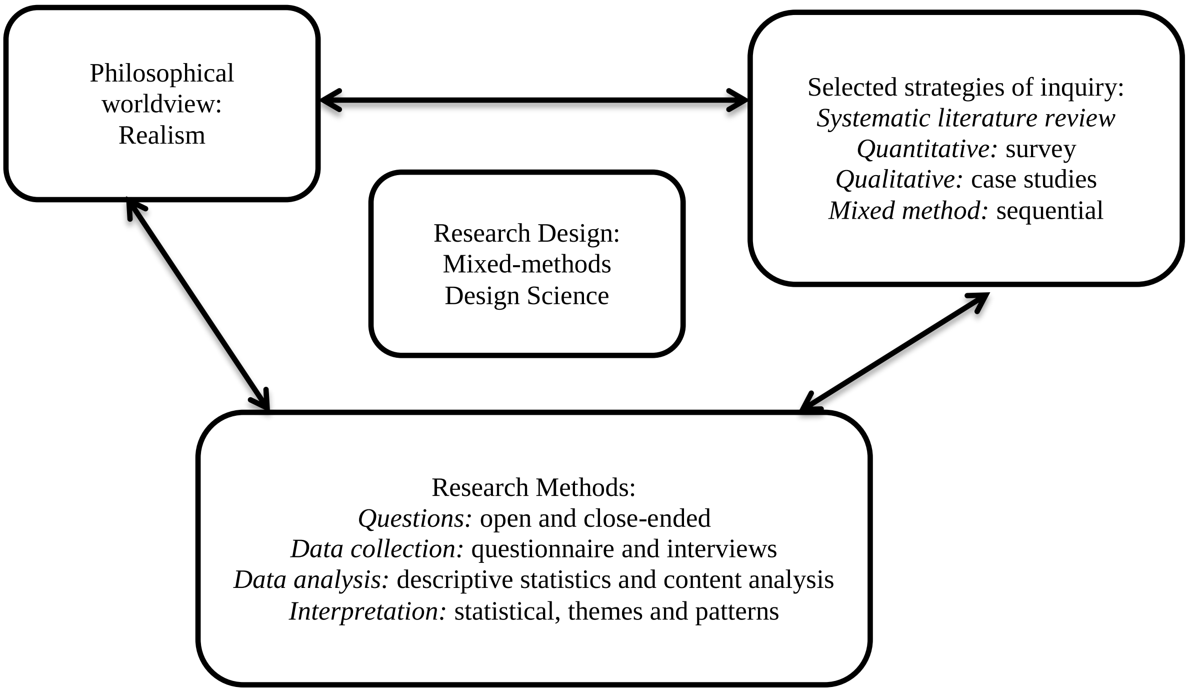

Figure 3.2 Interconnection of worldviews, strategies of inquiry and research methods

The philosophical worldview forms the foundation of the study and informs the selection of strategies of inquiry that, in turn, inform the philosophical view. Both the philosophical worldview and the strategies of inquiry inform, and are informed by the research methods.

The study takes the philosophical worldview of realism, which is explained in more detail in section 3.3. The strategies of inquiry used include a systematic literature review (explained in Chapter 2), a survey (described in section 3.5), case study (described in section 3.6) and design science (detailed in section 3.7).

The research approaches of the social sciences and design science are widely used and accepted in the information systems (IS) discipline. The IS discipline uses theory from a wide range of reference disciplines and takes a multidisciplinary approach in the study of phenomena. As advised in Vessey, Ramesh and Glass (2002, p. 168), doctoral 'students should have solid foundations in IS literature, as well as in core theories from the social and behavioural sciences, management and cognitive psychology literatures' and be exposed to research conducted at organisational, individual and group levels of analysis.

By adopting a multi-paradigmatic and multi-method research approach, the study also addresses the applicability checks that can increase the relevance of research to industry (Rosemann & Vessey 2008). The study involved a panel of experts drawn from industry and academia. The industry partners evaluated the ITSM performance measurement framework.

This section described the mixed-methods approach used by the study and depicted the interrelations of the philosophical view, strategies of inquiry and research method and how these elements support the research design. A justification of the research approach is also provided.

3.3 Research philosophy

In this section the study philosophy is explained, beginning with an examination of the importance of philosophy, followed by an explanation of how the philosophy forms a foundation for the ontology, epistemology, methodology and research methods used in the study. The foundation role of the research philosophy in this study is shown in Figure 3.3.

Table 3.1 The study philosophy foundation role in the study

	Performance measurement framework design guidelines	**ITSM Performance measurement practice: frequency of measurement and reporting, frequency of reporting,**		**Deriving ITSM metrics: source of metrics**		**What to measure**	**How to measure**	**ITSM PMF**
Results	Categorisation of ITSM benefits and metrics	Types of ITSM metrics		Towards a contingency theory for ITSM performance measurement		Organisation level	BSC perspective metrics	A model to measure ITSM performance at the organisation level
		Types of ITSM benefits		Factors influencing the selection of ITSM metrics		Service level	Service metrics	
	Study conceptual model	Revised conceptual model		Confirmed study conceptual model		Process level	Process metrics	Consolidated ITSM metric constituents
	ITSM theory and practice gaps	Tested hypotheses				Technology level	Component metrics	
Data analysis	Describe, summarise, evaluate, clarify and integrate previous literature	Non-parametric statistical analysis	Logical qualitative analysis	Content analysis	Cross-case analysis	IS Design Sceince Research (ISDR) Matching, Analysis Projection Synthesis (MAPS)		
Data collection	Systematic literature review	Online questionnaire		Structured interviews				
Methodology	Literature review	Survey of ITSM benefits and metrics		Case studies		ITSM artefact design		
Epistemology	Knowledge through valid, reliable, replicable results			Understanding ITSM practitioners view of ITSM performance measurement		Knowledge from the design of ITSM artefact		
Ontology	Objective reality e.g. measured behaviour			Social constructs e.g. ITSM processes		Design artefacts e.g. performance measurement frameworks		
	Natural					Artificial		
Philosopy	Realism							

It is advised that ‘any discussion of philosophy that stands beside a discussion of social theory also needs to consider these terms: ontology, epistemology, methodology and method’ (Lee 2004, p. 5). Research philosophy can be understood as the worldview of reality and how reality is known. In the IS discipline, a variety of philosophies have been used broadly ranging from positivist, realist to interpretivist. A range of ontologies, epistemologies and methodologies has also been applied. In selecting the study research philosophy, positivism, critical realism and interpretivism were considered.

The importance of philosophy is that ‘the confidence provided by understanding different philosophical positions provides the researcher and the practitioner with the power to argue for different research approaches and allows one to confidently choose one's own sphere of activity’ (Dobson 2002). A choice of a suitable philosophy for the study was made by considering the different philosophies available for use in IS research on the subject of ITSM. The subject of IT service management comprises people, processes, partners and technology. ITSM is concerned with naturally occurring entities such as people and man-made or artificial entities such as computer hardware, software, and management processes. An awareness of the strengths and weaknesses of the different philosophies was gained from the review and used to select the philosophy that best suited this ITSM study.

The study is based on a realist research philosophy. The study applies a definition of realism based on Hirschheim in Galliers (1992, p. 36) who states, ‘Realism postulates that the universe is comprised of objectively given, immutable objects and structures. These exist as empirical entities, on their own, independent of the observer's appreciation of them’. The realism adopted is not naïve realism, as reality cannot be perceived without different subjective understanding. The study adopts indirect realism, a philosophy that underlies the multi-method research approach. Indirect realism differs from direct realism in that indirect realists ‘argue that our perceptions of the external world are mediated by our perceptions of subjective intermediaries (sensations)’ (Brown 2009, p. 378). There is a directly perceived subjective reality and an indirectly perceived subjective reality. An understanding of the phenomena of study is sought by seeking multiple views of the ITSM phenomena collected from the literature review surveys and case studies from the findings of academics and practitioners.

The realist philosophy selected suits the ITSM study as the phenomena studied is varied and ranges from quantifiable to intangible and includes interactions between the quantifiable and intangible. A study of ITSM practitioners' behaviour and actions in managing and delivering IT services requires a researcher's observation of the external ITSM world, as well as mediation of the researcher's perception of subjective intermediaries.

3.3.1 Ontology

This section explains the different ontological approaches that were considered for the study. The section begins with an examination of the philosophical concept of ontology and its significance to a study's philosophy and then explains the choice made for the study. The choice is made based on previous IS studies and the nature of the problem of the study.

Ontology is the study of being concerned with defining reality. The philosophy of a study forms the basis of what is considered the reality that is the ITSM phenomena of the study. A scholarly school of thought on ontology is explained by Lee (2004, p. 5) as comprising 'its members' foundational beliefs about the empirical or "real" world that they are researching'. The significance of ontology to a study is that 'beliefs about what comprises the real world have an effect on what one seeks to observe, what one subsequently observes, how one explains what one observes, and the reasoning process by which one performs each of these' (Lee 2004, p. 6). This study conceives the real world of ITSM as comprising naturally-occurring—as well as man-made—entities engaged in managed interactions resulting in performance. In ITSM the subject focus comprises people, information technology, management processes and practices and the results of the interactions of the IT service components.

Studies in IS have used positivist, interpretivist and realist ontologies. The positivist ontology is explained in Khazanchi and Munkvold (2000, p. 34) study as 'being rooted in the natural sciences, the positivist perspective is based on the ontological assumption that there exists an objective social reality that can be studied independently of the action of the human actors in this reality'. ITSM studies focusing on objective reality of inanimate ITSM components such as the internal working of software agents as service components reported by Valiente et al. (2012), Graves (2010), Brito e Abreu et al. (2010), Yixin and Bhattacharya (2008) and other IT service engineering studies in ITSM are based on a positivist ontology. The interpretivist philosophy 'is based upon the ontological assumption that reality and our knowledge thereof are social constructions, incapable of being studied independent of the social actors that construct and make sense of this reality' Khazanchi and Munkvold (2000, p. 34). The social-technical view of ITSM tends to be an interpretivist ontology, as it argues that IS is better understood by considering the social constructs created from the interactions of IS components in organisations. Example ITSM studies that tend towards an interpretivist ontology include Cater-Steel et al. (2009a), Lynge and Schou (2008), and Alter (2008).

Critical realist ontology proposes existence of the real, the actual and the empirical. Critical realist ontology plays an important role in research as non-permanent, conditional, and intimately related to the outcomes and practice of research (Dobson 2001).

Based on the explanations of ontology the study considers natural and artificial entities as phenomena of interest. Given the realist philosophy of the study, reality is perceived as 'an inter-subjective construction of the shared human cognitive apparatus' (Walsham 1995, p. 76). This study contends that an objective ITSM reality exists, both natural (people, partners) and artificial (processes, technology), independently of perception, but also recognizes the reality that is socially produced (IT services and IT artefacts).

3.3.2 Epistemology

This section provides an explanation of the choice of epistemology for the study. A consideration of epistemologies used in previous IS studies is presented and a choice of epistemology based on consistency with the study ontology and the nature of the problem of study is made.

The philosophy of a study determines the conceptualisation of how knowledge is gained. Epistemology can be conceptualised 'as a broad and high-level outline of the reasoning process by which a school of thought performs its empirical and logical work' (Lee 2004, p. 6). A positivist epistemology is based on the notion that research can be objective, that the researcher is independent, the phenomena of study is an object and that knowledge is achieved through valid, reliable and replicable results. The epistemological assumption in positivism ‘is that there exist unidirectional cause-effect relationships that can be identified and tested through the use of hypothetic-deductive logic and analysis’ (Khazanchi & Munkvold 2000, p. 34).

Interpretivist epistemology does not seek unidirectional cause-effect relationships but, instead, focuses on understanding the actors' view of their social world (Khazanchi & Munkvold 2000).

Critical realist epistemology views ‘science as an ongoing developing process of explanation and enlightenment rather than the derivation of immutable scientific laws; scientific and social research involving the steady unearthing of the increasingly deeper structures and mechanisms which make up the objects under study’ (Dobson 2001, p. 202).

The realist epistemology used in this study is of the view that ‘facts and values are inter-twined; both are involved in scientific study’ (Walsham 1995, p. 76). The realist epistemology is used in other IS studies and is consistent with the ontology of the study. This ITSM study begins by reviewing documented ITSM studies, followed by surveying ITSM benefits and performance practice, phenomena that is considered objective with the researcher considered independent, and aiming for valid and replicable results. The second stage of the study involves gaining further knowledge by extending the findings of the first stage by further focusing on the ITSM practitioners’ view of their ITSM performance measurement practices. The third stage of the study involves using the understanding of ITSM performance measurement gained from the first and second stages by developing an ITSM artefact addressing the gaps in ITSM performance measurement knowledge and practice. The realist epistemology in this ITSM study identified academic literature, industry practices, objective observations, individual perceptions and object design as sources of and processes of knowledge. The methods applied to gain knowledge in this study are explained in the next section.

3.3.3 Methodology

This section explains the selection of the study methodology based on the study's philosophical, ontological and epistemological choices. An explanation of the methods applied in the study is provided.

Methodology 'refers to a more specific manner in which to do empirical and logical work' (Lee 2004, p. 6). This study uses methods from the social sciences, as well as the artificial sciences, to ensure both rigour and relevance are achieved (Gable 1994). The mixed-method approach provides a richer contextual basis for interpreting and validating results (Patton 2002). The approach also forms a practical orientation as it relies on practitioner reports and involvement. This approach promotes the dissemination of successful practices by systematising and making explicit what practitioners are already doing (Lee 1999).

The study begins with a literature review followed by a survey, then case studies and artefact development. A panel of experts drawn from industry and academia provides advice and evaluates the survey design, case study design and artefact development. The study uses a panel comprising three ITSM academics and seven industry experts to review the survey questionnaire and to guide in the selection of the case study organisations and criterion based evaluation of the performance measurement framework. The role of the panel of experts is to provide valuable industry insights, as well as to ensure that the methods used are valid, rigorous and the results relevant.

The research methodology is appropriate for this study and provides a systematic method for the development of the ITSM performance measurement framework, as well as development of theory. The research methodology will facilitate contributions to the IS body of knowledge in academia and industry.

3.3.4 Research methods

The study uses a systematic literature review, survey, case study and design science methods. A systematic literature review was undertaken to provide a means to integrate current best evidence on the specific research questions with practical experience (Kitchenham et al. 2009). A systematic literature review was chosen to achieve rigour and relevance by employing a transparent and repeatable method.

This method has its origins in evidence-based research conducted in medical science, but has been recommended for management studies (Tranfield, Denyer & Smart 2003), software engineering and IS (Kitchenham et al. 2009). The literature review is described in Chapter 2.

A survey provides a broad snapshot of ITSM benefits and specific performance metrics used to measure ITSM benefits. According to Pinsonneault and Kraemer (1993) survey research is most appropriate when the central questions of interest about the phenomena are ‘what is happening?’, and ‘how and why is it happening?’ They further advise: ‘Survey research aimed at description asks simply about the distribution of some phenomena in a population or among subgroups of a population’. The survey is described more fully in section 3.4.2.

In-depth case studies of private and public sector organisations are conducted to fully answer the study research questions. A case study is described in Yin (2009, p. 18) as an ‘empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context especially when the boundaries between the phenomenon and the context are not clearly evident’. The case study is further described in section 3.4.3.

The design science research methodology (DSRM) method and matching analysis projection and synthesis (MAPS) approach provide a method to design, build and evaluate the study artefact. Design science research provides for the integration of the survey and case study findings into the artefact development. The next section explains the integration of the research methods in the research design.

This section explained the study philosophy and provided an examination of the importance of philosophy, and how the philosophy forms a foundation for the ontology, epistemology, and methodology—as well as research methods—used in the study. The section also described the role of the panel of experts.

3.4 Research design and mixed methods

This section describes the research design and explains the methods used. It shows the research procedures that were applied. The research philosophy forms the basis of the research design described in section 3.4.1, followed by descriptions of the methods in sections 3.4.2 to 3.4.4. The survey design, implementation and limitations are described in section 3.4.2. The case study design and execution is described in section 3.4.3. The artefact design method is described in section 3.4.4.

3.4.1 Mixed-methods research design

The research design aims at facilitating the collection of data to answer the research questions and develop the ITSM performance measurement framework. The research philosophy provides a guide to the research design. The multi-paradigmatic and mixed-method approach taken in this study complies with the realist ontology and epistemology adopted in this study. The study uses mixed methods to gain insight into the phenomena under study that could not be achieved by solely using a single method or a single source of data. The use of mixed methods also allows for triangulation using the quantitative and qualitative data collected. Survey, case study and design science methodologies are integrated into a research design that is depicted in Figure 3.3. The study is conducted in sequential stages, with the survey preceding the case studies followed by the artefact design. The literature review is iterative and, similarly, the artefact design has an iteration across the stages of design, build and evaluate. Throughout the study, interaction with industry practitioners and academics is achieved through communication with a panel of experts, and publishing and presenting research findings in academic and practitioner journals and conferences.

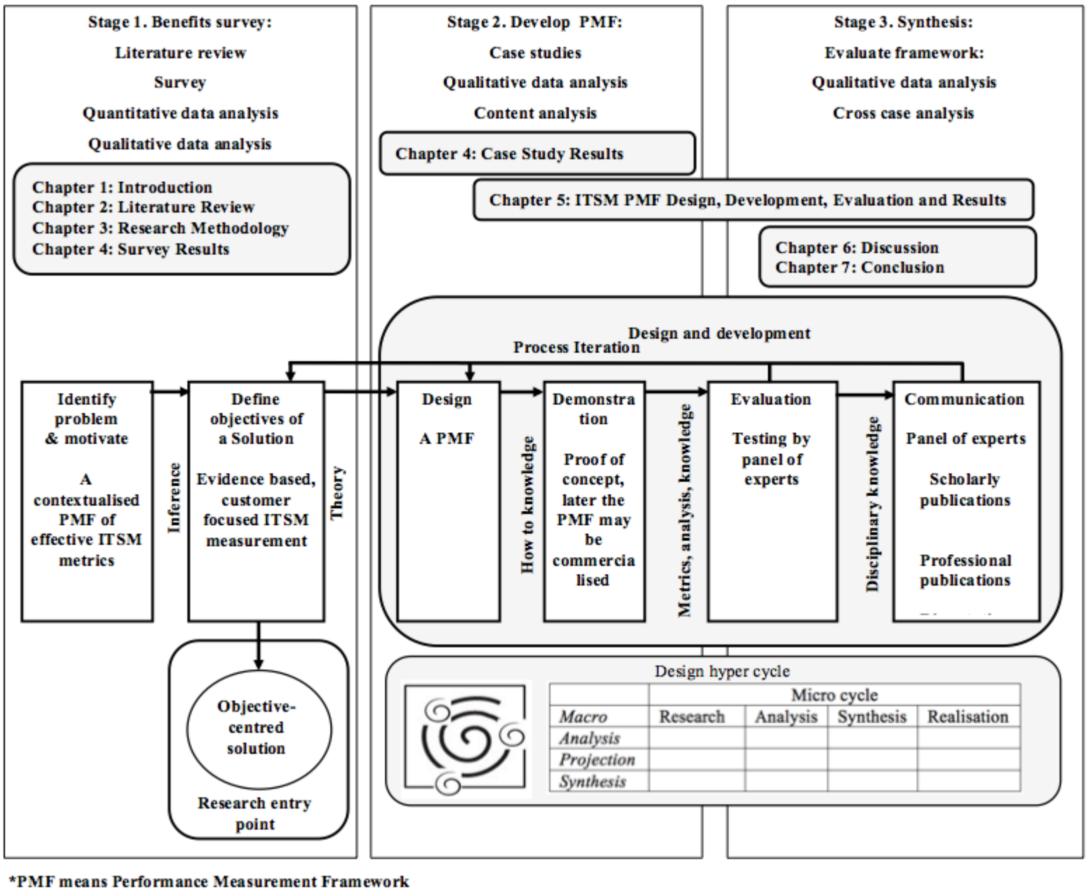

Figure 3.3 Study design framework

3.5 Survey on ITSM benefits and metrics

This section of the chapter describes the survey development, procedures and implementation. The primary aim of the survey is to identify the types of benefits and specific metrics used to measure ITSM performance. The survey provides a basis for the selection of organisations for case study.

3.5.1 Survey design

The questionnaire is designed primarily to collect data to answer the four research questions:

1. *RQ1. What types of benefits are reported from ITSM improvement initiatives by organisations?*
2. *RQ2. Which specific metrics can be used to measure ITSM performance?*
3. *RQ3. How can specific ITSM performance metrics be derived?*
4. *RQ4. What internal and external environmental factors influence the organisations' selection of specific performance metrics for ITSM?*

The survey uses a cross-sectional, self-administered web-based questionnaire, offered online. The procedure and design of the survey was chosen as it is low cost, easily accessible, provides a fast response, and data collected would be available in electronic format (Sheehan 2001). The survey questionnaire design is informed by a literature review and feedback from the panel of experts. Design progresses from panel of experts review, to pilot test, then to survey.

The ITIL version 2 and 3 manuals are used to frame the performance metrics questions used to identify the overall ITSM benefits along BSC-based perspectives (OGC 2002b, 2007a). Initially, a paper-based questionnaire was developed and it included an appendix with a sample list of metrics developed from white papers and reports from industry press, as well as industry publications (Brooks 2006; OGC 2002b, 2007a; Steinberg 2006). This was revised and updated to a shorter electronic version following advice from the panel of experts.

The survey questionnaire was emailed to the panel of experts to evaluate its relevance, validity and practicality. A panel of ITSM experts drawn from the public and private sectors in Australia, as well as a leading international ITIL expert, reviewed the questionnaire. The panel of experts suggested the questionnaire be shortened, simplified and changed from paper-based to electronic format. The panel of experts advised that the paper-based questionnaire was lengthy and would take a long time for respondents to complete, and would cost more to conduct via mail. Categorisation of the number of staff, business sector and annual turnover were also revised, based on the recommendations of the panel of experts, to more closely match industry practice. The questions, structure and length of questionnaire were then compared with other ITIL surveys (Bruton 2004; Cater-Steel et al. 2009a; Marrone 2009). This comparison with other ITIL questions was conducted to identify demographic and general questions from earlier-tested questionnaires that could be used in the study. The questionnaire was revised into a more precise electronic version, and then emailed to the members of the Board of IT Service Management Forum Australia (itSMFA) who further reviewed and approved the questionnaire. Pre-testing by the panel of expert helped to establish the reliability and validity of the questionnaire (Creswell 2009). This was done prior to pilot testing the survey.

The survey electronic questionnaire was designed using Survey Monkey. Survey Monkey was chosen as it provided more features and allowed for more survey responses in comparison with alternative survey tools. Survey Monkey also allowed for branching logic that was required by the questionnaire design. The electronic questionnaire has questions in four sections based on the topics listed in Table 3.2.

Table 3.2 Survey question distribution per section

Section	**Topic**	**Number of questions**
A	Respondent’s organisation	7
B	ITSM processes	6
C	ITSM performance and benefits measurement	7
D	ITSM challenges	5

The questionnaire comprised four sections: demographics; ITSM process implementation; ITSM benefits measurement; and ITSM challenges.

The demographic questions used for this survey are drawn from previous ITIL adoption surveys (Cater-Steel et al. 2009b). The questions on the key benefits from the overall ITSM implementation offered a list of thirty choices, organised into five sections taken from the OGC classification of service management benefits (2002b, 2007a) similar to the four BSC perspectives: finance, customer, internal business, and innovation and learning. The survey comprised a total of 25 questions that could be completed in approximately 20 minutes.

In section A of the questionnaire, demographic questions from previous ITIL adoption surveys (Cater-Steel & Tan 2005) Cater-Steel et al. (2007); (2008, 2009b) are used for ease of comparison and standardisation. The questions in section B related to specific ITSM processes, process specific benefits and key benefits from the overall ITSM implementation for ITIL v2, ITIL v3, Microsoft Operation Framework (MOF®), IBM Service Management Reference Model (IBM® SMRM), HP IT Service Management Model (HP® ITSM)—with an option to specify other ITSM frameworks. The respondents were provided a list of the core ITSM processes for each framework and an option to specify other implemented processes, as shown in Table 3.3.

Table 3.3 Mapping of questionnaire ITSM process choices for implemented frameworks

ITIL V2 (11 processes)	**ITIL V3 (22 processes)**	**HP ITSM (16 processes)**	**MOF (16 processes)**
IT Financial management	Financial management	Cost management	Financial management
	Demand management	Customer management	
	Service portfolio management		
	Service catalogue management		Business and IT alignment
Capacity management	Capacity management	Capacity management	
Availability management	Availability management	Availability management	
Service level management	Service level management	Service level management	
	(Information) security management	Security management	
	Supplier management		
IT service continuity management	IT service continuity management		Governance, risk and compliance
	(Transition) planning and support	Service planning	Project planning
Change Management	Change management	Change management	Change and configuration management
Configuration management	Service asset and configuration management	Configuration management	
	(Service) validation and testing management	Build and test	Build
Release management	Release & deployment management	Release to production	Deploy
	(Service) evaluation (management)	Business assessment	Service monitoring and control
	(Service) knowledge management		
	Event management		
	Request fulfilment		
Incident management	Incident management	Incident management	Stabilise
Problem management	Problem management	Problem management	Problem management
Service desk function			Customer service
	Access management		
		Operations management	Operations
		IT strategy development	Policy
			Envision
			Team
			Reliability
Other (please specify)	Other (please specify)	Other (please specify)	Other (please specify)

In section C of the survey questionnaire, the questions on the key benefits from the overall ITSM implementation present a list of choices organised into five sections sourced from the Office of Government Commerce (OGC) classification of service management benefits similar to the four BSC perspectives (OGC 2002b, 2007a). The sections are ‘business benefits, financial benefits, employee benefits, innovation benefits and internal benefits’ (OGC 2007a, p. 10).

In section D, questions on the single major challenge in measuring and reporting ITSM are asked. The questionnaire format is depicted in Figure 3.4, which shows how the path of questions branch depending on which ITSM framework is selected. An extract of the questionnaire with all the survey questions using ITIL v2, a single ITSM framework, is shown in Figure B.2 in Appendix B.

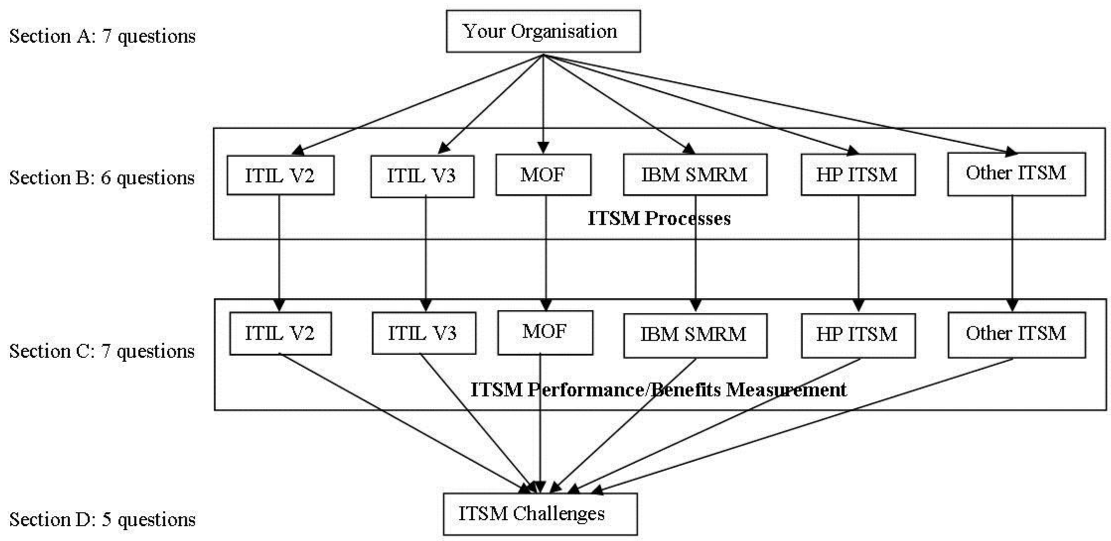

Figure 3.4 Survey of ITSM benefits questionnaire structure

3.5.2 Ethics approval

On completing the survey questionnaire design an application for ethics approval was submitted to the USQ Human Research Ethics Committee. The purpose of the application was to obtain approval to conduct the research. The application entailed demonstrating that the research would be conducted ethically and that the research participants would be informed of their rights, safety and freedoms and treated ethically. USQ’s Human Research Ethics Committee assessed the application and agreed that the proposal met the requirements of the National Statement on Ethical Conduct in Human Research. The project was endorsed and full ethics approval granted on 8th October 2009. An application for extension of approval was made to cover the case studies and was granted to cover the entire period until the end of the study. The ethics approval is included in Figure B.1 in Appendix B.

3.5.3 Survey pilot test

The electronic survey questionnaire was pilot tested online by two ITSM industry managers and an ITSM academic before being distributed by itSMFA to all members via e-mail with a link to the questionnaire. The testing allowed for an improvement on the sequencing of questions and provided an estimate of the length of time needed to complete the survey. The layout of the questionnaire was improved to include a brief message on the project and a note on the survey respondents' right to privacy and freedom to participate.

3.5.4 Survey constructs

The survey questionnaire addresses the research questions: RQ1, RQ2, and RQ3 and RQ4. The constructs shown in the conceptual framework described in Figure 1.3 in Chapter 1 are made operational by measured variables from the survey, as depicted in the revised study conceptual framework (see Figure 3.5).

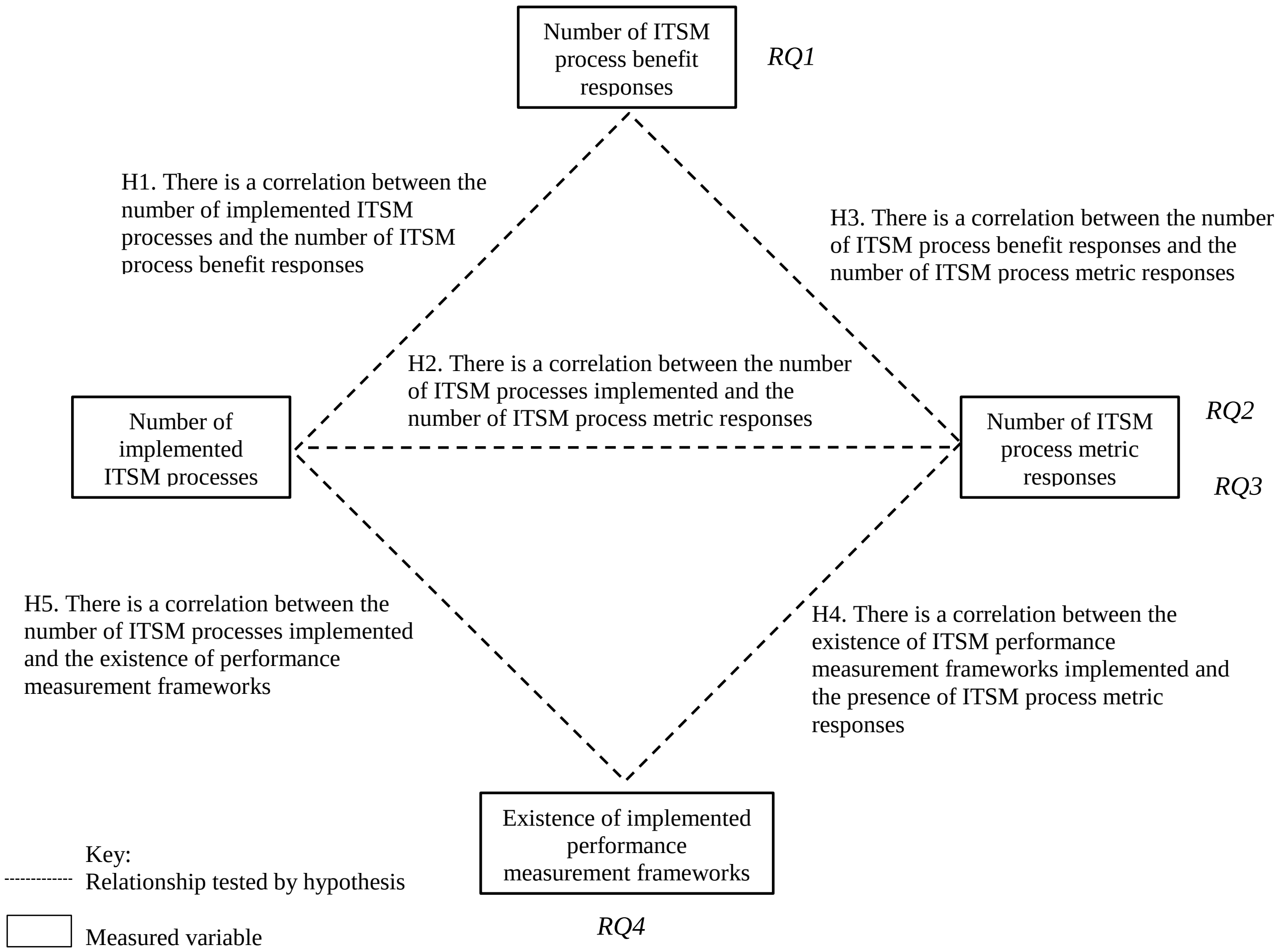

Figure 3.5 Revised study conceptual framework

The variables relating to individual characteristics of the organisations and survey respondents included industry sector; organisation ownership; organisation size measured as annual turnover and total number of staff; duration of ITSM framework implementation; number of implemented ITSM processes; number of implemented performance measurement and process maturity frameworks; and sequence of ITSM process implementation sequenced as first, second and third. Other measured variables comprised overall ITSM benefits, number of ITSM process benefits responses, number of ITSM process metrics responses, ITSM performance measurement frequency, ITSM performance reporting frequency, ITSM performance reporting level, ITSM greatest performance measuring challenge, and ITSM greatest performance reporting challenge.

The survey questionnaire of ITSM benefits and metrics is designed to collect quantitative and qualitative data. The quantitative data collected measures the key attributes of the study variables and tests the relationship between the study variables to answer the research questions. The relationship between the variables measured, the research question addressed, and the questionnaire item included in the quantitative data analysis is summarised in Table 3.4.

Table 3.4 Definition of key variables for quantitative analysis

Variable Name ***Research Question***	**Question Type** **Scale of measurement**
Number of implemented ITSM processes (extracted from responses on specific ITSM processes implemented) *RQ1*	Selection from a predefined list of ITSM framework specific core processes (ITILv2 – 11 processes, ITIL v3 – 22 processes, IBM service management reference model – 42 processes, MOF – 16 processes, HPITSM – 16 processes, Other ITSM – open text box) and a free text option for specifying other processes. **Scale of measurement - Interval**
Duration of ITSM framework implementation *RQ1*	Selection from a predefined list of eleven options including a free text option for specifying other duration. **Scale of measurement - Interval**
Sequence of ITSM process implementation: 1st, 2nd and 3rd *RQ1*	Open-ended. **Scale of measurement - Nominal**
Number and type of overall ITSM benefits *RQ1*	Selection of choices along five predefined BSC based perspectives: business (7 options), financial (7 options), employee (4 options), innovation (5 options), and internal improvement (6 options). Scale of measurement - Nominal
Number of ITSM process benefit responses (extracted from responses on specific ITSM processes benefits) *RQ1*	Open-ended. Quantitative analysis performed on count of responses. **Scale of measurement - Interval**
Number of ITSM process metric responses (extracted from responses on specific ITSM processes metrics) *RQ2*	Open-ended. Quantitative analysis performed on count of responses. **Scale of measurement - Interval**
Number of implemented performance measurement and process maturity frameworks (extracted from responses on specific ITSM performance measurement frameworks implemented) *RQ3*	Selection from a predefined list of eight options and a free text option for specifying other performance framework. **Scale of measurement - Interval**
ITSM performance measurement frequency *RQ3*	Selection from predefined options: daily, weekly, monthly, quarterly, and ad hoc. **Scale of measurement - Ordinal**
ITSM performance reporting frequency *RQ3*	Selection from predefined options: daily, weekly, monthly, quarterly, and ad hoc. **Scale of measurement - Ordinal**
ITSM performance reporting level *RQ3*	Selection from predefined options: strategic, tactical, and operational. **Scale of measurement - Nominal**
Industry sector *RQ4*	Selection from a predefined list of sixteen options including a free text option for specifying other sector. **Scale of measurement - Nominal**
Organisation ownership *RQ4*	Selection from a predefined list of eight options including an option for stating not known. **Scale of measurement - Nominal**
Organisation size: annual turnover *RQ4*	Selection from a predefined list of six options including an option for stating not known. **Scale of measurement - Ordinal**
Organisation size: total number of staff *RQ4*	Selection from a predefined list of six options. **Scale of measurement - Ordinal**

The literature review results helped focus the research questions theoretical constructs into measurable variables with relationships between variables that could be explained by testing hypotheses that would address the lack of empirical ITSM performance measurement studies addressing the relationships between ITSM implementation, benefits and performance contributing to alleviating this deficiency identified in the literature review. A mapping of the hypotheses to the research questions is shown in Table 3.5. Following the advice of Field (2009, p. 7), the terms predictor variable and outcome variable are used since ‘in cross-sectional research we do not manipulate any variables, and we cannot make causal statements about relationships between variables’. The advice suits this study, as the hypotheses do not imply a causal relationship between the measured variables.

Table 3.5 Hypothesis, variables and research questions

Hypothesis	**Predictor variable**	**Outcome variable**
H1. There is a correlation between the number of implemented ITSM processes and the number of ITSM process benefit responses RQ1	Number of ITSM processes implemented	Number of ITSM process benefit responses
H2. There is a correlation between the number of ITSM processes implemented and the number of ITSM process metric responses RQ2	Number of ITSM processes implemented	Number of ITSM process metric responses
H3. There is a correlation between the number of ITSM process benefit responses and the number of ITSM process metric responses RQ1	Number of ITSM process benefit responses	Number of ITSM process metric responses
H4.There is a correlation between the existence of ITSM performance measurement frameworks implemented and the presence of ITSM process metric responses RQ2, RQ3	Number of ITSM processes implemented	Existence of performance measurement frameworks
H5. There is a correlation between the number of ITSM processes implemented and the existence of performance measurement frameworks RQ3, RQ4	Existence of performance measurement frameworks	Number of ITSM process metric responses

The survey collected data that was analysed qualitatively and helped provide more detail on the performance measurement practices of the survey respondents. The relationships of the variables, research questions, question types and qualitative analysis method are summarised in Table 3.6.

Table 3.6 Description of key variables for qualitative analysis

Variable Name	**Research Question**	**Question Type**	**Analysis Method**
ITSM process benefit responses	RQ1	Open-ended	Qualitative analysis performed on content of responses
ITSM process metric responses	RQ2		
ITSM greatest performance measuring challenge responses	RQ3		
ITSM greatest performance reporting challenge responses	RQ3		

3.5.5 Survey sampling

The study unit of analysis is a group, the IT organisation, and the itSMFA members act as the key source of information on ITSM performance measurement practices. The survey uses a non-probability purposive, expert sample of Australian ITSM practitioners. The sampling frame used is the database of itSMFA members at the time of the survey. Purposive sampling minimises the occurrence of coverage error. The itSMFA members are selected as the sample because the membership list is accessible to the study, provides a clearly defined membership, and itSMF is the only internationally-recognised and independent organisation dedicated to ITSM. The forum is a 'not-for-profit organisation, wholly owned and principally operated on a volunteer basis by its members' (itSMF Australia 2011a). It describes itself as working globally with government and standards organisations to provide best practice to industry. Internationally, there are about 54 national itSMF chapters (itSMF Australia 2011a); and itSMF Australia is the third largest itSMF chapter globally (itSMF Australia 2011b). The sample represents a subgroup of a population of ITSM practitioners. As a non-probability sample is used, analysis of potential coverage and non-response error is conducted (King & Jun 2005).

3.5.6 Survey Implementation

On completion of the design of the survey questionnaire USQ ethics clearance was sought and granted. After receiving USQ ethics approval and endorsement of the panel of experts and the Board of Directors of itSMFA, refinements were made following the survey pilot test. Subsequently, a sample of the final survey and a cover letter was emailed to the Chairman of the Board of itSMFA. A copy of the cover letter is included in Figure B.3 in Appendix B. The survey was open for responses between 20th November 2009 and 23rd December 2009. A link to the online questionnaire was emailed by itSMFA to all 2,085 itSMFA individual and corporate members on 20^{th} November 2009. To be considered a member of itSMFA one needs to pay an annual fee for individual membership or be listed as a primary or secondary corporate contact to an organisation that pays an annual corporate membership fee. To encourage survey completion and increase the response rate a prize draw of a netbook computer was offered and plans were made for a follow-up email reminder. A reminder with a link to complete the survey was sent to itSMFA members through the itSMFA '4ward Thinking' electronic newsletter on 15^{th} December 2009. A copy of the survey email invitation and reminder is included in Figure B.4 in Appendix B. A total of 263 responses were received with 211 usable responses, resulting in an effective response rate of 10%. The study was not able to establish the number of non-responses that may have resulted from failed or blocked emails as itSMFA did not have a record of these. Survey responses that included email addresses were entered into a draw and the winner of the draw was contacted and the survey prize mailed. A press release on the prize-winner was sent to USQ and itSMFA.

The survey was accessed by respondents from web browsers on their computers via a link emailed to them by itSMFA. The survey participants were assured of confidentiality and freedom to withdraw from the survey at any time. After survey completion, participants were invited to enter into a prize draw by providing their email address. The respondents were thanked their participation using a message of gratitude placed on the last page of the survey. The survey responses were uploaded to the Survey Monkey servers. At this point the survey responses were accessible to the researcher from the study Survey Monkey account.

The survey responses were downloaded from the Survey Monkey web account in comma separated values (CSV) format and then saved in Microsoft Excel file format. SPSS software was used to aggregate survey responses to provide a snapshot of the types of performance measurement practices and benefits measured and reported for each of the ITSM processes. MS Excel and NVivo software were used to analyse the qualitative data and identify themes. Organisations identified from the survey responses as leading best practice in terms of benefit realisation and performance measurement were identified as potential candidates for the case studies stage of the study. The results of the survey data analysis are described in Chapter 4.

3.5.7 Limitations of the survey methodology

This section describes the limitations of the survey methodology used in the study. A description of the steps taken to minimise the effect of the limitations on the study is provided. Surveys are best suited for ‘studies with the individual as the unit of analysis’ (Bhattacherjee 2012, p. 73). In this study, the survey unit of analysis is a group—the IT organisation—and the itSMFA members act as the key source of information on ITSM performance measurement practices. The limitation in using a survey with the organisation as the unit of analysis is that ‘such surveys may be subject to respondent bias if the informant chosen does not have adequate knowledge or has a biased opinion about the phenomenon of interest’ (Bhattacherjee 2012, p. 73). The itSMFA members would have adequate knowledge on the subject of IT service management given their training and ITSM practice. It is probable that the itSMFA members have a biased opinion on the phenomena of interest, as they are members of a speciality forum subscribing to the benefits of ITSM. To counter this limitation, non-response bias and sampling bias are measured and analysed and are described in Chapter 4.

3.6 Case study research approach

This section describes the case study approach used and provides a description of the case study design, case study pilot, the constructs, and how the case studies were implemented, together with the limitations of the case study method. The case study method enables controlled observations and deductions, and allows for replication and generalisation to theory (Yin 2009). Six case study organisations were selected from the 211 survey respondents. The criteria for selecting organisations are based on provision of a rich range of ITSM benefits and performance metrics. The organisations selected represented a mix of public and private sector, large and small size, profit and not-for-profit and were drawn from a wide geographic area. Following a pilot case study, interviews were conducted with six organisations in Australia.

3.6.1 Case study design

Each case study applies a protocol comprising the following steps: planning, data collection, data analysis, development of a case study report, and validation of the report (Neale, Thapa & Boyce 2006; Tellis 1997).

The case study questions are developed from the survey findings and literature reviewed. A panel of three academic and two industry experts reviewed the interview questions. Structured interviews were used for data collection as they are an effective tool for measuring subjective variables. Furthermore, Foddy (1993, p. 1) offers the following advice: ‘Asking questions is widely accepted as a cost-efficient (and sometimes the only) way, of gathering information about past behaviour and experiences, private actions and motives, and beliefs, values and attitudes’. To ensure that the questions were well-structured, Belson's (1981) sixteen categories were used as a guide to ensure the questions were well-structured. The interview questions are provided in Figure B.5 in Appendix B.

The case studies sought to identify the environmental factors influencing the selection of ITSM performance metrics and reference is made to contingency theory. There are a number of reasons why contingency theory was selected for the study. Contingency theory ‘enables a researcher to relax assumptions underlying theoretical propositions and/or systematically introduce factors to explain or predict expected phenomena’ (Umanath 2003). Services, including IT services are created and consumed simultaneously and, in many services, the customer is a co-creator (Grönroos 2000; Normann 2000). It is, therefore, important to understand how the environment influences the management of IT as a service. Contingency theory is based on the premise that there is no universally-appropriate performance measurement system that applies equally to all organisations in all circumstances. Using the contingency theory may lead to a better understanding of ITSM performance measurement by enabling the identification of ‘specific aspects of a performance measurement system that are associated with certain defined circumstances’ (Rejc 2004).

The data collected from the case studies is analysed using content analysis. Content analysis is ‘a systematic, replicable technique for compressing many words of text into fewer content categories based on explicit rules of coding’ (Krippendorff 1980, 2004; Weber 1990b). Content analysis is performed to discover and describe the internal and external factors influencing an organisation’s selection of ITSM performance metrics. The content analysis follows the ‘seven step’ guidelines summarised by the U.S. General Accounting Office (1996). Cross-case analysis is used to aggregate the metrics and methods from the six case study organisations and integrate the findings of the case studies with survey results and literature to identify the factors that determine the organisations' choice of appropriate performance metrics for ITSM.

Conducting a cross-case analysis helps derive the benefit of multiple case studies, as advised by Eisenhardt (1991, p. 626): 'Theoretical insights of case studies arise from methodological rigor and multiple-case comparative logic'.

The study defines the context units as the entire case study interview and documents. Recording units were defined based on syntax, in effect using the separations created by the respondents (Stemler 2001). The recording unit selected is the interview question responses addressing internal and external environmental factors that influenced the selection of ITSM performance metrics. According to U.S. General Accounting Office (1996) 'the recording unit is the portion of text to which evaluators apply a category label'.

The analysis focuses on the presence of variables, their frequency and allocated space and time. Each variable is allocated to a category—a group of words with similar meaning or connotations (Weber 1990). The study uses two *a priori* categories from the contingency theory of management: internal environment and external environment. The selected categories are mutually exclusive and exhaustive (Krippendorff 1980).

3.6.2 Case study pilot

The pilot case study was conducted to test the interview questions and verify the practicality of the content and length. The experience gained from the case study pilot was used to enhance the case study questionnaire and protocol. The case study pilot involved interviews with four IS staff members, including senior managers. Two interviews were conducted on-site over different days in September 2010 and each lasted two hours. The first interview involved senior managers and the second interview was a follow-up with the performance reporting manager and the reporting analyst. The interviewees provided software demonstrations and documents, which were reviewed. The interviews were audiotaped, transcribed and then sent to the interviewees for validation. A case study report was compiled for the pilot case based on information extracted from the transcripts and documents reviewed and published at PACIS 2012. The results and experience from the pilot case study were used to redesign and improve the case study interview questions that were administered on six organisations in November 2010.

3.6.3 Case study constructs

The case study interview questions are aimed at partly addressing RQ2, RQ3 and primarily addressing RQ4. The case study questions focused on factors influencing the selection and use of the performance measurement framework applied by the organisation, performance metrics in use and the performance measurement and reporting practices. A mapping of the case study interview questions to research questions is shown in Table 3.7.

Table 3.7 Mapping of case study interview questions to research questions

Interview Question	**RQ**
A. Performance Framework	
A.1 When did you start implementing your performance measurement framework?	RQ2
A.2 Is the framework used for ITSM only or is it part of the organisations performance measurement?	RQ2
A.3 What were the objectives of implementing the ITSM framework?	RQ4
A.4 How was the decision to implement the performance measurement framework made? What were the contributing factors?	RQ4
A.5 Were other performance measurement frameworks considered? If yes which ones and why did you chose the one you are using over the others?	RQ4
A.6 If you use a combination of performance measurement frameworks please explain how they are combined to measure your ITSM performance measurement?	RQ3
A.7 Describe the operation of the performance measurement framework of your organisation. What perspectives/dimensions of the framework are used to measure your ITSM? Please provide documentation of the PMF used.	RQ3
A.8 What are the goals of measuring the ITSM?	RQ3
A.9 Who is involved in measuring and reporting the performance of your ITSM? What are their roles?	RQ3
B. Performance Metrics	
B.1 How does your organisation determine an ITSM process is implemented? Using this measure, which are the ITSM, processes implemented in your organisation?	RQ3
B.2 Did your organisation set performance objectives prior to putting your ITSM into operation? Are the objectives associated with the metrics? Are the objectives and metrics reviewed?	RQ3
B.3 Please provide all the metrics used to measure the performance of the ITSM processes?	RQ2
B4. Why were these specific metrics selected? What factors contributed to the decision to use the these metrics?	RQ4
B.5 Are metrics defined? Does your organisation maintain a catalogue/dictionary of metrics? Please provide documentation.	RQ2
B.6 Are the metrics classified into categories for example lead versus lag, qualitative versus quantitative, internal versus external, financial versus nonfinancial?	RQ3
C. Performance Measurement and Reporting	
C.1 How is the performance measurement of the ITSM done? Who is involved, what is the organisation structure?	RQ2
C.2 At what levels (tactical, operational and strategic) is performance measurement of ITSM done? How is the measurement across the levels linked?	RQ3
C3. What was the rationale for having ITSM performance measurement done at these levels?	RQ3
C.4 What is the frequency of measurement for each of the metrics? For example daily, weekly, monthly, quarterly, ad hoc and the reason for the time frame. Why the frequency?	RQ3
C.5 At what level (tactical, operational and strategic) is performance measurement of ITSM reported. Please provide me with sample reports.	
C.6 What is the frequency of reporting for each of the metrics? For example daily, weekly, monthly, quarterly, ad hoc and the reason for the time frame. Why this frequency?	RQ3
C.7 You may provide any other information and documentation you would like to add.	

The case study interview mapping assisted in aligning the interview questions to the research questions. The detailed mapping of the case study interview questions, aims and research questions can be found in Table B.1 in Appendix B. Qualitative analysis was performed on the data collected from the case studies.

3.6.4 Limitations of the case study methodology

A limitation of the qualitative case study approach is that findings cannot be generalised to an entire population. In this study, efforts are made to select cases that provide a broad representative sample in terms of industry sector, size, and geographic location. However, the study acknowledges the limitations of generalising case study findings to a population due to the small size of case study samples (Yin 2009). The intent in this study is to generalise the case study findings to theory and not to a population.

Multiple sources are used to ensure validity by triangulation—the survey responses, case study interviews and cross-case analysis. This study recognises the challenge of demonstrating validity in case studies as noted by Ryan and Bernard (2003, p. 103): 'There is no ultimate demonstration of validity, but we can maximize clarity and agreement and make validity more, rather than less likely'. Confidence in reliability is enhanced by agreement across techniques, as well as across the coders. In this study, the PhD student and the research supervisors performed the coding of the case study data. The role of the coders is further described in section 4.9.4 in Chapter 4.

This section described the case study approach used and provided a description of the case study design. Descriptions of the case study pilot, the case study constructs, how the case study was planned and the limitations of the case study method used were also provided.

3.7 ITSM performance measurement framework: design research approach

The design science approach used to develop the ITSM performance measurement framework is the Design Science Research Methodology (DSRM) offered by Peffers et al. (2008). The DSRM has six stages: problem identification and motivation, definition of the objectives for a solution, design and development, demonstration, evaluation, and communication. DSRM provides guidelines on creating and evaluating an IT artefact. Design science 'creates and evaluates IT artefacts intended to solve identified organisational problems' (Hevner et al. 2004, p. 3).

Design is defined as 'a goal-directed thinking process by which problems are analysed, objectives are defined and adjusted, proposals for solutions analysed, objectives are developed and the quality of those solutions is assessed' (Roozenburg & Eekels 1995). The subject and object of design science is design; and using the definition of Roozenburg and Eekels, its purpose is 'to conceive the idea for some artefact or system and/or to express the idea in an embodiable form' (1995, p. 53). This study heeds the advice of Osterle et al. regarding the design step, namely, 'artefacts should be created through generally accepted methods, be justified as much as possible and be contrasted with solutions already known in science and business' (2010).

The study adopts matching analysis projection and synthesis (MAPS) (Chow & Jonas 2008) as the design guide for the design step in DSRM as MAPS is similar to the concepts of 'the true', 'the ideal' and 'the real' matching realism consistent with the underlying philosophy of the study. MAPS also presents an integrative design research medium, as well as flexibility. The DSRM framework integrated with the MAPS design guidelines used in the study is depicted in Figure 3.3. The design research approach for the implementation of the ITSM performance measurement framework artefact is described in Chapter 6. The design is guided by the design science research methodology (DSRM) method in Peffers et al. (2008) with the design step supplemented by mapping, analysis, synthesis and projection (MAPS) (Chow & Jonas 2008; Jonas 2007).

A criterion-based evaluation of the ITSM performance measurement framework artefact is undertaken at three levels based on feedback from a panel of experts. The three levels, based on the recommendation of Neely, Gregory and Platts (2005), comprise the individual performance measures, the set of performance measures, and the relationship between the performance measurement system and the environment within which it operates.

Section 3.7.1 introduces the design model and explains the linking between DSRM and MAPS. The two design cycles used in the study are described in Section 3.7.2

and 3.7.3. The limitations of the artefact design methodology are described in section 3.7.4.

3.7.1 Design Science Research Methodology (DSRM) and MAPS

A design science method process model (shown in Figure 3.3) is used to guide the development of the ITSM performance measurement framework. Although design science in IS research 'has been used most commonly for generating field-tested and theoretically grounded knowledge for creating software applications' (McLaren, Head, Yuan & Chan 2011, p. 2) it has also been successfully used for developing 'methods for measuring complex multidimensional constructs such as the strategic fit of a firm's IS' (McLaren et al. 2011, p. 2). The implications of the design study espoused by McLaren et al. (2011) support the use of design science in the development of an ITSM performance measurement framework.

This study blends the six stages design science research methodology (DSRM) method (Peffers et al. 2008) and matching, analysis, projection and synthesis (MAPS) method (Chow & Jonas 2008) as presented in Figure 3.3. The three main data collection methods demarcate the three stages of the study. Stage 1 of the study comprised the literature review presented in Chapter 2 and the survey presented in Chapters 3, section 3.5 and Chapter 4. In stage 2, case studies and cross case analysis is conducted as described in Chapter 3, section 3.6 and Chapter 4. Stages 1 and 2 are analysis phases of the study; while stage 3 of the study is described in Chapter 3, section 3.7. Chapter 5, provides the synthesis of literature review, survey and case study findings into an ITSM performance measurement framework. In stage 1 the problem and motivation of the study was established. The motivation of the study was the development of an objective-centred solution, a contextualised ITSM performance measurement framework. In stage 1 the literature review and survey are the methods used to define objectives of a solution that is evidence-based and customer-focused. In stage 2, qualitative data collected using case studies is analysed using content analysis with the objective of the design and development of the ITSM performance measurement framework based on a detailed understanding of the ITSM performance measurement in organisations. The MAPS macro cycle steps of analysis, projection and synthesis—along with the micro cycle steps of research, analysis, synthesis and realisation—are performed in stage 2 and stage 3 to make the design operational. In stage 3, synthesis, demonstration and evaluation of the framework is performed, followed by a single iteration in design to incorporate feedback from the evaluation. Communication occurs throughout the three stages with feedback received from the research partners, panel of experts, industry and academic conference and journal reviewers and audience incorporated into the study.

In stage 1 the literature review identified literature on theory and practice of ITSM performance measurement, while the survey provided a snapshot into the performance measurement practices of organisations. The case studies in stage 2 provided more detailed information on ITSM performance measurement practice and contingency factors. The results of stages 1 and 2 are synthesised in the design of the ITSM performance measurement framework in stage 3. Based on the findings of the literature review, survey and case study, the ITSM performance measurement framework is designed to address current ITSM performance measurement requirements and challenges.

In the micro cycle of the design, *research* involves summarising the results of the literature review, survey and case studies. *Analysis* entails extracting specific elements for the performance measurement framework from the qualitative and quantitative data analysis results from the survey and case studies. *Synthesis* involves employing the five aspects of 'designerly ways of knowing' from Cross (1982) to integrate the findings of the literature review, survey and case studies. The five aspects of designerly ways of knowing are mapped to the features of the study:

1) The problem is ill-defined as an ITSM PMF has not been previously developed and the dimensions of the framework were unknown;
2) The focus is to develop a solution to the problem: ITSM practitioners experience challenges in measuring and reporting the performance of ITSM;
3) A constructive mode of thinking is adopted to develop, populate and implement the PMF;
4) The findings are summarised in diagrams as visual representation of codes used to translate the abstract requirements of dimensions to arrange metrics for the metrics catalogue;

5) This model can inform a database design ('object language') of the repository to store the elements of the PMF including metrics, benefits, processes, BSC perspectives, challenges, and business sectors.

Realisation includes the combination of the ITSM benefits and metrics categories from the literature review and survey with the selection factors from the case studies.

For each of three phases of the macro cycle the four steps in the micro cycle are undertaken. A summary showing the specific design elements for the macro and micro design cycles is presented in Table 3.8.

Table 3.8 Summary of hyper-cyclic model applied to the ITSM PMF design (based on Jonas 2007)

Macro Cycle – steps/components of the iterative macro process of designing	**Micro Cycle – steps of the iterative micro process of learning/designing**			
	Research	**Analysis**	**Synthesis**	**Realisation**
Analysis "the true" how it is today	Systematic literature review Survey and case study data How to get data on the situation as it IS? – data on what IS	Literature review findings, survey and case study data How to make sense of this data – knowledge on what IS	Design science research methodology (DSRM) How to understand the situation as a whole? – worldviews	Summarisation and interpretation of the literature review, survey results and case study results How to present the situation as IS? – consent of the situation
Projection "the ideal" how it could be	Systematic literature review Survey and case study data How to get data on future changes? – future related data	Quantitative and qualitative analysis of survey data How to interpret these data? – information about futures	Design Science Research Methodology (DSRM) How to get consistent images of possible futures? - scenarios	Identification of types of benefits and metrics 1st iteration of ITSM PMF - organisation level ITSM performance measurement model - factors that influence the selection of ITSM metrics - catalogue of metrics How to present the future scenarios? – consent on problems/goals
Synthesis "the real" how it is tomorrow	Publication and conferences - Interactions with panel of experts and ITSM practitioners How to get data on the situation as it SHALL BE – problem data	Content and cross case analysis of case study data How to evaluate these data? – problem list of requirements	Research on design theory and performance measurement framework design How to design solutions of the problem? – design solutions	Integration of the literature review, survey results into 2nd iteration of ITSM PMF - towards a contingency theory for the performance measurement of ITSM -improved consolidated catalogue of metrics How to present the solutions? – decisions about "go/no go"

The study develops an ITSM performance measurement framework. Two design iterations are undertaken in the development of the ITSM performance measurement framework. ITSM performance measurement development entails the incorporation of feedback received from academic reviewers and ITSM performance measurement experts through evaluation and communication cycles. Feedback is provided throughout the study via the communication step of the DSRM method. Communication and feedback is from the panel of experts, case study organisation staff, academic and practitioner conferences, journals and blogs.

3.7.2 ITSM performance measurement framework: artefact design process

The artefact design process cycles through research analysis, artefact design, artefact evaluation, artefact redesign and, finally, artefact evaluation. Two artefact evaluation iterations are conducted in the study. Table 3.9 shows an outline of the ITSM PMF design process. The process integrates behavioural science methods with an IS design science framework that incorporates 'designerly ways of knowing' in the design step. This fusion of science and design is achieved in the study's three stages.

Table 3.9 ITSM design process: Fusion of science and design

Research/ Design	**Stage 1**	**Stage 2**	**Stage 3**
Objective	Problem identification and definition of objectives of a solution Determine ITSM benefits and performance metrics	Understand the domain of ITSM performance measurement Design ITSM PMF	Development of ITSM PMF Build, evaluate and communicate ITSM PMF
Method	Systematic literature review Survey	Case studies, cross case analysis DSRM (Peffers et al. 2008) and MAPS synthesis and realization (Chow & Jonas 2008; Jonas 2007)	
Paradigm	Behavioural science	Behavioural science	Design science
Parent Discipline	Social science	Social science	IS strand of the Sciences of the Artificial (Gregor & Jones 2007)
Philosophy	Positivist	Positivist/realist	Realist
Data Analysis	Quantitative & qualitative	Qualitative & quantitative	Expert evaluation
Purpose	Exploratory	Explanatory	Application
Phenomena	Organisation	Organisation	Problem solving artefact
Outcome	Theory building: analysing and describing	Theory building: explaining and predicting	Design and action
Contribution	Empirical ITSM metrics and benefits	A contingency theory of ITSM performance measurement	ITSM performance measurement framework

The ITSM PMF artefact is evaluated for its usefulness and fitness, and on its capability to assist the organisation to select contextualised metrics, generate relevant reports to the organisation and provide an integrated set of ITSM performance metrics. ITSM managers and a panel of experts provide feedback as input to build the final ITSM performance measurement framework artefact. A summary of the study philosophy and approaches is shown in Table 3.10.

Table 3.10 The study philosophy and research approaches

		Research Approach Used		
	Literature Review	**Survey**	**Case Study**	**Artefact Design**
Philosophy	Positivist-realist	Realist	Realist	Realist
Ontology	Performance measurement body of knowledge	IS function ITSM practitioners	IS function ITSM practitioners	IS function
Epistemology	Knowledge gained by studying inter-subjective views on: Organisation, IS, ITSM: performance measurement literature	Knowledge gained by studying subject: ITSM practitioners responses	Knowledge gained by studying subject: ITSM practitioners responses	Object: Performance measurement practices
Method	Systematic literature review	Quantitative and qualitative analysis	Content analysis and cross case analysis	DSRM and MAPS
Research object	Academic and practitioner literature	IS function	IS function	Decision making framework
Research Purpose	Understanding state of research	Building theory for explaining	Building theory for explaining	Design and action

3.7.3 ITSM performance measurement framework: artefact constructs

The ITSM performance measurement framework provides a contextualising framework, metric classification guidance and a sample catalogue of metrics that can be used by organisations in developing standardised ITSM performance measurement. The artefact constructs are drawn from the study's conceptual framework, literature review, survey and case study results. The ITSM performance measurement framework constructs include performance measurement and reporting layers from the organisation's external and internal environment, ITSM organisational level and process benefits, balance scorecard based organisational level categories, ITSM process benefit and metric categories, ITSM process metric constituents (outcome, stage and type), and factors influencing ITSM performance metric selection.

3.7.4 Limitations of the artefact design methodology

This section describes the limitations of the artefact design methodology used in this study. A description of the steps taken to minimise the effect of the limitations on the study is provided in section 3.8. A limitation faced by the design methodology as well as the study overall design is the different perspectives and circumstances that exist for academics and practitioners. The study addresses theoretical concerns and, at the same time, aims to provide a practical solution useful to industry practitioners. The industry practitioners are burdened to deliver immediate solutions to pressing problems, whereas theoretical concerns focus on long-term solutions to more general problems. The ITSM PMF is tested in a single location and may not be applicable or replicable in other organisations.

A second limitation of this study's design methodology is the limited number of iterations. The study uses two cycles, although additional iterations may have improved the artefact design by providing more detail on the taxonomy of ITSM process metrics. The number of iterations was limited to two due to time constraints.

3.8 Study reference disciplines

The discipline of information systems (IS) draws from multiple areas such as the social sciences and the natural sciences, as well as the sciences of the artificial (Gregor 2002). The study draws from theories and methods of social science disciplines of management, management accounting, production and operations management, marketing, and artificial sciences and design. The social science methods of systematic literature review, survey and case study are used in analysis. The design science method of IS design research and design method of matching analysis and projection (MAPS) are used to synthesise the findings in the design and development of the ITSM performance measurement framework.

3.9 Unit of analysis and study artefact

The unit of analysis in IS can be at the organisational, group or individual level as identified by Vessey, Ramesh and Glass (2002). The study unit of analysis is at the group level, in this case, the IS function. Specifically, the study unit of analysis was the members of IT service management forum of Australia (itSMFA). The study acknowledges that the members of itSMFA represent a subgroup of a wider population of ITSM practitioners.

The study artefact is an ITSM performance measurement framework that can be used by IS functions to implement performance measurement and reporting systems.

3.10 Conclusion

The study integrates mixed-methods and social science and design science paradigms to develop research that meets academic rigour and satisfies industry relevance. By applying a mixed-method, multi-paradigmatic approach the study minimises the shortcomings of each method by using the strengths of supplementing methods. For example, the shortcomings of survey are minimised by the opportunity to seek clarification and deeper meaning provided by case studies. The theoretical study elements are enhanced by application in the design component of the study. The study research philosophy provides a scaffold that assists in undertaking the research.

Chapter 4 Survey and Case Study Analysis and Results

4.1 Introduction

This chapter provides a detailed description of the survey and case study data analysis and results. Chapter 3 described the study research approach, including the philosophy, design of the survey, case study and design science methods planned for the study. The aim of the survey was to provide a broad snapshot of ITSM benefits and specific performance metrics used to measure them; and to identify organisations that could be selected for the case studies. Chapter 4 describes the analysis and results of the survey and case studies.

This chapter is organised into eleven sections. Section 4.1 presents an introduction to the survey data analysis and results. Section 4.2 presents the results of the survey responses and provides a description of the survey respondents and preliminary data preparation prior to the survey data analysis. Section 4.3 presents the survey data analysis approach describing the quantitative and qualitative data analysis; and quantitative tests conducted to check for normality of the data, compare means and inspect relationships between variables. Section 4.4 presents a description of the survey sample characteristics and demographics. Section 4.5 answers *RQ1. What types of benefits are reported from ITSM improvement initiatives?* by describing the ITSM benefits reported in the survey and the results of the quantitative and qualitative analysis of the data. In section 4.6 *RQ2. Which specific metrics can be used to measure ITSM performance?* is answered by describing the ITSM process metrics reported in the survey and the results of the quantitative and qualitative analysis of the data. Section 4.7 answers *RQ3. How can specific ITSM performance metrics be derived?* by describing the ITSM performance practices reported in the survey and the results of the quantitative analysis of the data. In sections 4.5, 4.6 and 4.7 descriptive statistics and quantitative tests are conducted and non-parametric statistical tests checked for correlations of key study variables. In these sections, analysis is performed by applying Miles and Huberman (1994) logical qualitative analysis to answer RQ1 and RQ2. A summary of the survey findings is presented in section 4.8. Section 4.9 presents the case study results and describes the results of the content analysis of the case study data answering *RQ4: What internal and external environmental factors influence the organisations' selection of specific performance* *metrics for ITSM?* In section 4.10 the findings of the cross case analysis of the case study data is described further, establishing the internal and external factors influencing the selection of ITSM performance metrics. Section 4.11 consolidates the case study findings answering *RQ4: What internal and external environmental factors influence the organisations' selection of specific performance metrics for ITSM?* by presenting a contingency model for the performance measurement of ITSM. The conclusions of the study analysis and results are summarised in section 4.12.

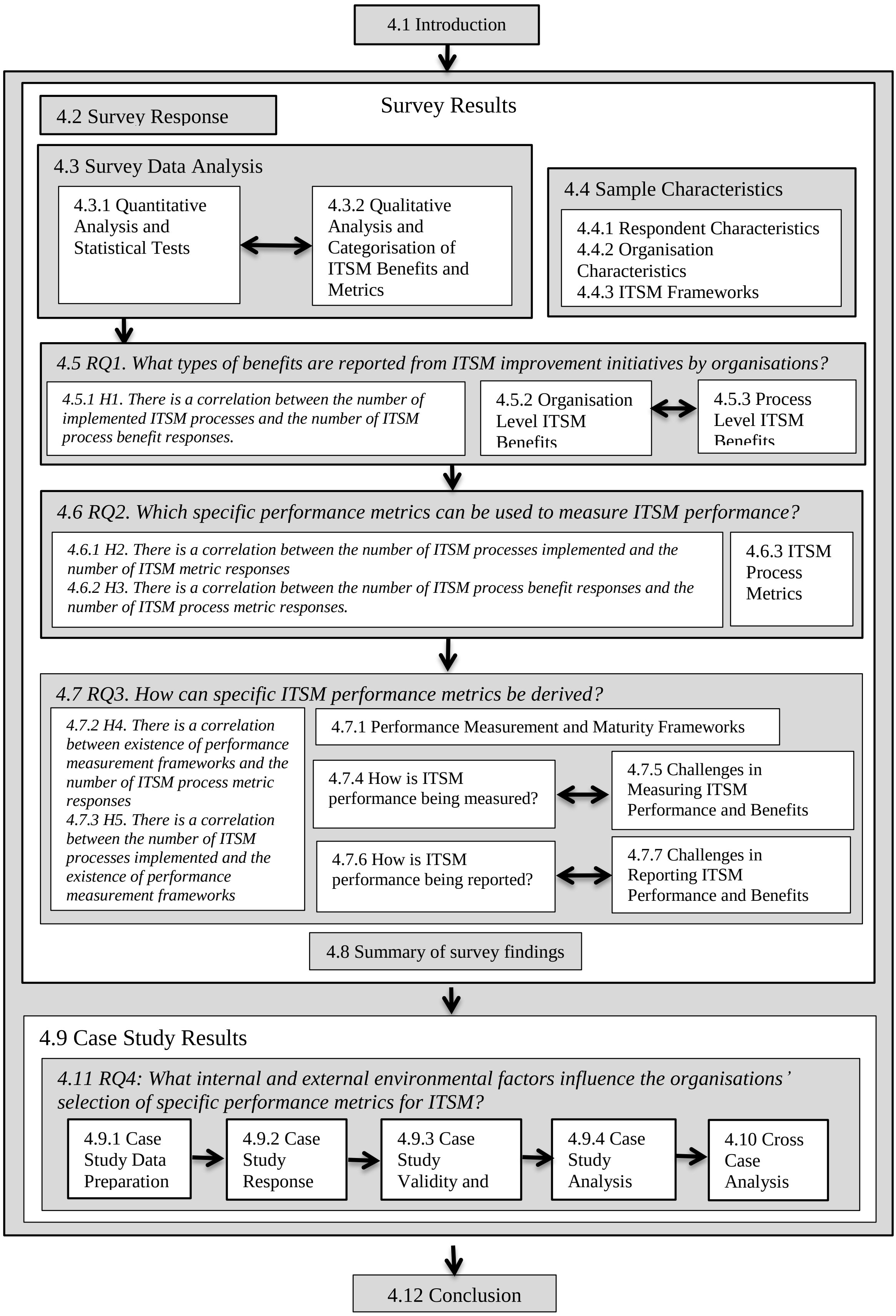

Figure 4.1 Chapter 4 overview and section linkages

4.2 Survey response

This section describes the survey responses and the preliminary data preparation. Section 4.2.1 describes the criteria used to filter the survey responses. The treatment of organisations with multiple responses is described in section 4.2.2. In section 4.2.3 non-response bias is examined; and section 4.2.4 describes sampling bias. The survey received a total of 263 responses out of a population of 2,085 ITSM Australia members, with 211 considered complete—achieving a return rate of 10 percent. A description of the survey design and implementation was provided in Chapter 3. An email with a link to the online survey sent by IT Service Management Forum Australia (itSMFA) in November 2009 was followed up by a reminder second email with a link in an itSMFA newsletter emailed to members in December.

To improve the survey response rate, survey respondents willing to enter the draw were offered a chance to win the prize of a netbook computer on completing the survey and voluntarily providing their email address. The design of the survey questions focused on subject matter that was relevant to the target population and it was estimated the questionnaire required approximately 20 minutes to complete. The survey was easily accessible by computer and had the endorsement of itSMFA on each page and the respondents were assured of confidentiality. The return rate may have been affected by non-response caused by the 'timing of follow-up waves, confidentiality concerns, and misidentification of the survey as Spam' (Sills & Song 2002, p. 25). Four preliminary steps undertaken to prepare the data for analysis are described in subsections 4.2.1 filtering responses, 4.2.2 organisations with multiple respondents, 4.2.3 non-response bias, and 4.2.4 sampling bias.

4.2.1 Filtering responses criteria

The first step taken was to determine which of the 263 responses were complete so that only these could be used for data analysis. A filter applied to determine complete responses is described in the next paragraph. The questionnaire was organised into four sections with questions on the respondent's organisation, ITSM processes, ITSM benefits measurement and ITSM challenges. The respondents completed organisation-specific survey questions in section A, then selected the ITSM framework they were implementing, after which they answered survey questions in sections B and C on ITSM processes and performance measurement dependent on the ITSM framework selected. The ITSM framework option comprised six branches to ITIL v2, ITIL v3, Microsoft Operation Framework (MOF®), IBM Service Management Reference Model (IBM® SMRM), or HP IT Service Management Model (HP® ITSM) and an option to specify other ITSM frameworks. Section C of the survey presented organisation- specific questions. The questionnaire involved branching to ensure only relevant options were provided. None of the questions were compulsory. The branching possibilities in the questionnaire are depicted in Table 4.1.

Table 4.1 Survey questionnaire branching

Survey questionnaire sections				
A Respondents' organisation	**Branching based on ITSM framework**	**B ITSM processes**	**C ITSM performance and benefits measurement**	**D ITSM challenges**
Organisation specific	114 respondents: ITIL v2	ITIL v2 processes	ITIL v2 process specific	Organisation specific
	90 respondents: ITIL v3	ITIL v3 processes	ITIL v3 process specific	
	1 respondents: Microsoft Operations Framework (MOF)	MOF processes	MOF process specific	
	4 respondents: HPITSM	HPITSM processes	HPITSM process specific	
	2 respondents: Other ITSM	Other ITSM processes	Other ITSM process specific	

The criteria for inclusion are based on the main survey objective, which is to identify ITSM processes, benefits and metrics. The survey responses were filtered and the responses selected were those that answered the first three questions (1-3) and at least one of the other questions (4-8) as listed below:

Q1. Section B. What ITSM framework has your organisation primarily adopted/adapted?

Q2. Section B. What is your role in the ITSM implementation?

Q3. Section B. What ITSM processes (for the framework selected) has your organisation implemented?

Q4. Section C. For each of the ITSM processes you are involved in please list the key benefit(s) realised from the implementation of the process.

Q5. Section C. For each of the ITSM processes you are involved in please list the metric used to measure the key benefits realised from the implementation of the process.

Q6. Section C. Please select the key employee and innovation benefits of the overall ITSM implementation.

Q7. Section C. Please select the key business and financial benefits of the overall ITSM implementation.

Q8. Section C. Please select the key internal benefits realized from the overall ITSM implementation.

Based on the selection criteria, a total of 211 out of the 263 returned survey responses were retained. This meant that 20 percent of the survey responses were deemed incomplete and unusable for the study. Applying the filter resulted in an effective response rate of 10 percent of the population of 2,085 itSMF Australia members. This was a low response rate and may be explained in part by the complexity of the survey subject, as well as the time pressure on ITSM professionals in responding to the survey in their work setting. Given that this was an exploratory survey, the low response rate was not considered troublesome because, as advised by Pinsonneault & Kraemer (1993), the survey is not solely intended to be generalisable to an entire population. The survey results are generalisable to itSMF international membership as further explained in section 4.2.4 and the survey is part of a mixed-method study. The low response rate necessitates the evaluation of non-response bias (Sivo, Saunders, Chang & Jiang 2006).

4.2.2 Organisations with multiple respondents

Analysis of the email addresses voluntarily provided by respondents showed that in a number of cases, multiple questionnaires were returned from some large organisations. Out of the 211 responses, 116 provided their email addresses. Of these, 65 email addresses were from organisations with single respondents; and 39 responses with organisational email addresses belonged to 17 organisations each with two to four respondents distributed in the following way: 13 of the organisations had two respondents, three of the organisations had three respondents and one of the organisations had four respondents. Twelve respondents provided personal email addresses. Ninety-five respondents did not provide email addresses.

The survey responses from organisations having two or more respondents are presented along the key study variables: number of ITSM processes, count of performance measurement frameworks implemented, number of ITSM process benefits responses, and number of ITSM process metrics responses. Table 4.2 lists organisations with multiple respondents.

Table 4.2 Organisations with multiple respondents

Key Study Variables	Org ID	Respondent	Number of ITSM processes	Count of performance measurement frameworks implemented	Number of ITSM process benefits responses	Number of ITSM process metrics responses
Survey Responses	1	1	8	1	1	4
		2	9	1	11	9
	2	1	9	0	8	3
		2	5	1	5	3
	3	1	10	1	1	1
		2	13	2	7	4
	4	1	12	4	11	11
		2	11	3	11	11
		3	16	2	1	1
	5	1	9	4	11	11
		2	10	1	8	8
	6	1	6	0	6	5
		2	2	0	9	1
	7	1	9	1	8	9
		2	5	1	5	2
	8	1	8	2	0	0
		2	3	1	1	1
		3	4	0	2	2
	9	1	11	2	11	10
		2	6	0	1	1
		3	11	1	0	0
		4	11	1	11	11
	10	1	4	0	11	11
		2	5	0	0	0
	11	1	7	0	4	6
		2	6	0	4	0
	12	1	6	0	4	4
		2	5	0	3	3
	13	1	4	1	1	1
		2	4	0	1	1
	14	1	4	1	4	2
		2	4	0	3	2
	15	1	7	0	0	0
		2	10	1	11	0
	16	1	8	2	1	1
		2	6	2	6	3
		3	7	1	3	3
	17	1	3	0	0	0
		2	10	0	7	6

Given that the study unit of analysis was the members of IT service management forum of Australia (itSMFA) and the fact that the respondents worked in a variety of ITSM roles and locations and provided a diversity of qualitative responses on ITSM benefits and metrics, the responses from multiple respondents from the same organisations were retained. The qualitative content of the responses on ITSM metrics and benefits from respondents from the same organisations were essentially unique and provided a diversity of response useful to this study.

4.2.3 Non-response bias

The low response rate of the survey necessitated testing for non-response bias. A Mann-Whitney U test is used to compare responses along the four key study variables in the first and second wave of survey responses. The five survey response characteristics closely related to the study research questions selected for first and second wave comparisons are: number of ITSM processes implemented, count of performance measurement frameworks in use, number of ITSM benefits responses, and number of ITSM metrics responses. The early respondents are considered to have returned the first wave of surveys from 20th November 2009 to 14th December 2009 after the first email; and the late respondents' second wave between 15th December 2009 and 23rd December 2009 after the email reminder. The Mann-Whitney U test is used as the data is from a non-parametric sample and the goal is to compare two unpaired groups from the same population (Field 2009). The results of the test are displayed in Table 4.3 and Table 4.4. Table 4.3 shows mean rank and sum of ranks for the two waves tested. Table 4.4 shows the actual significance values of the tests and provides the test statistic, *U* value, as well as the asymptotic significance (2-tailed) *p*-value. The results indicate that the distribution of responses is not significantly different across the five selected characteristics between the first wave and second wave.

Table 4.3 Comparisons of survey responses between first and second wave based on date: Mann-Whitney U test results: ranks

Tested Variables	**Wave**	**N**	**Mean Rank**	**Sum of Ranks**
ITSM processes	1	205	105.22	21569.5
	2	6	132.75	796.5
	Total	211		
PMF count	1	205	105.89	21706.5
	2	6	109.92	659.5
	Total	211		
ITSM benefits response	1	105	54.76	5750
	2	5	71	355
	Total	110		
ITSM metrics response	1	90	46.32	4168.5
	2	3	67.5	202.5
	Total	93		

Table 4.4 Comparisons of survey responses between first and second wave based on date: Mann-Whitney U test results: test statistics

Test Statistics (a) **a. Grouping Variable: Wave**	**ITSM Processes**	**PMF Count**	**ITSM Benefits Response**	**ITSM Metrics Response**
Mann-Whitney U	454.5	591.5	185	73.5
Wilcoxon W	21569.5	21706.5	5750	4168.5
Z	-1.094	-0.195	-1.127	-1.361
Asymp. Sig. (2-tailed)	0.274	0.846	0.26	0.174

From this data it can be concluded that there is no statistically significant difference between the first wave and second wave responses for ITSM process implementation responses (U = 454.5, p = 0.274), PMF responses (U = 591.5, p = 0.846), ITSM benefits responses (U = 185, p = 0.26), and ITSM metrics responses (U = 73.5, p = 0.174).

The basis for non-response bias detection in this case is the assumption that late respondents are similar to non-respondents (Sivo et al. 2006). The results show that the similarity of the distribution of responses between the first wave and second wave is statistically significant and, hence, non-response bias is not detected when comparing successive ‘waves’ of the questionnaire. However, given the comparatively small number of responses (6) received after 15th December, the data set was sorted by date and split in half to make further comparisons. The results are summarised shown in Table 4.5 and Table 4.6.

Table 4.5 Comparisons of survey responses between first and second wave data split in half: Mann-Whitney U test results: ranks

Tested Variables	**Wave**	**N**	**Mean Rank**	**Sum of Ranks**
ITSM Processes	1	106	106.97	11339
	2	105	105.02	11027
	Total	211		
PMF Count	1	106	101.23	10730
	2	105	110.82	11636
	Total	211		
ITSM Benefits Response	1	49	51.48	2522.5
	2	61	58.73	3582.5
	Total	110		
ITSM Metrics Response	1	43	46.78	2011.5
	2	50	47.19	2359.5
	Total	**93**		

Table 4.6 Comparisons of survey responses between first and second wave data split in half: Mann-Whitney U test results: test statistics

Test Statistics (a) **a. Grouping Variable: Wave**	**ITSM Processes**	**PMF Count**	**ITSM Benefits Response**	**ITSM Metrics Response**
Mann-Whitney U	5462	5059	1297.5	1065.5
Wilcoxon W	11027	10730	2522.5	2011.5
Z	-0.233	-1.395	-1.2	-0.074
Asymp. Sig. (2-tailed)	0.815	0.163	0.23	0.941

From this data it can be concluded that there is no statistically significant difference between the first wave and second wave responses for ITSM process implementation responses (U = 5462, p = 0.815), PMF responses (U = 5059, p = 0.163), ITSM benefits responses (U = 1297.5, p = 0.23), and ITSM metrics responses (U = 1065.5, p = 0.941).

The results are interpreted as indicating that the distribution of responses is not statistically significantly different across the four selected characteristics between the first wave and second wave responses.

4.2.4 Sampling bias

Since non-probability sampling was used it is important to establish whether there was sampling bias. The survey used a purposive sample of identifiable IT service management practitioners who were members of the itSMFA. The sample for practical purposes excluded ITSM practitioners who were not members of itSMFA.

The members of itSMF Australia chapter are part of a larger population of itSMF International (itSMFI) and share common practices and similar characteristics with the other 53 chapters of itSMFI. A comparison of the study results with those of an ITSM study conducted in the UK and USA by Marrone (2009) sought to identify constructs in common with the Australian study. The comparison considered the distribution of ITIL users, process implementations, benefits and performance measurement. To compare the population in Australia with the UK/USA population, the adoption rates for sample process were compared using the Wilcoxon Mann-Whitney Test. There was no statistically significant difference in the adoption pattern for either ITIL v2 or v3 users. The UK/USA population was the same as the Australian population in terms of the proportion implementing ITIL v2 and v3. Comparisons were made across the surveys as shown in Table 4.7. Based on the result of the comparison of the Australia and UK/USA studies the results of the survey in this study are likely to be generalisable to the target population of itSMFA and itSMFI as the survey sample is from a representative cross section of the population.

Table 4.7 Comparison of ITIL adopted in Australia, the UK and USA survey data

Location	**Population**	**ITIL v2 (%)**	**ITIL v3 (%)**
Australia	211	54	43
UK/USA	503	56	44

The similarity of the itSMF Australia and UK/USA populations is further depicted in Figure 4.2, which shows a high similarity in the adoption pattern of ITIL v2 and ITIL v3 processes in Australia, the UK and USA. Therefore, it is expected that the study findings from the itSMFA survey can be generalised to the wider itSMF international community.

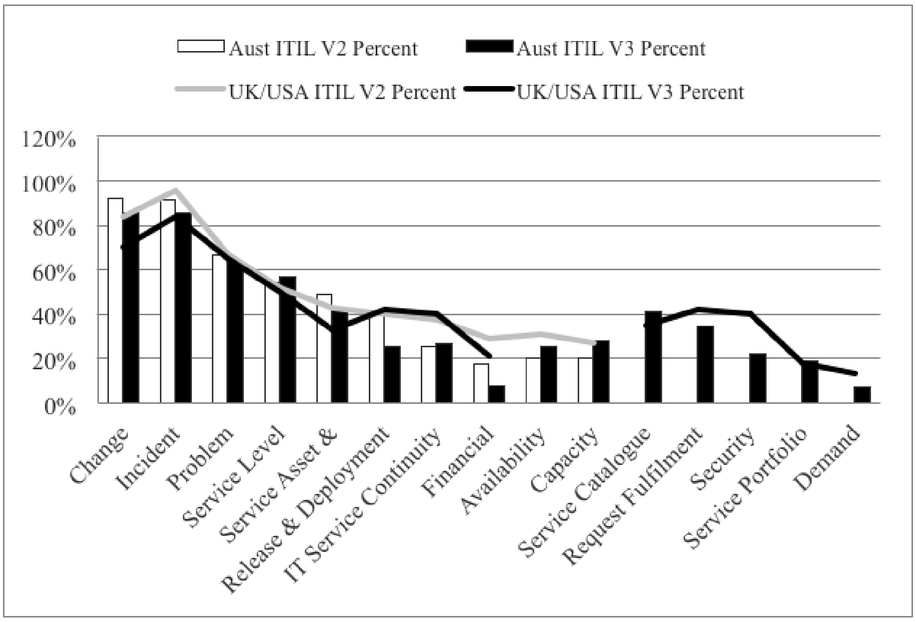

Figure 4.2 Comparability of ITIL version processes adopted: itSMFA and ITSM UK and USA surveys

The results of the survey may, however, not be readily generalisable to ITSM practitioners who are not members of itSMF. There are alternative IT service management membership organisations to itSMF that exist, such as Help Desk Institute (HDI), Institute of IT Service Management (IOSM) and Institute of Certified Service Managers (ICSM) that have a different focus; and at least ten of these alternative organisations are listed in a study by England (2007).

This section provided a description of the survey response and the preliminary data preparation. The survey achieved a 10 percent return rate and non-response bias was not detected. The results of the sample can be generalised to the itSMFI membership, though the results of the survey may not be readily generalisable to ITSM practitioners who are not members of itSMF.

4.3 Survey data analysis

This section presents the survey data analysis by first explaining the implementation, followed by the guiding considerations, and then the results. In section 4.3.1 the implementation and considerations of the quantitative analysis are provided. Sections 4.3.2 and 4.3.3 present the implementation and guiding considerations of the qualitative analysis. The results of the survey are then presented in sections 4.4

to section 4.7, beginning with the description of the sample characteristics in section 4.4. A summary of the survey findings is presented in section 4.8.

4.3.1 Quantitative analysis and statistical tests

The purpose of the statistical analysis was to address the first two research questions by providing answers from the quantitative aspects of the research questions.

1. *What types of benefits are reported from ITSM improvement initiatives by organisations? (RQ1)*
2. *Which specific metrics can be used to measure ITSM performance? (RQ2)*

The first research question assumes that there is an association between ITSM improvement initiatives and ITSM benefits. To test the assumption the study examines the association and correlation between the number of ITSM processes implemented and the number of ITSM process benefits responses for each process.

The second research question shares the underlying assumption of the study that performance measurement frameworks can be used to measure the performance of IT service management. To test the assumption, the study examines the correlation between ITSM performance measurement framework existence and the presence of ITSM process metrics responses, performance measurement frequency and performance measurement reporting frequency and level. Tests are also conducted to measure association between performance measurement practice and challenges in measuring and reporting ITSM performance.

Characteristics of the quantitative responses were explored in order to determine the appropriate statistical tests to conduct testing of the hypothesis and answer the research questions. The number of ITSM processes implemented and the number of performance measurement and maturity frameworks in use were factors along which the dependent variables are tested. Tests for normality are conducted on the aggregate number of ITSM processes implemented in each organisation and the aggregate number of performance measurement and maturity frameworks. The distribution of ITSM framework implementation appears non-normal based on visual inspection of the histogram presented in Figure 4.3. Since the data set had less than 2000 elements non-probability sampling was used. The Shapiro-Wilk test is applied to test the observation of the visual inspection.

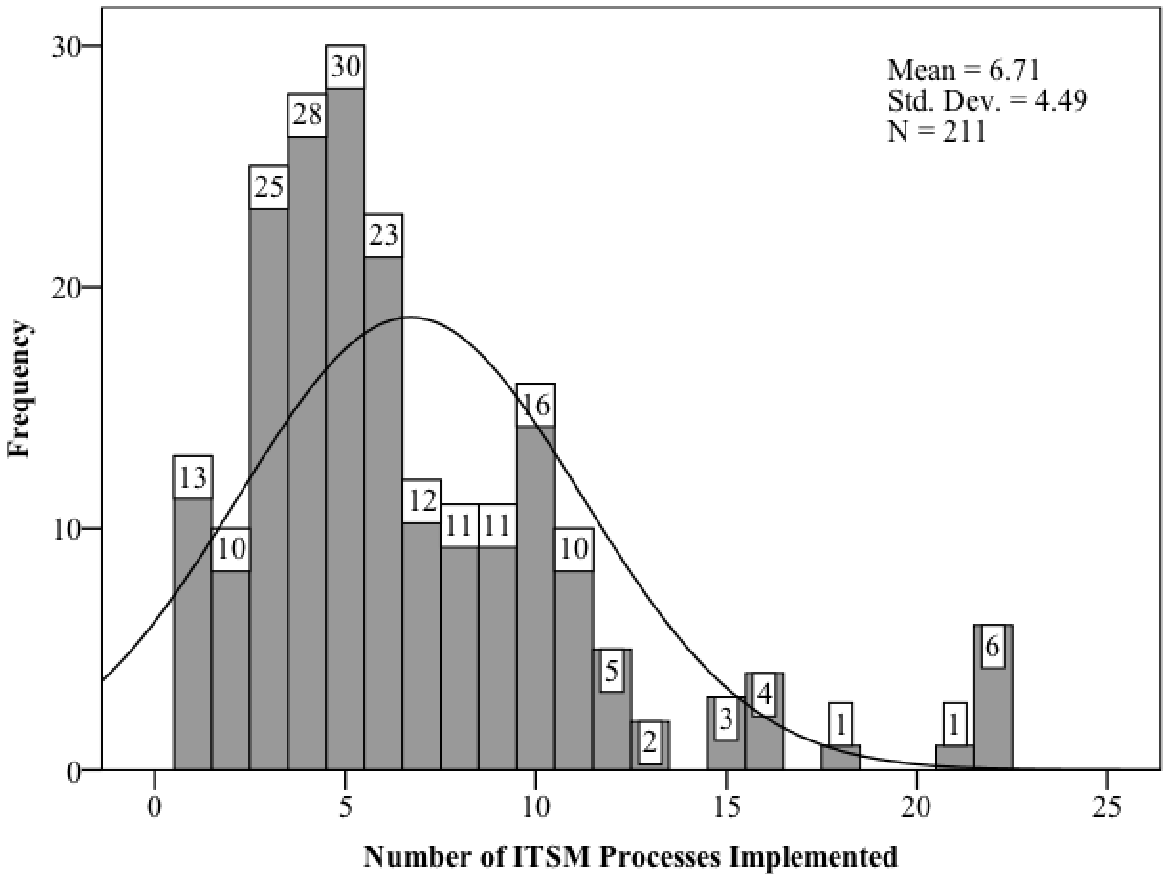

Figure 4.3 Distribution of implemented ITSM processes

The p-value of the Shapiro-Wilk test shown in Table 4.8 is below 0.05 confirming that the data significantly deviate from a normal distribution. Non-parametric statistical tests are conducted as non-probability sampling was used and the distribution of the responses was non-normal.

Table 4.8 Test of normality for implemented ITSM processes

	Shapiro-Wilk		
	Statistic	**df**	**Sig.**
Total number of implemented ITSM processes	.876	211	.000

Tests of normality of the distribution of the performance measurement and framework implementation were conducted. The distribution of the variable, performance measurement and maturity frameworks implemented is non-normal based on visual inspection of the distribution presented in Figure 4.4.

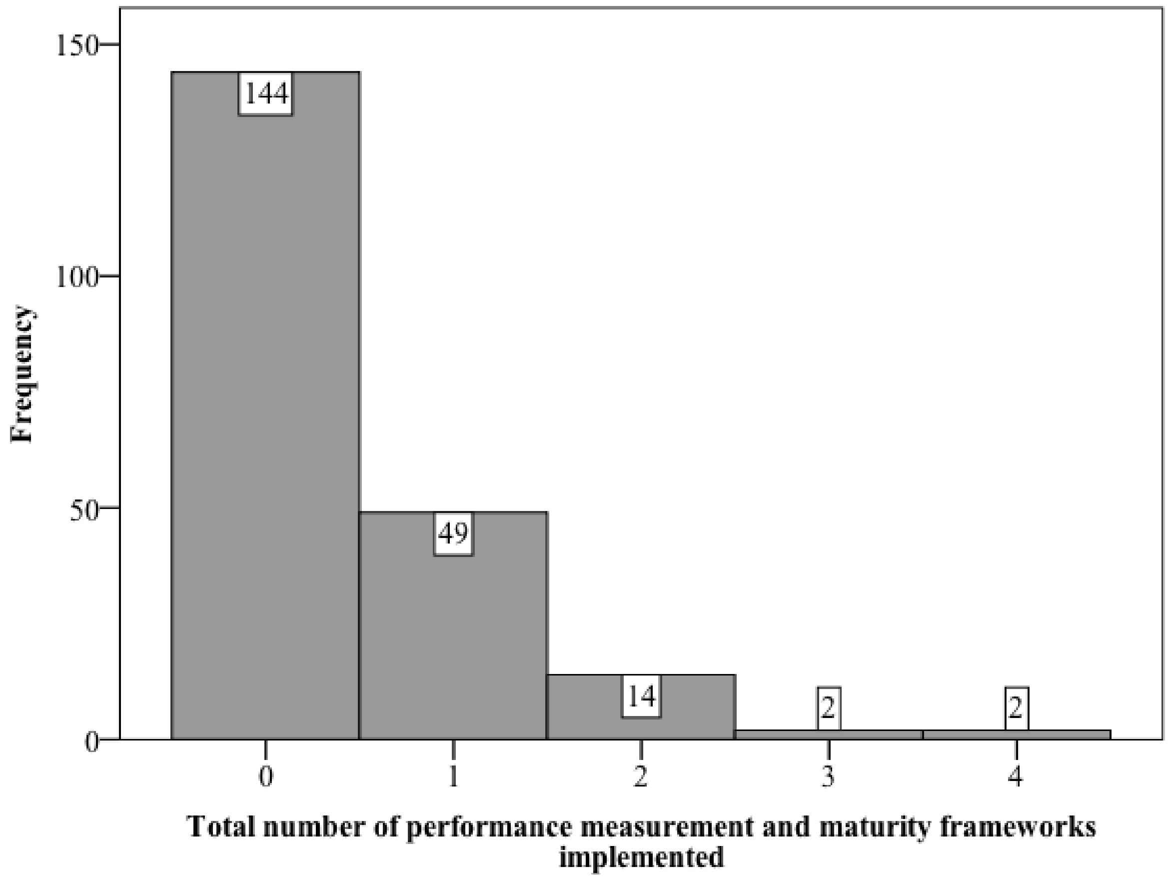

Figure 4.4 Distribution of implemented performance measurement frameworks

The p-value of the Shapiro-Wilk test shown in Table 4.9 is below 0.05, confirming that the data significantly deviates from a normal distribution.

Table 4.9 Test of normality for performance measurement frameworks

	Shapiro-Wilk		
	Statistic	**df**	**Sig.**
Total number of performance measurement and maturity frameworks implemented	.623	211	.000

4.3.2 Qualitative analysis and categorisation of ITSM benefits and metrics

The design of the qualitative data analysis is based on three main flows of activities: ‘data reduction, data display and conclusion drawing/verification’ (Miles & Huberman 1994, p. 10). The method prescribed by Miles and Huberman was selected for the survey qualitative data analysis to provide logical analysis resulting in written description as advised by Ratcliff (2009).

Qualitative analysis was performed on the ITSM metric and benefits question responses. Data reduction involves sorting then coding the responses. Data display involves creating frequency tables and charts to be used as a basis for conclusion drawing. The survey qualitative responses were transferred from Survey Monkey into Microsoft Excel and then sorted by ITIL processes. Single responses were extracted where the respondent had provided multiple responses to the survey question. In some instances the respondents listed more than one ITSM process benefit or process metric for each process. In such cases each response was identified and assigned to a unique cell. Sorting was then performed on the expanded list of benefits and metrics responses. Similar process benefits and metrics were grouped together along the service constituents and ITSM process benefits sub-categories listed in Table 4.10.

Table 4.10 ITSM process benefits and metrics categorisation

Service Constituents	**ITSM process benefit sub-categories derived from the survey responses**
People	Customer needs identification, Customer satisfaction, Customer service
Process	Process improvement
Resources (Partners and Technology)	Governance, Compliance, Control, Cost management, Resource management, Risk management
Product	System availability, Service improvement, Value to the business, Knowledge acquisition

The nature of the responses was such that a single benefit was described in a variety of ways by different respondents, for example, increased customer satisfaction, improved customer satisfaction, and better customer satisfaction. The ITSM process benefits are classified by applying the qualitative analysis technique proposed by Miles and Huberman (1994).

The survey results presented in sections 4.5, 4.6 and 4.7 identify the types of overall business benefits and ITSM process-specific benefits, metrics, and measuring and reporting challenges reported by organisations implementing ITSM.

4.4 Sample characteristics

This section describes the characteristics of the sample. In section 4.3.1 the characteristics of the respondents are reported and in section 4.3.2 the characteristics of the organisations are described.

4.4.1 Respondent characteristics

This section describes the survey respondents by reporting on respondents' itSMFA membership category, organisation position and ITSM roles. The respondents represented corporate (74%), individual (23%) and vendor (3%) categories of itSMFA membership, with most respondents being corporate members. A detailed categorisation is shown in Table C.1 in Appendix C.

The respondents of the survey were drawn from a wide cross-section of organisation positions, as shown in Figure 4.5. More than half of the respondents were managers distributed as follows: service manager (21%), IT manager (18%), ITIL process manager, business manager and change manager (16%), project manager (5%), and operations manager (3%). Fourteen percent of the respondents were consultants. Six percent of the respondents were technical experts, while seven percent who were in the *other positions* category included chief information officer, knowledge coach, combined role, process implementation role, contract officer, sales executive, finance and administration officer, ITSM designer-infrastructure team leader, and client services team leader. Directors and analysts made up seven percent of the respondents. A detailed categorisation of respondent's positions is shown in Table C.2 in Appendix C.

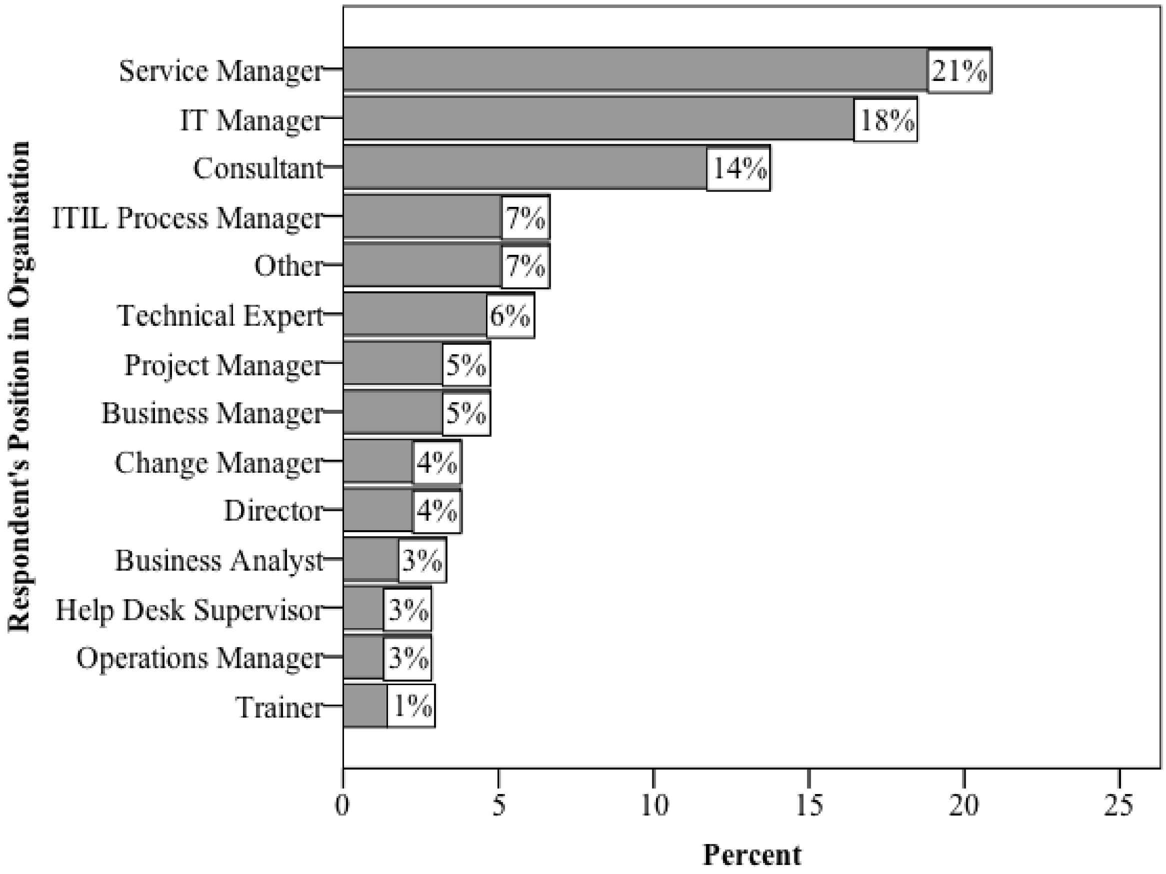

Figure 4.5 Respondent's position in the organisation

When asked about their assigned role in the ITSM implementation, most respondents indicated having multiple roles. A total of 551 responses on ITSM roles were reported. The distribution of the responses is shown in Table 4.11. The majority of respondents (57%) indicated having one ITSM role, 13 percent had two roles and 10 percent had 3 roles. Two respondents each indicated having 13 and 14 ITSM roles.

Table 4.11 Distribution of responses on ITSM roles

Number of Roles	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**10**	**9**	**12**	**13**	**14**	**Total**
Frequency	3	120	28	21	14	8	4	2	2	3	1	1	2	2	211
Percent (%)	1	57	13	10	7	4	2	1	1	1	1	1	1	1	100

To identify the number of ITSM roles reported, the responses on roles were tabulated, coded, sorted, similar roles merged and then analysed. The frequencies of each role were determined, distributions established and then summarised in Table

4.12. The survey recorded 120 different ITSM role titles. A total of 69 different ITSM roles distributed across the ITSM frameworks implemented were reported. The three most frequently specified ITSM roles were change manager (12%), 1st/2nd/3rd level support (11%) and service level manager (10%). Roles in the other category included: administrator, applications analyst/ architect ITILv3, incident coordinator, incident resolver, IT executive officer, IT manager, IT strategy development process owner, IT technical role, monitoring manager, portfolio manager, problem analyst, release to production process owner, scheduling manager, service desk manager ITILv2, technology area manager, and test manager v3. Five respondents (0.9%) indicated not knowing or having a specific ITSM role.

Table 4.12 Survey respondents ITSM roles summarised

ITSM Roles Summarised	Frequency	Percent
Change manager	65	11.8%
1st/2nd/3rd Level support	59	10.7%
Service level manager	57	10.3%
Configuration manager	36	6.5%
Incident manager	33	6.0%
Problem manager	27	4.9%
Release manager	25	4.5%
IT service continuity manager	23	4.2%
Service catalogue manager	19	3.4%
Consultant	15	2.7%
Service owner	13	2.4%
Financial manager	12	2.2%
Overall ITSM manager	12	2.2%
Knowledge manager	11	2.0%
Project manager	10	1.8%
Capacity manager	9	1.6%
Availability manager	8	1.5%
Compliance manager v3	8	1.5%
Technical analyst/ architect	8	1.5%
Business/ other sponsor	7	1.3%
IT security manager	7	1.3%
Project / Program manager	7	1.3%
Service design manager	7	1.3%
Service portfolio manager	7	1.3%
Change owner v3	6	1.1%
Designer/architect/analyst	6	1.1%
IT architect v3	6	1.1%
Risk manager	6	1.1%
Others	16	7.6%
Total	**551**	**100.0%**

A detailed table with all the ITSM role responses elaborated is provided in Table C.3 in Appendix C. In this sub-section the characteristics of the sample were provided through descriptions of the distribution of responses of survey respondents. A profile of a typical survey respondent based on the majority of responses is: a corporate itSMFA member; with the role of ITIL process manager and up to two other ITIL roles.

4.4.2 Organisation characteristics

This section describes the distribution of organisation location, business sector, ownership, annual turnover and total number of staff. The respondents were drawn from all the states and territories of Australia. Victoria had the largest number of respondents (24%), closely followed by New South Wales (22%). The large number of responses from Victoria may be explained by the fact that it is the headquarters and largest branch of itSMF Australia (itSMF Australia 2011b). Queensland and Western Australia both had fifteen percent of the responses followed by Australian Capital Territory (8%), South Australia (8%), and Tasmania (4%). The Northern Territory (2%) had the smallest number of responses as shown in Figure 4.6. Four respondents (2%) did not provide the location of their organisation. The distribution of responses is proportional to itSMFA chapter branch size distribution. A table with detailed distribution by state/territory responses is provided in Table C.4 in Appendix C.

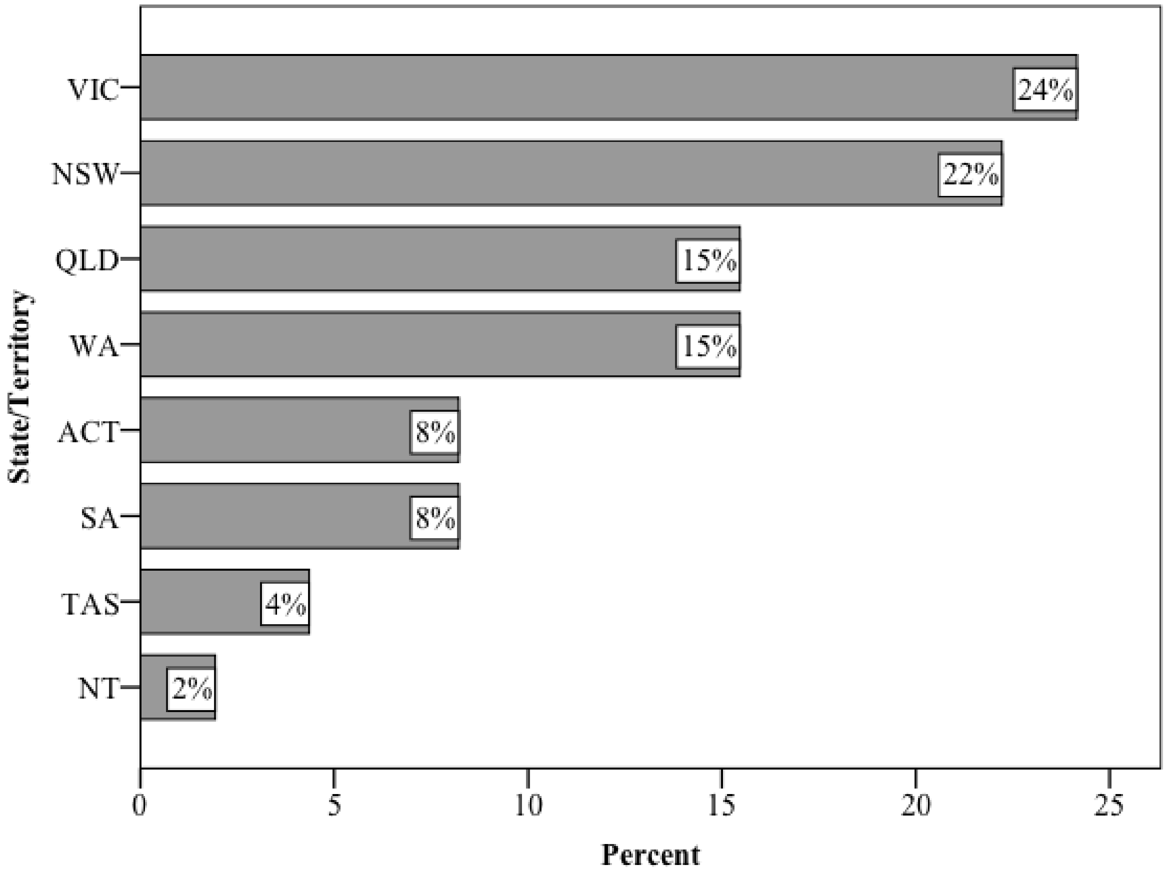

Figure 4.6 Proportion of respondents by location: State/Territory

The percentage distribution of responses by industry sector is shown in Figure 4.7. Property and business services including IT firms (27%) and government administration and defence (26%) had the largest number of respondents followed by education (15%), and finance and insurance (10%). Singular responses were reported from the mining (0.5%) and retail trade (0.5%) industry sectors. A detailed table on the distribution of industry sector responses is provided in Table C.5 in Appendix C.

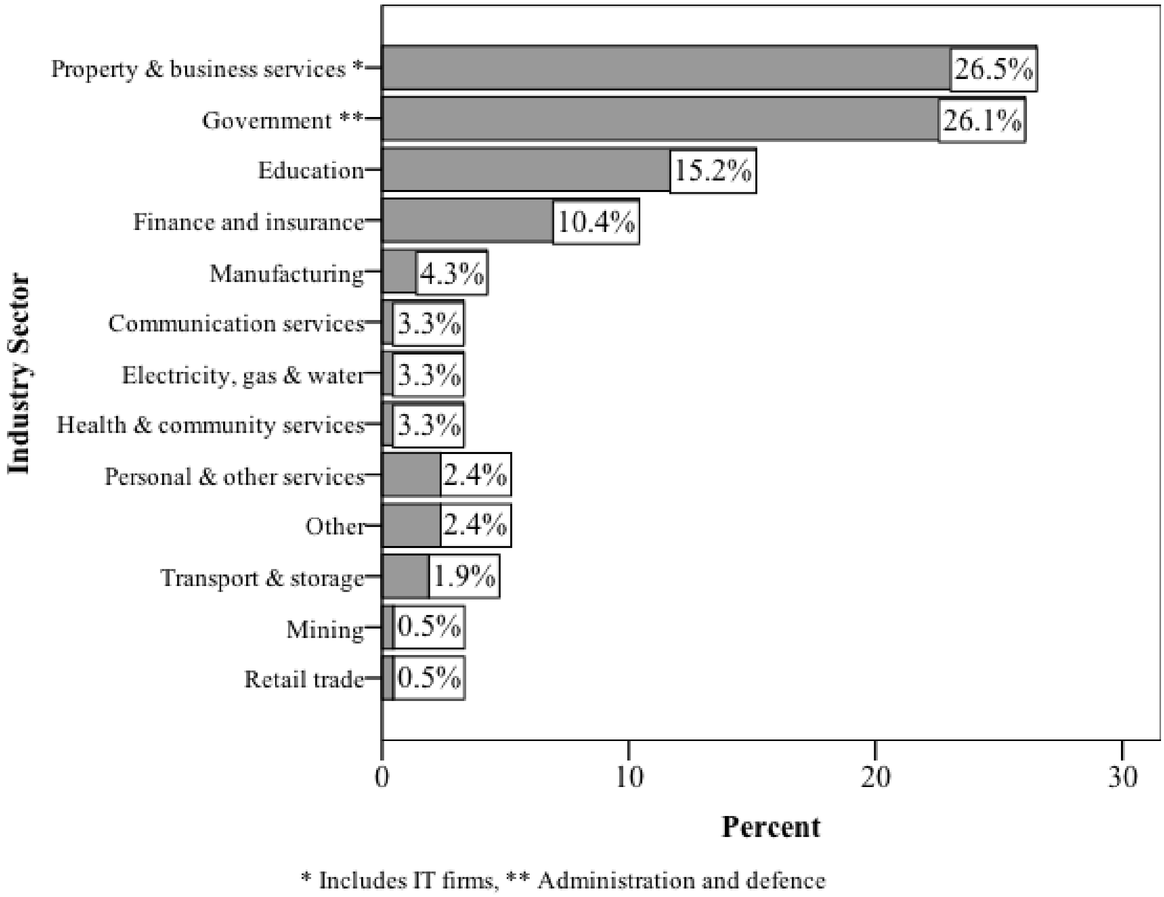

Figure 4.7 Proportion of respondents by industry sector

Seventy six percent of the responses were from Australian owned organisations: government (42%), wholly Australian owned public listed company (18%) and wholly Australian owned private company (16%). Less than a quarter of the organisations in the survey were wholly funded by foreign capital (8%) or were partly Australian owned public listed company (4%) and partly Australian owned private company (3%). Ten respondents (5%) did not know the ownership of their organisation. Two respondents (0.9%) did not respond to the question on ownership. The distribution of organisations by ownership is shown in Figure 4.8. A detailed table on the distribution of ownership is provided in Table C.6 in Appendix C.

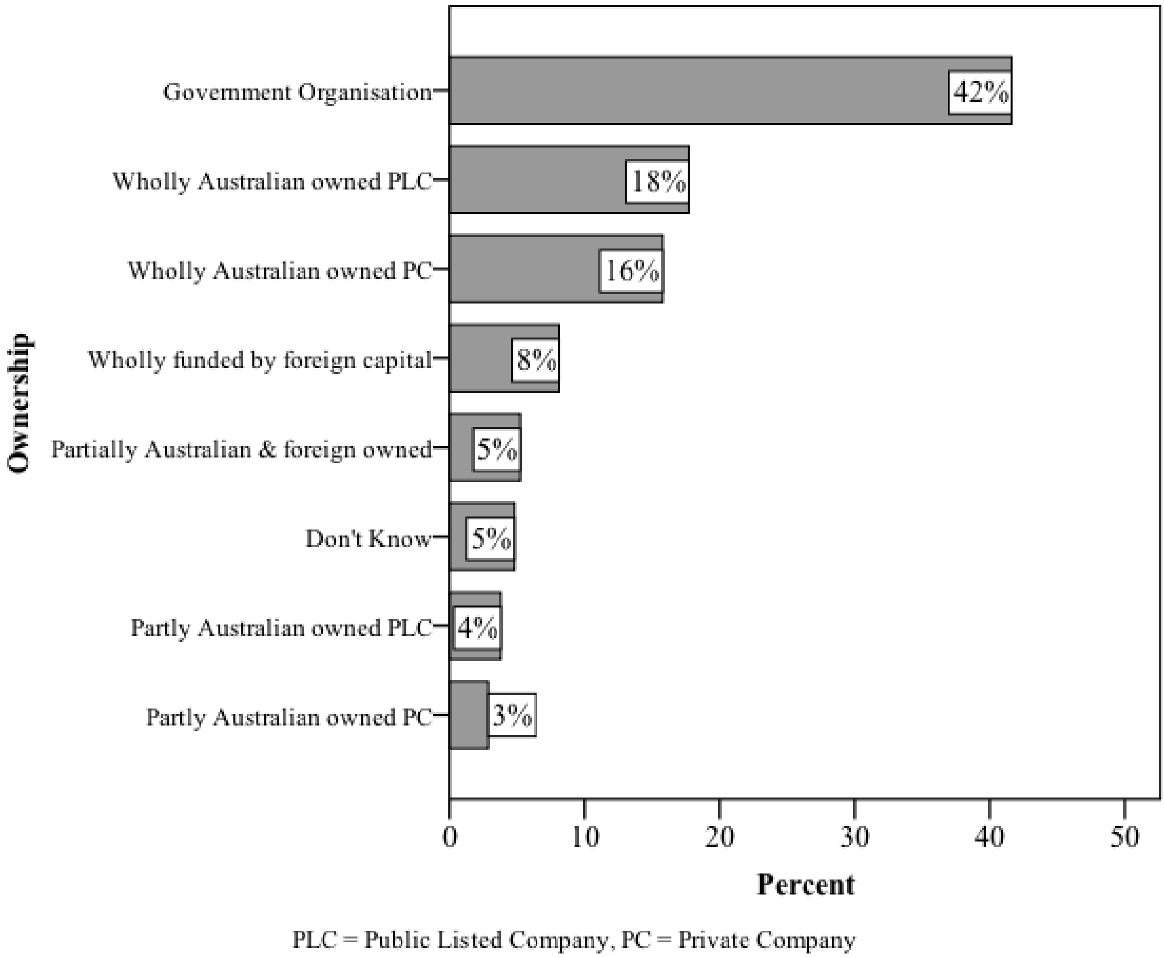

Figure 4.8 Proportion of respondents by ownership of organisation

The majority (52%) of respondents were from organisations with annual turnovers greater than $50 million. The largest proportion of respondents was from organisations with an annual turnover exceeding $150 million (39%). A relatively large number of respondents (31%) indicated they did not know the annual turnover of their organisation. The distribution of organisations by annual turnover is shown in Figure 4.9. A detailed table of the distribution of the annual turnover of organisations is shown in Table C.7 in Appendix C.

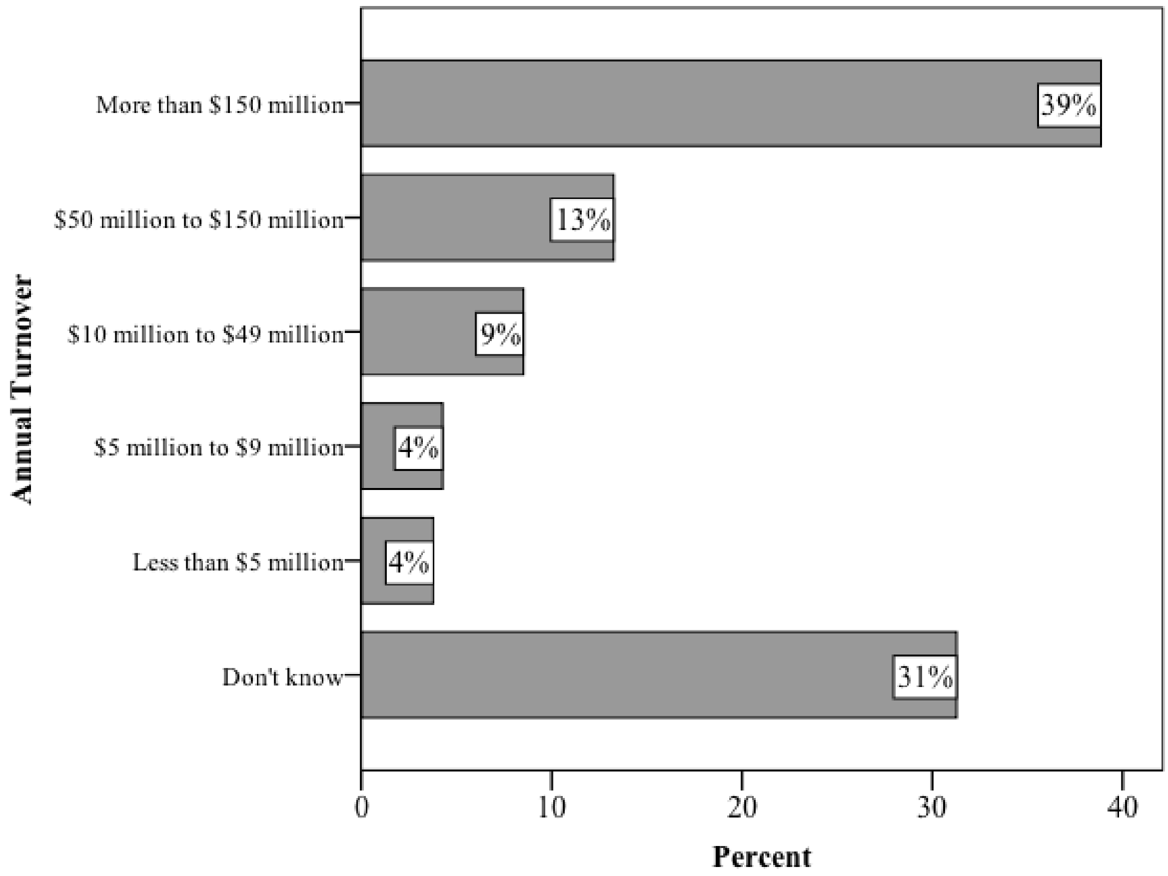

Figure 4.9 Proportion of respondents by annual turnover of organisation

The majority of responses (65%) were from organisations with more than 1,000 fulltime staff while 35 percent were from organisations with less 1,000 fulltime staff. The largest proportion of responses were from organisations with 200 to 999 fulltime staff (27%), and more than 10,000 fulltime staff (19%) and 2,000 to 4,999 fulltime staff (18%). The least number of responses (8%) were from organisations with less than 200 full time staff employed. The percentage distribution of responses on the organisations' total number of fulltime staff is shown in Figure 4.10. A detailed table of the distribution of the total number of staff is shown in Table C.8 in Appendix C.

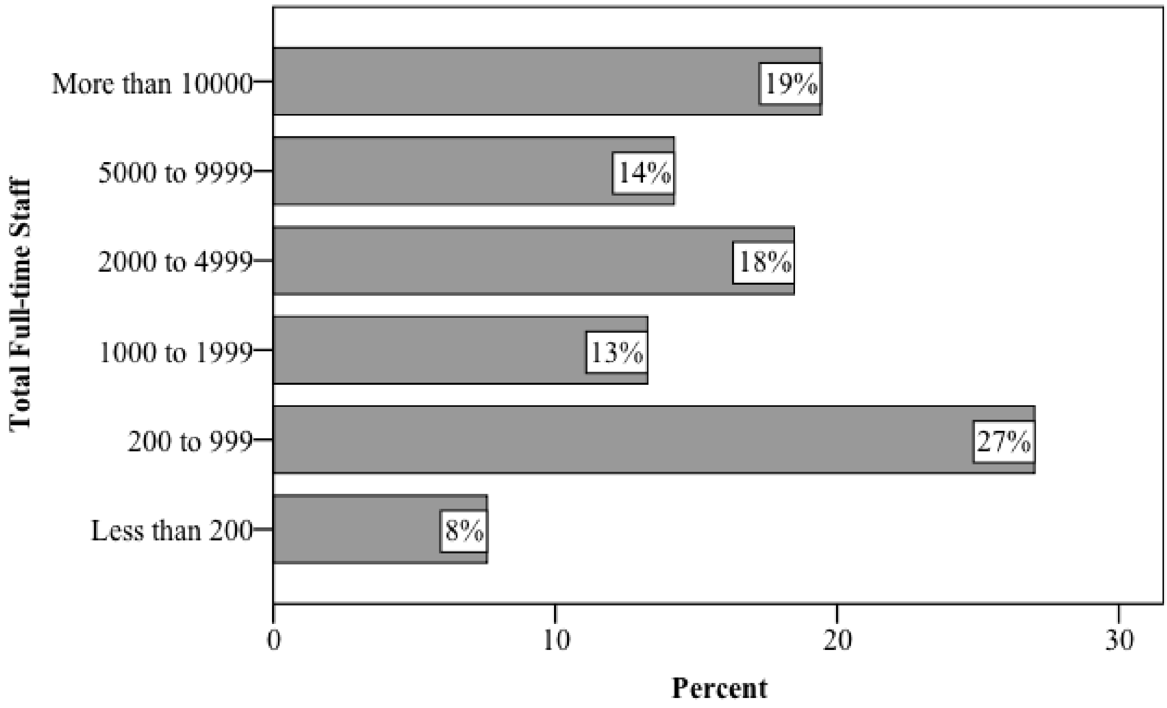

Figure 4.10 Proportion of respondents by total fulltime staff

In this sub-section the characteristics of the sample were provided through descriptions of the distribution of responses on organisation features. Based on the majority of responses provided, a profile of a typical organisation represented in the survey is one that is located in the largest (geographical area and by population) Australian state; in the property, business service, government, education or finance and insurance industry sectors; Australian owned, with annual turnover greater than $50 million and employing more than 1,000 fulltime staff.

4.4.3 ITSM frameworks adopted

The survey reported ITIL as the dominant ITSM framework used by 97 percent of respondents, as shown in Figure 4.11, with a majority (54%) selecting ITIL v2 over ITIL v3 (43%). Some of the other ITSM frameworks reported include Microsoft Operations Framework (MOF) (0.5%) and HP IT Service Management Reference Model (HPITSM) (2%). A small number of respondents indicated using customized ITSM based on leading frameworks (1%). ITIL v3, which was released in 2007, was in use for two years by the time of the survey, and almost at par with ITIL v2 implementations.

The vast majority of itSMFA members use ITIL as opposed to alterative ITSM frameworks. The frequency table of the ITSM framework response distribution is shown in Table C.9 in Appendix C.

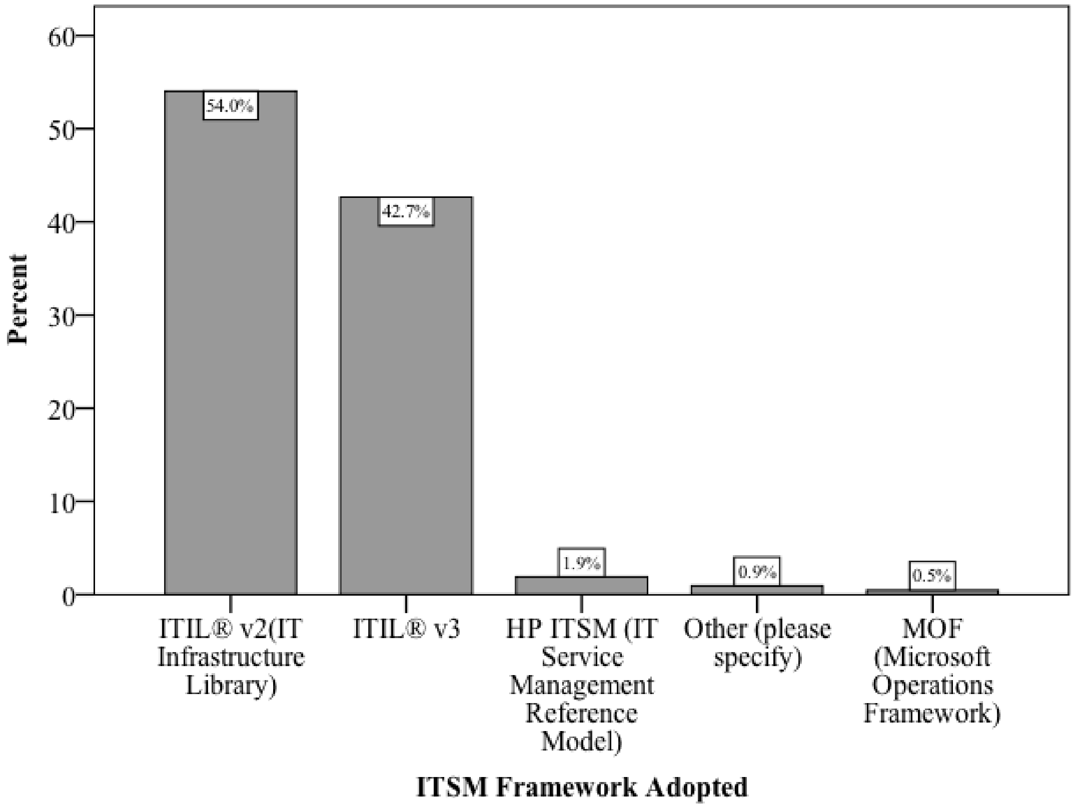

Figure 4.11 ITSM frameworks adopted/adapted in Australia

In terms of duration of using an ITSM framework, 72 percent had been using an ITSM framework for four years or less and 18 percent between five and ten years. Ten percent of the respondents did not know or indicate the duration of ITSM framework use. A small minority (3%) had been using an ITSM framework for at least 10 years. A distribution of the years of ITSM framework use is shown in Figure 4.12. The frequency table for the distribution of the duration of ITSM framework use is shown in Table C.10 in Appendix C.

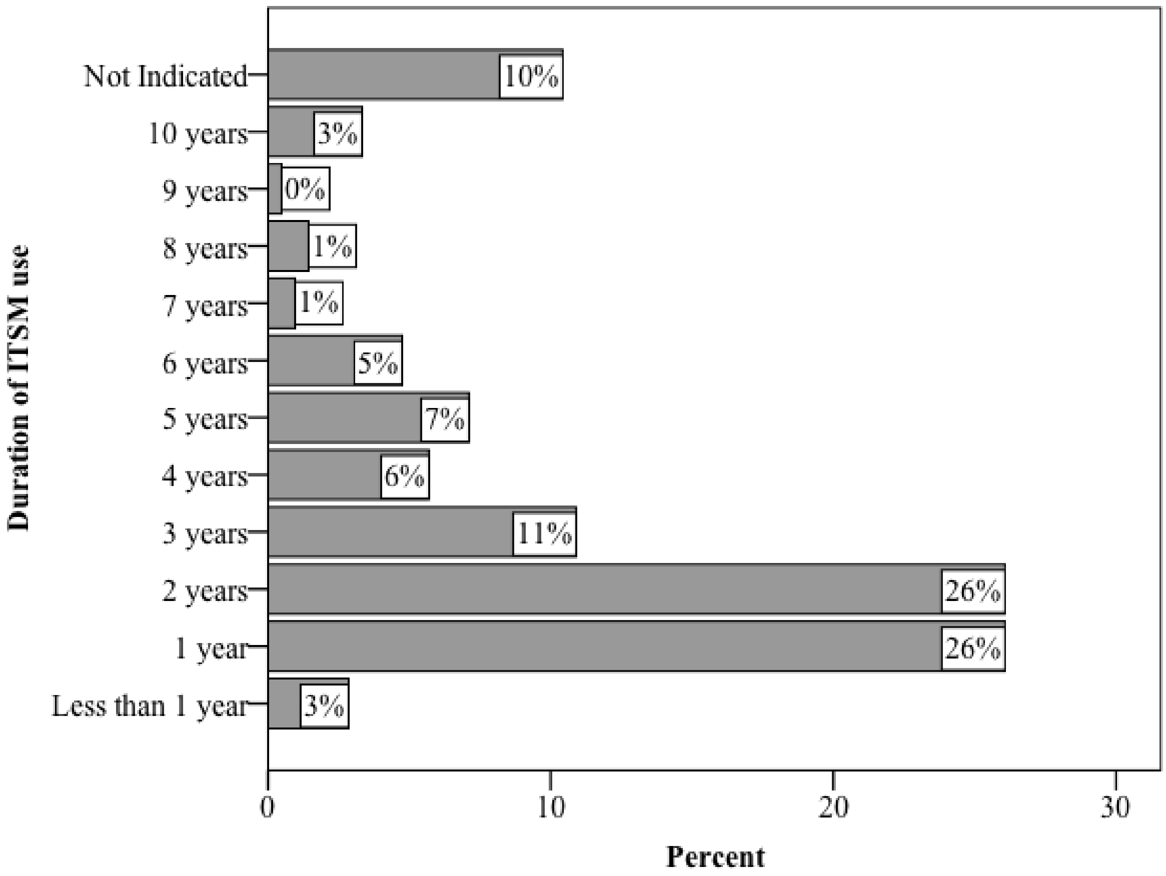

Figure 4.12 Duration of ITSM framework use

4.4.4 ITSM framework processes

The survey collected 1,415 responses on implemented ITSM framework processes. An initial analysis of all the implemented processes was performed. The distribution of the implemented ITSM framework processes is shown in Table 4.13.

Table 4.13 Distribution of ITSM processes implemented for each framework

ITSM Framework	**Number of processes**	**Percent**	**Cumulative Percent**
ITIL® v3	706	49.9%	49.9%
ITIL® v2 (IT Infrastructure Library)	645	45.6%	95.5%
HPITSM (IT Service Management Reference Model)	44	3.1%	98.6%
MOF (Microsoft Operations Framework)	16	1.1%	99.7%
Other (please specify)	4	0.3%	100.0%
Total	**1415**	**100.0**	

The pattern of implemented processes was similar to the ITSM framework implementation, with the majority implemented being ITIL processes (96%). Further analysis was performed on the ITIL process implementation. Table C.11 in Appendix C shows processes across the ITSM frameworks in use grouped together based on the similar ITSM framework processes; an extension of the mapping presented earlier in Chapter 3. For example ITIL v2, ITIL v3 and HPITSM include change, incident and problem management and many other processes. The distribution of implemented ITSM framework processes is presented in Table 4.14.

Table 4.14 Summary of implemented ITSM framework processes

Mapped ITSM Processes	**Number of respondents**	**Percent of total response**	**Proportion of survey respondents**	**Cumulative Percent**
Change management	190	13.4%	90	13.4%
Incident management	187	13.2%	89	26.6%
Problem management	143	10.1%	68	36.7%
Service level management	120	8.5%	57	45.2%
Configuration management	98	6.9%	46	52.2%
Service desk function	96	6.8%	45	58.9%
Release management	78	5.5%	37	64.5%
IT service continuity management	58	4.1%	27	68.6%
Capacity management	55	3.9%	26	72.4%
Availability management	52	3.7%	25	76.1%
Service catalogue management	42	3.0%	20	79.1%
Financial management	35	2.5%	17	81.6%
Request fulfilment	34	2.4%	16	84.0%
Event management	29	2.0%	14	86.0%
Access management	29	2.0%	14	88.1%
Information security management	26	1.8%	12	89.9%
Service knowledge management	23	1.6%	11	91.5%
Service portfolio management	22	1.6%	10	93.1%
Transition planning and support	21	1.5%	10	94.6%
Supplier management	16	1.1%	8	95.7%
Demand management	14	1.0%	7	96.7%
Service evaluation management	13	0.9%	6	97.6%
Validation and testing management	12	0.8%	6	98.4%
Partially implemented/starting	8	0.6%	4	99.0%
Operations management	3	0.2%	1	99.2%%
IT Strategy development	3	0.2%	1	99.4%
Consulting	3	0.2%	1	99.6%
Governance	2	0.1%	1	99.8%
Document management	1	0.1%	0	99.9%
Envision MOF	1	0.1%	0	99.9%
Team MOF	1	0.1%	0	100.0%
Total	**1415**	**100.0%**		

The most frequently implemented ITIL processes by number of respondents were change management (13%), incident management (13%), problem management (10%), service level management (9%), configuration management (7%) and the service desk function (7%). The top 12 most implemented processes accounted for 80 percent of the processes implemented. A few respondents indicated that they were starting or had partially implemented ITSM processes (0.8%), or were providing ITSM consulting services (0.2%). Presented as a proportion of the 211 survey respondents, change management (90%), incident management (89%), problem management (68%) and service level management (57%) had the highest number of responses, as shown in Table 4.14. An expanded frequency distribution table with all the ITSM processes implemented for each framework is provided in Table C.12 in Appendix C.

When asked to select the first three ITSM processes in sequence of implementation, 572 question-responses were provided from the 211 survey respondents. Incident management (102 question-responses) was the process most frequently implemented: (1st), change management was the process mostly frequently implemented (2nd and 3rd—67 and 61 question-responses respectively), followed by problem management (50 question-responses). The typical sequence of ITSM process implementation was incident management, followed by change management then problem management. A summary of the process implementation is shown in Table 4.15. A detailed record with implementation sequence of all the processes is shown in Table C.13 in Appendix C.

Table 4.15 Sequence of ITSM process implementation

ITSM process	**Sequence of Implementation**		
	1st	**2nd**	**3rd**
Incident management	102	59	11
Change management	25	67	61
Service desk function	52	6	5
Problem management	3	31	50
Service level management	6	6	15
Configuration management	6	8	13
Request fulfillment	0	6	7

The majority (80%) of organisations were implementing different frameworks alongside ITSM framework processes as part of the IT service management improvement initiatives. The number of related frameworks implemented ranged from one framework (32%), two frameworks (26%), three frameworks (10%), four frameworks (7%), five frameworks (4%), and six frameworks (1%)—as shown in Table 4.16.

Table 4.16 Number of implemented ITSM related frameworks

Number of ITSM related frameworks	**Frequency**	**Percent**
0	43	20%
1	67	32%
2	54	26%
3	22	10%
4	15	7%
5	8	4%
6	2	1%
Total	**211**	**100.0%**

The survey collected 353 responses on the question of specific frameworks implemented alongside ITSM. The frameworks most cited were PRINCE2® (IT project management framework) (46%); ISO 9000 (the International Standard for Quality Management Systems) (29%); ISO/IEC 20000 (the International ITSM standard) (29%), Six Sigma (19%), PMBOK (18%) and CobiT® (17%). The distribution of standards and frameworks concurrently used is depicted in Table 4.17. Other frameworks (9%) reported related to auditing, governance, health and safety, environmental management and security. ITIL, Prince 2 and ISO/IEC 20000 all have their early origins from the UK Office of Government Commerce (OGC). The vast majority of itSMFA members selected PRINCE2 for project management rather than PMBOK. The detailed distribution of related ITSM frameworks implemented is provided in Table C.14 in Appendix C.

Table 4.17 Related ITSM frameworks implemented

Related ITSM Frameworks Implemented	**Number of responses**	**Percentage of response on 211 survey respondents**
PRINCE2®	97	46%
ISO 9000	61	29%
ISO/IEC 20000	61	29%
Six Sigma	40	19%
PMBOK	37	18%
CobiT®	35	17%
Other	18	9%
Not Sure	4	2%
Total	**353**	

The respondents reported a wide cross-section of organisation positions with more than half holding managerial roles. The respondents were drawn from an even spread of organisation sizes. Organisations in both the public and private sectors in Australia were represented, with close to half being public sector organisations. A range of organisation sizes was represented, with the majority having an annual turnover of more than $150 million and employing more than 2,000 full time staff.

A summary of the survey sample characteristics is provided in section 4.8

4.5 RQ1. What types of benefits are reported from ITSM improvement initiatives by organisations?

The results of the quantitative analysis presented in sections 4.5 to 4.8 begin with the presentation of descriptive statistics, followed by an outline of the differences between data and an exploration of relationships within the data, and ending in the hypotheses tests. The qualitative analysis results are then presented, concluding with answers to the research questions. Section 4.5 answers RQ1, section 4.6 answers RQ2, and section 4.7 answers RQ3.

Section C of the questionnaire addressed *RQ1. What types of benefits are reported from ITSM improvement initiatives by organisations?* In this section the survey results on the type of benefits reported from ITSM improvement initiatives are presented. The survey sought to identify the benefits at the ITSM process level and at the organisational level. In section 4.5.3 the rational for categorisation of types of process level benefits and the ITSM process benefits are presented. Section 4.5.3 presents the ITSM organisational level benefits alongside BSC based perspectives; and section 4.5.4 reports on ITSM benefits.

Previous studies identified in the literature provide ITSM benefits identified by measuring the perception of ITSM benefits using surveys (e.g. Marrone and Kolbe (2010) Conger et al. (2008) or case study interviews (e.g. Cater-Steel et al. (2006b); Tan et al. (2010) . Previous research has not examined the correlation of reported ITSM benefits with reported ITSM metrics. This study extends the understanding of ITSM benefits by inspecting the correlation between ITSM implementation and benefits (H1), ITSM implementation and metrics (H2), ITSM benefits and metrics (H3), performance measurement frameworks and ITSM metrics (H4), and performance measurement frameworks and ITSM implementation. The basis for inspecting the correlation is the definition of a measurable benefit offered by Ward and Daniel (2006) as 'one where either measures exist or can be put in place that will enable the improvement in performance to be determined after the event'.

4.5.1 Correlation between ITSM process implementation and benefits

To examine the relationship between ITSM process implementation and benefits, a presentation of the descriptive statistics on the ITSM process implementation and ITSM benefit responses is provided, followed by results of the statistical tests of association.

A check for a correlation between the ITSM process implementation and ITSM process benefit responses was conducted using a scatterplot, as shown in Figure 4.13. The scatterplot shows that the majority of respondents had implemented less than ten ITSM processes and provided less than eight ITSM benefit responses. There are no prominent outliers observed as most points are close to each other. There appears to be a trend in the data where a greater number of implemented ITSM processes are associated with a greater number of ITSM benefit responses.

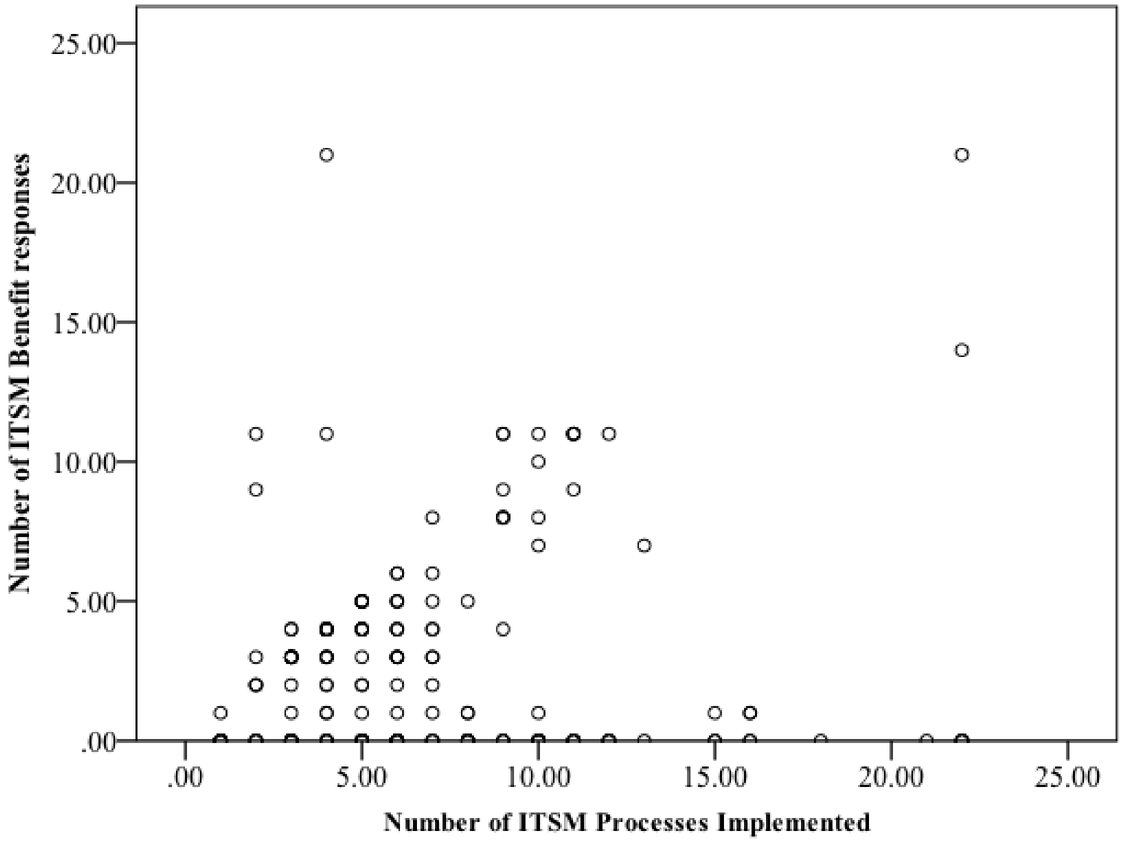

Figure 4.13 Scatterplot of the relationships between ITSM process implementation and benefit responses

Survey respondents from organisations implementing four ITSM processes had the highest number (23) of ITSM process benefit respondents. The number of respondents to the question on ITSM process benefits increased with the number of implemented processes—with the trend peaking at four implemented processes. The upward trend was followed by a downward trend where a decline was observed in respondents from organisations implementing between five and eight ITSM processes, as shown in Figure 4.14.

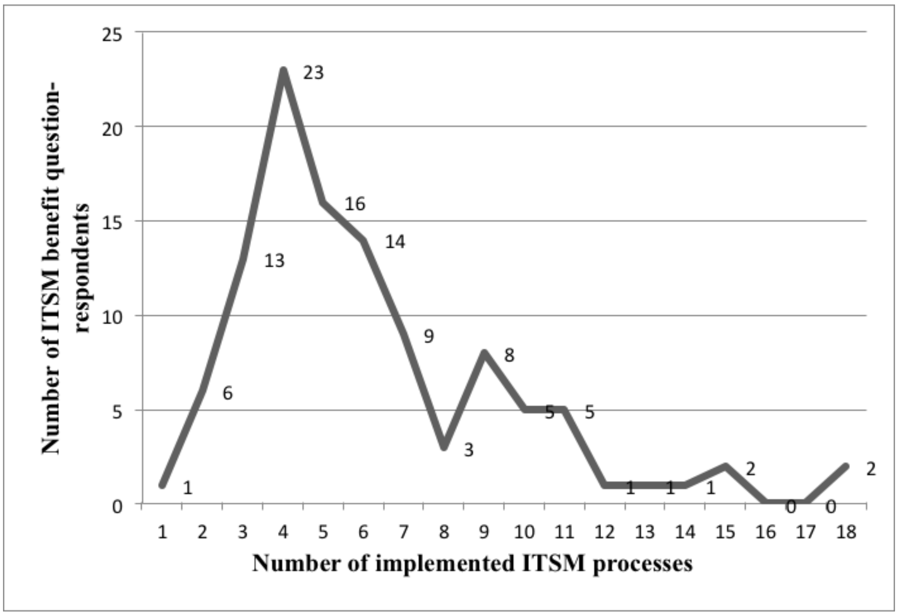

Figure 4.14 ITSM benefit response survey respondent trends along implemented ITSM processes

The highest number of survey respondents (27) to the question on ITSM process benefits provided responses for four implemented ITSM processes. The upward trend of number of survey respondents matching an increase in process benefit responses peaked at four processes; and reversed to a downward trend that plateaued at an average of five respondents with six or more ITSM process responses. This is trend is depicted in Figure 4.15.

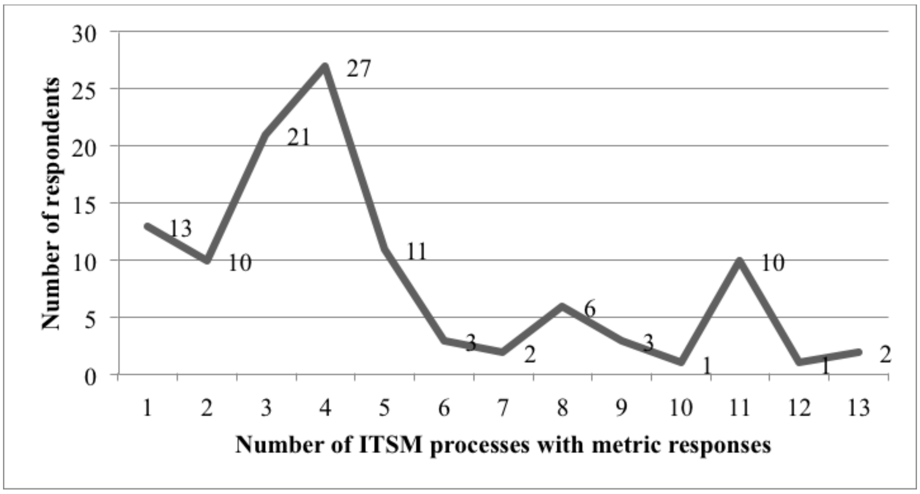

Figure 4.15 ITSM metric response survey respondent trends along ITSM process metric responses

To further explore the observations on the scatterplot, Spearman's correlation is used to quantify the correlation between the total number of ITSM processes implemented and the number of ITSM process benefit responses. The Spearman correlation is performed to test the hypothesis: *H1. There is a correlation between the number of implemented ITSM processes and the number of ITSM process benefit responses.* The Spearman correlation test is deemed appropriate as the data is non-parametric and the two variables are measured on an interval scale, and the two variables appear to have a monotonic relationship (Field 2009). The cross tabulation of the number of ITSM processes implemented and the number of ITSM benefit responses is shown in Table C.15 in Appendix C. A Spearman's Rank Order correlation was conducted to determine the correlation between ITSM process implementation and ITSM benefits. The correlation between number of implemented ITSM processes and the number of ITSM benefit responses is not statistically significant (r_s (209) = 0.039, p= 0.575). The test result is shown in Table C.16 in Appendix C.

4.5.2 Organisation level ITSM benefits

The questions on the key benefits from the overall ITSM implementation offered a list of choices organised into five sections taken from the OGC (2002b, 2007a) classification of service management benefits similar to the four BSC perspectives, as shown in Table 4.18.

Table 4.18 ITSM benefits along BSC based perspectives

<table>
<tr><th colspan="2">BSC based perspective</th><th>Number of question responses</th></tr>
<tr><td colspan="2">Business</td><td>119</td></tr>
<tr><td colspan="2">Financial</td><td>114</td></tr>
<tr><td rowspan="2">Internal business</td><td>Employee</td><td>95</td></tr>
<tr><td>Internal Improvement</td><td>93</td></tr>
<tr><td colspan="2">Innovation</td><td>95</td></tr>
<tr><td colspan="2">Total</td><td>516</td></tr>
</table>

The survey questions on the key benefits from the overall ITSM implementation included a list of choices organised into five sections taken from the OGC classification of service management benefits (2007) similar to the four BSC perspectives. The key benefits were further analysed along the four perspectives of the BSC: finance, customer, internal business, and innovation and learning. The BSC approach recognises the limitations of purely financial measurement and each of the four perspectives has goals and measures. The study applies the BSC structure to identify goals, measures and reported benefits to facilitate the linking of organisational strategic goals to the ITSM process performance measures and benefits as advised in Kaplan and Norton (2005). Along the business perspective 119 question-responses were received, with the most frequent business benefit from ITSM being improved quality of business operations (34%), followed by better working relationships between the customers and IT (17%) and more reliable business support (15%). The distribution of responses on ITSM business benefits along the business perspective is shown in Figure 4.16.

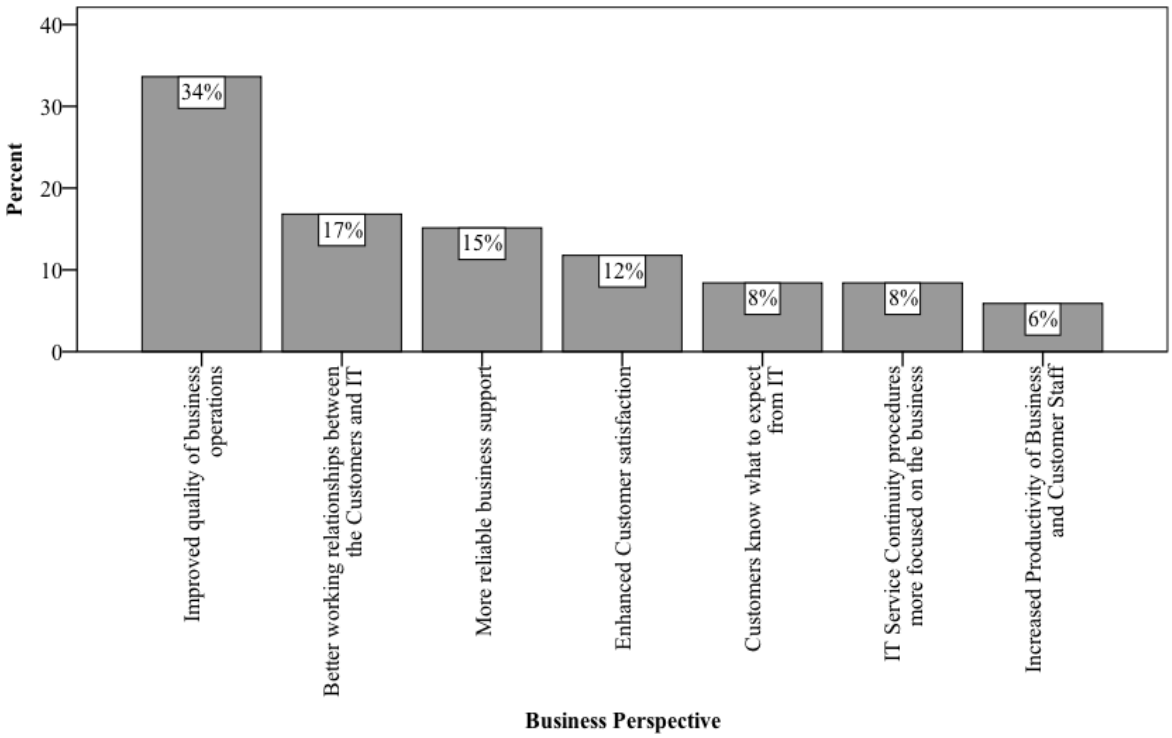

Figure 4.16 ITSM business benefits along the business perspective

Along the financial perspective, 114 responses on ITSM business benefits were returned. Cost justified IT infrastructure and IT services (34%), savings on costs of errors (19%) and reduced cost of implementing change (19%) were the most frequently selected financial perspective options, as shown in Figure 4.17.

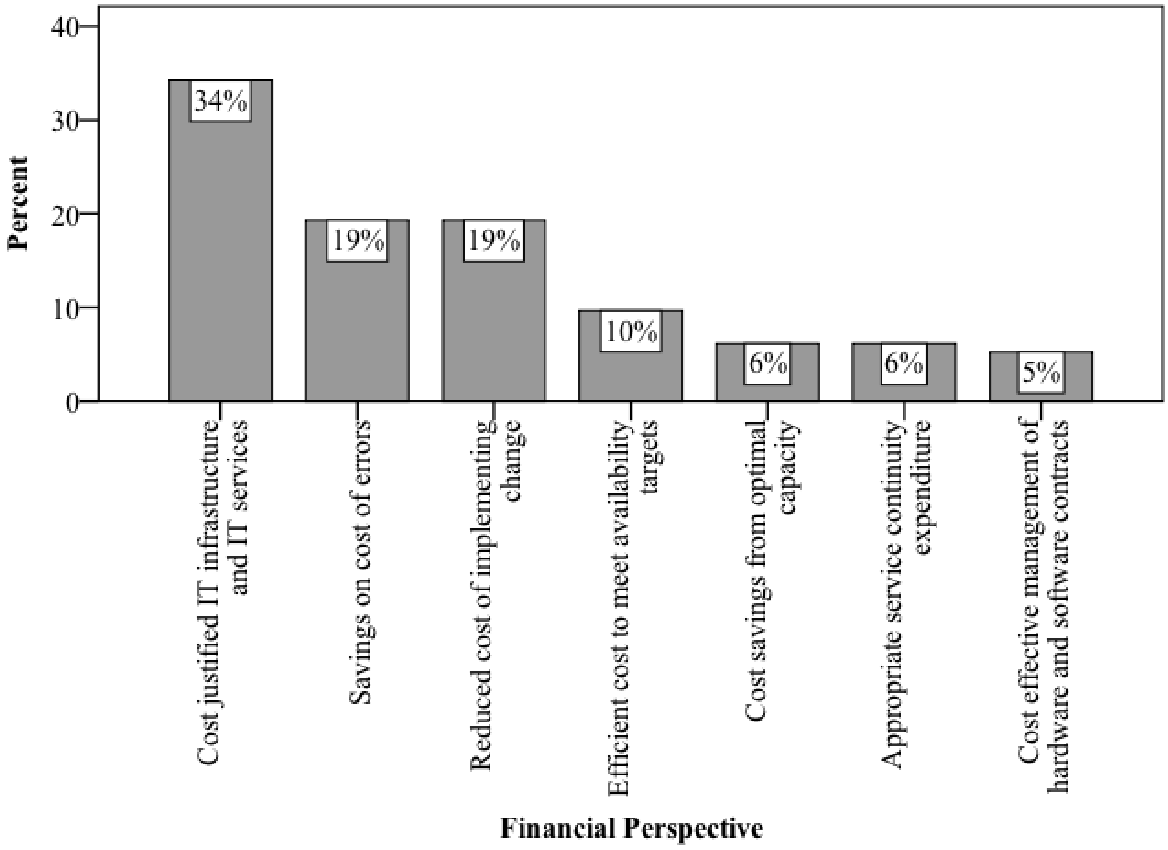

Figure 4.17 ITSM business benefits along the financial perspective

The survey received 95 question-responses on ITSM business perspectives along the employee perspective. The most frequently selected options were improved visibility and reputation of the IT department (44%), IT staff have clear expectations (31%), and increased productivity of IT staff (21%). The results are shown in Figure 4.18.

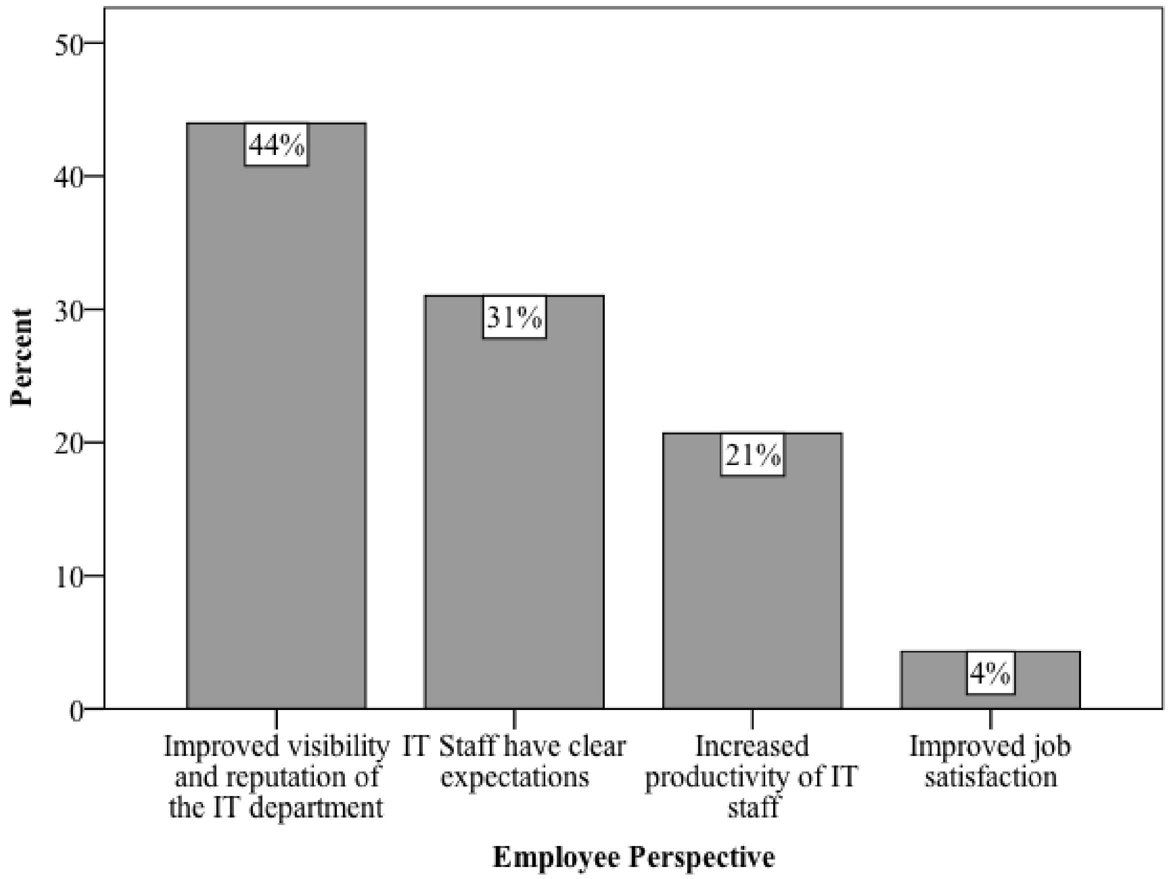

Figure 4.18 ITSM business benefits along the employee perspective

A total of 95 question-responses on ITSM business benefits along the innovation perspective were received. The most frequently selected options were delivery of IT services that underpin business processes (37%) and better information on current services (34%), as shown in Figure 4.19.

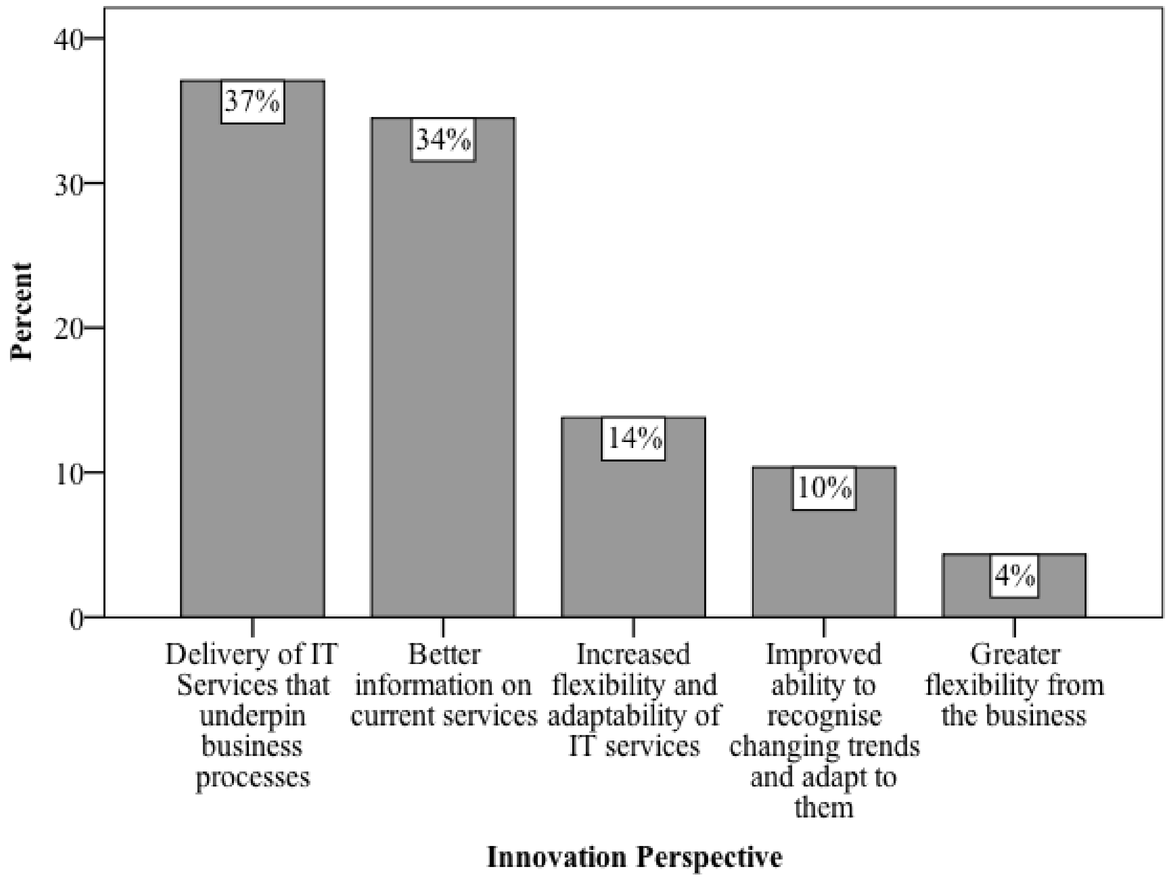

Figure 4.19 ITSM business benefits along the innovation perspective

A total of 93 question-responses on ITSM business benefits along the internal improvement perspective were received. The most frequently cited options were improved communications and inter-team working (21%), process maturity benefits (19%), improved metrics and management reporting (17%) and better information on current services (15%), as shown in Figure 4.20.

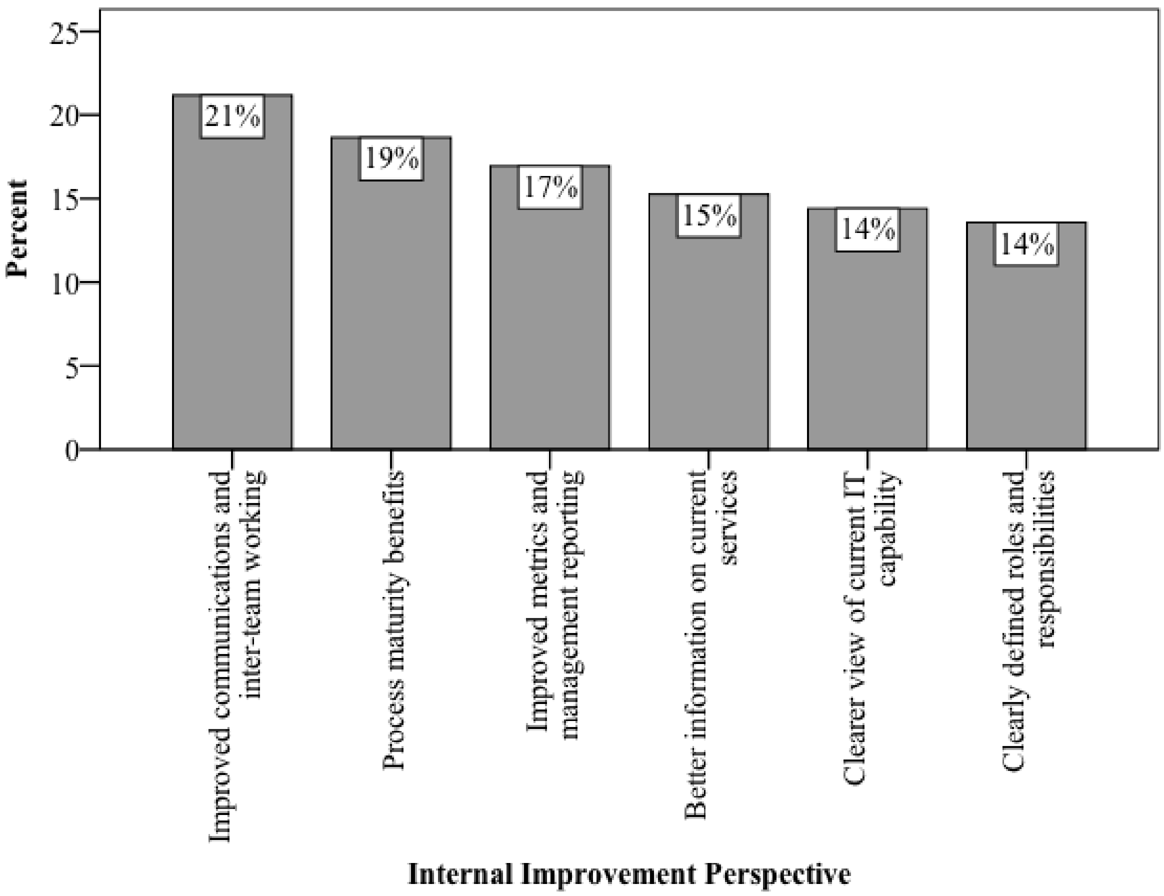

Figure 4.20 ITSM business benefits along the internal improvement perspective

The OGC (2009) classification of benefits was provided along ITSM service cycles and processes and not along the BSC perspectives. To provide a basis of comparison with this study's organisational level ITSM benefit findings the OGC (2009) ITSM lifecycle benefits were classified along the BSC perspectives as shown in Table 4.19.

Table 4.19 Comparison of organisational level ITSM benefits along BSC perspectives: industry

BSC based perspective	**Number of benefit responses in the study**		**ITSM service cycle benefits along the BSC perspectives**	
	Count	**Percent**	**Count**	**Percent**
Internal business (employee and internal improvement)	188	36%	11	58%
Customer	119	23%	5	26%
Financial	114	22%	2	10%
Innovation and learning	95	18%	1	5%
Total	516	100%	19	100%

A comparison of the classification of the ITSM lifecycle benefits along the BSC perspectives shows a similarity in emphasis of internal business operation benefits between the study and the OGC (2009) organisational level benefits.

A comparison provided in Table 4.20 of the study findings with the previous empirical literature on ITSM benefits at the organisational level shows a similar focus on internal business operations, followed by a customer focus then financial and, finally, a learning and innovation focus.

Table 4.20 Comparison of organisational level ITSM benefits along BSC perspectives: empirical studies

BSC based perspective	**Number of benefit responses in the study**		**Empirical studies ITSM benefits along the BSC perspectives**		
	Count	**Percent**	**Count**	**Percent**	**Author(s)**
Internal business (employee and internal improvement)	188	36%	6		Cater-Steel and Tan (2005); Cater-Steel et al. (2007); (2008, 2009a)
			1		Potgieter et al. (2005)
			3		Hochstein et al. (2005c)
			2		Koch and Gierschner (2007)
			2		Cater-Steel and McBride (2007)
			1		Spremic et al. (2008)
			1		Tan et al. (2010)
			16	53%	Total
Customer	119	23%	1		Potgieter et al. (2005)
			2		Hochstein et al. (2005c)
			1		Šimková and Basl (2006)
			2		Koch and Gierschner (2007)
			2		Cater-Steel and McBride (2007)
			2		Spremic et al. (2008)
			1		Chan et al. (2008)
			1		Tan et al. (2010)
			11	37%	Total
Financial	114	22%	1		Koch and Gierschner (2007)
			1		Chan et al. (2008)
			2	7%	Total
Innovation and learning	95	18%	1	1%	Spremic et al. (2008)
Total	**516**	**100%**	**30**	**100%**	**Total**

A comparison of the theoretical study findings on ITSM benefits along the BSC perspectives at the organisational level shows the highest proportion of benefits provided along the customer perspective, closely followed by benefits along the internal operations perspective and then along the financial perspective and learning and innovation perspective.

Table 4.21 Comparison of organisational level ITSM benefits along BSC perspectives: theoretical studies

BSC based perspective	Number of benefit responses in the study		Theoretical studies ITSM benefits along the BSC perspectives		
	Count	Percent	Count	Percent	Author(s)
Internal business (employee and internal improvement)	188	36%	2		Wagner (2006)
			2		Barafort et al. (2005)
			3		Donko and Traljic (2006)
			1		Donko and Traljic (2009)
			8	33%	Total
Customer	119	23%	4		Wagner (2006)
			1		Yixin and Bhattacharya (2008)
			2		Praeg and Schnabel (2006)
			2		McNaughton et al. (2010)
			1		Donko and Traljic (2009)
			10	42%	Total
Financial	114	22%	2		Yixin and Bhattacharya (2008)
			1		Moura et al. (2006b)
			1		Donko and Traljic (2009)
			1		McNaughton et al. (2010)
			5	21%	Total
Innovation and learning	95	18%	1	4%	Donko and Traljic (2009)
Total	**516**	**100%**	**24**	**100%**	**Total**

4.5.3 Process level ITSM benefits

The survey received ITSM process benefit responses from 101 respondents (48%) from 211 survey respondents. The 101 survey respondents articulated ITSM process benefits with a total of 644 question-responses on ITSM process benefits recorded. There were a variety of question-responses, with some more detailed than others in listing benefits realised from the ITSM implementations. The respondents were provided an open-ended space to provide a response and, in some instances, multiple benefits were provided for a process. The responses were collected and separated into a benefit associated with a process, resulting in a count of 644 benefit question-responses. The study faced a challenge in classifying the ITSM process benefits provided in order to determine the unique benefits, as a definitive list or taxonomy of ITSM benefits does not exist. The previous literature reviewed on ITSM process benefits presented in Section 2.5.4.4 in Chapter 2 highlights a lack of a definitive categorisation of ITSM benefits. For practical purposes it was decided to apply the widely-accepted constituents of service found in OGC (2007b) as a basis to group and analyse the benefit responses. The service components and ITSM process benefits categories listed in Table 4.10 form the basis of tables summarising the results of the survey. A categorised list of all the responses on ITSM process benefits is presented in summary in

Table 4.22 and the distribution detailed in Table C.17 in Appendix C. The majority of ITSM process benefit question-responses categorised along service constituents were processes (240), followed by products (167), resources (121), and people (116).

Table 4.22 ITSM process benefits by service constituents

Service constituent	**ITSM process benefit**	**Total**
Process (240)	Process improvement	240
Product (167)	Service improvement	73
	System improvement	42
	System availability	33
	Value to the business	16
	Knowledge acquisition	3
Resources (121)	Cost management	32
	Control	30
	Resource management	30
	Risk management	19
	Compliance	9
	Governance	1
People (116)	Customer service	53
	Customer satisfaction	50
	Customer needs identification	13
	Total	**644**

The distribution of the benefit responses were analysed along the organisations' characteristics. The tabulation of ITSM process benefit responses by industry sector showed that the majority of question-responses were from the property and business services (216 question-responses), education (122 question-responses), government administration and defence (94 question-responses) finance and insurance (52 question-responses), and communication services (47 question-responses). The distribution of ITSM benefit responses by industry sector is shown in Table 4.23.

Table 4.23 Count of ITSM process benefit responses by industry sector

ITSM process benefit category	**Property and business services (includes IT firms)**	**Education**	**Government administration and defence**	**Finance and insurance**	**Communication services**	**Manufacturing**	**Transport and storage**	**Health and community services**	**Personal and other services**	**Electricity, gas and water**	**Retail trade**	**Other**	**Total**
Process improvement	60	43	46	25	17	11	13	10	4	5	2	4	240
Service improvement	36	14	6	1	2	1	4	2	3	2	0	2	73
Customer service	7	10	19	2	5	1	2	4	3	0	0	0	53
Customer satisfaction	21	15	1	4	3	3	0	0	0	0	0	3	50
System improvement	7	13	3	8	0	3	3	1	1	1	0	2	42
System availability	18	3	2	4	1	0	2	0	2	0	0	1	33
Cost management	19	1	4	1	6	0	1	0	0	0	0	0	32
Control	10	2	4	3	6	2	0	0	1	0	0	2	30
Resource management	14	7	2	2	2	1	0	1	0	0	1	0	30
Risk management	6	7	4	0	0	2	0	0	0	0	0	0	19
Value to the business	10	3	1	0	1	0	0	0	0	0	1	0	16
Customer needs identification	6	3	1	0	2	0	0	0	1	0	0	0	13
Compliance	1	1	1	2	1	2	0	0	1	0	0	0	9
Knowledge acquisition	1	0	0	0	1	0	0	1	0	0	0	0	3
Governance	0	0	0	0	0	1	0	0	0	0	0	0	1
Total	**216**	**122**	**94**	**52**	**47**	**27**	**25**	**19**	**16**	**8**	**4**	**14**	**644**
Percentage of total responses	**34%**	**19%**	**15%**	**8%**	**7%**	**4%**	**4%**	**3%**	**2%**	**1%**	**1%**	**2%**	**100%**
Survey Respondents	**27%**	**15%**	**26%**	**10%**	**3%**	**4%**	**2%**	**3%**	**3%**	**2%**	**0%**	**2%**	**211**

The majority of ITSM process benefit question-responses by ownership were provided by government organisations (226 question-responses), wholly Australian owned public listed company (118 question-responses), and wholly Australian owned private company (90 question-responses). The distribution of ITSM process benefit responses by ownership is provided in Table 4.24.

Table 4.24 Count of ITSM process benefit responses by ownership

ITSM process benefit category	**Government Organisation**	**Wholly Australian owned Public Listed Company**	**Wholly Australian owned Private Company**	**Partially Australian and foreign owned**	**Partly Australian owned Public Listed Company**	**Wholly funded by foreign capital**	**Partly Australian owned Private Company**	**Don't Know**	**Not Indicated**	**Total**
Process improvement	93	55	28	8	11	20	13	10	2	240
Service improvement	21	15	14	15	4	2	1	1	0	73
Customer service	32	3	8	3	2	3	1	1	0	53
Customer satisfaction	16	4	5	12	5	3	2	3	0	50
System improvement	18	9	8	0	0	2	4	1	0	42
System availability	7	3	6	6	6	3	2	0	0	33
Cost management	6	4	2	5	11	3	1	0	0	32
Control	6	7	8	0	2	0	3	4	0	30
Resource management	8	7	4	0	5	4	0	2	0	30
Risk management	9	2	4	1	1	0	0	2	0	19
Value to the business	4	2	0	9	1	0	0	0	0	16
Customer needs identification	4	5	1	1	0	1	1	0	0	13
Compliance	2	2	2	0	3	0	0	0	0	9
Knowledge acquisition	0	0	0	1	1	1	0	0	0	3
Governance	0	0	0	0	1	0	0	0	0	1
Total	**226**	**118**	**90**	**61**	**53**	**42**	**28**	**24**	**2**	**644**
Percentage of total responses	**35%**	**18%**	**14%**	**9%**	**8%**	**7%**	**4%**	**4%**	**0%**	**100%**
Survey Respondents	**41%**	**18%**	**16%**	**5%**	**4%**	**8%**	**3%**	**5%**	**1%**	**211**

The majority of ITSM process benefit responses by annual turnover were from organisations with annual turnover of more than $150 million (290 question-responses), followed by those who did not know their organisation's annual turnover (154 question-responses) and 92 question-responses were from organisations with an annual turnover between $50 million and $150 million. The distribution of the ITSM process benefit responses by total annual turnover is shown in Table 4.25.

Table 4.25 Count of ITSM process benefit responses by annual turnover

ITSM process benefit category	**More than $150 million**	**$50 million to $150 million**	**$10 million to $49 million**	**$5 million to $9 million**	**Less than $5 million**	**Don't know**	**Total**
Process improvement	97	39	23	6	13	62	240
Service improvement	37	12	9	3	1	11	73
Customer service	15	7	10	2	3	16	53
Customer satisfaction	27	9	2	0	1	11	50
System improvement	14	3	5	2	0	18	42
System availability	21	0	4	2	2	4	33
Cost management	23	1	3	1	1	3	32
Control	11	5	1	1	3	9	30
Resource management	14	3	1	1	2	9	30
Risk management	7	5	0	2	2	3	19
Value to the business	12	2	0	0	0	2	16
Customer needs identification	6	2	0	0	0	5	13
Compliance	4	3	0	0	1	1	9
Knowledge acquisition	2	0	0	1	0	0	3
Governance	0	1	0	0	0	0	1
Total	**290**	**92**	**58**	**21**	**29**	**154**	**644**
Percentage of total responses	**45%**	**14%**	**9%**	**3%**	**5%**	**24%**	**100%**
Survey Respondents	**39%**	**13%**	**9%**	**4%**	**4%**	**31%**	**211**

The highest number of ITSM process benefit question-responses were from organisations with more than 10,000 full time staff (178 question-responses), followed by 200 to 999 fulltime staff (156 question-responses) and 2,000 to 4,999 fulltime staff (133 question-responses). The distribution of ITSM process benefit responses by total staff is shown in Table 4.26.

Table 4.26 Count of ITSM process benefit responses by total staff

ITSM process benefit category	More than 10,000 full time staff	5,000 to 9,999 full time staff	2,000 to 4,999 full time staff	1,000 to 1,999 full time staff	200 to 999 full time staff	Less than 200 full time staff or equivalent	Total
Process improvement	49	27	57	27	73	7	240
Service improvement	25	9	14	4	11	10	73
Customer service	9	5	10	5	17	7	53
Customer satisfaction	18	6	14	3	8	1	50
System improvement	15	5	6	4	10	2	42
System availability	10	10	3	0	5	5	33
Cost management	13	11	2	1	3	2	32
Control	8	1	4	3	11	3	30
Resource management	9	5	3	4	7	2	30
Risk management	3	0	8	1	3	4	19
Value to the business	11	0	4	0	1	0	16
Customer needs identification	3	1	4	0	5	0	13
Compliance	3	1	3	0	1	1	9
Knowledge acquisition	2	0	0	0	1	0	3
Governance	0	0	1	0	0	0	1
Total	**178**	**81**	**133**	**52**	**156**	**44**	**644**
Percentage of total responses	**28%**	**13%**	**21%**	**8%**	**24%**	**7%**	**100%**
Survey Respondents	**19%**	**14%**	**18%**	**13%**	**27%**	**8%**	**211**

The majority of ITSM process benefit responses by duration of ITSM implementation were from organisations that had been implementing an ITSM framework for two years (162 question-responses), one year (138 question-responses) and 3 years (66 question-responses), as shown in Table 4.27.

Table 4.27 Count of ITSM process responses by duration of ITSM implementation

ITSM process benefit	**2 years**	**1 year**	**3 years**	**4 years**	**5 years**	**10 years**	**6 years**	**7 years**	**9 years**	**8 years**	**Less than 1 year**	**Not Indicated**	**Total**
Governance	1	0	0	0	0	0	0	0	0	0	0	0	1
Knowledge acquisition	1	2	0	0	0	0	0	0	0	0	0	0	3
Compliance	8	1	0	0	0	0	0	0	0	0	0	0	9
Customer needs identification	1	3	2	2	2	1	0	0	0	1	0	1	13
Value to the business	4	10	0	0	2	0	0	0	0	0	0	0	16
Risk management	8	6	2	1	1	0	0	0	0	0	1	0	19
Control	12	4	2	5	1	3	1	0	0	1	0	1	30
Resource management	5	10	3	3	6	1	0	0	0	0	0	2	30
Cost management	4	9	3	5	7	0	1	0	0	3	0	0	32
System availability	2	7	2	5	8	2	1	0	0	0	0	6	33
System improvement	6	7	17	2	2	0	3	0	3	0	1	1	42
Customer satisfaction	17	5	2	2	6	1	2	11	1	0	1	2	50
Customer service	18	18	6	1	4	3	2	0	1	0	0	0	53
Service improvement	8	17	7	8	8	0	5	11	1	0	0	8	73
Process improvement	67	39	28	37	19	20	12	0	2	2	0	14	240
Total	**162**	**138**	**74**	**71**	**66**	**31**	**27**	**22**	**8**	**7**	**3**	**35**	**644**
Percentage of total responses	**25%**	**21%**	**11%**	**11%**	**10%**	**5%**	**4%**	**3%**	**1%**	**1%**	**0%**	**5%**	
Survey Respondents	**26%**	**26%**	**11%**	**6%**	**7%**	**3%**	**5%**	**1%**	**0%**	**1%**	**3%**	**10%**	**211**

The survey received 110 survey responses on ITSM process benefits which was over half (52%) of the 211 survey respondents. The highest number (27) of survey respondents provided ITSM benefit responses for four processes. Two survey respondents provided ITSM benefit responses for 21 processes. The distribution of survey responses for the number of ITSM processes with benefit responses is shown in Table 4.28.

Table 4.28 Number of ITSM processes with benefit responses

Number of ITSM Benefit Responses	21	14	11	10	9	8	7	6	5	4	3	2	1	0	**Total**
Number of Survey Respondents	2	1	10	1	3	6	2	3	11	27	21	10	13	0	**110**

The majority of ITSM benefits responses by processes were reported from change management (124 question-responses), incident management (119 question-responses) and problem management (68 question-responses), as shown in Table 4.29. The majority of process benefits along the benefit categories were process improvement, service improvement and system improvement benefits. Along ITSM service constituents the majority of benefit were process followed by product.

Table 4.29 Count of ITSM process responses by ITSM process implementation

Service constituents		**Product**					**Resources**						**People**			
ITSM process benefit	**Process improvement**	**Service improvement**	**System improvement**	**System availability**	**Value to the business**	**Knowledge acquisition**	**Cost management**	**Control**	**Resource management**	**Risk management**	**Compliance**	**Governance**	**Customer service**	**Customer satisfaction**	**Customer needs identification**	**Total**
Change	40	7	17	12	4	0	4	15	3	11	3	0	4	4	0	124
Incident	66	15	3	3	0	1	3	3	3	0	0	0	13	8	1	119
Problem	26	10	12	4	1	0	2	0	2	0	0	0	8	3	0	68
Service desk function	30	3	1	1	0	0	1	3	0	0	0	0	12	6	1	58
Service level	10	6	1	0	1	0	3	1	3	0	1	0	7	17	5	55
Configuration	16	5	1	1	2	1	1	1	13	0	1	0	1	1	1	45
Release	15	5	2	2	0	0	0	4	0	0	1	0	1	1	0	31
Capacity	7	2	1	3	1	0	2	0	2	2	0	0	0	2	1	23
ITSCM	10	2	0	3	1	0	1	0	1	3	0	0	0	1	0	22
Financial	1	2	0	0	1	0	8	1	2	0	0	0	0	1	0	16
Service catalogue	4	5	0	0	0	0	1	0	1	0	0	0	1	1	1	14
Availability	2	1	1	3	0	0	0	0	0	0	0	0	0	2	3	12
Request	0	6	0	0	0	0	0	0	0	0	0	0	2	1	0	9
Access	1	1	0	0	0	0	0	1	0	2	1	0	1	0	0	7
Deployment	3	0	1	0	0	0	1	1	0	0	0	1	0	0	0	7
Knowledge	3	0	0	0	1	1	0	0	0	0	1	0	0	1	0	7
Service portfolio	4	1	0	0	0	0	1	0	0	0	0	0	0	0	0	6
Demand	0	0	0	0	2	0	1	0	0	0	0	0	1	1	0	5
Security	0	0	1	1	0	0	0	0	0	1	1	0	0	0	0	4
Supplier	0	0	0	0	0	0	3	0	0	0	0	0	1	0	0	4
Event	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Validation	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2
Evaluation	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Operations	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Transition	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Total	**240**	**73**	**42**	**33**	**16**	**3**	**32**	**30**	**30**	**19**	**9**	**1**	**53**	**50**	**13**	**644**
Service constituents Total	**240**	**Product (167)**					**Resources (121)**						**People (116)**			**644**

The study consolidated the ITSM process benefits by identifying common benefits along categories. Given the open-ended nature of benefit responses, an attempt at identifying unique process benefits was not possible. The researcher found that the open-ended responses were subject to different interpretation. This was established by having different researchers interpret the meaning of the benefit responses in an attempt to establish unique responses and, in most cases, the interpretations were different. This may have been because the survey responses, unlike the case study responses, were not in context and the researcher did not have the opportunity to seek clarification on the response. A second difficulty was that qualitative analysis software available is based on key word analysis, whereas the ITSM benefits were sentence and phrase based and it was not possible to establish the key words. Popular qualitative analysis software including NVivo® and Leximancer® were evaluated but could not serve the purpose of identifying unique ITSM benefit responses. A formal evaluation on the suitability of the qualitative analysis software was based on the advice of Lowe (2003). Samples of unique ITSM process benefits generated from the data reduction are presented in Table 4.40. The researcher selected a sample of ITSM process benefits for each ITSM processes. The selection was based on the frequency of occurrence of the ITSM process benefit. A distribution table of categorised ITSM process benefits responses is shown in Table C.17; and a complete and categorised list of all the ITSM process benefit responses is presented in Table C.18 in Appendix C.

Commonly-reported change management process benefits included improved control of the change management process, reduction in change related incidents and outages, reduced risk, and improved system availability. The change management process benefits fell in the categories of compliance, control, cost management, customer satisfaction, customer service, process improvement, resource management, risk management, system availability, system improvement and value to the business. Sample change management process benefits are shown in Table 4.30.

Table 4.30 Types of ITSM process benefits - change management

Category	**ITSM change management process benefit**
Compliance	Diligence
	Improved governance over scheduled outages
Control	Better change management control
	Better controls of changes to Infrastructure and software
	Control of impact to business
	Control of operational environment
Cost management	Better control of cost to organisation on change activity
	Budget and standard operating environment
	Costs measurement
	Reduction in the cost to deliver services
Customer satisfaction	Improved customer satisfaction
Customer service	Improved customer service due to reduced risk of issues
	Increased customer service levels
Process improvement	Ability to track changes to infrastructure/network
	Better co-ordination of changes with other parties
	Better documentation
	Better planned upgrades
	Capture workload more effectively
	Change control and coordination of changes
	Consistent process across organisation
	Effective controls in ensuring a structured approach for implementing change that has a fall-back plan
	Lodging and tracking of all changes where none existed before
	Systematic change procedure preparation
	Visibility of changes and associated workload
Resource management	Better management of project scope
	Better resource management - prioritisation
	Greater certainty about what is in production
Risk management	Better planning and risk assessment
	Improved risk management and communications
	Reduced risk to live systems
	Reduced risk to the agency
	Reduction in feral changes
System availability	Assurance that business will still run after change has been implemented
	Increased availability
	Reduced downtime
System improvement	Improved delivery of projects
	Improved resource allocation
	Increased stability in production environments
	Network functionality increased
	Reduced service incidents arising from implementing Change
	Stabilised environment
Value to the business	Changes reviewed for business benefit and approved
	Control of what changes are made - better business value
	Maximise value from asset investment

Common incident management process benefits include improved call response times, improved communication, improved resolution times, and improved process control. Incident management process benefits were mainly in the process improvement and service improvement category. Sample incident management process benefits are shown in Table 4.31.

Table 4.31 Types of ITSM process benefits – incident management

Category	**ITSM incident management process benefit**
Control	More control over how incidents are resolved
	Process control
Cost management	Reduced cost to deliver services
	Understanding service delivery costs
Customer satisfaction	Improved customer satisfaction
	Increased user satisfaction
	Understanding the types of issues coming from our customers to focus our investment and education
Customer service	Better servicing of customers and faster resolution of incidents
	Customers able to seek assistance
	Increased customer service levels meeting key performance indicators and satisfaction
Knowledge acquisition	Greater knowledge sharing
Process improvement	Ability to do trend analysis
	Ability to provide meaningful reports to the business and supports problem management
	Accurate reflecting of IT incidents in the client environment
	Better communication between resolver groups
	Capture workload more effectively
	Clearer processes for handling and prioritising service incidents
	Common error analysis
	Consistent process across organisation
	Improved tracking and accountability to resolution
	Improved turnaround time for issues
	Incident visibility and tracking
	Increased incident resolution
	Increased tracking of IT support work undertaken
	Reduced mean time to restore/respond
Resource management	Better resource management
Service improvement	Better service restoration time
	Defined service targets and improved response times
	Fast restoration of services
	Improved call handling and assignment
	Improved response and resolution times
	Increased resource use efficiency
	Reduced restoration time
	Reduced timeframe for service restoration
System availability	Managing outages
	Minimise business disruption by managing failures in service responsive to business impact and urgency
System improvement	Network functionality increased

Problem management process benefits that were commonly cited include increased customer satisfaction and customer service, meeting service level agreement targets, improved system availability, reduction of recurring incidents and reduction in repeat problems. Sample problem management process benefits are shown in Table 4.32.

Table 4.32 Types of ITSM process benefits - problem management

Category	**ITSM problem management process benefit**
Cost management	Reduce IT spend
	Reduced cost to deliver services
Customer satisfaction	Increased customer satisfaction levels
Customer service	Better customer service
	Increase customer service levels meeting key performance indicators and satisfaction
	Increased customer service levels
	Improved customer service
Process improvement	Identify problems and track their progress
	Permanent resolution of incident causes
	Quick turnaround of issues
	Capture workload more effectively
	Consistent process across organisation
	Coordinated management of errors
	Escalation of incidents to problem for further investigation and resolution
	Move to proactive focus; Incident correlation; relationship with configuration; known error documentation process
	Permanent solutions
	Proactive problem management
	Roll up of incidents into problems had not previously been attempted
	Seeing trends - easier to get through incidents
	Visibility of problems and accountability to resolve
Resource management	Better resource utilisation
Service improvement	Managing effective future delivery
	Better service during problems
	Reduced impact of systemic IT problems
	Reduction of ongoing problems
System availability	Reduced downtime
	Reduced outages
System improvement	Recover hidden issues
	Better root cause analysis and reduced 'repeat' incidents
	Identify root causes and implement preventative measures
	Network functionality increased
	Removed a number of major systemic issues and stabilised core infrastructure
Value to the business	Maximising value from investment and minimising business disruption by increasing reliability of service with reactive and proactive analysis and resolution of service quality and performance issues

Commonly cited service desk benefits include improved customer satisfaction, increased customer service levels, provision of a single point of contact, consistency of process and faster call resolution. Few benefits were found in the cost management category. Sample service desk function benefits are shown in Table 4.33.

Table 4.33 Types of ITSM process benefits – service desk function

Category	**ITSM service desk function benefit**
Control	Better and consistent control and management of all IT incidents and requests
Cost management	Bring to front incident resolution/reduce cost of services
Customer needs identification	Better alignment to support demand and appropriate skills
Customer satisfaction	First point resolution for many requests/faults is much appreciated by customers
	High levels of customer satisfaction survey Results
	Improved customer satisfaction and first call resolution
Customer service	Better customer service
	Better customer support
	Improved customer service levels
	More customer/service focus
Process improvement	Centralised single point of contact for logging incidents
	Co-ordinated support
	Consistent process across organisation
	Faster call resolution
	First call resolution improvement
	History of incidents accrued
	Improved logging and tracking
	One central location that all customers can call
	Reduced mean time to restore/respond
	Resolve IT related calls promptly & within agreed timeframes
	Significant improvement to 1st call resolution
	Single point of contact for all IT related issues
	Tracking and history of Incidents
Service improvement	Better response times to requests
	Reduced phone wait time
	Reduced rework
System availability	Less distractions for 2nd level
System improvement	Network functionality increased

Service level management process benefits that were commonly cited include aligning IT with the business, better understanding the customer needs, and increased customer satisfaction. The categories with the highest number of benefits were process improvement and customer satisfaction. Sample service level management benefits are shown in Table 4.34.

Table 4.34 Types of ITSM process benefits – service level management

Category	**ITSM service level management benefit**
Compliance	Measurement and accountability
Control	Enables us to establish meaningful performance measures with the business and report performance
Cost management	Minimise cost wastage by ensuring that agreed levels of services are defined and monitored.
	Management of service revenue lines
	Used for determining funding levels
Customer needs identification	Greater understand between business and it re criticality of services provided
	Align IT service provision with business needs
	Bringing IT closer to the business - gaining an understanding of business needs
Customer satisfaction	Better expectation management
	Customer awareness
	Increased customer satisfaction and transparency
	Clear SLAs managed with each customer
	Customers have clearer picture of what to expect in terms of service
	Expectations are set with the customer
	Improving level of managed expectation - early stages of development
	Increased customer satisfaction
	Shared expectations of service
Customer service	Agreed customer service delivery levels
	Business confidence in IT Services
	Increased customer service
	Manage service levels and service level agreements within the business
	Better relationship with customer
Process improvement	Ability to monitor performance and meet service targets
	Capture workload more effectively
	Consistent process across organisation
	Consistent reporting base/measures
	Consistent service levels across customers
Resource management	Improved decision making for ICT investment
	Vendor relationship increased and network availability
Service improvement	Reduced rework
System improvement	Stability
Value to the business	Benefit realisation through better management of services

Common release management process benefits included increased control of changes, reduced incidents related to release of changes, and increased customer satisfaction. The release management benefits were in the categories of compliance, control, customer satisfaction, customer service, process improvement, service improvement, system availability and system improvement. The vast majority of release management process benefits were in the process improvement category. Sample release management process benefits are shown in Table 4.35.

Table 4.35 Types of ITSM process benefits - release management

Category	**ITSM release management benefit**
Compliance	Increased governance of released software
Control	Better control of changes
	More control of release
	Process control (change implementation plans)
Customer satisfaction	Increased customer satisfaction
Customer service	Improved customer service due to reduced risk of issues
Process improvement	More reliable transitioning
	Better understanding of impacts if the change goes wrong
	Clear methods for development and deployment
	Fewer issues sith enhancements and upgrades
	Higher release success rate
	Higher visibility of planned work
	Improved turn-around time of changes
	Increased successful change
	Less impact
	More prepared to support
	Reduced incidents
	Relationship with configuration (for example, alarms can be correlated to in progress changes)
	Smoother transition from projects to operations
	Visibility to the agency of all changes
Service improvement	Improved release quality
	Increased infrastructure stability and created a more stable communication channel with some customer groups
	Reduced rework
	Service transition planning (where applied)
	Streamlined much of the work from specific customer groups into the release process which has decreased workload
System availability	Less disruption to end users through release controlling when changes are deployed to end users with consideration to end users business needs
	Increased availability
System improvement	Network functionality increased
	Reduction in problems caused by changes

Improved asset management increased awareness of configuration items, clearly defined business services, and increased understanding of impact. The majority of configuration management benefits were in the process improvement and resource management categories. All the configuration management process benefits responses are shown in Table 4.36.

Table 4.36 Types of ITSM process benefits - configuration management

Category	**ITSM configuration management benefit**
Compliance	Compliance with license requirements
Control	Better control
Cost management	Reduced cost to deliver services
	Contain costs
Customer needs identification	Clear understanding of business impact
	Common area of understanding between customer and service providers about the services being provided
Customer satisfaction	Increased customer satisfaction and service transparency
Customer service	Increased customer service levels
Knowledge acquisition	Knowledge for billing
Process improvement	Ability to identify rogue assets and track machines more effectively
	Application owner relationships
	Beginning to control configuration changes
	Better incident impact identification
	Configuration documentation
	Consistent process across organisation
	Data modelling and system mapping
	Escalation processes
	Improved overall management of IT assets
	Reducing duplication of effort
	Understanding relationships of systems to services
	Centralised procurement & billing
	Improved awareness of the services provided by ITS
	Increase understanding of products and services offered
	Visible service listing
Resource management	Greater control of assets and equipment
	Better understanding of IT environment (underpinning other processes)
	Better view on installed software on hardware items
	Contract relationships
	Remote software deployment
	Visibility/report-ability of our IT assets.
	Better asset management
Service Improvement	Better service desk service and clearly understanding of impacts of incidents and changes.
	Improved service
	Clearer understanding of business of the services we offer and the level of service we provide
	Making services and their interactions visible
Value to the business	Maximise value from asset investment by tracking and monitoring asset performance

IT service continuity management process benefits were primarily concerned with risk management. The majority of the 22 benefit responses centred on reducing risk and improving recovery of the systems as shown in Table 4.37.

Table 4.37 Types of ITSM process benefits – IT service continuity management

Category	**ITSM configuration management benefit**
Cost management	Minimise business cost due to ICT failures
Customer satisfaction	Increased customer satisfaction
Process improvement	Ability to operate through incidents
	Clarity of process and expectations
	Clear processes and control points provide a basis for service continuity to be managed from at all
	Ensuring there is a documented and established plan to ensure that service can function with back up solutions
	Fast recovery in the event of a disaster
	Implementation of process across designated business areas
	Increased confidence in ability to restore services following a disaster
	Strong disaster recovery for services requiring IT
	Support and trust from management/executives
	Support business continuity planning
Resource management	Increased awareness of systems involved in running a service
Risk management	Reduced risk
	Proven disaster recovery process for key corporate applications
	Risk management
Service improvement	Better response mechanisms following outages/disasters
	Reduced rework
System availability	Minimise business disruption (productivity & reputation) during disaster events by supporting customer ability to continue business activities during such
	Ensure that the key business systems can be restored in a timely fashion reducing risk and increases customer confidence in our organisation
	Improved availability
Value to the business	Value add / business continuity

The capacity management process benefits were primarily in the process improvement category. Common capacity process benefits cited include reducing capacity related incidents, less disruptions and better planning. The capacity management process benefit responses are shown in Table 4.38.

Table 4.38 Types of ITSM process benefits - capacity management

Category	**ITSM configuration management benefit**
Cost management	Containing costs
	Lowering cost by utilising different forms of storage
Customer needs identification	Early consideration of needs
Customer satisfaction	Manage expectation and identify business constrains to deliver expectation
	Increased customer satisfaction
Process improvement	Awareness of utilisation and the environment to allow for planning of future expansion and monitoring existence performance
	Better planning
	Implementation of process across designated business areas
	Increase in successful change
	Management of technical resources
	Problems with capacity are avoided
	Reduction of capacity related incidents
Resource management	Controlled/JIT capacity allocation
	Informed decision making for ICT investment
Risk management	Decreased risk
	Identification of potential bottlenecks
Service improvement	Improved performance
	Reduced rework
System availability	Less outages
	Minimises business disruption (productivity) by ensuring service have right level of capacity to cope with customer demands
	Improved availability
System improvement	Network functionality increased
Value to the business	Increased value and efficiency

The availability management process benefits presented were mainly categorised in the system availability category. Commonly cited benefits included better planning, improved availability and increased customer satisfaction. The availability management process benefits are shown in Table 4.39.

Table 4.39 Types of ITSM process benefits - availability management

Category	**ITSM financial management benefit**
Customer needs identification	Early consideration of needs
	Mapped to service requirements
	Understanding of service requirements
Customer satisfaction	Improved user/customer satisfaction
	Increased customer satisfaction
Process improvement	Better planning
	Implementation of process across designated business areas
Service Improvement	Reduced rework
System availability	Controls and process ensure a fundamental level of uptime
	Better hours of availability for customers
	Improved availability
System improvement	Network functionality increased

The vast majority of financial management process benefits fall in the category of cost management. Commonly cited financial management process benefits included controlling expenditure and reducing costs. The financial management process benefit responses are shown in Table 4.40.

Table 4.40 Types of ITSM process benefits - financial management

Category	**ITSM financial management benefit**
Cost management	Controlled asset spend
	Clear reporting on costs to deliver services
	Meet budgeted cost & revenue targets
	Visibility of and controls around IT expenditure
	We can now accurately track and report expenditure both operating expenditure (OPEX) and capital expenditure (CAPEX)
Customer satisfaction	Increased customer satisfaction
Resource management	Informed decisions on ICT investment
Service Improvement	Reduced rework
Value to the business	Understanding of asset value per service
Control	Control
Cost management	Better visibility and understanding total cost of ownership
	Ensuring appropriate spend
	Reduced "revenue leakage"
Process improvement	Increased transparency and value
Resource management	Centralised budget allocation
Service Improvement	Competitively priced services (customers getting best priced product on the market)

By providing ITSM process level benefits this section answered *RQ1. What types of benefits are reported from ITSM improvement initiatives?* Process improvement, service improvement, customer service and customer satisfaction were the subcategories with the most ITSM process benefit responses. The next section addresses RQ2 by providing ITSM organisational level benefits. A summary of the ITSM process level benefits is provided in section 4.8

4.6 RQ2. Which specific metrics can be used to measure ITSM performance?

4.6.1 Correlation between ITSM process implementation and performance metrics

To examine the relationship between ITSM process implementation and metrics, a presentation of the descriptive statistics on the ITSM process implementation and

ITSM metric responses is provided, followed by results of the statistical tests of association. The majority of respondents (72%) had implemented up to eight ITSM processes; while a minority (28%) had implemented over eight ITSM processes.

Table 4.41 Distribution of ITSM process implementation

Number of ITSM Processes Implemented	**Frequency**	**Percent**	**Cumulative Percent**
One	13	6.2%	6.2%
Two	10	4.7%	10.9%
Three	25	11.8%	22.7%
Four	28	13.3%	36.0%
Five	30	14.2%	50.2%
Six	23	10.9%	61.1%
Seven	12	5.7%	66.8%
Eight	11	5.2%	72.0%
Nine	11	5.2%	77.3%
Ten	16	7.6%	84.8%
Eleven	10	4.7%	89.6%
Twelve	5	2.4%	91.9%
Thirteen	2	0.9%	92.9%
Fifteen	3	1.4%	94.3%
Sixteen	4	1.9%	96.2%
Eighteen	1	0.5%	96.7%
Twenty one	1	0.5%	97.2%
Twenty two	6	2.8%	100.0%
Total	**211**	**100.0%**	

A check for a correlation between the ITSM process implementation and ITSM process metrics responses was carried out using a scatterplot, as shown in Figure 4.21. The scatterplot shows that the majority of respondents had implemented less than ten ITSM processes and provided less than seven ITSM metric responses. No obvious outliers are observed as most points are close to each other. There appears to be a trend in the data where a greater number of implemented ITSM processes are associated with a greater number of ITSM metric responses.

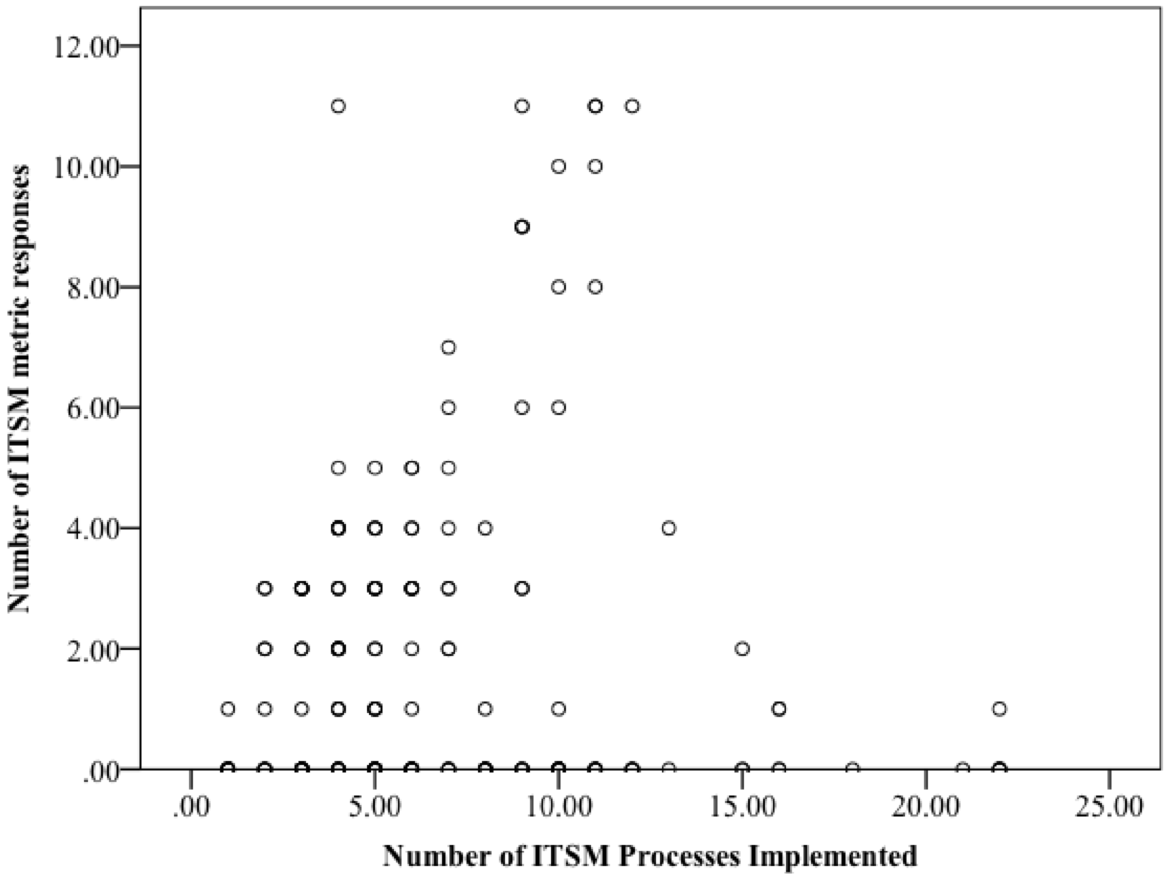

Figure 4.21 Scatterplot of the relationships between ITSM process implementation and metrics responses

The process metric responses clustered around one to seven respondents; for one to seven metric responses; and for one to seven implemented processes. Survey responses from organisations implementing four ITSM processes originated from the highest number (21) of ITSM process metric respondents. The number of respondents to the question on ITSM process metrics increased with the number of implemented processes, with the trend peaking at four implemented processes. The upward trend was followed by a downward trend where a decline was observed in respondents from organisations implementing between five and eight ITSM processes, as shown in Figure 4.22.

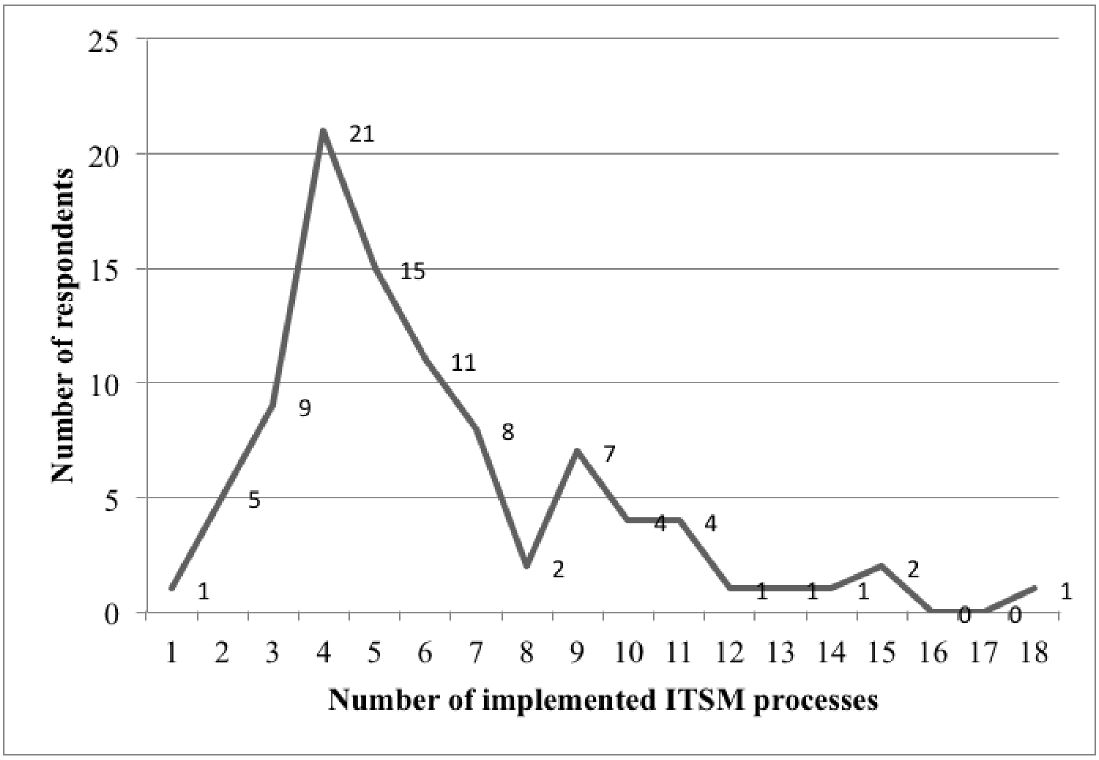

Figure 4.22 ITSM metric response survey respondent trends along implemented ITSM processes

The highest number of survey respondents (25) to the question on ITSM process metrics provided responses for three implemented ITSM processes. The upward trend of number of survey respondents showed an increase in process metric responses peaked at three processes; and reversed to a downward trend that plateaued at an average of five respondents for with five or more ITSM process responses. This is movement is depicted in Figure 4.23.

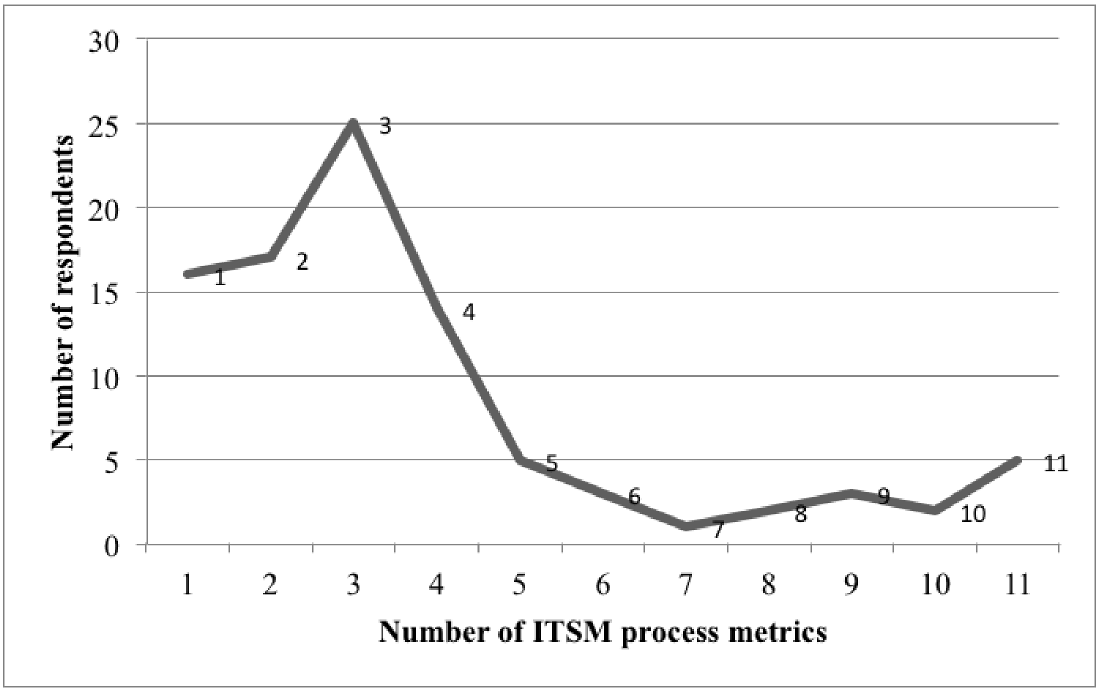

Figure 4.23 ITSM metric response survey respondent trends along ITSM process metric responses

To test the hypothesis: *H2. There is a correlation between the number of implemented ITSM processes and the number of ITSM process metric responses* the Spearman correlation test was conducted to quantify the correlation between the number of ITSM processes implemented and the number of ITSM metrics responses. The Spearman correlation test is deemed appropriate as the data is non-parametric and the two variables are measured on an interval scale, and the two variables appear to have a monotonic relationship (Field 2009). The cross tabulation of the number of ITSM processes implemented and the number of ITSM metric responses is shown in Table C.19 in Appendix C. A Spearman's Rank Order correlation was conducted to determine the correlation between ITSM process implementation and ITSM metrics. The correlation between the number of implemented ITSM processes and the number of ITSM metric responses is not statistically significant (r_s (209) = 0.01, p= 0.882). The test result is shown in Table C.20 in Appendix C.

4.6.2 Correlation between ITSM benefits and performance metrics

To examine the relationship between ITSM process benefits and metrics, a presentation of the descriptive statistics on the ITSM process benefit and ITSM process metric responses is provided, followed by results of the statistical tests of association.

The majority of survey respondents (56%) did not provide responses on ITSM metrics. The distribution of the ITSM benefit responses on ITSM process benefits is shown in Table 4.42.

Table 4.42 Distribution of ITSM process benefit responses

Number of ITSM Benefit Responses	**Frequency**	**Percent**
Zero	101	47.9%
One	13	6.2%
Two	10	4.7%
Three	21	10%
Four	27	12.8%
Five	11	5.2%
Six	3	1.4%
Seven	2	0.9%
Eight	6	2.8%
Nine	3	1.4%
Ten	1	0.5%
Eleven	10	4.7%
Fourteen	1	0.5%
Twenty one	2	0.9%
Total	**211**	**100%**

The distribution of the ITSM metric responses is shown in Table 4.43. The majority of survey respondents (56%) did not provide responses on ITSM metric.

Table 4.43 Distribution of ITSM process metrics responses

Number of ITSM Metric Responses	**Frequency**	**Percent**
Zero	118	55.9%
One	16	7.6%
Two	17	8.1%
Three	25	11.8%
Four	14	6.6%
Five	5	2.4%
Six	3	1.4%
Seven	1	0.5%
Eight	2	0.9%
Nine	3	1.4%
Ten	2	0.9%
Eleven	5	2.4%
Total	**211**	**100%**

The survey received responses from 110 respondents to questions on ITSM process benefits; and received responses from 110 respondents to the question on ITSM process metrics. An examination of the correlation of the ITSM process benefit and ITSM process metric responses is performed on the 110 responses. An initial check for a correlation between the ITSM process metric and ITSM process benefit responses was conducted using a scatterplot (see Figure 4.24). The scatterplot shows that the majority of respondents to the questions relating to ITSM benefits and metrics provided less than seven ITSM benefits or metrics responses. No obvious outliers are observed as most points are close to each other. There appears to be a trend in the data where a greater number of ITSM benefit responses are associated with a greater number of ITSM metric responses.

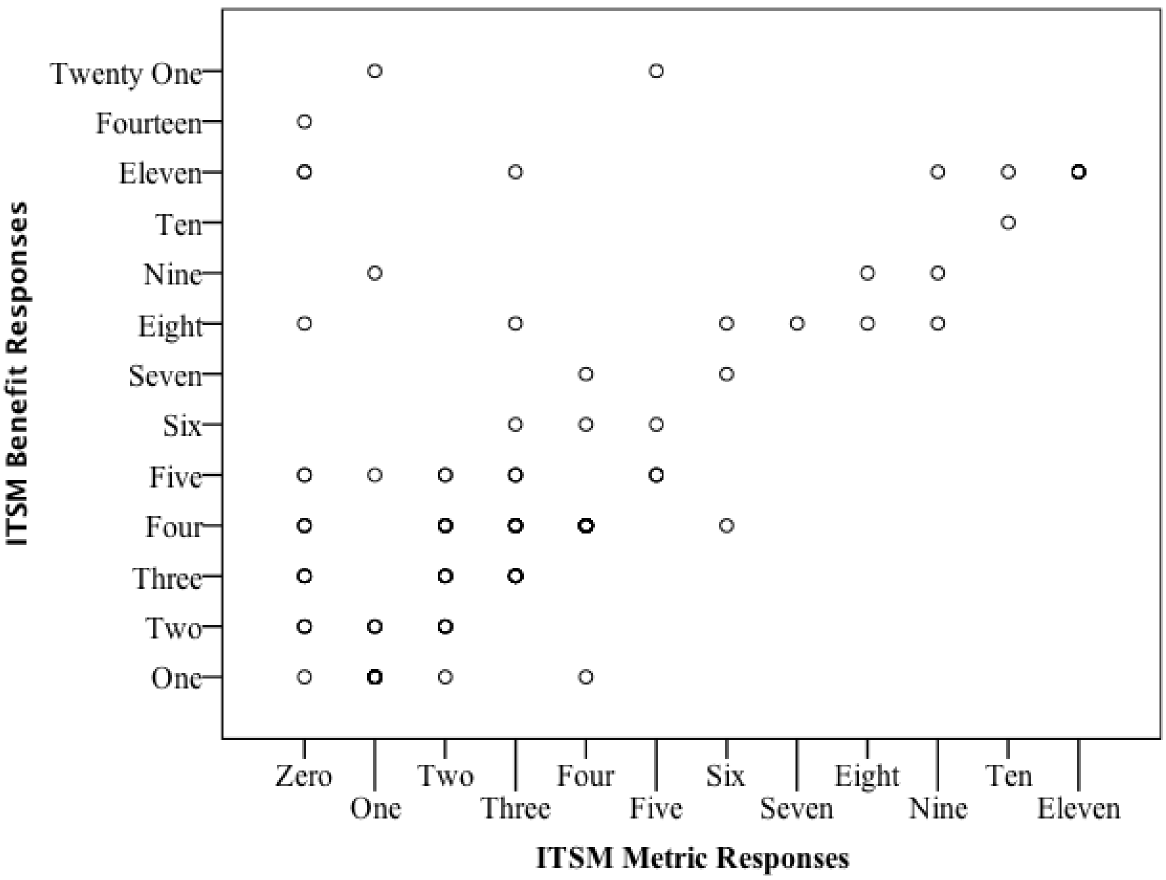

Figure 4.24 Scatterplot of the relationships between ITSM benefits and metrics responses

To test hypothesis *H3 There is a correlation between the number of ITSM process benefit responses and the number of ITSM process metric responses* the Spearman correlation test is conducted. Given the observations made on the scatterplot it was deemed necessary to conduct an appropriate non-parametric statistical test to establish whether there is a statistically significant relationship between the ITSM process benefit responses and ITSM performance metric responses. The Spearman correlation test is deemed appropriate as the data is non-parametric and the two variables are measured on an interval scale, and the two variables appear to have a monotonic relationship (Field 2009). The cross tabulation of the number of ITSM process benefit responses and the number of ITSM process metric responses is shown in Table C.21 in Appendix C. There is a moderate, positive correlation between the number of ITSM process benefit responses and number of ITSM process metric responses, which is statistically significant (r_s (108) = .501, P = .000). The test result is shown in Table C.22 in Appendix C.

4.6.3 ITSM process metrics

Section C of the questionnaire addressed *RQ2. Which specific metrics can be used to measure ITSM performance?* The survey received 93 survey-responses (44%) from the 211 survey respondents.

A variety of responses on ITSM performance metrics were provided. A few of the responses were more detailed than others and some respondents provided more than one metric for each ITSM process. A process similar to that employed in categorising the ITSM process benefit responses described in section 4.5.1 was used to group ITSM process metric responses. The ITSM process metric responses were collected and separated into a metric associated with a process resulting in a count of 418 metric responses. A distribution of the ITSM performance metric question-responses is shown in Table C.23 in Appendix C. The study faced a challenge in classifying the ITSM process metrics to determine the unique metrics, since there is no definitive list or taxonomy for ITSM benefits. The previous literature reviewed on ITSM process metrics presented in Section 2.5.4.4 in Chapter 2 highlights a lack of a definitive categorisation of ITSM metrics. A common approach employed for ITSM metric categorisation has been to group the metrics by ITSM process. For practical purposes it was decided to apply the widely-accepted constituents of service found in

OGC (2007b) as a basis to group and analyse the ITSM process metric responses. The service components and ITSM process benefits categories are listed in Table 4.10 presented in section 4.4.3. A list of all the responses on ITSM process metrics, based on the ITSM process metric categorisation and detailed in Table C.24 in Appendix C, is summarised in Table 4.44. The majority of ITSM process metric question-responses categorised along service constituents were product (121), followed by process (109), people (56), and resources (41).

Table 4.44 ITSM process metrics by service constituents

Service constituent	**ITSM process metric**	**Total**
Product (121)	Service improvement	121
	System improvement	80
	Systems availability	10
	Knowledge acquisition	1
Process (109)	Process improvement	109
People (56)	Customer satisfaction	56
Resources (41)	Cost management	12
	Resource management	12
	Risk management	10
	Compliance	7
	Total	**418**

The distribution of the metric responses were analysed along the organisations' characteristics. The tabulation of ITSM process metric responses by industry sector showed that the majority of responses were from the property and business services (109 question-responses), education (87 question-responses), government administration and defence (72 question-responses) finance and insurance (41 question-responses), and health and community services (25 question-responses). Service improvement, process improvement, system improvement and customer satisfaction were the categories with the most ITSM process metric responses. The distribution of ITSM benefit responses by industry sector is shown in Table 4.45.

Table 4.45 ITSM process metric responses by industry sector

	Industry Sector												
ITSM Process Metric Category	**Property and business services (includes IT firms)**	**Education**	**Government administration and defence**	**Finance and insurance**	**Health and community services**	**Manufacturing**	**Communication services**	**Other**	**Transport and storage**	**Personal and other services**	**Electricity, gas and water**	**Retail trade**	**Total**
Service improvement	34	25	17	11	8	7	3	7	3	4	1	1	121
Process improvement	20	28	19	8	10	9	6	1	6	0	0	2	109
System improvement	18	9	18	9	4	4	3	5	3	3	3	1	80
Customer satisfaction	15	17	8	5	3	2	3	0	1	0	2	0	56
Cost management	7	2	1	2	0	0	0	0	0	0	0	0	12
Resource management	8	1	0	2	0	0	1	0	0	0	0	0	12
Risk management	3	2	3	2	0	0	0	0	0	0	0	0	10
Systems availability	0	0	5	2	0	0	1	0	0	2	0	0	10
Compliance	3	3	1	0	0	0	0	0	0	0	0	0	7
Knowledge acquisition	1	0	0	0	0	0	0	0	0	0	0	0	1
Total	**109**	**87**	**72**	**41**	**25**	**22**	**17**	**13**	**13**	**9**	**6**	**4**	**418**
Percentage of total responses	**26%**	**21%**	**17%**	**10%**	**6%**	**5%**	**4%**	**3%**	**3%**	**2%**	**1%**	**1%**	**100%**
Survey Respondents	**27%**	**2%**	**26%**	**10%**	**3%**	**4%**	**3%**	**2%**	**2%**	**2%**	**3%**	**0%**	**93**

The majority of ITSM process metric responses, by ownership, were provided by government organisations (164 question-responses), wholly Australian-owned publicly listed company (91 question-responses), and wholly Australian owned private company (73 question-responses). The distribution of ITSM process metric responses by ownership is provided in Table 4.46.

Table 4.46 Count of ITSM process metric responses by ownership

ITSM Process Metric Category	Ownership								
	Government Organisation	Wholly Australian owned Public Listed Company	Wholly Australian owned Private Company	Wholly funded by foreign capital	Don't Know	Partially Australian and foreign owned	Partly Australian owned Public Listed Company	Not indicated	Total
Service improvement	40	22	26	13	8	3	3	0	121
Process improvement	44	28	16	8	4	2	3	1	109
System improvement	31	18	13	3	5	2	1	1	80
Customer satisfaction	31	11	9	2	0	0	0	0	56
Cost management	3	4	2	1	0	1	0	0	12
Resource management	0	4	4	1	1	2	0	0	12
Risk management	5	0	2	0	0	2	0	0	10
Systems availability	6	3	0	0	0	1	0	0	10
Compliance	4	1	1	1	0	0	0	0	7
Knowledge acquisition	0	0	0	0	0	0	1	0	1
Total	**164**	**91**	**73**	**29**	**18**	**13**	**8**	**2**	**418**
Percentage of total responses	**39%**	**22%**	**17%**	**7%**	**4%**	**3%**	**2%**	**39%**	**100%**
Survey Respondents	**41%**	**18%**	**16%**	**8%**	**5%**	**5%**	**4%**	**41%**	**92**

The majority of ITSM process metric responses by annual turnover were from organisations with annual turnover more than $150 million (142 question-responses), followed by those who did not know their organisation's annual turnover (109 question-responses) and 89 responses were from organisations with an annual turnover between $50 million and $150 million. The distribution of the ITSM process metric responses by total annual turnover is shown in Table 4.47.

Table 4.47 Count of ITSM process metric responses by annual turnover

ITSM Process Metric Category	Annual Revenue						
	More than $150 million	$50 million to $150 million	$10 million to $49 million	$5 million to $9 million	Less than $5 million	Don't know	Total
Service improvement	39	26	10	5	7	34	121
Process improvement	37	29	13	3	5	22	109
System improvement	28	15	7	3	4	23	80
Customer satisfaction	18	9	4	3	1	21	56
Cost management	4	5	0	1	0	2	12
Resource management	4	1	0	0	3	4	12
Risk management	3	2	2	0	2	1	10
Systems availability	6	0	2	1	0	1	10
Compliance	2	2	1	0	1	1	7
Knowledge acquisition	1	0	0	0	0	0	1
Total	**142**	**89**	**39**	**16**	**23**	**109**	**418**
Percentage of total responses	**34%**	**21%**	**9%**	**4%**	**6%**	**26%**	**100%**
Survey Respondents	**39%**	**13%**	**9%**	**4%**	**4%**	**31%**	**93**

The highest number of ITSM process metric responses were from organisations with 200 to 999 fulltime staff (149 question-responses); followed by organisations with 2000 to 4999 fulltime staff (103 question-responses); and then organisations with more than 1000 staff (70 question-responses). The distribution of ITSM process benefit responses by total staff is shown in Table 4.48.

Table 4.48 Count of ITSM process metric responses by total staff

ITSM Process Metric Category	Total Staff						
	More than 10000 full time staff	5000 to 9999 full time staff	2000 to 4999 full time staff	1000 to 1999 full time staff	200 to 999 full time staff	Less than 200 full time staff or equivalent	Total
Service improvement	20	7	37	13	33	11	121
Process improvement	18	10	29	16	33	3	109
System improvement	13	2	17	9	34	5	80
Customer satisfaction	12	3	9	2	25	5	56
Cost management	0	1	2	0	8	1	12
Resource management	1	0	3	0	5	3	12
Risk management	2	0	2	0	4	2	10
Systems availability	3	2	1	0	4	0	10
Compliance	1	0	2	0	3	1	7
Knowledge acquisition	0	0	1	0	0	0	1
Total	**70**	**25**	**103**	**40**	**149**	**31**	**418**
Percentage of total responses	**17%**	**6%**	**25%**	**10%**	**36%**	**7%**	**100%**
Survey Respondents	**19%**	**14%**	**18%**	**13%**	**27%**	**8%**	**93**

The majority of ITSM process benefit responses by duration of ITSM implementation were from organisations that had been implementing an ITSM framework for two years (108 question-responses), 1year (82 question-responses) or 3 years (55 question-responses)—as shown in Table 4.49.

Table 4.49 Count of ITSM process metric responses by duration of ITSM implementation

ITSM Process Metric Category	Duration in years										
	None	< 1	1	2	3	4	5	6	9	10	Total
Service improvement	5	1	30	34	16	11	8	7	2	7	121
Process improvement	3	0	20	22	19	21	7	11	1	5	109
System improvement	5	1	12	26	12	7	3	6	3	5	80
Customer satisfaction	6	0	11	13	7	4	8	3	1	3	56
Cost management	0	0	1	1	1	4	1	2	0	2	12
Resource management	1	0	3	3	0	2	0	0	0	3	12
Risk management	1	0	2	1	0	0	1	3	1	1	10
Systems availability	0	0	2	6	0	0	1	0	0	1	10
Compliance	0	0	1	1	0	2	1	2	0	0	7
Knowledge acquisition	0	0	0	1	0	0	0	0	0	0	1
Total	**21**	**2**	**82**	**108**	**55**	**51**	**30**	**34**	**8**	**27**	**418**
Percentage of total responses	**5%**	**0%**	**20%**	**26%**	**13%**	**12%**	**7%**	**8%**	**2%**	**6%**	**100%**
Survey Respondents	**10%**	**3%**	**26%**	**26%**	**11%**	**6%**	**7%**	**5%**	**0%**	**3%**	**93**

The majority of ITSM process benefits responses by processes were reported from incident (102 responses), change (96 responses) and problem (45 responses)—as shown in Table 4.50. The vast majority of responses were from organisations implementing ITSM between one and two years.

Table 4.50 Count of ITSM process metric responses by ITSM process implementation

	ITSM Process Metric Category										
ITSM Process	**Service improvement**	**Process improvement**	**System improvement**	**Customer satisfaction**	**Cost management**	**Resource management**	**Risk management**	**Systems availability**	**Compliance**	**Knowledge acquisition**	**Total**
Incident	52	19	14	15	0	0	0	2	0	0	102
Change	2	35	48	7	0	0	1	1	2	0	96
Problem	17	14	10	1	0	0	0	2	1	0	45
Service desk function	23	12	0	6	0	0	0	0	0	0	41
SLM	7	7	0	16	1	0	0	2	3	0	36
Release	8	2	3	3	1	0	0	0	0	0	17
Configuration	2	3	1	0	0	8	0	0	0	0	14
ITSCM	1	3	0	0	1	0	9	0	0	0	14
Capacity	0	4	1	0	1	3	0	0	0	0	9
Availability	0	2	1	2	0	0	0	3	0	0	8
Financial	0	0	0	0	7	0	0	0	0	0	7
Knowledge	4	1	0	0	0	0	0	0	0	1	6
Request	2	1	0	2	0	1	0	0	0	0	6
Service Catalogue	0	1	1	2	0	0	0	0	0	0	4
Deployment	0	2	1	0	0	0	0	0	0	0	3
Security	1	1	0	0	0	0	0	0	1	0	3
Access	0	0	0	2	0	0	0	0	0	0	2
Event	1	1	0	0	0	0	0	0	0	0	2
Service portfolio	0	1	0	0	0	0	0	0	0	0	1
Supplier	0	0	0	0	1	0	0	0	0	0	1
Validation	1	0	0	0	0	0	0	0	0	0	1
Total	**121**	**109**	**80**	**56**	**12**	**12**	**10**	**10**	**7**	**1**	**418**

The analysis of performance metrics was performed for the implemented ITSM processes. Classification was carried out by the researcher and then reviewed by the study supervisors. The majority of ITSM process metric responses were on incident metrics (102 question-responses). The incident management process metrics were mainly in the service improvement category. Commonly-cited incident management metrics include number of incidents, time taken to resolve incident, calls resolved at first contact, compliance with service level agreements (SLAs) and call response. Sample incident management metrics are listed in Table 4.51.

Table 4.51 Types of ITSM process metrics - incident management

Category	**ITSM incident management metric**
Customer satisfaction	Compliance with SLAs
	Increased customer satisfaction - number of incidents resolved at first contact
	Increased customer service
	Percentage resolved in agreed timeframe and backlog
	Time taken to resolve against service level
	Percentage of satisfied customers as per quick survey responses
	Response and resolution times against SLA targets
Process improvement	Incidents appropriately categorised
	Number of calls logged
	Top ten categories
	Type of calls logged Incidents/Tasks
	Number of jobs conducted
	Number of priority 1 incidents
Service improvement	Mean time to restore/respond (MTTR)
	Average age of closed calls
	Closed 1st point and aged outstanding’s
	Incidents closed within agreed thresholds
	Percentage of calls closed at first point
	Resolution times per priority
	Resolved or outstanding for a period
	Incident resolution time
	Incidents closed by due date (%)
	Incidents resolved at first contact
	Number of incidents reported each week
	Number of breach calls
	Number of incidents
	Service restoration time; process issues arising from major incident reviews
	Time taken to complete jobs
Systems availability	System downtime per month

Change management metrics (96 question-responses) were mainly in the system improvement and process improvement categories. Commonly-cited change management process metrics include number of changes implemented, number of change related incidents, percentage of successful changes, impact of changes, number of approved changes, and reduction in outages. A list of commonly cited change management metrics is provided in Table 4.52.

Table 4.52 Types of ITSM process metrics - change management

Category	**ITSM change management process metric**
Compliance	Compliance to process
Customer satisfaction	Breakdown of changes by priority
	Changes approved
	Customer survey responses indicate increased satisfaction
	Number of changes implemented within timeline
	Number of changes presented at the Change Advisory Board (CAB)
Process improvement	Change percentage success rate
	Change volumes
	Failed changes against changes implemented
	Incidents related to changes
	Number of changes by classification
	Number of changes reviewed/approved/implemented in period
	Percentage of successful changes
	Process avoidance both by work unit
	Promptness of workflow queue
Risk management	Reduced risk to the agency
Service improvement	Minimum service lapse duration
System availability	Increased availability to business
System improvement	Change packages immediately successful
	Efficiency target maintained
	Incidents caused by change
	Less than 2% of all changes are backed out
	Less than 2% of all changes fail
	Less than 5% of all changes are emergency
	Number of emergency changes
	Number of incidents caused by change
	Number of change related incidents
	Number of changes applied (by impact)
	Number of changes backed out
	Number of changes that cause outages
	Percentage of scheduled changes versus emergency RFC's
	Percentage of successful changes
	Reduced emergency changes and reduction in failed changes
	Reduction in changes over time
	Reduction in number of system outages due to changes
	Reduction in the number of incidents arising from unmanaged changes
	Stability of environment
	Successful change rate

Problem management metrics (45 question-responses) were primarily in the service improvement and process improvement categories. Commonly mentioned problem management metrics include incidents related to problems, number of resolved problems, number of known errors and time take to resolve problems. A sample list of problem management metrics is shown in Table 4.53.

Table 4.53 Types of ITSM process metrics - problem management

Category	**ITSM problem management process metric**
Compliance	Avoidance of service penalties for SLA breaches
Customer satisfaction	Problems by affected business units
Process improvement	Incident trend by classification
	Incidents related to problems
	Number of incidents & Request for Change (RFCs) logged/resolved
	Number of known errors
	Problems by category
	Problems by number of associated Incidents
	Problems identified from patterns of incidents
	Root causes identified
Service improvement	Number of client impacting outages
	Duration of problem resolution
	Number of open problems and time they have been open as defined by priority - potential v impact
	Number of permanent fixes implemented
	Number of problems resolved
	Problem resolution rate
	Resolved by known error
	Time spent vs. incidents fixed
	Time taken problem to known error
	Count of open problems and its ageing
	Increased resolution rates
	Number of breach calls
	Number of incidents resolved by known error
	Reduction in incidents due to fix of root cause
	Time taken to complete jobs
	Number of incidents
	Number of incidents rolled into problems
	Number of recurring incidents for each problem
	Number of repeat incidents
	Number of resolved problems
	Reduction in number of recurring incidents
	Reduction in the number of problem and age of problems
	Number of repeating incidents solved
Systems availability	Increased levels of system availability
	System downtime hours assured

Commonly-cited service desk function metrics are shown in Table 4.54. Service desk function metrics (41 question-responses) were primarily in the service improvement categories. Common metrics include number of calls, time to respond to calls, number of first call resolutions, and customer satisfaction with call resolution.

Table 4.54 Types of ITSM process metrics – service desk function

Category	**ITSM service desk function metric**
Customer satisfaction	Compliance with SLAs
	Customer satisfaction when calls are closed
	Increased level of customer service - building knowledge base of solutions
Process improvement	Calls by type
	Calls resolved at first contact
	Calls taken and closed per agent
	Number of reassignments
Service improvement	Abandoned Rate
	Average call time
	Average seconds to answer
	Call resolution rate at service desk
	Call volumes
	Calls answered within thresholds
	Number and type of incidents resolved
	Number of calls resolved at first point of contact
	Number of dropped calls
	Number of incidents resolved at first level percentage to mature over time
	Percentage of service requests versus percentage of faults
	Resolution rate
	Response rate
	Response times
	Time taken to attend to issues
	Time taken to resolve at first point of contact
	Total number of incidents raised

Service level management received 36 question-responses on ITSM process metrics. The majority of responses were in the customer satisfaction category. Common service level management process metrics include number of service level agreements (SLAs) number of SLAs met, customer satisfaction feedback, service availability and number of incidents. Sample service level management process metrics are listed in Table 4.55.

Table 4.55 Types of ITSM process metrics – service level management

Category	**ITSM service level management process metric**
Compliance	Percentage of business areas that have SLA
	Percentage of SLA aligned with services catalogue
	Reporting on time - visibility of not meeting SLAs
Cost management	Cost effectiveness
Customer satisfaction	Annual customer satisfaction survey
	Customer satisfaction surveys
	Extent that each customer group agreed service arrangements
	Improved customer satisfaction levels
	Incidents meeting SLA targets
	Number of SLAs & percentage success rate
	Number of SLAs met
	Performance against KPIs
	SLAs are mostly measured under incident
	Customer feedback
	Customer satisfaction survey
	Functions meeting SLA
	Percentage of calls completed within service levels
	Service target exceptions
Process improvement	Number of documented SLAs
	Number of service agreements
	Service desk function and availability
	Incident response
Service improvement	Accuracy of service catalogue
	Minutes of SLA breach per service item
	Number of incidents & RFCs logged/resolved
	Reduction in SLA breached incidents and failed changes
	Helps to resolve incident and/or request in hourly manner
	Service availability
Systems availability	System availability

The survey elicited 17 responses on release management metrics. The majority of these responses related to service improvement metrics. Commonly-cited release management metrics were the number of successful releases and number of incidents after release. A sample of the release management metrics is shown in Table 4.56.

Table 4.56 Types of ITSM process metrics - release management

Category	**ITSM release management process metric**
Cost management	Cost
Customer satisfaction	Number of releases to same target audience within specific timeframe
	Change advisory board
	On target performance (time)
Process improvement	Number of completed release plans
	Number of releases reviewed/approved/implemented in period
Service improvement	Impact
	Number of software releases tested and reduction approval time
	Number of successful releases
	Percentage of successful releases
	Visibility to the agency of all changes
System improvement	Number of defects resulting from release
	Number of incidents after release
	Number of incidents with cause code of ‘change’

The survey received 14 responses on configuration management process metrics. The majority of the configuration management process metrics were in the resource management category. Common configuration management process metrics related to the accuracy of the configuration management database (CMDB), as shown in Table 4.57.

Table 4.57 Types of ITSM process metrics - configuration management

Category	**ITSM configuration management process metric**
Resource management	Accuracy of configuration management database (CMDB)
	Accuracy of CMDB/configuration management system (CMS)
	Accuracy of configuration information (audits)
	Degree of accuracy
Process improvement	Improved configuration management due to greater knowledge of impact
	Number of incorrect configuration items detected
	Quality of configuration information
Service improvement	Mean time to resolve incidents/requests
	Time to implement change
Resource management	Number of configuration items linked to other configuration items
	Number of assets out of service/unused
	Physical configuration items reconciliation to finance asset register
	Reduced numbers of untraceable items
System improvement	Number of incidents shown as relating to changes

A small number of responses (14) on IT service continuity management (ITSCM) process metrics were collected and primarily categorised in risk management. The majority of the ITSCM process metrics were concerned with disaster recovery tests. The ITSCM process metric responses are shown in Table 4.58.

Table 4.58 Types of ITSM process metrics – IT service continuity management

Category	**ITSM IT service continuity management process metric**
Cost management	Cost of risks identified
Process improvement	Disaster recovery tests completed successfully
	Test results
	Plans up to date
Risk management	Number of hours before disaster recovery facility/systems reinstated
	Number of processes for which service continuity measures have been defined
	Number of successful disaster recovery tests
	Percentage of services with DR plan and/or current test performed
	Success biannual recovery testing
	Test results against recovery time objectives.
	Tested and resourced
	Testing effective
	Testing successful/reports
Service improvement	Completion and success rate on IT Service Continuity Tests

The nine capacity process metrics responses collected were primarily in the process improvement category, as shown in Table 4.59.

Table 4.59 Types of ITSM process metrics - capacity management

Category	**ITSM capacity management process metric**
Cost management	Planned budget spend
Process improvement	Fewer urgent changes (for unplanned capacity requirements)
	Number of capacity events detected
	Number of incidents with cause code of ‘capacity’
	Plan produced/updated
Resource management	Capacity forecasting
	Average Central Processing Unit (CPU)
	Disk utilisation
System improvement	Reduction in capacity related incident

The eight availability management process metrics responses are shown in Table 4.60.

Table 4.60 Types of ITSM process metrics - availability management

Category	ITSM capacity management process metric
Customer satisfaction	Availability thresholds met
	Service availability percentage measured against target where this information is available
System availability	Additional availability hours delivered
	Better availability
System availability	Increased system availability
Process improvement	Plan produced/updated
	Impact penalties reduced
System improvement	Fewer outages and service level agreements (SLA) penalties

The seven financial management metric responses—all on cost management—are shown in Table 4.61.

Table 4.61 Types of ITSM process metrics - financial management

Category	ITSM capacity management process metric
Cost management	Cost reduction and improved budgeting
	Costs associated with change
	Financial targets tracked and met
	Percentage of services covered by cost model
	Planned budget spend
	Recoveries in dollar figures
	Spend versus actual cost of services

A summary of the types of ITSM process metrics is provided in section 4.8

4.7 RQ3. How can specific ITSM performance metrics be derived?

This section reports the results of ITSM performance measurement practices of the organisations surveyed by describing the performance measurement frameworks and maturity frameworks used by the organisations, ITSM measuring and reporting practices, and challenges in measuring and reporting ITSM performance and benefit. Section 4.7.1 describes the results of the tests of association of ITSM framework implementation and ITSM metrics. Performance measurement and maturity frameworks used by the organisations surveyed are described in section 4.7.2. Section 4.7.3 provides a description of how ITSM is measured, followed by a description of the challenges of measuring ITSM performance in section 4.7.4. A description of how ITSM performance is reported is presented in section 4.7.5, followed by the challenges in reporting ITSM performance.

4.7.1 Performance measurement and maturity frameworks

Organisations in both the public and private sectors in Australia have invested in a variety of initiatives related to service management, governance and quality management. The majority of respondents (68%) did not respond to the question and it can be assumed they were not implementing a performance measurement framework for their ITSM. The minority (23 percent) were implementing one performance measurement framework. A small number of respondents implemented two (7%) and three or four (1%) performance measurement frameworks. The distribution of survey responses on performance measurement and maturity frameworks implementation is shown in Table 4.62.

Table 4.62 Distribution of PMF responses

Number of PMFs in use	**Frequency**	**Percent**	**Cumulative Percent**
0	144	68%	68%
1	49	23%	91%
2	14	7%	98%
3	2	1%	99%
4	2	1%	100%
Total	**211**	**100%**	

The survey elicited 162 question-responses on performance measurement and maturity frameworks. The minority (32%) of survey respondents who were using a performance measurement framework implemented a variety of frameworks. The balanced scorecard (15%), IT balanced scorecard (12%), and CMMI® (9%) were the frameworks mainly implemented. A small number of survey respondents implemented ISO/IEC 15504 (IT Process Assessment) (2%) and organisation-specific internal measurement (1%). Other performance measurement frameworks in use (2%) included CMMI® for services, maturity self-assessments, and contract-based assessments. There were survey respondents (34%) who indicated *not applicable* (19%) or *none* (1%), or did not know whether they were using a performance measurement framework (14%). Table 4.63 shows the distribution of responses for performance measurement and maturity frameworks.

Table 4.63 Performance measurement frameworks implemented

Performance Measurement Framework	**Number of responses**	**Percentage of response on 211 survey respondents**
Balanced Scorecard	32	15%
IT Balanced Scorecard	25	12%
CMMI®	19	9%
ISO/IEC 15504	5	2%
Organisation specific internal measurement	3	1%
Other	5	2%
Not applicable	41	19%
Don't know	30	14%
None	2	1%
Total	**162**	

4.7.2 Correlation between the existence of performance measurement frameworks and ITSM process metrics

The majority of survey respondents reporting ITSM process metrics (68% of the 211 survey respondents) were not using a performance measurement framework; with 46% not providing metrics and 22% providing metrics. The respondents using a performance measurement framework (32% of the 211 survey respondents) had a majority (22%) not providing ITSM process metric responses; and a minority (10%) providing ITSM process metric responses. The cross-tabulation of ITSM process metric respondents with performance measurement framework existence is shown in Table 4.64.

Table 4.64 Existence of ITSM performance measurement frameworks implemented by presence of ITSM metrics response cross tabulation

Count	**Not using PMF**	**Using PMF**	**Total**
No Metrics Given	97 (46%)	21 (10%)	118 (56%)
Metrics Given	47 (22%)	46 (22%)	93 (44%)
Total	**144 (68%)**	**67 (32%)**	**211 (100%)**

To test the hypothesis: *H4. There is a correlation between the existence of ITSM performance measurement frameworks and the number of ITSM process metric responses* Spearman's correlation is used. The Spearman correlation test is deemed appropriate as the data is non-parametric and the number of ITSM process metrics responses variable is measured on an interval scale and the existence of ITSM metrics is a categorical variable measured on a nominal scale (Field 2009). The cross tabulation of the existence of performance measurement frameworks and the number of ITSM metric responses is shown in Table C.25 in Appendix C. There is a positive correlation between the existence of performance measurement frameworks and number of ITSM process metric responses, which is statistically significant (r_s (209) = .338, P = .000). The test result is shown in Table C.26 in Appendix C.

4.7.3 Correlation between the existence of ITSM performance measurement frameworks and ITSM process implementation

The majority of survey respondents (68%) did report the existence of performance measurement frameworks. The number of respondents reporting the existence of performance measurement frameworks varied with the number of ITSM processes implemented. The cross-tabulation of existence of performance measurement frameworks with the number of ITSM processes implemented is shown in Table 4.65.

Table 4.65 Existence of ITSM performance measurement frameworks implemented by number of ITSM processes implemented cross tabulation

Number of ITSM Processes Implemented	**Not using PMF**	**Using PMF**	**Total**	**Percent Use**
One	12	1	13	8%
Two	9	1	10	10%
Three	20	5	25	20%
Four	17	11	28	39%
Five	21	9	30	30%
Six	19	4	23	17%
Seven	3	9	12	75%
Eight	7	4	11	36%
Nine	6	5	11	45%
Ten	11	5	16	31%
Eleven	5	5	10	50%
Twelve	4	1	5	20%
Thirteen	0	2	2	100%
Fifteen	2	1	3	33%
Sixteen	2	2	4	50%
Eighteen	1	0	1	0%
Twenty one	1	0	1	0%
Twenty two	4	2	6	33%
Total	**144**	**67**	**211**	**32%**

A check for a correlation between the existence of performance measurement frameworks and ITSM process implementation was performed using a scatterplot, as shown in Figure 4.25. The scatterplot shows that the majority of respondents reporting existence of performance measurement frameworks had implemented less than ten ITSM processes. No obvious outliers are observed as most points are close to each other. There appears to be a trend in the data with existence of performance measurement frameworks clustered around three to ten implemented ITSM processes.

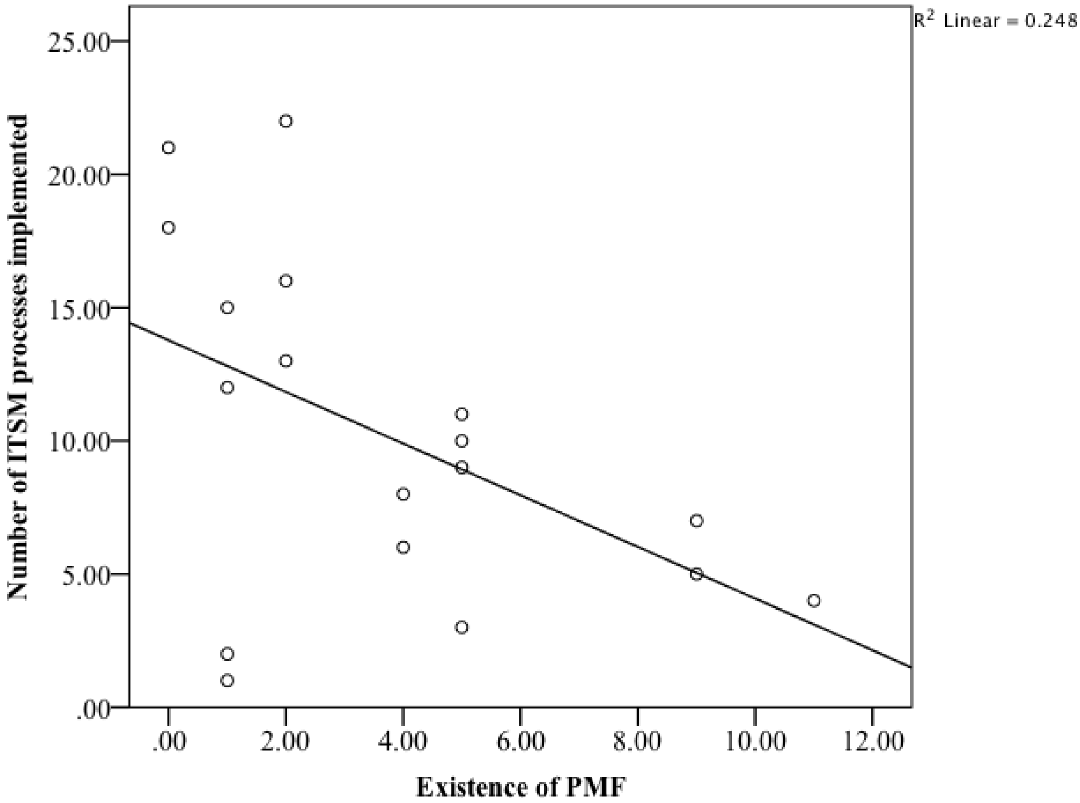

Figure 4.25 Scatterplot of the relationships between existence of performance measurement frameworks and ITSM process implementation

To test the hypothesis: H5. *There is a correlation between the number of ITSM process implemented and the existence of performance measurement frameworks* Spearman's correlation is used. The Spearman correlation test is deemed appropriate as the data is non-parametric and the number of ITSM processes implemented variable is measured on an interval scale and the existence of ITSM metrics is measured on a nominal scale (Field 2009). The cross tabulation of the number of ITSM processes implemented and the existence of performance measurement frameworks is shown in Table 4.65. There is a positive correlation between the existence of performance measurement frameworks and number of ITSM process metric responses, which is statistically significant (r_s (209) = .179, P = .009). The test result is shown in Table C.27 in Appendix C.

4.7.4 How is ITSM performance being measured?

Section C of the survey addressed how performance is being measured by focusing on the frequency of performance measurement. The study received 112 responses (53%) on the ITSM performance reporting practice from the 211 survey respondents. The survey respondents were required to provide up to five processes by typing in a process, and then selecting the frequency of measurement from a drop down list. This section reports on the results of the frequency of performance measurement, while Section 4.6.3 reports on the results of the frequency and level of performance measurement reporting. The study received 328 question-responses on the questions relating to ITSM performance measurement and reporting practices. Incident management (26%), change management (23%), and problem management (16%) had the highest number of responses on ITSM performance measurement practice. Performance measurement primarily occurred daily for incident management (11%), quarterly for change management (10%), and daily, monthly and quarterly for problem management (approximately 5%). Across all processes ITSM performance measurement was occurring evenly (32% to 28%) on monthly, quarterly and daily intervals. The distribution of ITSM performance measurement frequency is shown in Table 4.66 and detailed in Table C.28 in Appendix C.

Table 4.66 ITSM process performance measurement frequency

ITSM Process	Monthly	Quarterly	Daily	Ad Hoc	Not Stated	Monthly, Daily	Total
Incident management	7%	7%	11%	1%	0%	0%	26%
Change management	8%	10%	4%	1%	0%	0%	23%
Problem management	5%	5%	4%	2%	0%	0%	16%
Service level management	3%	3%	2%	0%	0%	0%	9%
Service desk function	2%	1%	5%	0%	0%	0%	8%
Configuration management	2%	1%	1%	0%	0%	0%	5%
Release management	1%	1%	1%	0%	0%	0%	2%
Service catalogue management	1%	1%	0%	1%	0%	0%	2%
IT service continuity management	0%	1%	0%	0%	0%	0%	2%
Request fulfillment	0%	0%	1%	0%	0%	0%	1%
Service portfolio management	0%	0%	0%	0%	0%	0%	1%
Capacity management	1%	0%	0%	0%	0%	0%	1%
Release and deployment management	0%	1%	0%	0%	0%	0%	1%
Service knowledge management	1%	0%	0%	0%	0%	0%	1%
IT financial management	1%	0%	0%	0%	0%	0%	1%
Availability management	0%	0%	0%	0%	0%	0%	0%
Demand management	0%	0%	0%	0%	0%	0%	0%
Information security management	0%	0%	0%	0%	0%	0%	0%
Service asset and configuration management	0%	0%	0%	0%	0%	0%	0%
Transition Planning and Support	0%	0%	0%	0%	0%	0%	0%
TOTAL	**32%**	**32%**	**28%**	**7%**	**0%**	**0%**	**100%**

4.7.5 Challenges in measuring ITSM performance and benefits

The survey received 126 survey-responses on performance measurement challenges; this represented 60 percent of the survey respondents. A Microsoft Excel spreadsheet was used to analyse the qualitative responses. Single performance measurement challenge responses (126) were identified and recorded in individual rows in the spreadsheet. An initial review of the responses identified key words from the responses. A second review of the responses was based on identifying system elements of input, process, output, resources and environment. Categories for the ITSM measuring challenges emerged based on the system elements, as shown in Table 4.70. The majority of ITSM measurement challenges were in the category of measurement methods (51%), measurement stakeholders (17%) and measurement tools (13%) as shown in Figure 4.26.

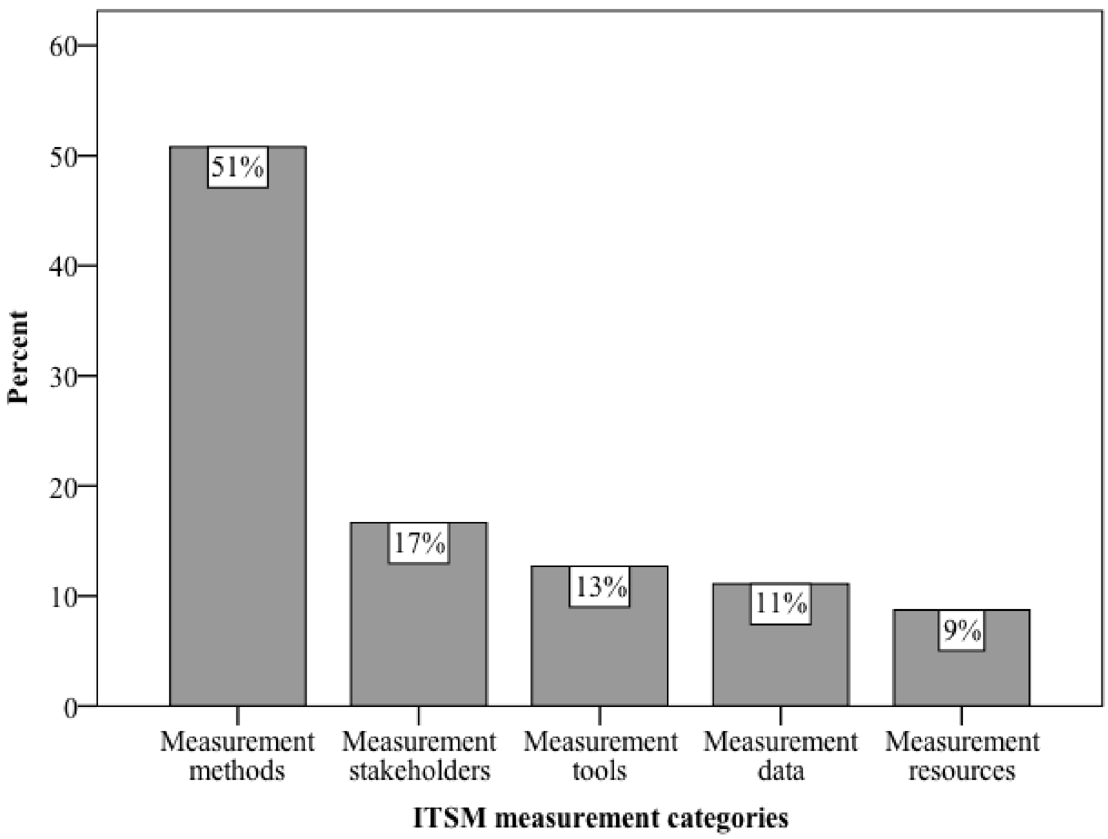

Figure 4.26 ITSM measurement challenges

After the ITSM measurement challenge responses were categorised, a table of unique challenges was generated—a sample of which is shown in Table 4.67. A detailed table of the responses on ITSM measuring challenges is shown in Table C.29 in Appendix C.

Table 4.67 Sample ITSM measurement challenges

Category	Measurement Challenge
Measurement data	Accurate measurements
	Consistent data
	Data quality
	Having correct data
Measurement methods	Keeping the metrics tangible and focused on real benefits
	Quantifiable metrics that align to business needs
	Allowing for large range from simple to complex requirements
	Finding the right metric and the way to measure it
	The broadness of ITSM means that in order to accurately measure success you must review a multitude of areas and information
	Tying all the different IT components together to a "single source of truth".
Measurement resources	Funding the resources required to produce these measures
	Lack of ability of ITSM project managers and consultants to translate benefits of implementation into financial gains
	Available time to analyse statistical data
Measurement stakeholders	Measuring what the customer actually cares about and not what we think they do
	Understand what metric to measure and what the affect the metric will have on the staff
	Reporting processes and agreed reporting business rules with all stakeholders
	Engaging staff on why the measurements are recorded
	Senior management understanding and support
	Appropriate business engagement over service improvement
	Benefits not being understood consistently by all stakeholders
	Fear of 'bad' result
	Having the means to measure and use this information to the value of the business
Measurement tools	Obtaining relevant data from existing systems
	Appropriate processes and toolsets that allow measurements
	Configuring and reporting from our ITSM tool
	Disparate metrics systems
	Getting taxonomy model in toolset correct to create effective reports
	Having the right tools
	Lack of existing toolset for easy reporting
	Multiple, non-interoperable IT systems, with poor understanding of control points

Challenges in configuring and reporting were reported despite the fact that the ITSM tools usually include a menu of metrics. Though there are many ITSM metrics available from the ITSM literature and tools, organisations continue to struggle to identify meaningful or effective metrics. Difficulties in managing stakeholder perceptions, identifying intangible benefits, and the time delay between improving processes and measuring the outcomes are characteristic of benefits not being realised in the short term but over time, for example, ‘After the initial bang for buck with the service desk/incident management, many of the other benefits take a while to realise—keeping management on board at this time when reporting of benefits is lean is a challenge' (ID# 109). A summary of the challenges of measuring ITSM performance is provided in section 4.8

4.7.6 How is ITSM performance being reported?

The study received 112 responses (53%) on the ITSM performance reporting practice from the 211 survey respondents. The survey respondents were required to provide up to five processes by typing in a process, and then selecting the frequency of reporting and the level of reporting from a drop down list. This section reports on the results of the frequency and level of performance measurement reporting; and Section 4.7.2 reports the results on the frequency of performance measurement. The study received 328 question-responses on the frequency of the ITSM reporting practice. The processes attracting the most responses were incident management (85 question-responses), change management (75 question-responses), and problem management (53 question-responses). The respondents typed in the process and frequency of performance measurement, frequency of reporting and the level of reporting for the process. Performance measurement reporting occurred primarily monthly for incident management process (13%), change management process (12%), and problem management (9%). Considering all the ITSM processes implemented, reporting mainly occurred monthly (53%), quarterly (19%) and weekly (14%)—as shown in Table 4.68 and further detailed in Table C.30 in Appendix C.

Table 4.68 ITSM performance reporting frequency

ITSM Process	Monthly	Quarterly	Weekly	Ad Hoc	Daily	Not stated	Total % of question-responses
Incident management	13%	8%	1%	1%	3%	1%	26%
Change management	12%	3%	8%	0%	0%	0%	23%
Problem management	9%	2%	3%	2%	1%	0%	16%
Service level management	5%	3%	0%	0%	0%	0%	9%
Service desk function	4%	1%	2%	0%	1%	0%	8%
Configuration management	4%	0%	0%	0%	0%	0%	5%
Release management	2%	0%	0%	1%	0%	0%	2%
IT service continuity management	1%	0%	0%	0%	0%	0%	1%
Service catalogue management	1%	0%	0%	1%	0%	0%	2%
Capacity management	1%	0%	0%	0%	0%	0%	1%
IT financial management	1%	0%	0%	0%	0%	0%	1%
Service knowledge management	1%	0%	0%	0%	0%	0%	1%
Availability management	0%	0%	0%	0%	0%	0%	0%
Demand management	0%	0%	0%	0%	0%	0%	0%
Information security management	0%	0%	0%	0%	0%	0%	0%
Request fulfillment	0%	0%	0%	0%	0%	0%	1%
Service asset and configuration	0%	0%	0%	0%	0%	0%	0%
Service portfolio management	0%	0%	0%	1%	0%	0%	1%
Release and deployment management	0%	1%	0%	0%	0%	0%	1%
Transition planning and support	0%	0%	0%	0%	0%	0%	0%
Total % of question-responses	**53%**	**19%**	**14%**	**8%**	**5%**	**2%**	**100%**

The study received 328 question-responses on the level at which ITSM performance measurement is reported. Reporting occurred mainly at the operational level for incident management (18%), change management (13%) and problem management (8%). Considering all the ITSM implemented processes, ITSM performance was mainly reported at the operational (57%), tactical (22%) and strategic (17%) levels of the organisation—as shown in Table 4.69 and detailed in Table C.31 in Appendix C.

Table 4.69 ITSM performance reporting level

ITSM Process	Operational	Tactical	Strategic	Not Stated	Total
Incident management	58	15	8	4	85
Change management	41	17	13	4	75
Problem management	27	14	9	3	53
Service level management	10	14	6	0	30
Service desk function	22	1	2	0	25
Configuration management	10	3	2	0	15
Release management	2	2	4	0	8
Service catalogue management	4	2	2	0	8
IT service continuity management	3	1	2	0	6
Request fulfillment	3	1	0	0	4
Service portfolio management	1	0	2	1	4
Capacity management	1	0	1	1	3
Release and deployment management	2	0	1	0	3
Service knowledge management	2	1	0	0	3
IT financial management	1	0	1	0	2
Availability management	1	0	0	0	1
Demand management	0	0	1	0	1
Information security management	0	0	1	0	1
Transition planning and support	0	0	1	0	1
Total	**188**	**71**	**56**	**13**	**328**

4.7.7 Challenges in reporting ITSM performance and benefits

Section D of the questionnaire addressed the challenges of measuring and reporting ITSM performance and benefits. The survey received 121 (57%) survey-responses on ITSM reporting challenges from the 211 survey responses. A Microsoft Excel spreadsheet was used to analyse the qualitative responses, resulting in 121 single performance reporting challenge responses. Single performance reporting challenge responses were identified and recorded in individual rows in the spreadsheet. An initial review of the responses identified key words from the responses. A second review of the responses was based on classifying the challenges according to system elements of input, process, output, resources and environment based on service management as a practice described in OGC (2011). Categories for the ITSM performance reporting challenges emerged based on the system elements as shown in Table 4.70.

Table 4.70 ITSM measurement challenge categories along system elements

Systems elements	Inputs	Processes	Outputs	Resources	Environment
ITSM performance measurement categories	Measurement data	Measurement methods	Measurement tools, Reports	Measurement resources	Measurement stakeholders

The majority of the ITSM reporting challenges were identified as reporting to stakeholders (40%), closely followed by reporting methods (37%) and reporting tools (11%), as shown in Figure 4.27.

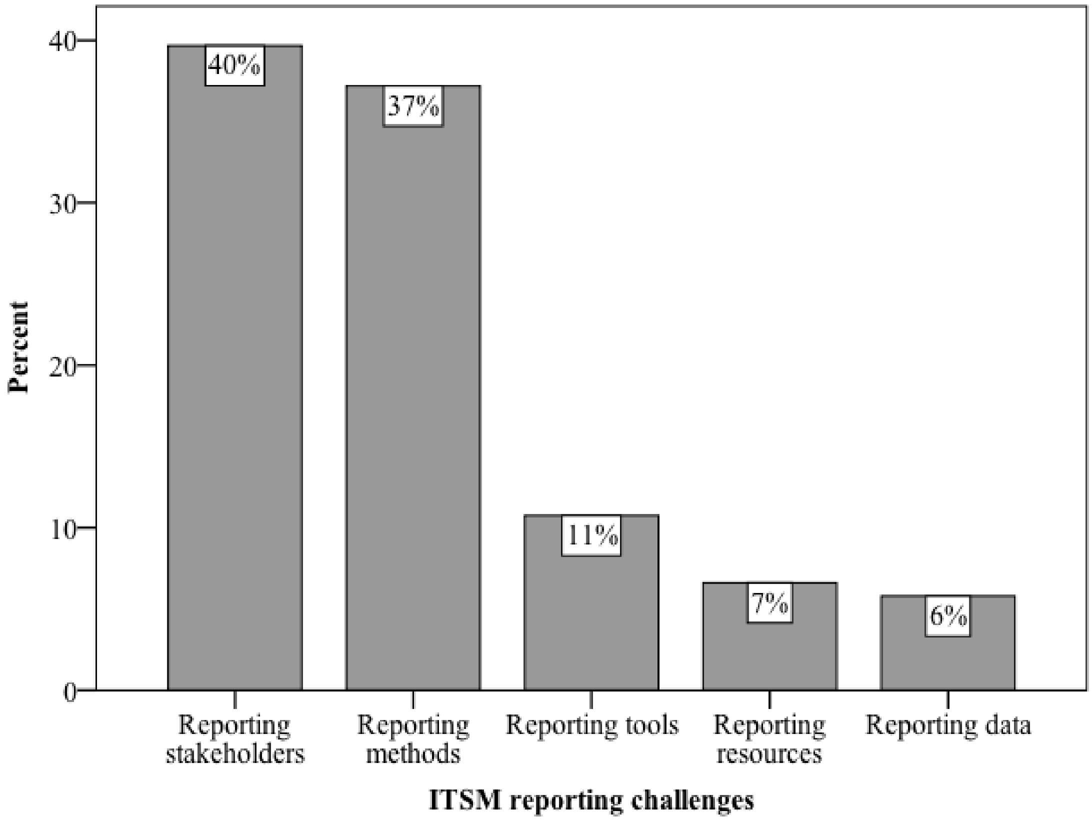

Figure 4.27 ITSM reporting challenges

Based on the categorisation of ITSM reporting challenges, a table of unique ITSM reporting challenges was generated and a sample is shown in Table 4.71. A detailed table of the responses on ITSM reporting challenges is shown in Table C.32 in Appendix C.

Table 4.71 Sample ITSM reporting challenges

Category	Reporting Challenge
Reporting data	Accurate data in reports
	Base lining data to report on metrics
	Ensuring appropriate data has been entered and can be measured
Reporting methods	Defining metrics
	Producing useful before/after data to evidence the changes
	Being able to slice and dice the data in different ways to present it to different parts of the organisation.
Reporting resources	Budget constraints
	Time
Reporting stakeholders	Implementation projects not managed by executives at the right level. Level not high enough to ensure proper visibility
	IT units see no value in it
	What is done with reports: staff fear of exposure of bad results
Reporting tools	A reporting tool covering the scope of report criteria
	Limitations of how we are currently using our service desk system
	Your service management toolset must collect information to allow you to measure benefits

From the comments provided by the respondents, the major measuring and reporting challenges stem from two main sources: measurement and reporting methods and stakeholders. A constant theme in the comments regarding measurement was the admission that the ITSM practitioners lacked measurement expertise, that is, ‘knowing what metrics to capture’ (ID# 30). Most of the benefits that accrue from ITSM efforts are intangible and non-financial. This may explain the challenges reported from the BSC financial perspective: ‘A large number of benefits lie within the business and are soft benefits, not hard dollar savings. Difficult to measure as no reporting’ (ID# 50); and ‘Quantitative benefits are easily visible. Many of the benefits are qualitative, however, and not as easy to measure. As we're getting better customer relationships, we are getting access to more of this qualitative kind of data which is great’ (ID# 109).

It is evident from the comments that practitioners who know what to measure complain of insufficient resources in terms of time, for example, ‘Time taken recording and reporting in an overstretched and busy environment’ (ID# 118). Despite the proliferation of ITSM tools, many respondents experience problems with configuring and using the tools, for example, ‘effective tool that isn’t labour intensive’ (ID# 22); and ‘configuring and reporting from our ITSM tool’ (ID#136).

Measuring and reporting performance to multiple stakeholders increases the complexity of the task, for example, ‘Defining reporting requirements to meet the needs of multiple customers" (ID# 78); and 'Being able to slice and dice the data in different ways to present it to different parts of the organisation' (ID# 138). Survey and case study respondents indicated that their efforts to engage with business are futile. Examples of the frustration experienced by practitioners include: 'Business is not interested; reporting to internal IT group is as far as we can go' (ID# 29); 'Management don't care enough' (ID# 72); and 'Getting senior managers to take action on measures' (ID# 71). Furthermore, some ITSM staff fear the outcome of reporting to senior management, for example: 'Preconceptions of executive level of what is being reported, hearing what they want to, ignoring self-evident truth' (ID# 5); 'What is done with reports: staff fear of exposure of bad results' (ID# 88); and 'Explaining results good or bad in a way that makes sense' (ID# 51).

The survey results point to ITSM practitioners not generally using performance measurement frameworks and none reported having implemented ITSM framework performance measurement processes. ITSM practitioners described performance measurement and reporting challenges mainly stemming from measurement methods, measurement stakeholders, reporting stakeholders, and reporting methods. To a lesser extent, ITSM practitioners faced measuring and reporting challenges attributed to tools, data and resources.

4.8 Summary of survey findings

The survey revealed performance measurement practices and primarily answers two research questions:

> *RQ1. What types of benefits are reported from ITSM improvement initiatives?*
>
> *RQ2. Which specific metrics can be used to measure ITSM performance?*

The survey also provides a basis for addressing the third research question:

> *RQ3. How can specific ITSM performance metrics be derived?*

The third research question *RQ.3* provides a foundation for the development of the performance measurement framework described in Chapter 5.

4.8.1 Summary of ITSM benefits, metrics and performance measurement practice

Based on the majority of survey responses, the typical survey respondent was a corporate itSMFA member, with three or less ITIL roles; and in the role of ITIL process manager employed in an organisation located in the largest (geographical area and by population) Australian states; in the property, business service, government, education or finance and insurance industry sectors; Australian owned, with annual turnover greater than $50 million and employing more than 1,000 fulltime staff.

The vast majority of itSMFA members use ITIL as opposed to alternative ITSM frameworks. The most frequently implemented ITIL processes by number of respondents were change management (13%), incident management (13%), problem management (10%), service level management (9%), configuration management (7%) and the service desk function (7%). The top 12 most implemented processes accounted for 80 percent of the processes implemented.

The majority of respondents (68%) were not using a performance measurement framework. The minority (32%) of respondents who were using a performance measurement framework mainly used the balanced scorecard (18%), IT balanced scorecard (15%) or CMMI® (12%).

Based on the majority of responses provided, a typical ITSM organisation has the following performance measurement practices: predominantly implementing ITIL processes for one or two years, implemented change management, incident management, problem management, implemented incident management first then change management second, followed by problem management, implementing one or two additional frameworks alongside ITSM framework processes as part of the IT service management improvement initiatives, typically Prince 2 and ISO 9000 or ISO/IEC 20000, limited use of performance measurement frameworks for ITSM, and when a performance measurement framework is used it is typically the balanced scorecard (BSC).

Statistical tests performed do not support the finding that there is a correlation between the number of ITSM processes implemented and the number of ITSM benefits responses (H1). Statistical tests also do not support the finding that there is a significant correlation between ITSM process implementation and number of ITSM metrics responses (H2). The statistical test results support the finding that there is a moderate, positive correlation between ITSM process benefit responses and ITSM metric responses (H3). There is a correlation between the existence of ITSM performance measurement framework implementation and number of ITSM metrics (H4). There is a correlation between ITSM process implementation and the existence of performance measurement frameworks (H5).

At the organisational level using balanced scorecard (BSC) based perspectives, improved quality of business operations was the most commonly cited ITSM benefit along the business perspective; cost justified IT infrastructure and IT services was most cited along the financial perspective; improved visibility and reputation of the IT department was most commonly cited along the employee perspective; delivery of IT services that underpin business processes and better information on current services were the commonly cited ITSM benefits along the innovation perspective.

At the ITSM process level the majority of benefits were process improvement benefits (37% of responses). Change management process benefits were the most commonly cited. Common ITSM process benefits for the change management process include: improved control of the change management process, reduction in change related incidents and outages, reduced risk, and improved system availability.

The majority of ITSM process metric responses were service improvement metrics (29%), closely followed by process improvement metrics (26%). The incident management process had the most metric responses (24%). Commonly cited incident management metrics include number of incidents, time taken to resolve incident, calls resolved at first contact, compliance with service level agreements (SLAs) and call response.

At the process level, ITSM performance measurement primarily occurred monthly, quarterly and daily. ITSM performance reporting mainly occurred monthly and was reported primarily at the operational level.

4.8.2 Summary of challenges of measuring and reporting ITSM benefits

Commonly-cited challenges in measuring ITSM performance were related to measurement methods with sample challenges such as '*keeping the metrics tangible* *and focused on real benefits'* and '*tying all the different IT components together to a single source of truth'* reported.

The ITSM reporting challenges primarily related to reporting to stakeholders and reporting methods, for example, '*being able to agree on common metrics across divisions'* and '*focusing on correct things to prove the benefit'* reported.

4.9 Case study results

The case studies were conducted to achieve a more detailed understanding of the performance measurement practices and answer RQ4: *what internal and external environmental factors influence the organisations' selection of specific performance metrics for ITSM?* The results of the survey form the basis for selecting the organisations for case study. This section is organised into sub-sections providing descriptions of the case study results. In section 4.9.1 the analysis and results of the case studies are introduced. Section 4.9.2 provides an account of the case study responses. The case study validity and reliability measures are presented in section 4.9.3. The case study analysis is described in section 4.9.4. Descriptions of the six case studies are provided in sections 4.9.5 to 4.9.10. Cross-case analysis is presented in section 4.9.11.

4.9.1 Case study data preparation

The 211 survey responses were used as the basis for case study selection. Organisations that met specific criteria were selected for case study. The following parameters were used to increase the chance of selecting organisations that were actively measuring the performance of their ITSM:

- Include only organisations using ITIL as ITSM Framework
- Exclude responses without any metrics
- Exclude responses without a PMF or related framework that guide measurement
- Exclude organisations with less than four processes implemented
- Exclude responses with less than four benefits
- Exclude responses describing less than three process metrics, measurement frequency, report frequency and report level.

A profile of the selected 14 organisations is shown in Table 4.72.

Table 4.72 Potential case study organisations

Org.	State	Business Sector	Ownership	Annual Turnover ($ Millions)	Total Full Time Staff	ITSM Frame work	Duration
1	ACT	Government administration and defence	Government Organisation	50 to 150	2000 to 4999	ITIL v3	2 years
2	NSW	Finance and insurance	Wholly Australian owned Public Listed Company	Don't know	2000 to 4999	ITIL v2	5 years
3	NSW	Property and business services (includes IT firms)	Partially Australian and foreign owned	More than 150	More than 10000	ITIL v2	7 years
4	QLD	Education	Government Organisation	Don't know	5000 to 9999 full time staff	ITIL v3	Not Indicated
5	QLD	Government administration and defence	Government Organisation	5 to 9	200 to 999 full time staff	ITIL v2	4 years
6	SA	Personal and other services	Government Organisation	More than 150	Less than 200 full time staff or equivalent	ITIL v2	3 years
7	TAS	Education	Government Organisation	50 to 150	2000 to 4999 full time staff	ITIL v2	2 years
8	VIC	Not for Profit	Wholly Australian owned Private Company	More than 150	200 to 999 full time staff	ITIL v3	3 years
9	VIC	Education	Government Organisation	More than 150	5000 to 9999 full time staff	ITIL v2	4 years
10	VIC	Finance and insurance	Partly Australian owned Private Company	Don't know	2000 to 4999 full time staff	ITIL v2	9 years
11	VIC	Finance and insurance	Wholly Australian owned Public Listed Company	More than 150	More than 10000 full time staff	ITIL v3	2 years
12	VIC	Manufacturing	Partly Australian owned Private Company	Less than 5	1000 to 1999 full time staff	ITIL v3	2 years
13	WA	Education	Government Organisation	More than 150	More than 10000 full time staff	ITIL v2	5 years
14	WA	Health and community services	Don't Know	Don't know	1000 to 1999 full time staff	ITIL v3	2 years

A draft of the case study interview questions and invitation letter were sent to the panel of experts and itSMFA board for review, and endorsement was granted with minimal changes. An invitation letter to participate in the case study was sent to each of the 14 organisations. A copy of the case study invitation letter is included in Figure C.1 in Appendix C. At the 2010 itSMFA national conference in Melbourne, the PhD student conducted preliminary meetings with ten of the ITSM managers from the 14 organisations selected for case study. After the preliminary meetings a follow-up email was sent to the organisations. A copy of the case study follow-up email can be found in Appendix C. The preliminary meetings helped further develop a relationship with the target organisations and provided an opportunity to explain the importance of the study and achieve commitment from the organisations.

4.9.2 Case study implementation

Including the pilot case study, a total of seven case studies were conducted. In the six case studies undertaken after the pilot, the PhD student and principal supervisor conducted interviews. The PhD student and three study supervisors performed the content analysis. Each case study interview conducted was audio recorded, transcribed and checked by the researcher and interviewees. Interviews were conducted at two organisations in each of three Australian states: New South Wales, Queensland and Victoria. The interviewers travelled to each organisation and conducted the interviews on site. The case study interviewees were directly involved in ITSM implementation, management, performance measurement, and reporting. The interviewees held a wide range of ITIL process roles and were drawn from middle and operational levels of management.

4.9.3 Case study response

To increase the likelihood of attracting six organisations to participate in the case study, invitations were sent to 14 organisations. Seven of the 14 organisations accepted the invitation to participate in the case study. One of the seven organisations was unable to participate, as a suitable interview date could not be achieved. The six case study interviews were conducted on site during the period 28th October to 24th November 2010. A schedule of the case study interview dates is shown in Table 4.73. The interviews were used to further research ITSM performance measurement by following up on the ITSM performance measurement responses from the survey. The case study interviews were recorded and then transcribed.

Table 4.73 Schedule of case study interviews

State	**Actual case study date**	**Time**
QLD	Thursday 28/10/2010 AM	
QLD	Thursday 28/10/2010 PM	
NSW	Monday 22/11/2010 AM	9.00am to 12.00pm
NSW	Monday 22/11/2010 AM	2.00pm to 3.30pm
VIC	Wednesday 24/11/2010 AM	10.00am to 12.00pm
VIC	Wednesday 24/11/2010 PM	12.30am to 3.00pm

During the interviews the interviewees were mainly asked pre-designed open-ended questions and further clarifications and requests for supporting documents were made. At the beginning of the interviews the interviewees were presented with consent forms to read and sign. A copy of the case study interview participation consent form is shown in Figure C.3 in Appendix C. The case study interview questions can be found in Table C.33 in Appendix C. The PhD student and one of the study supervisors conducted the interviews. The interviewers used an interview guide and printed interview questions to conduct the interviews. Documents to be collected included letters, organisational charts, memos, emails, minutes of meetings, administrative documents, and press releases and newspaper articles made available by the organisation. A structured portfolio of the case study documents for each organisation was maintained and contained the following:

1. Organisation background information
2. Case study protocol
3. Interview guidelines
4. Interview consent forms
5. Interview instrument
6. Organisation artefacts
7. Correspondence
8. Case study report
9. Interview transcripts
10. ITSM benefits survey responses
11. List of common abbreviations.

4.9.4 Case study validity and reliability

To improve the validity and reliability of the case studies the following actions were undertaken: triangulation, independent checks, respondent verification, and multiple reviews and use of case study protocol. Triangulation involves the convergence of the case study responses and results with survey data and results and the literature review findings. Independent checks by multiple researchers entailed the supervision team reviewing the analysed data. Verification was performed on the case study transcripts emailed to the respondents who checked and confirmed that the transcripts were an accurate reflection of the interview. The PhD student performed multiple reviews of the transcripts. A case study protocol provided a guide and procedures and is shown in Table C.34 in Appendix C.

4.9.5 Case study analysis

The data collected was analysed using content analysis. The Notepad++ computer software was used to perform the content analysis of the qualitative survey responses, the case study data and data from the documents collected. The following coding scheme was used:

1. Define the recording units
2. Define the categories
3. Test coding on sample of text
4. Assess accuracy or reliability
5. Revise the coding rules
6. Return to step 3
7. Code all the text
8. Assess achieved reliability or accuracy (Weber 1990a, pp. 21-4).

The case study analysis focused on the performance measurement practice of ITSM practitioners with the aim of identifying the internal and external factors that influence the organisation's selection of ITSM performance metrics. Qualitative data analysis approaches were evaluated and content analysis was selected as an appropriate approach to identify themes (U.S. General Accounting Office 1996). Content analysis was used since the objective of the qualitative analysis of the case study data is the identification of themes and classification of key ideas from written text. The highly-cited content analysis text by Krippendorff (1980) and its revision

Krippendorff (2004); (Weber 1990b) were used as guides to the content analysis. The content analysis answered the six questions shown in Figure 4.2 that, according to Krippendorff, must be addressed in every content analysis (1980).

Data analysis entailed counting the codes' frequency and finding associations between variables. This was achieved by first marking the codes of categories on identified themes, followed by counting the codes and summarising them. The researcher followed a set of content analysis instructions shown in Table C.35 in Appendix C. Table 4.74 lists the content analysis criteria.

Table 4.74 Content analysis criteria

Which data are analysed?	Interviewee responses and organisation information on factors influencing the selection of ITSM performance metrics
How are they defined?	Internal and external factors from a general contingency theory of organisations
What is the population from which they are drawn?	The case study interview transcripts and case study organisation documents
What is the context relative to which the data are analysed?	The contingency theory of management and ITSM
What are the boundaries of the analysis?	Organisations implementing ITSM performance measurement
What is the target of the inferences?	Identification of external and internal environment factors influencing the selection of ITSM performance metrics.

Textual materials used in the analysis include the case study interview transcripts and documents from the case study organisations. Six of the case study organisations provided internal documents and five of the organisations provided a demonstration of the performance measurement systems in use. One of the organisations did not provide a demonstration of their performance measurement systems as their organisation was undergoing a review.

Interviews were conducted at two organisations in each of three Australian states: New South Wales, Queensland and Victoria. All the organisations in the case study were implementing ITIL. The profiles of the six organisations selected for case study are presented in Table 4.75. The case study interviewees were directly involved in ITSM implementation, management, performance measurement, and reporting. They held a wide range of ITIL process roles. The interviewees were drawn from middle and operational levels of management. The case study organisations are referred to as Case A to F to ensure that the identity of organisations remains confidential. The case study and survey responses are also rendered anonymous and reference is made to a case response using the format Case ID, transcript line number. The transcribed interviews were documented using Notepad++ with assigned line numbers for each line in the body of text. The survey responses are numbered 1 to 211, each representing an entire survey response from a respondent. The survey response number is used as the reference ID when citing respondent's comments in this section.

Table 4.75 Profile of case study organisations

Case	**n**	**Position of Interviewees**	**Type/ Owner**	**Business Sector**	**Total Staff**	**Annual Turnover**	**Years**
A	2	Director Service Planning and Performance, Manager	Public	Health	> 10,000	> $150 Million	8
B	1	Director Client Services	Public	Administration - IT Managed Services Provider	200 to 999	$5 to $9 Million	4
C	1	Quality Assurance and Certification Manager	Private (Australian / Foreign)	IT Managed Services Provider	> 10,000	> $150 Million	7
D	4	Business Integration Manager, Service Level Manager, Manager, Service Management Office Director, IT Corporate Services	Public	Education	5,000 to 9,999	> $150 Million	4
E	4	Professional Services Manager, Operations Reporting Analyst, Project Office Manager, Operations Manager	Private (Australian owned)	Not for Profit	200 to 999	> $150 Million	3
F	1	IT Service Desk Manager	Private (Australian owned)	Health and community services	2,000 to 4,999	>$150 Million	1

Note: n – number of interviewees; years – ITSM adoption duration

The internal and external environmental factors are used as tags for segments of text and coding is performed manually. Stability (the same coder achieves the same results time after time) and reproducibility (different coders using the coding scheme classify the text into the same categories) are measured. Factors that did not fall into the listed internal and external environmental factors were identified and categorised as new factors emergent from the case studies. To achieve reliability, four researchers using the same coding scheme classified the text into internal and external factors (categories). The coding scheme was developed and trialled on the pilot case study at two meetings. The research team was organised so that the PhD student performed analysis on the six case study interviews and organisation documents while the other three researchers, the PhD supervisors, each separately analysed two different case studies. Once this was complete the PhD student met with each of the three study supervisors for an hour-long meeting on each case. During the meeting the two sets of analysis, one from each researcher, were compared and where there were differences, a consensus was reached. The division of key case study tasks is shown in Table 4.76.

Table 4.76 Division of key case study tasks

Key Task	**Role**	**Responsibility**	**Person Responsible**		
Case study design	Author	Conceptualise and configure case study protocols and instruments	PhD Candidate		
Case study interview questionnaire	Author	Design case study interview questionnaires	PhD Candidate		
	Editor	Review and provide feedback and suggestions		Principal Supervisor	Associate Supervisor 1
Case study interview scheduling	Manager	Contact organisations and set interview dates	PhD Candidate		
Case study interview implementation	Lead Interviewer	Ask case study participants questions and record responses	PhD Candidate		
	Support Interviewer			Principal Supervisor	
	Reviewer	Review transcribed interviews	PhD Candidate		
Content analysis design	Author	Conceptualise, research, design and author content analysis	PhD Candidate		
	Editor	Provide editorial corrections and review content analysis design		Principal Supervisor	Associate Supervisor
Content analysis coding	Author	Design codes and templates for use	PhD Candidate		
	Coder	Use coding guide to undertake content analysis of transcriptions	PhD Candidate	Principal Supervisor	Associate Supervisor 1 & 2
Content analysis consensus	Lead	Organise meeting and reach consensus with coder and record meeting	PhD Candidate		
	Participant	Present content analysis coding and justify recordings		Principal Supervisor	Associate Supervisor 1 & 2
Content analysis results	Author	Interpret, collate and present	PhD Candidate		
	Reviewer	Review and provide feedback and suggestions		Principal Supervisor	Associate Supervisor 1& 2
Case study documentation	Designer and custodian	Design of physical and electronic secure storage and filing system.	PhD Candidate		

4.9.6 Case A – public sector health organisation

Case A previously used the BSC as its performance measurement framework but, following a series of changes in Chief Information Officers (CIOs), its use tapered off. The organisation was considering reviving use of the BSC. Case A had implemented ITIL v2 over eight years. The following ITIL v2 processes had been implemented: incident management, problem management, configuration management, change management, release management, service desk function, service level management and capacity management. The sequence of ITIL process implementation was incident management, change management and configuration management. Case A also implemented ISO/IEC 20000, ISO 9000, PRINCE2 and CobiT.

In Case A, CIO influence was the primary internal environment factor influencing the selection of ITSM performance metrics: *So the CIO is basically setting his requirements for what we report on and then feeding those up into an organisational report;* and *The CIO basically looked at the BSC and said "this is not [what I want]"* (transcript line # 185, #500). ITSM tools and internal customers were also influencing factors. The other internal environment factors influencing the selection of ITSM performance metrics in Case A included: organisation strategy, governance framework, organisation culture (historical metrics), senior management needs, CIO influence, IS goals (visibility, chargeback, standardisation), improvement, IS function structure, IS budget size, ITSM manager perspective, ITSM and ICT tools, and internal customers.

To a minor extent, legislation was the only external environment factor influencing the selection of ITSM performance metrics.

4.9.7 Case B – public sector managed service provider

Organisation B had been using ITIL for four years and, at the time of the interview, was undergoing organisational structure changes. Case B had primarily implemented ITIL v2 and had the following processes in place: incident management, problem management, configuration management, change management, service desk function, service level management, and IT service continuity management. The sequence of the first three ITIL processes implemented was incident management, change management, problem management. Case B had also implemented

PRINCE2® and CobiT®. Case B did not have a formalised performance measurement framework for ITSM but had a formal management-reporting framework based on a modified BSC. Elements of ITSM were reported through the BSC. The modified BSC had been in use for two years. The organisation reported ITIL process benefits including an efficient way to monitor issues, assurance that business will still run after change had been implemented and having one central location that all customers can call. The organisation found that having a central location for customers to call standardised their customer service and improved management control. Examples of ITSM performance metrics included number of incidents, trend analysis, number of known errors, number of problem records and number of failed changes. Metrics were recorded and reported at the operational level for incident and problem management processes; while change management metrics were recorded weekly and reported quarterly at the tactical level. The service desk function metrics were recorded and reported monthly at the operational level. Challenges experienced by Case B included '*accurate record keeping and technical limitations'* (survey response ID #199), while reporting challenges included '*technical limitations and meaningful reports'* (survey response ID #199).

In Case B, the main internal environmental factor influencing the selection of ITSM performance metrics was organisation culture: '*I have worked here for a long time...where crisis management is the preferred modus operandi'*, and '*the only reason I capture this stuff is so that somebody else can report it to the executive'* (transcript line #143, #422). The main external environmental factor was external customers: '*We have a reporting framework and method with our customers'* (transcript line # 52). The organisation's performance measurement framework also influenced selection of ITSM performance metrics. In Case B the internal environmental factors were organisation goal, organisation culture (historical metrics), governance framework, organisation performance measurement framework, HR performance monitoring, management philosophy, senior management needs, IS function structure, IS budget size, ITSM manager perspective, ITSM and ICT Tools, and IT operations staff influence. The external factors influencing the selection of ITSM performance metrics in Case B included: industry, legislation and external customers.

4.9.8 Case C – private sector managed services provider

This organisation used a combination of frameworks and standards to measure the performance of ITSM. The organisation has implemented ITIL v2 in the past seven years, and had recently implemented ITIL v3. The following ITIL v2 and v3 processes had been implemented: incident management, problem management, configuration management, change management, release management, service desk function, service level management, IT financial management, capacity management, availability management, IT service continuity management and supplier management. The ITIL processes were implemented in groups. The first group comprised incident management, problem management, change management, configuration management and service desk function; followed by the second group: release management, service level management, capacity management, availability management and supplier management; followed by the third group: IT financial management and IT service continuity management. Case C also implemented CobiT, ISO/IEC 20000, ISO 9000, parts of ISO 27001-001, 14001 and 18001, Six Sigma, Organisation Health and Safety and parts of CMMI®. The BSC and the IT BSC were also being implemented, along with use of ISO/IEC 15504 and maturity assessments for processes. Reduced rework and increased customer satisfaction were listed as the benefits from ITSM. Incident management was measured daily and reported monthly at the strategic level. Problem management was measured monthly and reported quarterly at the strategic level. Configuration management was measured daily and reported quarterly at the strategic level. Change and release management were measured daily and reported monthly at the strategic level. A key measuring challenge was '*agreeing on what should be measured'*, while a key reporting challenge was *'what should be reported from all the metrics supplied'* (survey response ID# 11).

The IS function control structure was the main internal environment factor influencing the selection of ITSM performance metrics. '*Yeah, but that's the organisation structure. So these are the support functions that sit within it. You have a business improvement team that sits across that and that they feed into lines of service…It's matrixed, highly matrixed'* (transcript line # 140). Other internal environment factors included organisation strategy, organisation size, organisation goals, governance framework, organisation performance measurement framework, management philosophy, senior management needs, IS function size, IS function structure, ITSM and ICT tools, ITSM books, training and internal customers.

The major external environment factor influencing the selection of ITSM metrics was requirements of external customers: '*To give clients the idea that we have external people looking at us, we have metrics that are driven by those externals'* (transcript line # 36). Other external environment factors for Case C were industry, external customer and standards.

4.9.9 Case D – public sector education provider

Case D was measuring some of its implemented ITSM processes such as change management. The organisation had been using a maturity assessment framework through a consultant since 2007. The organisation had implemented ITIL v2 for four years. Incident management, change management, release management, service desk function and service level management had been implemented. The first three processes were implemented in the following sequence: incident management, change management, release management. PMBOK and IT BSC were also being implemented. Some of the benefits from the ITSM implementation include certainty of outcome from incidents, higher availability, single point of call, fast call resolution, and shared expectations of service. ITSM performance metrics in use included: mean time to restore, first call resolution, timeliness by work unit, misclassification of incidents, and process avoidance by work unit. Incident management, change management and release management were measured monthly and reported quarterly at the tactical level. A key measurement challenge was disparate metrics systems, while a key reporting challenge was getting senior managers to take action on measures.

CIO influence was a key internal environment factor influencing the selection of metrics: '*I'm pretty sure our CIO now doesn't like that. He just wants the figures';* '*So this is a very small sample of data which I just used to show our CIO because he said, "I want a report which looks like this" and he drew it and said, "that's what it looks like"* (transcript line # 904)'. ITSM tools were also a key internal environment factor influencing the selection of ITSM performance metrics: '*Well here are the reports the software provides out of the box. In maybe, 95% of the cases, that seems to meet our needs'* (transcript line #588). Other internal environment factors included: organisation strategy, organisation culture (historical metrics), governance framework, management philosophy, IS function structure, IS function maturity, ITSM manager perspective, IT operations staff influence, internal customers, and ease of use/measurement.

Industry sector was an important external environmental factor: '*We are just focusing on what is the best practice out in the industry'; 'From an external point of view, I think that at the time in 2007 what influenced it was listening to what a lot of other industry organisations were doing'* (transcript line #27, line #194). Legislation was, to an extent, an external factor: '*We've been audited by the Auditor-General's office'* (transcript line #547). In Case D's ITSM performance metric selection, other influencing external environment factors included competitive environment and culture—external to the organisation, external customer, and consultants.

4.9.10 Case E – private sector charitable organisation

Case E did not have a specific framework for performance monitoring and used the key performance indicators defined by ITIL. The organisation had been implementing ITIL v3 for three years. The first three processes were implemented in the following sequence: incident management, change management, and service catalogue management. The organisation also used PRINCE2, Six Sigma and the BSC. Some of the benefits from the ITSM implementation include clearer understanding by the business of the services offered by IT and the level of service IT provides, reduced service incidents arising from implementing change, and clearer processes for handling and prioritising service incidents and recovering hidden issues. Sample ITSM performance metrics included number of incidents or problems or requests raised and resolved, incidents arising from changes, and service level compliance. Service catalogue management and incident management were measured daily and reported monthly at the operational level. Change management was measured weekly and reported quarterly at the operational level. A key metric and reporting challenge was '*configuring and reporting from our ITSM tool'* (survey response ID#112).

Key internal environment factors influencing the selection of ITSM performance metrics were internal customers: '*It's been up to each division or department to determine how it would report back on that objective'* (transcript line # 308) and

ITSM tools: ‘*But, yeah, the bulk of it comes from the problem management tool or the service management tool’* (transcript line # 89). Other internal environment factors include organisation strategy, organisation size, organisation goals, organisation culture (historical metrics), governance framework, management philosophy, CIO influence, IS goals (visibility, chargeback, standardisation, improvement), IS function size, IS function structure, IS budget size, IS function maturity, ITSM manager perspective, ITSM books, training, ITSM staff management, IT operations staff influence, ITIL process implementation and complexity (too many people, too many areas).

Two external environment factors had some influence on the selection of ITSM performance metrics, Industry: ‘*We’ve had a lot of people come into the group who’ve got ITIL experience in other organisations’* (transcript line #166). Legislation in relation to federal audits also influenced the selection of metrics to some extent: ‘*There are security frameworks that we need to be compliant with’* (transcript line 877#).

4.9.11 Case F – health and community services provider

This organisation was in the early stages of implementing ITSM and is primarily adopting ITIL v3. The duration of the implementation was one year; and change management, request fulfilment, incident management and problem management processes had been implemented. The processes were implemented in the following order: incident management, request fulfilment, change management. The organisation was also implementing PMBOK. Sample benefits included providing customers visibility in what was being offered, availability reporting to management for core applications, reporting to management around adherence to agreed resolution times, visibility to the organisation (including IT) around changes being made in the production environments allowing for better scheduling, standardisation of workflows for requests, tracking and recording of all incidents and more in-depth investigation of issues as opposed to focus on ‘break then fix’. Sample metrics included: mean time between failures, overall availability, adherence to target resolution timeframes, number of service requests by service, by location, by user; and number of incidents by service, by priority, and by location. Incident management was measured monthly and reported ad hoc at the operational level, while request fulfilment, problem management, availability management and service level management were measured and reported monthly at the operational level. A key measurement challenge was '*knowing what to measure'* (survey response ID# 204) and a key report challenge was '*knowing who or what or how to report'* (survey response ID# 204).

The ITSM managers' perspective: '*It's based on me…I did a bit of research on Google and things like that'* (transcript line #1249); ITSM tools: '*So we have an ITSM tool that we're using and most of our data comes straight out of that'* (transcript line # 58); and IS goals: '*The motivation is to do with providing higher quality services and cost cutting'* (transcript line #157) were key internal environment factors influencing the selection of ITSM performance metrics. Other internal environment factors influencing the selection of ITSM performance metrics in Case F include organisation goals, organisation culture (historical metrics), governance framework, top management support for performance metrics, management philosophy, IS function structure, IS function maturity, ITSM books, training, ITSM staff management, and knowledge management.

The main influencing external environment factor was from the industry sector: '*Obviously, we do keep trends around first call resolutions, how we're tracking, and things like that, against industry benchmarks, but a lot of it is probably at the moment just about the justification, some of it is justifying the decision to go to a shared service'* (transcript line # 244). Other factors influencing the selection of ITSM performance metrics in Case F include the competitive environment: '*Yeah. Look, we would probably look at aged care providers but given that we also support corporate offices, we've got another service group with children's services and young people and families, which is not aged care. So we've got a whole range of services that we provide to our clients as well. It gets a little bit difficult to benchmark. Certainly you could take the different areas and try and extract them out and then benchmark them against things. So, I mean, we could look at interstate providers, there are a couple of larger ones in <<CONFIDENTIAL, place>> too, BSC I think, <<CONFIDENTIAL, organisation>>, <<CONFIDENTIAL, organisation>> are, look at what they're doing'* (transcript line # 488). Another influencing factor is legislation: '*I mean, certainly the industry is very heavily regulated but as far as, finance would probably be, they would have some pretty* *strong regulations around how they do that because most of our funding is from the government'* (transcript line # 172).

A summary of the six case studies is presented in Table 4.77.

Table 4.77 Summary of case study findings

Case	Performance measurement framework	ITIL	Sequence of implementation (1st, 2nd 3rd)	Benefits	Standard
A	None	v2	Incident management, change management and configuration management		ISO/IEC 20000, ISO9000, PRINCE 2 and CobiT
B	Elements of ITSM reported on a modified BSC	v2	Incident management, change management and problem management	An efficient way to monitor issues, assurance that business will still run after change had been implemented and having one central location that customers can call	PRINCE 2 and CobiT
C	Combination of frameworks and standards	v2 and v3	First group: incident management, problem management, change management, configuration management, and service desk function	Reduced rework and increased customer satisfaction	CobiT, ISO/IEC 20000, ISO 9000, parts of ISO 27001-001, 14001,18001, Six Sigma, OH&S, and parts of CMMI®.
			Second group: release management, service level management, capacity management, availability management, and supplier management,		
			Third group: IT financial management and IT service continuity management.		
D	Maturity assessment framework	v2	Incident management, change management, release management.	Certainty of outcome from incidents, higher availability, single point of call, fast call resolution, and shared expectations of service.	PMBOK and IT BSC.
E	None specific to ITSM	v3	Incident management, change management, and service catalogue management.	Clearer understanding by the business of the services offered by IT and the level of service IT provides, reduced service incidents arising from implementing change, and clearer processes for handling and prioritising service incidents and recovering hidden issues.	PRINCE2, Six Sigma, and BSC.
F	None	v3	Incident management, request fulfilment, change management.	Providing customers visibility of what was being offered, availability reporting to management for core applications, reporting to management around adherence to agreed resolution times, visibility to the organisation (including IT) around changes being made in the production environments allowing for better scheduling, standardisation of workflows for requests, tracking and recording of all incidents and more in-depth investigation of issues as opposed to focus on “break then fix”.	PMBOK

4.10 Cross case analysis findings

Cross case analysis of the case study interviews was conducted by tabulating the identified internal and external environment factors for each case. Comparisons were performed across cases and along the environmental factors. The cross case analysis findings are shown in Table 4.77. In all six cases the internal factors—governance framework, IS function structure, and ITSM and ICT tools—influenced the selection of ITSM performance metrics. Internal factors influencing the selection of ITSM performance metrics in five of the cases included organisational culture, management philosophy, the ITSM manager's perspective, and organisation culture. Important external environment factors in five of the cases were legislation and industry. The two managed service providers, Case B and Case C, as well as the public sector provider Case D, were influenced by external customers as an external environment factor; while three of the internal IT service units were influenced by internal customers as an internal environment factor. Internal customers may not have been an influencing factor in Case F as their implementation of ITSM was only one year old and in this case the ITSM manager's perspective was an influencing factor.

The analysis showed variation in the number of influencing factors. Case E had the highest number (20) of influencing internal environment factors, while Case D had the highest number (6) of external environment factors—as shown in Table 4.77. Case A had the least number of internal environment factors (11) and external environment factors (1).

Table 4.78 Environmental factors influencing the selection of ITSM performance metrics

	Case Study Organisation						
	A	**B**	**C**	**D**	**E**	**F**	**Count**
INTERNAL ENVIRONMENTAL FACTORS							
Organisation strategy	✓		✓	✓	✓		**4**
Organisation size			✓		✓		**2**
Organisation goals		✓	✓		✓	✓	**4**
Organisation culture (Historical metrics)	✓	✓		✓	✓	✓	**5**
Governance framework	✓	✓	✓	✓	✓	✓	**6**
Organisation performance measurement framework e.g. BSC		✓	✓				**2**
HR performance monitoring		✓					**1**
Top management support for performance metrics						✓	**1**
Management Philosophy		✓	✓	✓	✓	✓	**5**
Senior Management Needs	✓	✓	✓				**3**
CIO Influence	✓			✓	✓		**3**
IS goals: Visibility, Chargeback, Standardisation, Improvement	✓				✓	✓	**3**
IS function size			✓		✓		**2**
IS function structure	✓	✓	✓	✓	✓	✓	**6**
IS budget size	✓	✓			✓		**3**
IS function maturity				✓	✓	✓	**3**
ITSM Manager perspective	✓	✓		✓	✓	✓	**5**
ITSM and ICT Tools	✓	✓	✓	✓	✓	✓	**6**
ITSM Books, Training			✓		✓	✓	**3**
ITSM staff management					✓	✓	**2**
IT operations staff influence		✓		✓	✓		**3**
ITIL process implementation					✓		**1**
Internal Customers	✓		✓	✓	✓		**4**
Complexity: too many people, too many areas					✓		**1**
Knowledge Management						✓	**1**
Ease of use/measurement				✓			**1**
Count of internal environmental factors per case study organisation	***11***	***12***	***12***	***12***	***20***	***13***	
EXTERNAL ENVIRONMENTAL FACTORS							
Industry		✓	✓	✓	✓	✓	**5**
Competitive environment				✓		✓	**2**
Culture – external to the organisation				✓			**1**
Availability of resources							
Climate (Natural and man-made disasters)							
Legislation	✓	✓		✓	✓	✓	**5**
External customer		✓	✓	✓			**3**
Consultant				✓			**1**
Standards			✓				**1**
Count of external environmental factors per case study organisation	***1***	***3***	***3***	***6***	***2***	***3***	

As summarised in Figure 4.28, all six case study organisations identified the following internal environment factors as influencing the selection of performance metrics: IS function structure, ITSM and ICT tools, and the governance framework.

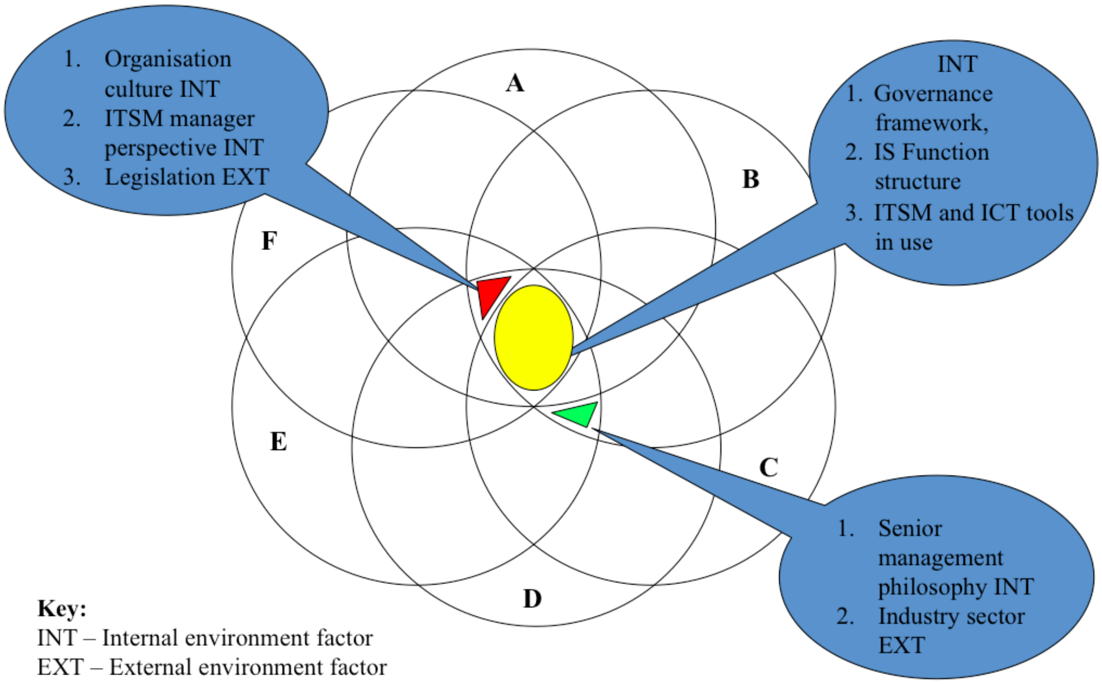

Figure 4.28 Summary of cross case analysis results

There were no differences observed in the selection of metrics when comparisons were made between public/private, small/large organisations, or the duration of the ITSM initiative. However, it was apparent during the interviews that organisations actively using a corporate performance measurement framework (e.g. Case B, Case C, Case D and Case F) had implemented a more clearly-defined set of metrics compared to the other two organisations. In Case A and Case E, it appeared that the metrics were dependent on the IS control structure as demonstrated by the personal interest and efforts of the CIO and ITSM manager.

In the pursuit of implementing ITSM best practices, organisations are faced with contingencies which influence the eventual selection of ITSM performance metrics. ITSM practitioners have numerous ITSM metrics at their disposal from the ITIL continual service improvement (OGC 2007a) and service transition (OGC 2007c) publications, ITIL metrics books (Brooks 2006; Steinberg 2006), ITSM practitioner forums (itSMF International 2008), numerous vendor and consultant websites (EAB. Group Pty. Ltd. 2009), blogs (England 2011), and social networking sites (Van Bon 2011).

4.11 RQ4. What internal and external environmental factors influence the organisations selection of specific performance metrics for ITSM?

The survey and case study findings show that ITSM performance metrics selection is influenced by a range of internal and external environment factors. Although it could be expected that larger organisations would have more resources for performance measurement, organisation size was not reported as a strong influencing factor among the organisations studied. It is also observed that the sequence of ITIL processes implemented did not influence the selection of metrics. ITSM maturity, in terms of the years of ITSM implementation, was expected to have a strong influence on the selection of ITSM performance metrics. ITSM practitioners tend to favour describing ITSM performance in terms of organisation maturity frameworks (England 2011). Process capability levels, such as those detailed in the CMMI, associate metrics use with advanced stages of process improvement, however this was only evident in Case C, and was lacking even for organisations which reviewed the effectiveness of their metrics.

Though senior management support is considered essential for implementing projects involving process change, top management support for performance metrics was not identified as an influencing factor in five of the six case study organisations.

The study summarises the findings in an ITSM performance metrics selection model shown in Figure 4.29 Factors influencing the selection of ITSM performance metrics. This model adapts Myers et al.’s IS assessment selection model (1997) to ITSM performance.

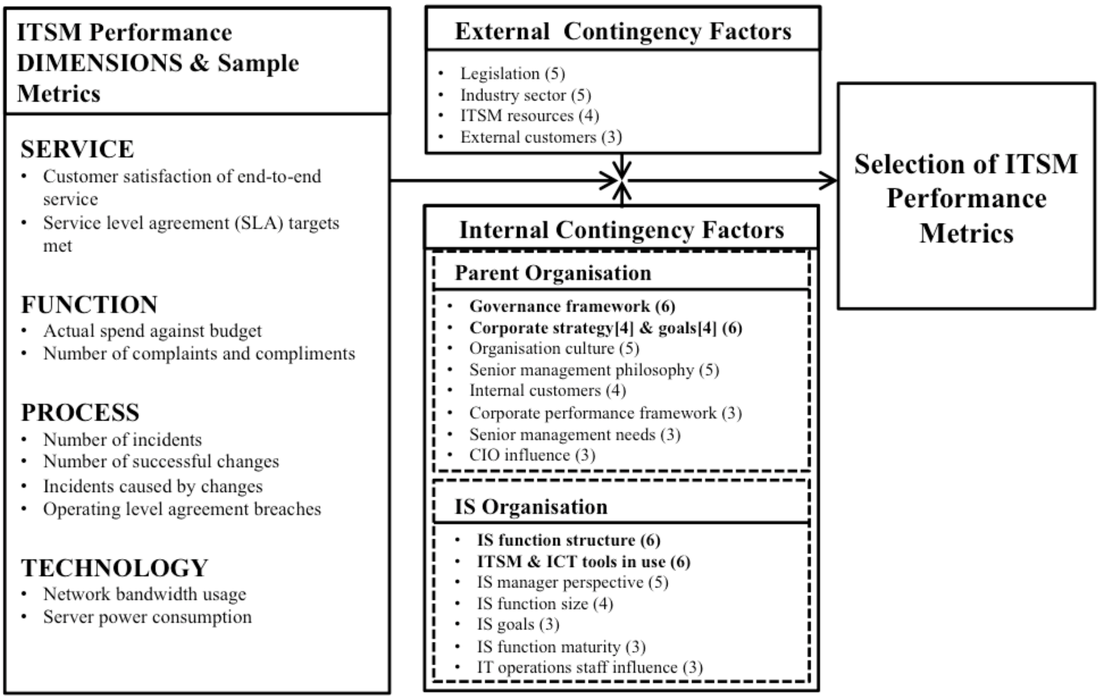

Figure 4.29 Factors influencing the selection of ITSM performance metrics

In the model, the ITSM performance dimensions of function, process and technology were derived from the practitioner literature (Brooks 2006; OGC 2011; Steinberg 2006) and confirmed in the case study interviews. A fourth dimension, *service,* sourced from OGC (2011), emerged to represent a higher-level category of metrics considered important to the business: 'From a metrics point of view it is a process-by-process thing not a contribution-to outcome thing. It's like all of these individual things on their own are interesting but it's their contribution overall to the outcome that really is the key for me and we're not there yet' (Case B, TL #320); 'No, [it's not about the client organisation size] because it's dependent upon the service and people value add...Yeah, so the service has a set of metrics that goes with it'. (Case C, TL #390 to 402).

The service dimension includes metrics to account for end-to-end process outcomes. For each dimension, a sample set of metrics derived from the literature and case studies is included in Figure 4.29.

The environment contingency factors shown in Figure 4.29 are based on the IS function studies performed by Saunders and Jones (1992) and Myers et al. (1997). Based on the emergent factors from the content analysis, the study extends the IS function model by separating the internal factors into two categories: parent organisation and the IS organisation. The factors shown in boldface are common to all six cases. The number in parentheses indicates the incidence of each factor across the six cases.

There were similarities between the selected internal contingency factors influencing the selection of metrics identified in the IS function study by Myers et al. (1997) and this ITSM study. In addition to all those listed in the previous IS function literature, this study identifies new internal contingency factors such as ITSM and ICT tools; and corporate performance measurement framework in use, such as the BSC.

The external environment contingency factors which emerged in this study are different from those reported in the IS function literature: industry sector and ITSM resources were the only factors identified in both studies. Occurrence of adverse events such as natural disasters and the Global Financial Crisis (GFC), were a factor in the Myers et al. (1997) list that were not influential in any of the case study organisations.

Furthermore, the list in this study identifies new contingency factors such as legislation and external customer; and ITSM resources such as, books, training and standards.

There were no differences observed in the selection of metrics when comparisons were made between public/private sector, small/large organisations, or the duration of the ITSM initiative. However, it was apparent during the interviews that organisations actively using a corporate performance measurement framework (e.g. Cases B, C and D) had implemented a more clearly-defined set of metrics compared to the other three organisations. In Case A and Case E, it appeared that the metrics were dependent on the IS function structure as demonstrated by the personal interest and efforts of the CIO and ITSM manager.

The external environment contingency factors identified are legislation, industry sector, ITSM resources (books, training, standards, and consultants) and external customers. Legislation includes legal and regulatory requirements that organisations comply with such as reporting customer complaints. Industry sector factors include benchmarking against the metrics used by other organisations in the same industry. External customers are customers of managed IT services such as the customer organisations that procure IT services from the managed service providers.

The internal environment contingency factors identified are divided into two categories: parent organisation and IS organisation. The parent organisation factors include governance framework, corporate strategy and goals, organisation culture (shared values and norms), senior management philosophy (principles guiding the management style), internal customers, corporate performance measurement framework, senior management needs (senior managers' task fulfilment requirements) and CIO influence (CIO affecting decisions and behaviour).

The IS organisation category includes the IS function structure, ITSM and ICT tools in use, IS manager's perspective, IS function size, goals and maturity, and the influence of IT operations staff. IS structure refers to the organisation structure of the IS function such as matrix, centralised or federated. The ICT tools include ITSM software, the telephone software and network monitoring software. IS function size includes headcount of IS department and budget value. IT operations staff influence was evident in reporting requirements for metrics around incident resolution and change management.

The contingency factors shown in the model in Figure 4.29 highlight the influence of individual preferences in the selection of metrics. The following factors are related to personnel: CIO influence, senior management needs, senior management philosophy, IS manager perspective and IT operations staff. In three cases (A, D and E), a change in personnel directly resulted in use or abandonment of performance measurement frameworks and ITSM metrics.

The survey and case study provide a basis for developing the performance measurement framework described in Chapter 5 and answering: *RQ3. How can specific ITSM performance metrics be derived?*

Areas of study focus	External Contingency Factors				Internal Contingency Factors														
					Parent organisation								IS organisation						
Factors influencing ITSM Metric Selection	**Legislation**	**Industry Sector**	**ITSM resources**	**External customers**	**Governance Framework**	**Corporate strategy and goals**	**Organisation culture**	**Senior management philosophy**	**Internal customers**	**Corporate performance framework**	**Senior management needs**	**CIO influence**	**IS function structure**	**ITSM & ICT tools in use**	**IS manager perspective**	**IS function size**	**IS goals**	**IS function maturity**	**IT operations staff influence**
ITSM PM dimensions	Service, Function, Process, Technology																		
ITSM organisation level PM dimensions	Business (BSC customer), Employee (BSC Internal operations), Financial (BSC Financial), Innovation (BSC learning and innovation), Internal improvement (BSC Internal operations)																		

IT service constituents	People			Process	Resources (partners and technology)					Product			
ITSM process performance benefit and measurement categories	Customer needs identification	Customer satisfaction	Customer service	Process improvement	Compliance	Control	Cost management	Resource management	Risk management	System availability	Service improvement	Value to the business	Knowledge acquisition

ITSM Processes	ITSM process performance measurement and reporting practices			
	Measurement frequency	Reporting frequency	Top process benefit category	Top process metric category
Change	Monthly, Quarterly	Weekly, Monthly	Process improvement	System improvement
Incident	Daily	Monthly	Process improvement	Service improvement
Problem	Monthly, Quarterly	Monthly	Process improvement	Service improvement
Service desk function	Daily	Monthly	Process improvement	Service improvement
Service level	Monthly, Quarterly	Monthly	Customer satisfaction	Customer satisfaction
Configuration	Monthly	Monthly	Process improvement and resource management	Resource management
Release	Daily, Monthly, Quarterly	Monthly	Process improvement	Service improvement
Capacity	Monthly	Monthly	Process improvement	Process improvement
IT service continuity	Quarterly	Monthly	Process improvement	Risk management
Financial	Monthly	Monthly	Cost management	Cost management
Service catalogue	Monthly, Quarterly, Ad Hoc	Monthly	Service and process improvement	Customer satisfaction
Availability	Daily	Monthly	System availability	System availability
Request fulfilment	Daily	Weekly, Monthly, Quarterly, Ad hoc	Service improvement	Service improvement
Access			Risk reduction, service and process improvement	Customer satisfaction
Deployment	Quarterly	Quarterly	Process improvement	Process improvement
Knowledge	Monthly	Monthly	Process improvement	Service improvement
Service portfolio	Daily, Monthly, Quarterly, Ad Hoc	Ad Hoc	Process improvement	Process improvement
Demand	Monthly	Monthly	Value to the business	
Security	Quarterly	Monthly	System improvement, availability, risk reduction	Service and process improvement
Supplier			Cost management	Cost management
Event			Service improvement	Process improvement
Validation			System improvement, value to the business	Service improvement
Evaluation			Value to the business	
Operations			Process improvement	
Transition planning/ support		Ad hoc	Customer service	

Figure 4.30 ITSM performance measurement - Organisation and process level factors, measurement and benefits

4.12 Conclusion

The analysis of the survey and case study interviews provide answers for RQ1, RQ2 and RQ4.

RQ1. What types of benefits are reported from ITSM improvement initiatives?

The benefits reported from ITSM improvement initiatives are primarily process and service improvement benefits, with the majority being process level benefits reported from change, incident and problem management ITSM processes.

RQ2. Which specific metrics can be used to measure ITSM performance?

A range of process-focused, customer and service-oriented process-specific metrics are used to measure the performance of ITSM.

RQ4. What internal and external environmental factors influence the organisations' selection of specific performance metrics for ITSM?

Internal and external environment factors influence the selection of ITSM performance metrics. Internal organisation factors include organisation and IS function specific. The survey and case study findings are summarised in Figure 4.30 which maps the layers across which ITSM performance measurement and reporting occurs with ITSM processes, IT service constituents, BSC and ITSM performance measurement dimensions, and the factors influencing the selection of ITSM performance metrics.

Chapter 5 ITSM Performance Measurement Framework Design, Development, Evaluation and Results

5.1 Introduction

This chapter describes the process and outcomes of the ITSM performance measurement framework design, development and evaluation. The ITSM performance measurement framework is presented. Section 5.2 explains the application of the design approach, including the design cycles applied in the development of the ITSM performance measurement framework that were earlier described in section 3.7. In section 5.2.2 the design guide used to develop the ITSM performance measurement framework is presented. The ITSM performance measurement framework resulting from the design and development effort is described in section 5.3.

The demonstration of the ITSM performance measurement framework at conceptual level and to an industry practitioner audience is described in section 5.4. The evaluation process and outcomes of the ITSM performance measurement framework development are described in section 5.5. The communication of the results of the study is summarised in section 5.6. In section 5.7 the theoretical outcomes from the design are provided. The conclusions are presented in section 5.8. A summary overview of Chapter 5 sections and their inter linkage is shown in Figure 5.1.

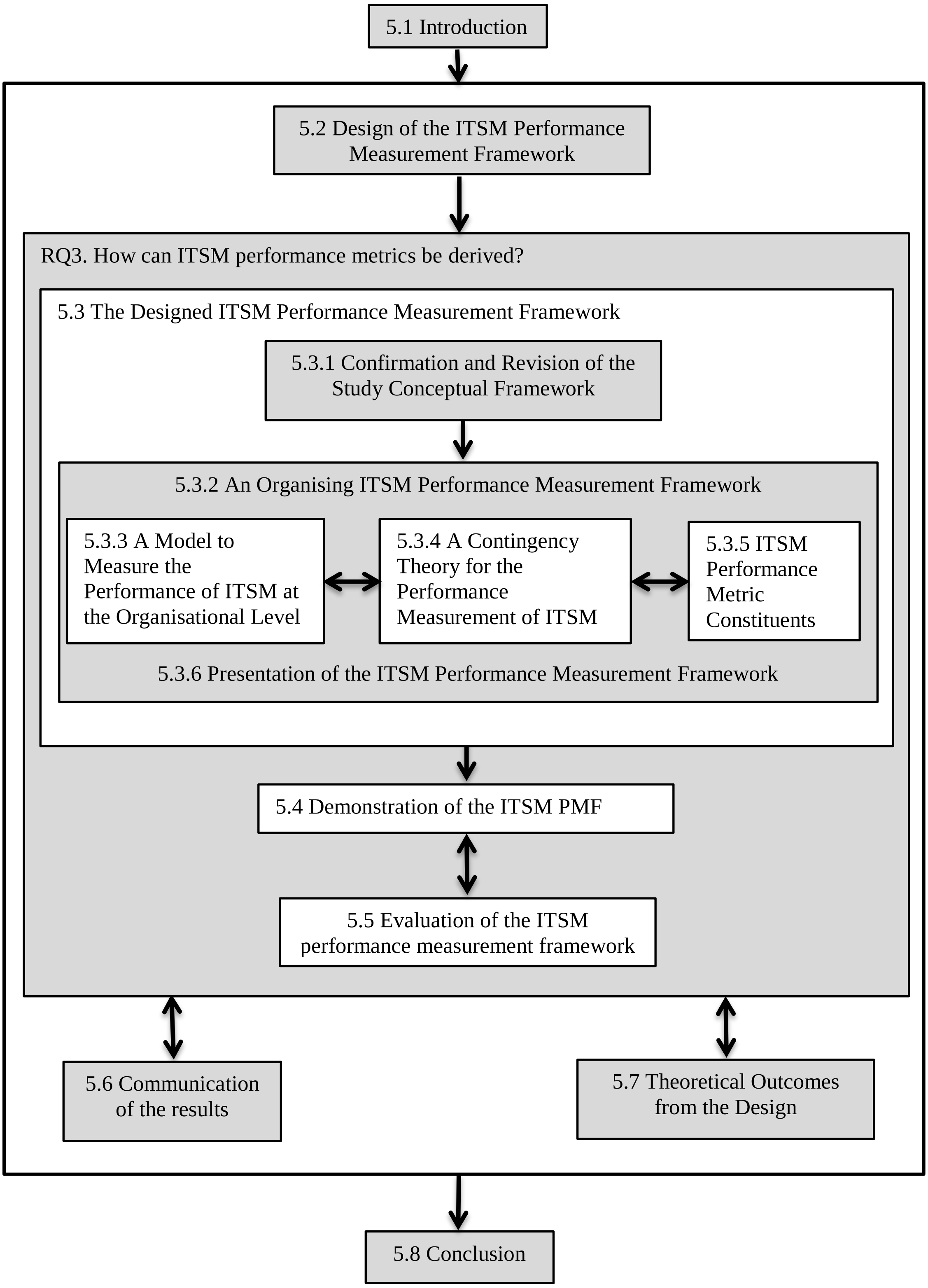

Figure 5.1 Chapter 5 overview and section linkages

5.2 Design of the ITSM Performance Measurement Framework

This section describes the procedures and actions taken in the design of the ITSM performance measurement framework. As reported in Chapter 2, the literature review provided key definitions for ITSM performance measurement, metrics and measures. ITSM performance measurement frameworks and metric classifications were developed from the literature review and emergent themes extracted from the survey data. The literature review and survey provided ITSM benefits and performance metrics, as well as measuring and reporting challenges. The literature review also provided insights into the design of performance measurement frameworks. The case studies identified the factors influencing the selection of ITSM performance metrics. The ITSM benefits and performance measurement survey and case study results are described in detail in Chapters 3 and 4. The results of the survey and case studies are used in the design step of developing the ITSM performance measurement framework. The design of the ITSM performance measurement framework extends earlier performance measurement frameworks and addresses gaps identified in the theory and practice of ITSM performance measurement. A detailed treatment of the ITSM performance measurement and IS design science theory and practice gaps that are addressed in the study is presented in section 5.5. The results of the design step of the ITSM performance measurement framework development performed in two Matching Analysis Projection and Synthesis (MAPS) cycles, a macro and micro cycle, are summarised in Table 5.1, and progresses to populate Table 3.8 which was introduced in section 3.7.1. In Table 5.1 the results of the macro cycle steps of analysis, projection and synthesis are matched to the overlapping micro cycle steps of research, analysis, synthesis and realisation.

Table 5.1 Results of the MAPS hyper-cyclic model applied to the ITSM PMF design (based on Jonas 2007)

Macro Cycle (iterative process of designing)	**Micro Cycle (iterative process of learning)**			
	Research results	**Analysis results**	**Synthesis results**	**Realisation results**
Analysis ('the true' how it is today)	Literature review findings (Data on what 'is' and future related data)	Diverse categorisation of benefits and metrics (Knowledge on what 'is')	Common themes and differences in performance metrics categories (Understanding the situation as it is – world views)	Proposed improvements to metric catalogues (Presentation on the situation as 'is' – consent on the situation)
Projection ('the ideal' how it could be)	Literature review findings Survey and case study data (Data on future-related data)	Findings of quantitative analysis and content analysis (Interpretation of the data – information about futures)	Cross case analysis (Getting consistent images of possible future scenarios)	A model to measure performance at the organisational level. Contingency theory of the performance measurement of ITSM (Presentation of future scenarios – consent on problems/goals)
Synthesis ('the real' how it is tomorrow)	Interactions with panel of experts and ITSM practitioners (Data on the situation as it SHALL BE – problem data)	Evaluation of the 1st iteration of the ITSM PMF (Evaluation of the data – problem, list of requirements)	Application of DSRM and MAPS and performance measurement design (Design solutions)	Revised ITSM PMF (Presentation of the solutions – decisions on "go/no go")

5.2.1 The hyper-cycle: macro and micro cycles of design

This section describes the results of the macro and micro cycles of the ITSM PMF design. The three macro-cycle steps of *analysis, projection,* and *synthesis* represented in the rows in Table 5.1 are each described by providing details of the micro cycles of *research, analysis* and *synthesis*, shown in the columns in Table 5.1, undertaken within each macro cycle.

The first step in the macro cycle of the design process, *analysis*, is undertaken using the findings of stages 1 and 2 of the study and involves the micro cycle steps of *research*, *analysis*, *synthesis* and *realisation*.

The micro cycle *research* results of the literature review, survey and case studies provide information on 'data on what "is" and future related data' (Chow &

Jonas 2008), that is, how ITSM performance measurement is currently conducted in industry and what is published on the topic in academia. The literature on ITSM performance metrics provides definition, purpose, types and examples of metrics. The results of the research micro cycle step in the analysis macro cycle design process were the literature review findings on the current state of ITSM performance measurement and the design of ITSM performance measurement.

The micro cycle *analysis* results present a meta-analysis of the literature reviewed providing ‘knowledge on what IS’. A variety of ITSM performance metric classifications were found in the literature. Performance measurement should occur at different levels in the organisation. The literature review on performance measurement levels is provided in section 2.6 of Chapter 2.

The micro cycle *synthesis* results provide common themes and differences in performance metrics categories ‘Understanding the situation as it is—world views’. There were similarities as well as differences in the metric classifications.

The micro cycle *realisation* results provide proposed improvements to ITSM metric catalogues ‘presentation on the situation as IS—consent on the situation’. The ITSM metrics identified from the literature compared in Table 2.14 in section 2.5.5.3 of Chapter 2 are consolidated in Table 5.2. This table compares and maps the ITSM metric catalogue categories offered by Brooks (2006); McNaughton et al. (2010); OGC (2011); Smith (2008); Steinberg (2006) with Internet and IS metric catalogue categories offered by Paxson (1996); Son et al. (2005). The first column of the table shows the ITSM metric catalogue attributes extracted from ITSM texts; and the second column shows the IS metric catalogue attributes extracted from IS studies. The two columns are aligned so that similar metric attributes are in the same row. Shaded cells represent areas where an attribute exists in ITSM but not in IS, and vice versa. A third column is generated by this study to consolidate featured metric catalogue attributes.

Table 5.2 Consolidation of ITSM metric catalogue attributes

ITSM Metric Categories (Brooks 2006; McNaughton et al. 2010; Smith 2008; Steinberg 2006)	**IS Metric Categories (Paxson 1996; Son et al. 2005)**	**Consolidated Metric Category**
Audience/Process owner/Raised by/Perspective (management, technology)/Dashboards	Further drill down (Performance metric owner)/ Performance metric recipient (Specifics and comments)/ Graphical presentation (Frequency of review)	Performance measurement report audience
Key performance Indicators (KPIs)/Qualitative KPIs/Progress indicator/Critical success factors (CSFs)	Critical Success Factors (Description)	Strategic importance of metric (CSF/KPI)
Goal/Objective/Outcomes/Target/Target set by management/Justification/Target rationale/Quality goal/Data quality/Baseline/Service improvement register	Measurement Objective (Target/Target Ranges)	Performance measurement goal
Definition/Description/Specification/Metric name/Metric name/Measure number/Opportunity Number	Name of metric/Cross reference to corresponding method definitions/Known problems with the definition	Metric definition
Formula	Underlying construct that the metric intends to measure, expressed as a composition of more basic metrics	Metric constituents
Measures/Possible value/Tolerance level/Target value/Polarity/ Danger value/Constraints (Upper or Lower limits)/What-Ifs	Standard unit of measurement	Metric scale
Data source	Source of Information e.g. tools (Formula)	Metric data source
Data collector/To be actioned by		Person/system taking measurement
Date raised/Measurement Frequency/Required by	Escalation procedures (Frequency of measurement)	Measurement Date
ITIL process/Process/ function	ITSM process	ITSM process
	Discussion of related metrics	Related ITSM process metrics
Type (Effectiveness, capability, efficiency)/Unit Type/Timescale (short, medium, long)/Priority (urgent, 1, 2,3)/Lag/Lead/Operational metrics/Analytical	Status: Active/Future/Retired (Metric last revised)	Classification of metric
Threshold actions		Actions resulting from measurement
Example		Metric example
Other/Comments/Notes/Initiatives	General measurement issues	Comments

None of the literature reviewed provided a rationale for the ITSM metrics classification schemes used. This study did not find a set of industry-validated performance metrics for ITSM. There are books, websites and ITSM tools presenting numerous metrics that are currently used by ITSM practitioners.

The ITSM metrics definitions, descriptions, typology and practice of performance measurement vary from one organisation to the next, from one book to the other, from website-to-website, and from ITSM tool to ITSM tool.

The second step in the macro cycle, *projection*, deals with 'the ideal' and is achieved by applying the micro cycle results of research, analysis, synthesis and realisation.

The micro cycle *research* results of the literature review and the survey and case studies provide information on 'the ideal—future related data'. The literature on organisation, IS and service performance measurement presents definitions, frameworks, dimensions and levels that could be applicable in an ideal ITSM performance measurement framework is provided in section 2.11 of Chapter 2.

The micro cycle *analysis* results provide findings from the quantitative analysis and content analysis of the case study data, presenting an 'interpretation of the data—information about futures'. The case studies findings in this research identified the internal and external environmental factors influencing the selection of ITSM performance measurement frameworks. The case studies results are described in detail in Chapter 4.

The micro cycle *synthesis* results present the cross case analysis findings providing 'consistent images of possible future scenarios'. Four factors common to all six case study organisations were identified as influencing the selection of ITSM performance metrics: governance, corporate strategy and goals, control structure, and ICT tools in use. The influence of legislation, organisation strategy, management philosophy, the ITSM manager's perspective, and organisation culture was evident in five of the cases. External customers influenced the two managed service providers, while internal customers were influencers in three of the internal IT service units. When comparisons were made between public/private, small/large organisations, or the duration of the ITSM initiative, no differences were observed in the selection of metrics. However, it was apparent that the use of a corporate performance measurement framework was associated with a more clearly articulated set of metrics.

The micro cycle *realisation* results are provided in the first iteration of the ITSM performance measurement framework comprising a model to measure the performance of ITSM at the organisation level and a contingency theory for the performance measurement of ITSM. The first iteration of the ITSM performance measurement framework presents ‘future scenarios—consent on problems or goals’. The literature review and survey results in the projection of an initial ITSM performance measurement framework incorporate organisation performance measurement theory and ITSM performance measurement theory. Section 5.3.1 presents the confirmation of the conceptual framework of this study. Section 5.3.2 provides the prescribed broad areas of performance measurement at the organisational level. The framework provides for the measurement of ITSM in broad economic and operational terms, as well as the use of specific internal and external measures. Section 5.3.3 presents the application of case studies findings on the development of a contingency theory for the performance measurement of ITSM.

The third step of the macro cycle, *synthesis,* is achieved by integrating the micro cycle results of research, analysis, synthesis and realisation through interactions with the panel of experts and ITSM practitioners, cross case analysis, application of the design method and the creation and revision of the ITSM Performance Measurement Framework (PMF).

The micro cycle *research* results are developed from interactions with the panel of experts, managers from Case A and feedback from journal reviewers and conference participants. The results provide ‘data on the situation as it shall be’.

The micro cycle *analysis* results present findings from the evaluation of the first iteration the ITSM PMF. The panel of industry and academic experts help identify how to contextualize the ITSM PMF. In this step the framework is compared against the performance measurement practices currently in place in one of the case study organisations, Case A.

The micro cycle *synthesis* results present the meta-synthesis of the ITSM PMF design presenting the application of the DSRM and MAPS in delivering a ‘design solution’.

The micro cycle *realisation* step results present the revised (second) iteration of the ITSM PMF. The ITSM PMF is revised based on the feedback provided by managers at Case A and review of the literature. The micro cycle realisation step provides 'a presentation of the solutions—decisions on go/no go'.

5.2.2 Design guide for the performance measurement framework

Based on a review of the performance measurement literature, ITSM survey, case studies of ITSM industry, performance measurement practices and informed by design science literature, a design guide was developed and applied. The design guide presented in Table D.1 in Appendix D is organised into steps and sub-steps summarising the design actions taken. The design guide was used alongside the key concepts summarised in Table D.2 in Appendix D.

The objective of the study was to design and build an ITSM performance measurement framework (PMF) that is informed by theory and based on scientific research and design. ITSM practitioners experience difficulty in measuring ITSM performance. ITSM literature in academia and practice primarily focuses on process measurement and metrics. The ITSM PMF addresses these gaps by delivering a framework that focuses on the identified key performance aspects of IT service management. The ITSM PMF is based on theory and practice findings and makes explicit the decision and rationale for the design and build. The ITSM PMF is developed then evaluated and improved. According to OGC (2011), an ITSM PMF is needed to help validate the strategy and vision, provide direction with targets and metrics, provide justification with a means to gauge value realised, and intervene and provide corrective action.

In designing the ITSM PMF the definitions of *service, management, service management, IT service, IT service management, service performance*, *performance measurement*, *design* and *IT artefact*, provided in section 1.6, are applied.

5.3 The designed ITSM performance measurement framework

The designed ITSM performance measurement framework comprises three components: a model to measure the performance of ITSM at the organisational level, a contingency theory for the performance measurement of ITSM, and

ITSM performance measurement constituents. The components of the performance measurement framework are described in sections 5.3.3 to 5.3.6. A confirmation of and revision of the study conceptual framework is provided in section 5.3.1. The organising ITSM performance measurement framework is described in section 5.3.2.

5.3.1 Confirmation and revision of the study conceptual framework

The survey results provided empirical confirmation of supported and non-supported relationships of the ITSM performance measurement variables tested by hypothesis summarised in Table 5.3.

Table 5.3 Summary of hypotheses test results

Hypothesis	**Outcome**
H1. There is a correlation between the number of implemented ITSM processes and the number of ITSM process benefit responses RQ1	Not supported
H2. There is a correlation between the number of ITSM processes implemented and the number of ITSM process metric responses RQ2	Not supported
H3. There is a correlation between the number of ITSM process benefit responses and the number of ITSM process metric responses RQ1	Supported
H4.There is a correlation between the existence of ITSM performance measurement frameworks implemented and the presence of ITSM process metric responses RQ2, RQ3	Supported
H5. There is a correlation between the number of ITSM processes implemented and the existence of performance measurement frameworks RQ3, RQ4	Supported

Based on the survey results and the statistical analysis, the relationships between ITSM performance measurement study variables are confirmed and presented in the revised research framework in Figure 5.2— which is based on the study research framework shown in Figure 3.3 in Chapter 3 that was founded on the conceptual framework shown in Figure 1.3 in Chapter 1.

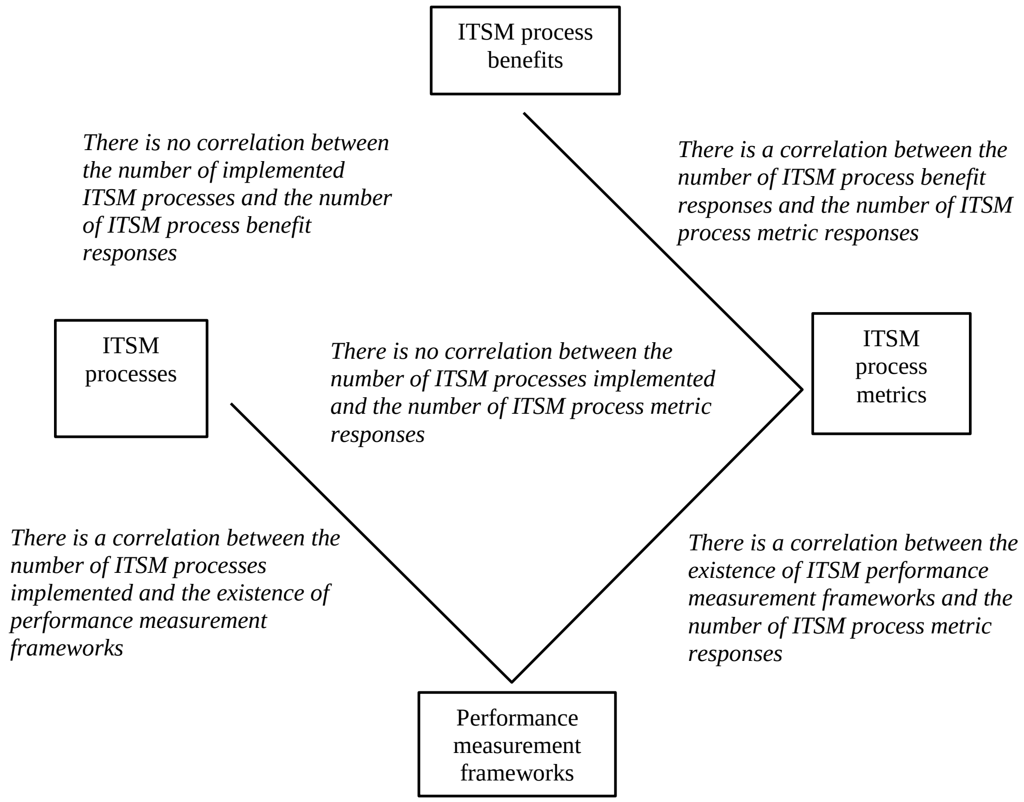

Figure 5.2 Confirmed study conceptual framework

Given the correlations between key ITSM performance variables identified in this study, organisations may report more ITSM process benefits by applying ITSM process metrics accompanied by use of a performance measurement framework. In Figure 5.2 the broken link between ITSM processes and ITSM process benefits is a result of the study not finding a correlation the number of implemented ITSM processes and the number of ITSM process benefit responses.

The confirmed study conceptual framework incorporates the survey statistical test results. The results confirm a correlation between ITSM process benefits and ITSM process metrics. There is a correlation between performance measurement framework existence and ITSM process metrics. There is a correlation between performance measurement framework existence and ITSM process implementation. The study did not confirm a correlation between ITSM process metrics and the number of ITSM processes implemented. The study did not confirm a correlation between ITSM process benefits and the number of ITSM processes implemented.

5.3.2 An organising ITSM performance measurement framework

The ITSM performance measurement framework developed in the study comprises three components:

1. A model to measure the performance of ITSM at the organisational level, presented in section 5.3.3 and shown in Figure 5.3.
2. ITSM performance metrics selection model, presented in section 5.3.4 and shown in Figure 4.29.
3. ITSM performance metrics constituents presented in sections 5.3.5 and shown in Figure 5.4, Figure 5.5 and Figure 5.6.

The three components of the ITSM performance measurement framework work together to provide a guide to measuring the performance of ITSM at different levels of an organisation, as shown in Table 5.4. Detailed performance metrics and their constituents are collected and consolidated at the operational layer labelled layer 3.

Table 5.4 Linking of the components of ITSM performance measurement frameworks along organisational levels

Performance measurement and reporting layers					
Layer 1	**Business Environment**				
Factors influencing selection of metrics	External		Internal (Parent and IS organisation)		
Layer 2	**Service - defined in the business and service catalogue**				
Service components	People	Process	Resources	Product	
Layer 3	**Performance metrics - defined in the metrics catalogue**				
Process metric constituents	Outcome	Stage	Type	Conduct	Measures

5.3.3 A model to measure the performance of ITSM at the organisational level

The literature review on performance measurement at the organisational level yielded a list of performance measurement frameworks and guidance that are applicable to performance measurement of ITSM. Performance measurement of ITSM concerns the effectiveness and efficiency of the IT capabilities and use of IT resources in terms of productivity, profitability and quality. The study applies the recommendation of Tangen (2005, p. 40) that performance measurement should be understood as a broad term that 'covers both overall economic and operational aspects'. An initial model of the ITSM performance measurement framework at the organisational level developed in the study is depicted in Figure 5.3.

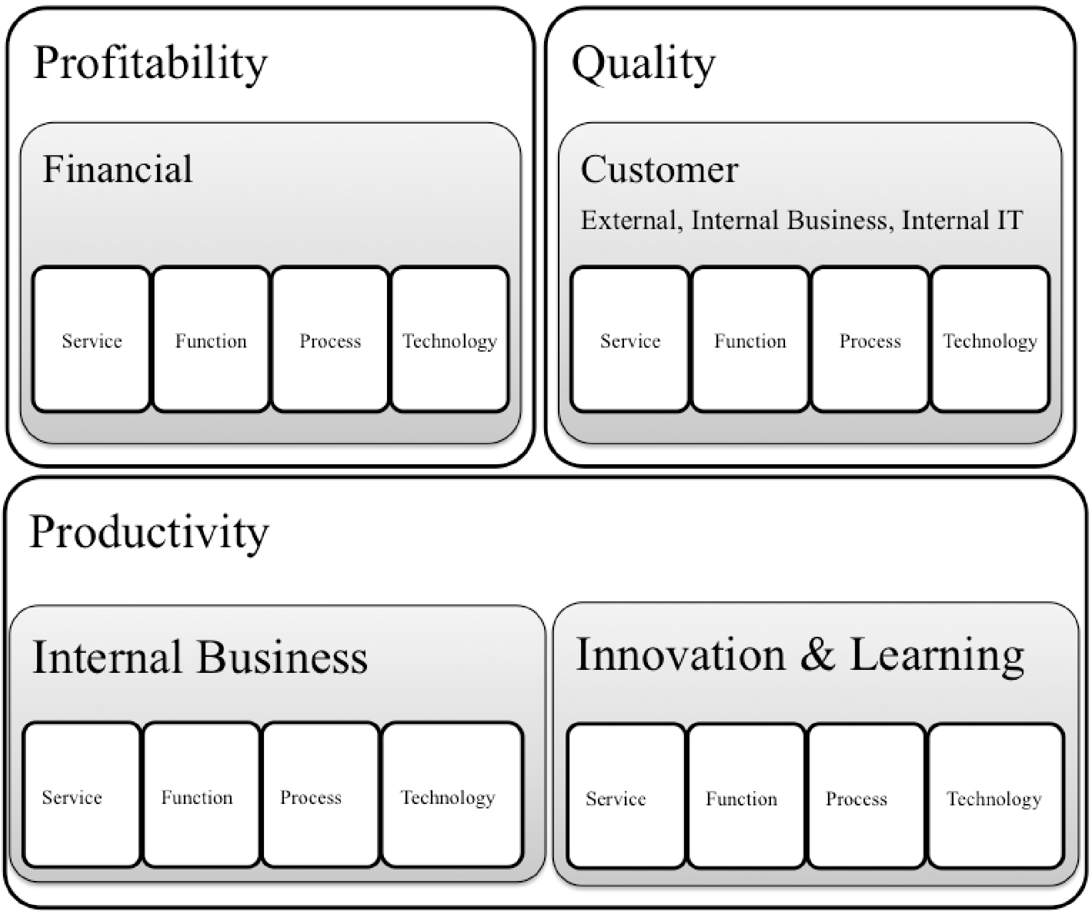

Figure 5.3 A model to measure the performance of ITSM at the organisational level

The three main boxes in Figure 5.3 represent the general areas of profitability, quality and productivity, which should be covered by performance measurement as advised by Tangen (2005). The general areas would provide top-level management with performance summaries along the three areas of focus. The next sub-level of boxes in Figure 5.3 representing the four BSC perspectives (Kaplan & Norton 1992): financial, customer, internal business, and innovation and learning are mapped into the three main boxes of profitability, quality and productivity. The financial performance measurement would provide information that would be used to generate the profitability summaries. The customer performance measurement would be used as the basis for the quality summaries. The internal business, and innovation and learning performance measurement would form the basis of the productivity summaries. The next sub-level of boxes present the operational level performance measurement along the dimensions of service, function, process and technology advised by OGC (2011). The operational level performance measurement would form the basis for generating performance measurement summaries along the BSC perspectives. The BSC perspectives were developed to enable organisations to gain a holistic view of their performance by considering financial and non-financial perspectives, as well as lead and lag perspectives. Applying the financial and non-financial and lead and lag perspectives on IT service performance would result in holistic ITSM performance measurement. Based on the OGC definition, an IT service is composed of activities within processes which may be co-ordinated as functions that are part of life cycle phases. A holistic evaluation of ITSM performance along the BSC perspectives of a service would be based on the service, function, process and technology metrics collected by the organisation. Service metrics are focused on the end product of the IT service management and would include metrics such as number of service level agreement targets achieved. The service level metrics would provide an evaluation of the collective effectiveness of the application of the ITSM lifecycle phases of service strategy, service design, service transition, service operation and service continual improvement. Process metrics present a detailed account of the performance of individual ITSM processes such as change management, incident management and problem management. At the lowest and most detailed level of performance measurement are the technology metrics, which include measurement of the performance of service configuration items such as database capacity and network bandwidth usage.

The proposed model is based on the comparison of existing organisation performance measurement frameworks presented in section 2.5.2. Based on the results of the literature review reported in Chapter 2, the study identified appropriate performance measurement dimensions that can be used to structure the proposed ITSM performance measurement framework to link with organisational level performance measurement.

5.3.4 A contingency theory for the performance measurement of ITSM

A contingency theory for the performance measurement of ITSM is based on the results of the literature review, survey, and content and cross case analysis results of the case studies. The contingency theory of ITSM performance measurement provides guidance on the selection of ITSM metrics 'that neither dictates a universal solution that is unrealistic for most organisations nor advocates a situation specific view that provides no assistance beyond a specific context' (Myers et al. 1997). The study analysis indicates that there are particular environmental factors, internal and external, common to the six case study organisations that influence the selection of ITSM performance metrics. Also, the selection of ITSM metrics is influenced by a variety of internal and external environmental factors for each of the case study organisations.

The model shown in Figure 4.29 shows various external and internal contingency factors that influenced the selection of ITSM metrics in the six case study organisations. The model depicts the internal and external environment factors influencing the selection of ITSM performance metrics, identified from the results of the case studies described in Chapter 4. The case studies confirm that environmental factors such as legislation, the industry sector, governance framework, corporate strategy and goals, IS function structure and the ITSM and ICT tools in use influence the selection of the ITSM performance framework and metrics.

5.3.5 ITSM performance metric constituents

The analysis of the survey data provided ITSM process performance metrics that are currently in use. Qualitative analysis of the metrics showed categories that can be used to group the metrics. To further understand the metrics and aid in their classification and to address the identified gap in ITSM metric taxonomy, qualitative analysis was performed to identify ITSM process metric constituents. Analysis on ITSM process performance metrics was performed based on the advice of Paxson (1996) who identifies decomposition of each metric into constituent metrics as important in performance measurement. The qualitative analysis was performed on the three most implemented ITSM framework processes: change management, incident management and problem management. The study found that metrics from the survey for the three processes constituted similar components. Qualitative analysis of the key words in the ITSM process metrics provided by survey respondents resulted in the emergence of the following five ITSM metric constituents:

1. Process outcome
2. Process stage
3. Process type
4. Process conduct
5. Unit measures

The metric constituents' structures for the ITSM change, incident and problem management processes are depicted in Figure 5.4, Figure 5.5 and Figure 5.6 respectively.

At the process metrics constituent level the ITSM PMF enables the organisation to measure ITSM performance by answering the questions:

What was the outcome of the ITSM management process?

What is the stage of the service ITSM management process?

What was the service ITSM process type?

How was the service of the ITSM process managed (process conduct)?

What unit of measures can be used to gauge the ITSM process management performance?

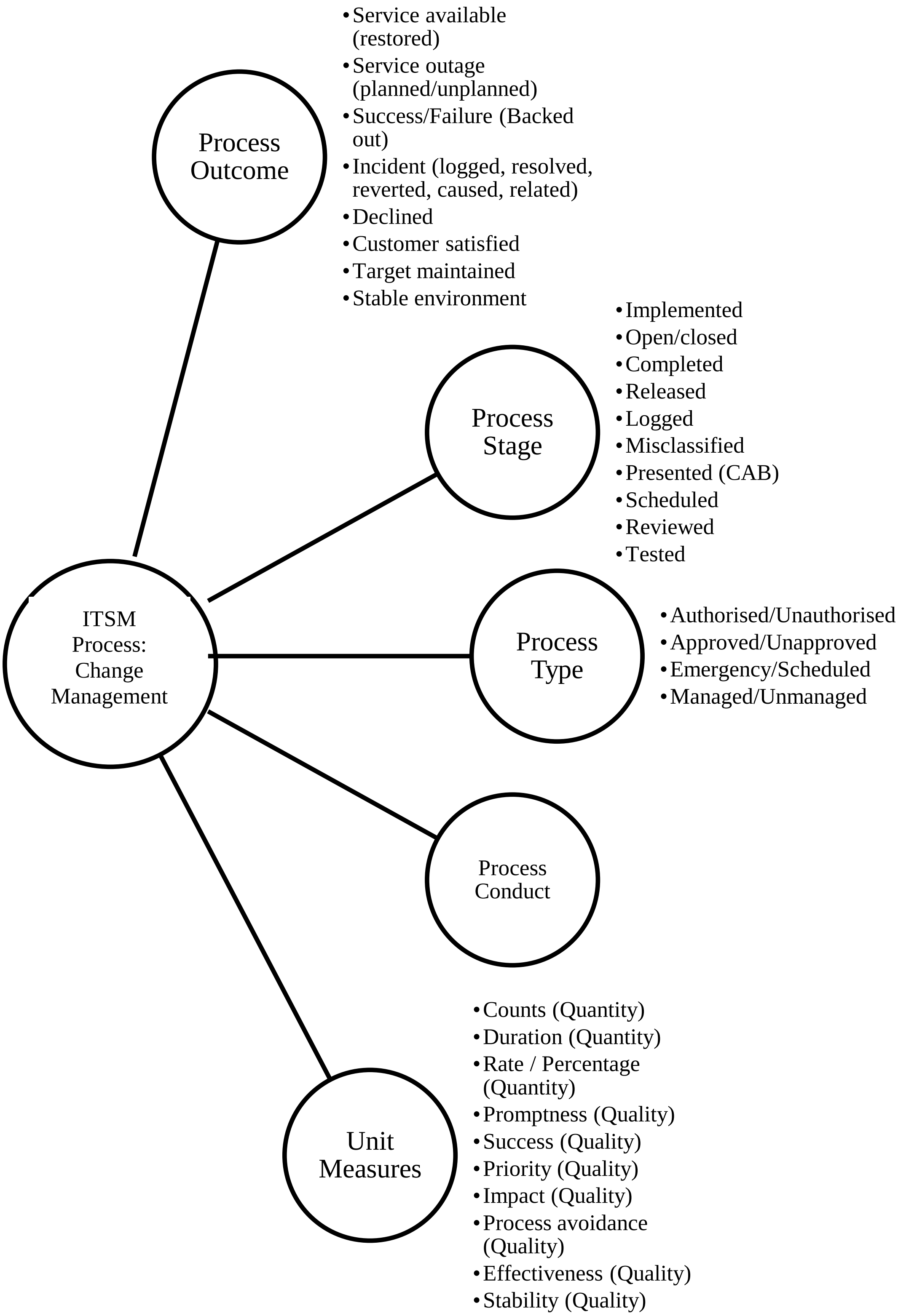

Figure 5.4 ITSM change management process metrics constituents

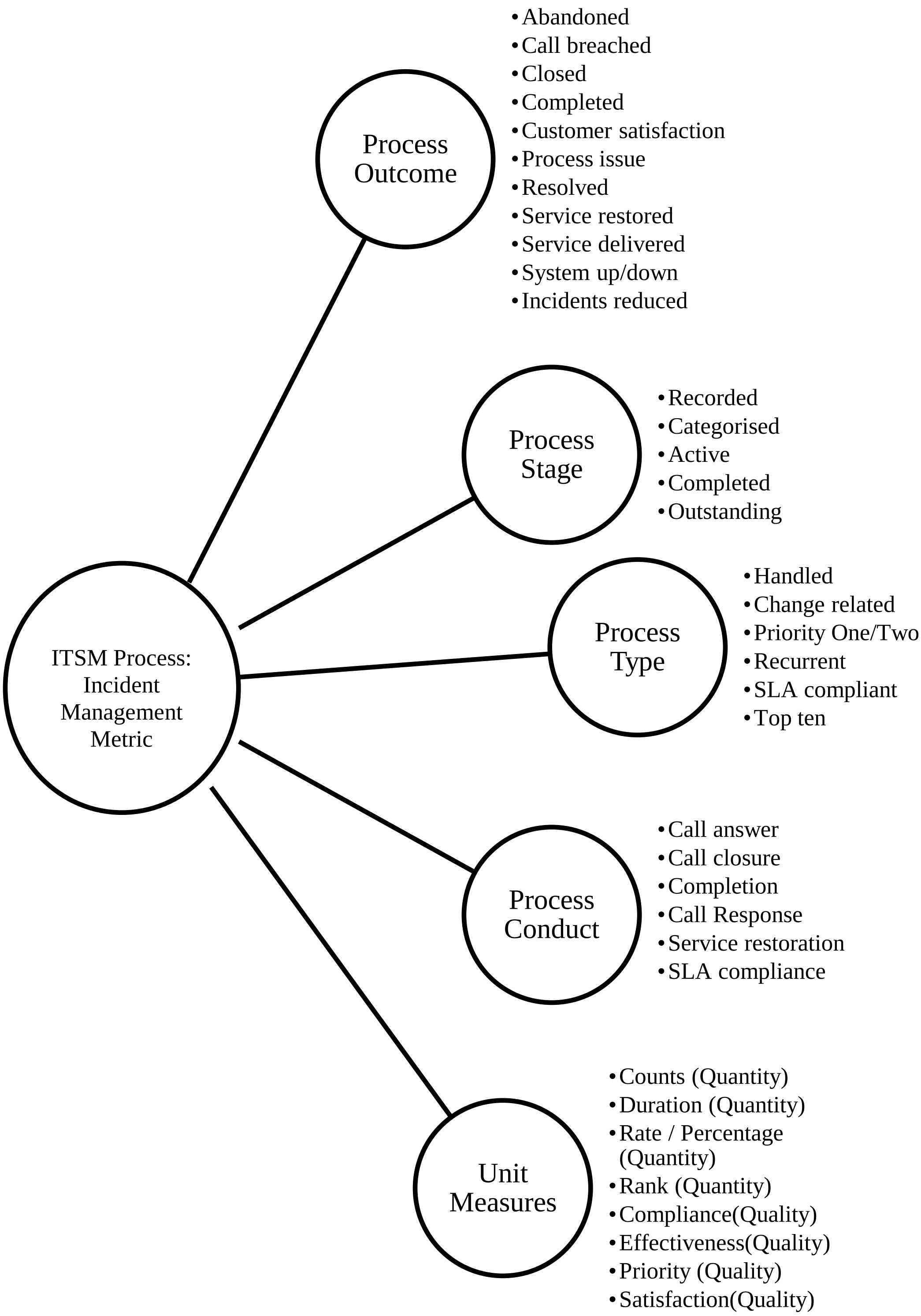

Figure 5.5 ITSM incident management process metrics constituents

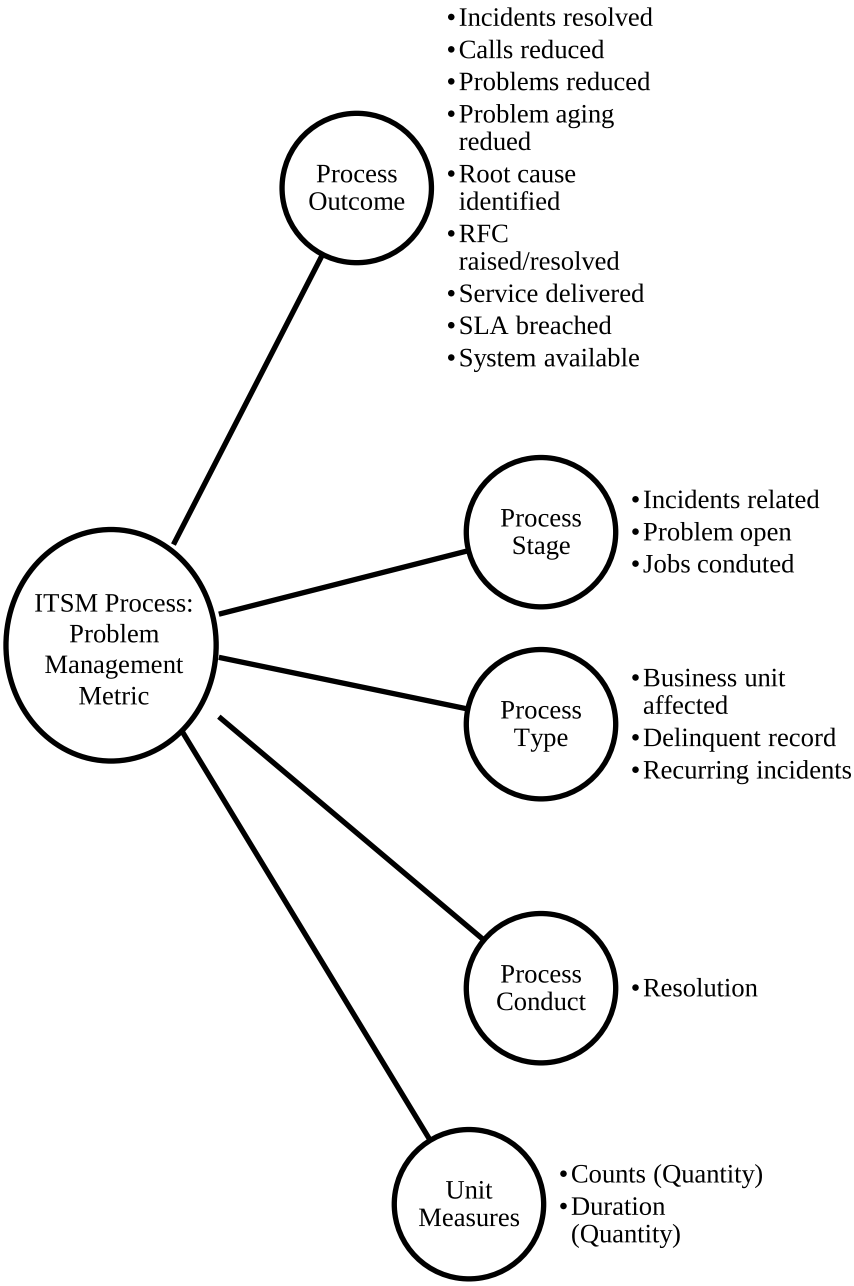

Figure 5.6 ITSM problem management process metrics constituents

Examples of ITSM process performance metrics with the metric constituents are shown in Table 5.5. The examples are derived from the study survey responses. The table presents three examples of populated metric constituents for the ITSM process metrics for change, incident and problem management.

Table 5.5 Examples of ITSM process metrics with process constituents

ITSM process	ITSM process metric	ITSM process metric constituents				
		Process outcome	**Process stage**	**Process type**	**Process conduct**	**Unit measures**
Change management	Customer survey responses indicate increased satisfaction	Customer satisfied	Completed	Approved		Count of positive customer survey responses
	Percentage of successful changes	Target maintained	Completed	Managed		Percentage of successful changes
	Less than 5% of all changes are emergency	Stable environment	Reviewed	Authorised		Count of changes
Incident management	Number of incidents resolved at first contact	Resolved	Categorised	Recurrent	SLA compliant	Time in hours or days
	Response and resolution times against SLA targets	Customer satisfied	Outstanding	Top ten		Time in hours or days
	Number of incidents reported each week	Incidents reduced	Recorded	Handled		Count of reported incidents
Problem management	Avoidance of service penalties for SLA breaches	Customer satisfied	Jobs conducted	Recurring incidents		Count of recurring incidents
	Number of known errors		Jobs conducted	Business unit affected		Count of known errors
	Reduction in incidents due to fix of root cause	Calls reduced		Recurring incidents		Count of incidents

5.3.6 Presentation of the ITSM performance measurement framework

This section presents the described ITSM performance measurement framework and explains how it can be used. The developed ITSM PMF has three components and provides a framework for organisations to measure the performance of their ITSM.

The study identifies that ITSM performance occurs in three main areas: management of the IT service demand, management of the IT service resources and management of the IT service offering. The three main areas of ITSM performance are developed from the findings on the types of ITSM benefits and types of ITSM metrics synthesised from the literature review, survey and case studies. Measuring the performance of ITSM entails measuring the performance of the management of the demand for the service, management of the resources used to craft the service, and management of the offering of the service. The OGC (2007b) literature organises management of IT services along five lifecycle phases and over 23 processes with some grouped into co-ordinating functions. The other ITSM frameworks such as HPITSM, the Microsoft Operational Framework (MOF), and IBM service reference model are all process based. By taking a performance measurement focus the ITSM life cycle phases and ITSM processes are classified in a matrix shown in Table 5.5.

Table 5.6 A performance measurement perspective on ITSM

Performance measurement of service management	**Management of the service demand**	**Management of the service resources**	**Management of the service offering**
Plan for the service	Manage the demand of the service	Manage the service finance	Manage the portfolio of services Plan the transition of services Plan the improvement of services
Design the service	Manage the levels of service	Manage the suppliers Manage the security of the service Manage the continuity of the service	Manage the catalogue of services Manage the capacity of the service Manage the availability of the service
Implement the service	Manage the evaluation of the transition to the service Manage the testing of the service	Manage the knowledge on the service Manage the assets for the service	Manage the release of the service Manage the deployment of the service Manage the change in the service Support the transition of the service
Operate the service	Manage access to the service Manage fulfillment of service requests	Manage events related to the service	Manage service incidents Manage service problems
Improve the service	Manage the reporting of the service		Manage the measurement of the service

ITSM frameworks provide IS organisations with guidance on how to manage the service demand, service resources and the service offering. The performance of the management occurring across the three service management areas effected through cycles of planning, designing, implementation, operation and improvement is depicted in Figure 5.7 developed by this study. The first circle in Figure 5.7 presents the cycles of planning, designing, implementation, operation and improvement that affect the performance of the management occurring in cycles, shown in the second circle, across the three service management areas of management of service demand, management of service resources and management of service offering. Performance measurement of ITSM should be conducted on the service cycles of planning, designing, implementation, operation and improvement that are undertaken by organisations in the management of the service demand, service resources and service offering.

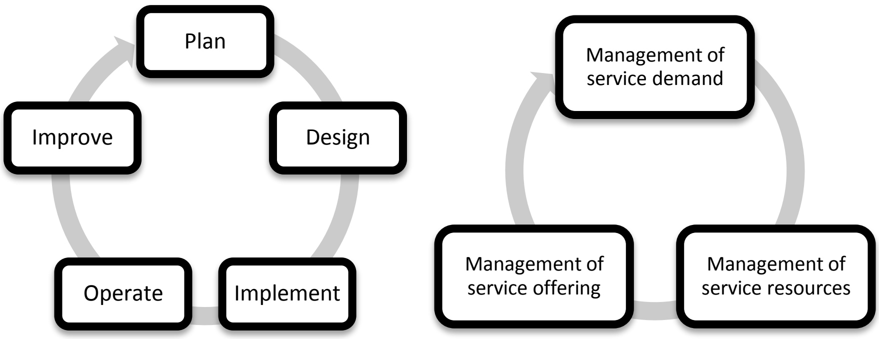

Figure 5.7 Performance measurement of ITSM

Management of organisations is performed at the strategic, operational and tactical levels. The ITSM frameworks provide processes and guidance on managing ITSM at the operational and tactical level, the two levels at which IT functions are mainly management represented. Performance measurement at the organisational level should be conducted in terms of broad economic and operational terms including profitability, productivity and quality (Tangen 2004). The performance of the management of organisational departments contributing towards the realisation of the organisation's strategy can be measured using the widely-adopted BSC (Kaplan & Norton 1992). The types of benefits and metrics identified in this study can be used to facilitate the measurement of ITSM service level and process level performance.

To apply the ITSM performance measurement framework designed in this study, the three components are integrated to offer a framework for performance measurement at the organisational, service, functions and process, and the technology component activity levels of ITSM. The integration of the ITSM PMF is shown in Table 5.7, which extends Table 5.4.

Table 5.7 Integration of ITSM performance measurement framework components

Performance measurement and reporting layers										
Layer 1	**Business Environment (derived from the literature review and case studies conducted in this study)**									
Factors influencing selection of metrics	External	Internal (Parent and IS organisation)								
Layer 2	**Organisation performance (sourced from (Tangen 2004))**									
Broad economic terms	Quality	Productivity	Profitability							
Layer 2	**Organisation performance (sourced from (Kaplan & Norton 1992))**									
Strategic	Customer	Internal operations	Learning and innovation	Financial						
Layer 3	**IS Organisation performance (based on (OGC 2007b))**									
ITSM Service level	Service demand	Service resources	Service offering							
Service components	Service demand	Service resources	Service offering							
Layer 3	**Types of performance benefits and metrics (developed from the study literature review and survey)**									
ITSM function and process level	People	Process	Resources	Product						
Layer 3	**Sub-types of performance benefits and metrics (developed from the study literature review and survey)**									
ITSM function and process level	Customer satisfaction	Process improvement	Cost management	Resources management	Risk management	Compliance	Service improvement	System improvement	System availability	Knowledge acquisition
Layer 4	**Performance metrics - defined in the metrics catalogue (developed from the study literature review and survey)**									
Process metric constituents	Outcome	Stage	Type	Conduct	Measures					
Layer 5	**Human and technology activity component metrics - defined in the metrics catalogue (identified from the study literature review)**									
Technology metrics	Human activity	Hardware activity	Software activity							

5.4 Demonstration of the ITSM PMF

The study follows the guidelines on demonstration found in Peffers et al. (2008). This section outlines how to use the artefact to solve the problem of measuring and reporting the performance of ITSM. In this section the study demonstrates how the ITSM performance measurement framework can be applied on a typical

IT email service. This study uses both a single act of demonstration described in this section, as well as formal evaluation described in section 5.5.

To demonstrate the proof of concept, a worked example of applying the ITSM performance measurement framework is provided in Table 5.8.

Table 5.8 An applied example of the ITSM PMF

Economic Perspectives	**Quality contribution of ITSM**	**Productivity contribution of ITSM**					**Profitability contribution of ITSM**			
Balanced scorecard (BSC)	Performance of ITSM on customer management	Performance of ITSM internal operations management	Performance of ITSM learning and innovation management				Performance of ITSM financial management			
Example service	*ABC Email service*									
ITSM service level performance	ITSM performance of ABC Email service demand management	ITSM performance of ABC Email service resources management					ITSM performance of ABC Email service offering management			
ITSM function and process level	ITSM performance of management of people	ITSM performance of management of process	ITSM performance of management of resources				ITSM performance of management of product			
ITSM function and process level	Customer satisfaction	Process improvement	Cost management	Resources management	Risk management	Compliance	Service improvement	System improvement	System availability	Knowledge acquisition
Process metric constituents	ITSM process outcome	ITSM process stage	ITSM process type	ITSM process conduct	ITSM process measures					
Layer 5	Human and technology activity component metrics - defined in the metrics catalogue (identified from the study literature review)									
Technology metrics	Human activity				Hardware activity		Software activity			
Technology metrics	Person configuration item: *Email manager, Network manager, Security manager, Users*	Documentation configuration item	Process configuration item	Service configuration item: *SLA agreement*	Hardware configuration items: *Server, PC clients, Router*	Facilities configuration item: *Server room, Offices, Bring Your Own Device (BYOD)*	Software configuration item: *Network operating system, client operating system, router operating system, email software*			

5.5 Evaluation of the ITSM performance measurement framework

In addition to the demonstration of proof of concepts this study conducted an evaluation of the ITSM performance measurement framework. Evaluation is an important requirement in design science research (Cleven, Gubler & Huner 2009; Gregor & Jones 2007). This study applies the evaluation guidelines offered by Peffers et al. (2008). Evaluation involves observing and measuring how well the artefact supports a solution to the problem. Evaluation in this study was designed for execution at two levels: logical proof and testing of use of the artefact in an organisation. To achieve logical proof the study compares the objectives of the solution identified in the ARC proposal with the actual defined ITSM performance measurement framework as described in section 5.5.1. Attempt at application of the artefact at Case A to solve a problem of ITSM performance measurement in an organisation is described in section 5.5.2

The ITSM PMF artefact is evaluated by observing and measuring 'how well the artefact supports a solution to the problem. This activity involves comparing the objectives of a solution to actual observed results from use of the artefact in the demonstration' (Peffers et al. 2008).

This involved evaluating the ITSM PMF on its capability to assist the organisation in selecting contextualized metrics, generating relevant reports to the organisation and providing an integrated set of ITSM performance metrics. ITSM managers and a panel of experts provided feedback as input to build the final prototype.

Applying the guidelines of Peffers et al. (2008, p. 56) given 'the nature of the problem venue and the artefact', evaluation in this study took two forms:

1. 'Conceptually, such evaluation could include any appropriate empirical evidence or logical proof'; and
2. A comparison of the artefact's functionality with the definition of objectives of a solution based on quantitative performance measures which, in this study, was feedback on the ITSM PMF provided by Case A. The study researcher also invited Case A to provide quantifiable measures of the ITSM PMF performance from its application at Case A.

At the end of the evaluation the decision was made in this study to make a single iteration back to design and development to try to improve the effectiveness of the artifact then continue to communication of the final results with further improvement left to subsequent projects (Peffers et al. 2008).

5.5.1 Logical proof of concept of the ITSM PMF

The development of the ITSM performance measurement framework was based on an Australian Research Council (ARC) grant proposal. The deliverables outlined in the ARC grant were presented as part of the PhD student's confirmation of candidature. Feedback from the confirmation of candidature panel was incorporated to manage the scope of the undertaking to fit within the study. A key recommendation of the confirmation of candidature panel was the management of the process and number of design and development iterations. The confirmation of candidature panel also advised on the moderation of number of ITSM processes included in the study. This study, when developing metric constituents, focused on the top three implemented ITSM processes of change management, incident management, and problem management.

The deliverables planned in the ARC grant proposal, along with the evaluation criteria used and the results of an evaluation of the study achievement, are presented in Table 5.8. The first column in the table presents the ARC grant proposal target deliverables. The second column presents the criteria used to evaluate how well the ITSM performance measurement framework supports a solution to the problem. The third column presents a brief description of the study artefact, the contribution of the study artefact in solving the problem and limitations of the study achievement.

The table presents an account of what the study achieved evaluated against the objectives set in the ARC proposal. The table presents the contributions made by this study, as well as a consideration of the limitations and delimitations.

Overall the study achieved the objectives set out in the ARC grant proposal.

Table 5.9 An evaluation of how well the artefact supports a solution to the problem of ITSM performance measurement

Actual ITSM performance measurement framework: product of study
Evaluation criteria: Does the list provide an organised itemisation of ITSM benefits that can be used by an organisation to identify the types of benefits reported from ITSM improvement initiatives? **ARC proposal deliverable:** List of ITIL benefits **Study artefact:** The study developed categorised lists of ITSM benefits along BSC perspectives shown in Table 4.18, categorisation for types of ITSM benefits shown as applied to ITIL lifecycle benefits in Table E.1 in Appendix E and ITIL process benefits in Table E.1 and Table E.2 in Appendix E. **Contribution to solving the problem:** The study provides an organising categorisation of ITSM benefits that ITSM practitioners can use to: link benefits with metrics evaluate the balance of the distribution of the organisations performance measurement practices and address any deficiencies interconnect operational level process metrics with, tactical and strategic level performance measurement
Evaluation criteria: Does the snapshot provide a representation of the ITSM practices that an organisation can use to contextualise benefits measured? **ARC proposal deliverable:** Snapshot of benefits measured **Study artefact:** Survey result summaries of ITSM benefits along industry sector, ownership, annual turnover, total staff, and duration of ITSM implementation shown in Table 4.23, Table 4.24, Table 4.25, Table 4.26, and Table 4.27 respectively. The study developed an ITSM performance metrics selection model, presented in section 5.3.3. The survey results on the organisations performance measurement practices presented in section 4.4 and the challenges of ITSM performance measurement presented in section 4.6 and section 4.7. **Contribution to solving the problem:** The snapshot of benefits measured can be used by an organisation to benchmark its benefits against those of other organisations along organisation characteristics. The ITSM performance metrics selection model can be used by an organisation to understand the contextualising factors influencing the selection of metrics. **Limitations:** The results are based on a sample of a population of ITSM practitioners who are itSMF members and may not be representative of ITSM practitioners who are not members of itSMF.

Actual ITSM performance measurement framework: product of study
Evaluation criteria: Does the skeleton structure present a performance measurement framework incorporating processes, BSC perspectives and objectives? **ARC proposal deliverable:** skeleton structure of performance measurement framework (Processes, perspectives, objectives) **Study artefact:** The study develops an ITSM performance measurement framework with the following components: 1. A model to measure the performance of ITSM at the organisational level presented in section 5.3.2 2. An ITSM performance metrics selection model, presented in section 5.3.3 and 3. ITSM performance metrics constituents presented in sections 5.3.5 **Contribution to solving the problem:** The ITSM performance measurement framework can be used as a guide to: selecting and organising ITSM metrics developing ITSM performance measurement and reporting systems evaluating existing ITSM performance measurement efforts benchmarking creating ITSM catalogues **Limitations:** The ITSM performance measurement framework developed has not yet been implemented in an organisation.
Evaluation criteria: Does the definition of each performance metric include: A name for the metric, A discussion of the underlying construct the metric intends to capture, Discussion of related metrics, Metric expressed as a composition of more basic metrics, Standard unit of measurement, General measurement issues, Cross references to corresponding method definitions and known problems with the definition? Is there an examination of convergent and divergent validity of derived metrics ARC proposal deliverable: Defined metrics and methods (Metrics catalogue) **Study artefact:** The study identified existing metric catalogues already in use and makes a contribution by enhancing the ITSM metric categories used with categories from an IS and an Internet catalogue. The study developed a consolidated ITSM process metrics catalogue classification with constituent metrics presented in section 5.3.5. **Contribution to solving the problem:** Provide a consolidated metrics catalogue structure that can be used by organisations to: Standardise cataloguing of metrics Justify selection of metrics Evaluate the completeness of metrics in use Link technology, process, function and service level metrics with higher level organisation performance metrics Have a basis for identifying underlying metric constructs by using the metric constituents Provide a rationalised starting point for organisation ITSM performance metric catalogue Implement a metric catalogue that links to the overall ITSM performance measurement and organisation performance measurement and reporting **Limitations:** The study did not examine the convergent and divergent validity of derived metrics.

Actual ITSM performance measurement framework: product of study
Evaluation criteria: Is a corresponding set of methods explaining how each metric is measured provided? Does each method include: name of the method, corresponding metric, assumptions behind the method, discussion of how the method works, an analysis of measurement errors and uncertainties. **ARC proposal deliverable:** Methods of measurement **Study artefact:** The literature review identified ITSM texts and websites that have already addressed this problem to a good extent and are in used by ITSM practitioners. **Contribution to solving the problem:** The study consolidates an extends the typology presented in the ITSM texts The study bases the typology on previous performance measurement literature **Limitations:** The study stopped short of generating a definitive, unique and complete list of ITSM metrics. The study offers a categorisation of metrics that can be used towards the development of a unique list of metrics that can then form the basis for generating a corresponding set of methods explaining how each metric is measured. An effort that this study identifies as broad in scope and significant area for further research. The results of the study show organisations with significant budgets and resourcing for ITSM performance measurement had not achieved this and did not perceive immediate benefit in the undertaking as a practical concern.
Evaluation criteria: Compile a glossary/taxonomy to provide clarification of terminology and to eliminate duplicate or inconsistent nomenclature. **ARC proposal deliverable:** Glossary/taxonomy **Study artefact:** The study developed a consolidated ITSM process metrics catalogue classification with constituent metrics presented in section 5.3.4. **Contribution to solving the problem:** The proposed metrics catalogue typology and ITSM benefits and metrics categorisation provided eliminates duplicate terminology and inconsistent nomenclature **Limitations:** Acceptance and wide adoption and use of the taxonomy presented in the study in section 5.3 are required to achieve this. Results of the study show the majority of organisations implementing ITSM do not use a performance measurement framework for ITSM and those that use a performance measurement framework do not maintain an ITSM metrics catalogue. It is important to note that none of the organisations in the study provided a metrics catalogue.
Evaluation criteria: To develop an instrument to enable a panel of experts to undertake a criterion based evaluation of the performance measurement framework. To evaluate the framework on individual performance measures, set of performance measures (the performance measurement system as an entity), the relationship between the performance measurement system and the environment. **ARC proposal deliverable:** Evaluation Criterion **Study artefact:** An instrument for evaluating the ITSM performance measurement framework was developed described in section 5.5.2 and shown in Table E.5 in Appendix E. **Contribution to solving the problem:** The evaluation criterion can be used by organisations as a guide to deriving constituent ITSM performance metrics used in populating metric catalogues. **Limitations:** Case A's commitment to fully evaluating and testing the ITSM performance measurement framework was limited by the organisation's immediate performance measurement and reporting needs and the resources the organisation was able to commit. Case A was the subject of a major restructure at the time.

Actual ITSM performance measurement framework: product of study
Evaluation criteria: Can the framework be hosted as a set of web-based documents? Is the framework designed to facilitate easy drill-down for more detailed information regarding metrics, methods and guidance? **ARC proposal deliverable:** ITSM Performance Measurement Framework **Study artefact:** The ITSM performance measurement developed can be hosted online. The ITSM performance measurement framework designed can be used to facilitate drill-down to more detailed information regarding metrics and the guidance is provided in section 5.3. Contribution to solving the problem: Provide guidance for organisations to interlinking metrics at different levels of the organisation. **Limitation:** The study did not have the capacity to develop methods for each metric given the magnitude of scope required to achieve this. A previous study (Son et al. 2005) identified that there were over 300 key performance indicators offered by ITIL and CobiT. The development of methods for a single ITSM performance metric has been the subject of one PhD study O'Callaghan (2010).

5.5.2 Evaluation of the ITSM performance measurement framework

Case A provided the opportunity to perform the evaluation of the ITSM PMF and the results of the evaluation edify the synthesis step of the macro cycle of the design process. Case A was one of the two industry linkage partners in the ARC grant funding the study. The PhD student and the study supervisor held two meetings with Case A staff in March and April 2012. The panel of ITSM practitioners from Case A comprised middle operational level managers including the Senior Director of Service Management, the Director of Strategy, Governance and Architecture, the Assistant Director of Governance, the Director of Service Planning and Performance, and a Principal Process Improvement Officer.

The early versions of the ITSM PMF components were presented to Case A for evaluation in the first meeting; and revised versions of the ITSM PMF components provided in sections 5.3.1 to 5.3.5 were presented to Case A for evaluation in the second meeting. The aim of the demonstration was to present the ITSM performance measurement framework to Case A, as well as to engage Case A in evaluating the usefulness of the ITSM PMF to solve the problem of measuring the performance of ITSM in their organisation. The first presentation was made to Case A on 14th March 2012 at Case A's premises and a follow up evaluation meeting conducted on 16th April 2012. The meeting proceedings are provided in this section and key outcomes are described in section 5.5.3 and section 5.5.4.

The first two-hour evaluation meeting with Case A began with the presentation of a meeting agenda, followed by a presentation of the first iteration of ITSM performance measurement framework and a sample populated ITSM Metrics Catalogue. After the presentation the senior managers at Case A presented feedback on the first iteration of the ITSM performance measurement framework. Prior to the first evaluation meeting with Case A the presentation and ITSM performance measurement framework had been emailed to senior managers at Case A. The senior managers at Case A were expected to undertake the review actions as part of the evaluation. The first action to be undertaken was a review of the ITSM performance measurement framework, followed by a review of part of the ITSM metrics catalogue—metrics elements. The senior managers at Case A were requested to supply the researcher with an initial catalogue of metrics for testing at Case A to:

a. test the catalogue and ITSM PMF for validity of metrics and metric elements;
b. verify usefulness of the PMF and categorisation of metric elements;
c. map a sample of current Case A metrics using the PMF to the proposed catalogue;
d. provide feedback on the use of the ITSM PMF and metrics catalogue; and
e. Suggest improvements to the ITSM PMF and metrics catalogue.

The final review action required from Case A senior managers was provision of feedback on the relevance and potential improvements to include in the framework to be presented at the second meeting.

The senior managers at Case A had not reviewed the ITSM performance measurement framework documents emailed to them in advance—perhaps due to busy work schedules. Comments and feedback were provided based on the presentation made on the day. The feedback provided by Case A was based on their current organisational needs. Case A was undergoing an overhaul in their performance reporting and had created a new structure for strategy, planning, governance and architecture that subsumed the previous benefits realisation reporting function of the information function of Case A. The information function senior manager advised that ITSM performance measurement represented a small fraction of Case A’s information function needs and direction. After the presentation of the ITSM performance measurement framework, Case A provided the following feedback, outlined in summary below and presented in detail in section 5.5.3:

1. At Case A more value was placed on an organising ITSM performance measurement framework than on an ITSM catalogue of metrics
2. Case A was content with their current operational level ITSM performance measurement and reporting
3. Focus was on strategic reporting of performance measurement with the aim of alignment of operational and tactical level performance with strategic level goals.

As a consequence of the organisation's focus and needs, Case A declined to commit resources and time to:

1. Review part of the ITSM metrics catalogue – metrics elements
2. Supply initial catalogue of metrics for testing at Case A to:
    a. Test the catalogue and ITSM PMF for validity of metrics and metric elements
    b. Verify usefulness of the PMF and categorisation of metric elements
    c. Map a sample of current Case A metrics using the PMF to the proposed catalogue
    d. Provide feedback on the use of the ITSM PMF and metrics catalogue
    e. Suggest improvements to the ITSM PMF and metrics catalogue.

Case A feedback was limited to comments on an organising ITSM performance measurement framework. A second evaluation meeting was sought with the senior manager at Case A responsible for ensuring ITIL performance with the organisation's performance.

5.5.3 Outcome of the first evaluation

Service performance reporting was a priority at Case A—though they had not yet implemented it. Case A collected process metrics that satisfied their operational and, to an extent, the tactical level of management. The ITSM dashboard used at Case A tracks correlation between what has changed at the business level and its impact on performance at the operational level. Case A had identified a need for service metrics suitable for presentation to the strategic level managers who report to the organisation's Chief Executive Officer (CEO). An earlier attempt by Case A to present an operational and tactical ITSM report at the organisation's strategic level failed. The CEO and strategic level managers rejected the operational report by Case A's IS unit as irrelevant to their needs. The strategic level managers were not interested in ITSM process metrics. Case A was of the view that a lot of effort was required internally to generate ITSM reports. In the past at Case A the BSC had been utilised for service performance reporting, however, that tapered off over time with a number of Chief Information Officer (CIO) personnel changes. Case A's CIO, who was appointed in 2011, had rejuvenated interest in service reporting with a step taken to advertise an ITSM service reporting position. Case A is also reinstating an ITSM governance committee that is developing a service improvement road map with a process-maturity monitoring program. Case A has an extensive list of ITSM process performance metrics with limited reporting. The metrics are mainly tool sourced. Case A sought reporting along the BSC perspective with five to six levels of breakdown to allow reporting to different performance reporting audiences such as strategic, tactical and operational with the key performance indicators linking into reports. Case A needed a multidimensional framework with a stakeholder's view. Case A perceived the stakeholders to be the end customer of metrics.

Case A had been using internal resources to develop ITSM performance reporting and had not received assistance from external consultants.

One of the managers at Case A stated that the ITSM performance metrics evolve from qualitative metrics and as maturity is achieved they develop into quantitative metrics. Case A placed more value on an ITSM PMF and less on an ITSM metrics catalogue. Case A expressed a need for a performance measurement framework with the capability to show how to roll up the metrics to the various organisation levels. Case A placed higher value in aligning the ITSM with the organisational performance and less value in ITSM performance measurement at the operational level. At Case A the type of reports generated and how the reports are used drives the validity of ITSM performance measurement. At Case A the level of granularity continually changes with the needs and priorities at different organisation levels over time and with senior management's '*appetite'* for ITSM. Case A preferred not to have too many categories for performance reporting in the ITSM performance measurement framework. A recurring need expressed at Case A was the need to show how the ITSM metrics at the operational level roll up to dashboards at the business reporting level. Given that different ITSM report customers are interested in different measures at different levels, varying granularity will be required and the ITSM performance measurement framework would need to be dynamic. At Case A knowledge of IT service issues in the customer domain was increasing and there was recognition of the importance of customers.

An ITSM performance measurement challenge at Case A was the issue of ITSM staff meeting target response times but missing reporting deadlines, skewing the metrics reports on call response times. Case A sought an ITSM performance measurement model adaptable to the organisation, and an approach to implementing metrics with guidance on where to begin. The performance measurement model ideally should provide advice on whether to start at the top level or operational level of the organisation; or whether to measure the overall organisation performance or unit level performance. At the operational level the ITSM performance measurement framework needs to be comprehensive to allow the '*slice and dice'*. A concern at Case A was the ability to demonstrate how the ITSM performance measurement supported the business.

5.5.4 Re-evaluation of the ITSM performance measurement framework

One month later, the second two-hour evaluation meeting with Case A was held. It began with the presentation of a meeting agenda, followed by a presentation of the second iteration of ITSM performance measurement framework and the ITSM performance metrics constituents. After the presentation the senior managers at Case A presented feedback on the first iteration of the ITSM performance measurement framework. Prior to the first evaluation meeting with Case A, the presentation and ITSM performance measurement framework had been emailed to senior managers at Case A. The senior managers at Case A were expected to undertake the following review actions as part of the evaluation. Case A senior managers were required to review part of the ITSM metrics catalogue, that is, metrics elements and supply initial catalogue of metrics for testing at Case A to:

a. test the catalogue and ITSM PMF for validity of metrics and metric elements;
b. verify usefulness of the PMF and categorisation of metric elements;
c. map a sample of current Case A metrics using the PMF to the proposed catalogue;
d. provide feedback on the use of the ITSM PMF and metrics catalogue; and
e. suggest improvements to the ITSM PMF and metrics catalogue.

The detailed outcome of the first meeting with Case A is presented in section 5.5.3 and the outcome of the second meeting is presented in section 5.5.4.

5.5.5 Outcome of the second evaluation

The second evaluation meeting was held at the offices of Case A between the PhD student and the Director of Service Planning and Performance. This director was assigned the task by other Case A senior managers as he was responsible for IT service management at Case A. The study supervisor attended part of the meeting via teleconference. The second evaluation meeting used a workshop format by working through a whiteboard session to gain further insight into Case A's service performance measurement and reporting needs and develop a plan of action. The meeting also sought to identify common areas between the research and Case A's immediate service performance measurement and reporting needs.

During the meeting a summary was presented on the study survey results on Case A's industry sector in terms of stakeholders, key performance indicators and reporting. Case A was provided a handout of summary findings from literature reviewed on implementing ITSM/IS performance measurement and reporting. A presentation of the revised metrics classification work-in-progress was made and feedback received from Case A.

Case A was implementing a strategy, planning and governance architecture that will be responsible for developing a service performance framework. The scope and requirements were still being determined. The Director of Service Planning and Performance will be responsible for a small component of the strategy, planning and governance architecture. The strategy, planning and governance architecture will be responsible for the whole of Case A's ICT functions performance, while the key focus for the Director of Service Planning and Performance in the service performance framework will be to ensure there is integration with ITIL and the performance reporting. Case A's report consumers are service owners or service providers responsible for performance. The monthly ITIL process metrics will be defined by the strategy, planning and governance architecture. The director was of the view that metrics should be driven from the top of the organisation down to the operational levels of the organisation. The ICT function at Case A does not have staff at the strategic level of the organisation; staff are located at the operational and tactical levels. Case A was in the process of determining stakeholders at each level to identify the audience to determine the planned reporting: '*For example, a capacity* *manager may be interested in the component level nuts and bolts reporting'* *(*Director of Service Planning and Performance). The stakeholders at each level, especially at the top level, may be individuals or committees. At Case A '*the governance structure informs or drives the organisation structure'* (Director of Service Planning and Performance). The organisation level and the governance structure are separate. The ICT function collaborates with the strategic level to identify the metrics of interest.

Key environmental changes were occurring in Case A's industry that were expected to have an impact on service measurement and reporting:

1. a national reform in the industry sector—expected to impact service level agreements; and
2. change in government—could result in change in policy, direction and strategic level personnel.

Case A was in the midst of a structural change and was seeking to identify ways to align the operational IT performance reporting with the organisation's business reporting. Case A was working to define a catalogue of key performance indicators.

Case A was also seeking ways to further develop the ITIL reporting it had commenced.

The director at Case A reviewed and provided feedback on the second iteration of the study ITSM performance measurement framework.

ITSM performance metrics constituents presented in sections 5.3.5 and shown in Figure 5.4, Figure 5.5 and Figure 5.6 were considered valuable and the structure 'made sense'. Case A's approach of top-down performance measurement meant that Case A was more inclined to align planned operational level metrics with strategic goals. Case A's immediate approach did not lend itself to developing an ITSM performance metrics catalogue, as this was perceived as a bottom up approach to performance measurement and reporting.

5.5.6 Proposed improvements to existing ITSM metrics catalogues

The feedback from the two meetings with Case A presented in section 5.5.2, section 5.5.3 and section 5.5.4 was used to improve the ITSM performance measurement framework by further incorporating guidance on interlinking performance reporting at different organisational levels, considered important by industry practitioners.

In its ITSM performance measurement, Case A sought to identify:

- Commonalities across industries—who are the stakeholders; what KPIs are of interest?
- How are ITSM performance reports rolled up and to whom are they distributed?
- What service performance metrics can be reported to the tactical and strategic level?

The second iteration of ITSM performance measurement framework design included revisions to further incorporate feedback from Case A by providing additional guidance on the interlinking performance reporting at different organisational levels. The ITSM framework components organised in Table 5.7 can be used as templates as applied in Table 5.8 to identify commonalties across industries, stakeholders and the key performance indicators of interest, how ITSM reporting is linked through the organisational levels, and service performance metrics that can be reported to the tactical and strategic level.

5.6 Communication of the results

This section presents the communication of the study results that was undertaken as part of the design science framework. Communication is an important requirement in design science research (Cleven et al. 2009; Gregor & Jones 2007). The purpose of the communication step is to 'communicate the problem and its importance, the artefact, its utility, novelty, the rigour of its design and its effectiveness to researchers and other relevant audiences such as practicing professionals, when appropriate' (Peffers et al. 2008, p. 56).

ITSM managers and a panel of ITSM industry practitioners from Case A provided feedback as input to build the final prototype. The results of the literature review, survey, case study and design research have been communicated through publications to audiences in industry and academia. Journal articles and conference papers from this study are summarised in Table 5.10 and listed in detail in Table D.3

in Appendix D. Regular communication with industry partners, case study interviewees and survey respondents was maintained throughout the study.

Table 5.10 Communication of results throughout the study

Dissertation Chapter	**Academic Journal**	**Academic Conference**	**Industry Journal and Conference**
Chapter 1: Introduction	JGITM 2010	ACIS 2010 doctoral consortium, GITMA 2011, PACIS 2011	itSMFA Queensland State Seminar 2010
Chapter 2: Literature Review	IGI-Global Book section 2012, COGIT 2010, JGITM 2010	SIGSVC 2011, ACIS 2010 doctoral consortium	itSMFA National Conference 2011
Chapter 3: Methodology	COGIT 2010, JGITM 2010	PACIS 2011 paper, ACIS 2010 doctoral consortium	itSMFA National Conference 2011
Chapter 4: Survey and Case Study Results	Sprouts 2011, JGITM 2010, COGIT 2010	ICIS 2011, PACIS 2011 paper 1, ACIS 2010 doctoral consortium	itSMFA National Conference 2011
Chapter 5: Design Science Results	EJBRM 2012, IGI-Global Book section 2012	ECRM 2012, PACIS 2011 paper 2	itSMFA National Conference 2011
Chapter 6: Discussion	All of the above	All of the above	All of the above
Chapter 7: Conclusion	All of the above	All of the above	All of the above

Early and constant publication and submission of results to academic and industry outlets was useful in achieving the objectives of the study. Interaction with ITSM practitioners yielded practical advice on what was considered important and valuable by industry experts. Feedback from practitioners who read the published articles and attended the presentations highlighted areas of interest such as contextualising factors that influence the selection of ITSM performance metrics. Academic reviewers of work from the study provided valuable methodological and theoretical insights. The study researcher re-examined assumptions of the study based on reviewer feedback that initially appeared critical but on extra contemplation proved invaluable. The study also gained from reviewers drawn from an international pool who, at least in one case, pointed to literature on efforts in ITSM performance measurement in a non-English speaking country that had otherwise not gained the researcher’s attention.

5.7 Theoretical outcomes from the design

5.7.1 Theory informing the design of the ITSM performance measurement framework

The theory informing the design of the ITSM performance measurement framework is drawn from three main sources. The definition of IS theory used in the study is based on the work of Schneberger et al. (2009). The explanation of IS design science is provided by theory presented by Gregor (2002, 2006, 2009) and Gregor and Jones (2007). The underlying theory of the design method is based on IS design research theory found in Peffers et al. (2008).

5.7.2 Theory from the design of the ITSM performance measurement framework

The research and design conducted in the study resulted in a proposed theory. The research identified a gap in ITSM performance measurement theory and IS design science theory and proposes solutions to alleviate the gaps. The study proposes a contingency theory of the performance measurement of ITSM, described in section 5.3.4. The study also identifies scarcity in guidance on the IS design science design step and proposes the use of MAPS to facilitate the design step in IS design science.

5.8 Conclusion

This chapter described the ITSM performance measurement framework design and development, evaluation and communication. The ITSM performance measurement framework was presented and an explanation of the design cycles used in the development of the ITSM performance measurement framework was provided. The study developed an ITSM performance measurement framework and answers for *RQ3. How can metrics used to measure ITSM performance be derived?* A conceptual, logical proof evaluation of the ITSM performance measurement framework shows that it fulfils the proposed objectives of the framework. A partial evaluation of the ITSM performance measurement framework at an organisation was achieved at Case A. This chapter described the communication conducted by the study and the importance of the communication in the design and development of the ITSM performance measurement framework.

This chapter described the developed ITSM PMF including dimensions, levels and categories of organisation performance measurement that contribute to a service-oriented approach to the management of the IT/IS function. The ITSM performance measurement framework developed in this study recognises the distinctions made between the short-term and long-term performance evaluation and proposes using a hierarchy with ITSM performance metrics and metrics constituents as a foundation for performance measurement and reporting of benefits along BSC perspectives, offering both a short term and long term perspective. This chapter develops a model applying the contingency theory of ITSM performance measurement to provide guidance on the selection of ITSM metrics. The contingency theory applied provides guidance within context without dictating a universal solution.

This chapter described the demonstration and evaluation of the ITSM PMF highlighting the importance of contextualised performance measurement to a case study organisation. The revision of the ITSM PMF and actions undertaken as a result of the evaluation feedback are also described in this chapter. A consolidation of existing ITSM performance measurement catalogues is proposed as an improvement to performance measurement practice. This chapter provide a description of the communication of the study results to academic and practitioner audiences and a reflection on the benefits of the feedback from reviewers of the study publications.

This chapter shows how the study contributes to IS design theory by applying and extending IS design research and using MAPS to as a design step method to alleviate the limited design step guidance in IS design science research frameworks.

This chapter shows that the ITSM PMF developed includes components that address areas that were identified as gaps and blends with existing performance measurement theory and practice.

Chapter 6 Discussion

6.1 Introduction

This chapter summarises and interprets the findings from the survey and case studies data analysis detailed in Chapter 4 and the ITSM performance measurement framework development provided in Chapter 5. The aim of this chapter is to discuss the findings in terms of each of the four research questions. In addition to discussing the outcome of the design of the ITSM performance measurement framework, this chapter provides context and meaning to the study by comparing the results with similar studies. The review of the literature in Chapter 2 provided the context of the research within Information Systems (IS) and demonstrated the need for the research. Chapter 2 also identified the existing gaps in ITSM performance measurement research. There is no industry standard ITSM performance measurement framework used to measure the performance of ITSM. The literature review showed that there is little research on the performance measurement of ITSM and also a lack of theory-based ITSM performance measurement frameworks.

Section 6.1 provides an introduction to the discussion on the findings of the survey, case studies and ITSM performance measurement framework design. This section is a preamble to the sections that follow and helps link Chapters 3, 4 and 5 with Chapter 6. Section 6.2 provides the context of the discussion in terms of the profile of the survey and case study organisations and the study conceptual framework. Section 6.3 focuses on findings related to the first research question, *RQ.1 What types of benefits are reported from IT service management improvement initiatives by organisations?* Section 6.4 is a discussion on the second research question *RQ2. Which specific metrics can be used to measure ITSM performance?* Section 6.5 presents a discussion on the third research question, *RQ3. How can specific ITSM performance metrics be derived?* This is followed by section 6.6, which provides a discussion based on the fourth research question *RQ4. What internal and external environmental factors influence the organisations' selection of specific performance metrics for ITSM?* The conclusion is provided in section 6.7. The summary and interpretation in this chapter are provided within the context of the study findings and prior research findings reviewed in Chapter 2. While Chapters 3, 4 and 5 focussed on reporting the results of the data analysis, this chapter lays emphasis on the interpretation and importance of the findings. Figure 6.1 provides an overview of Chapter 6 and its linkages.

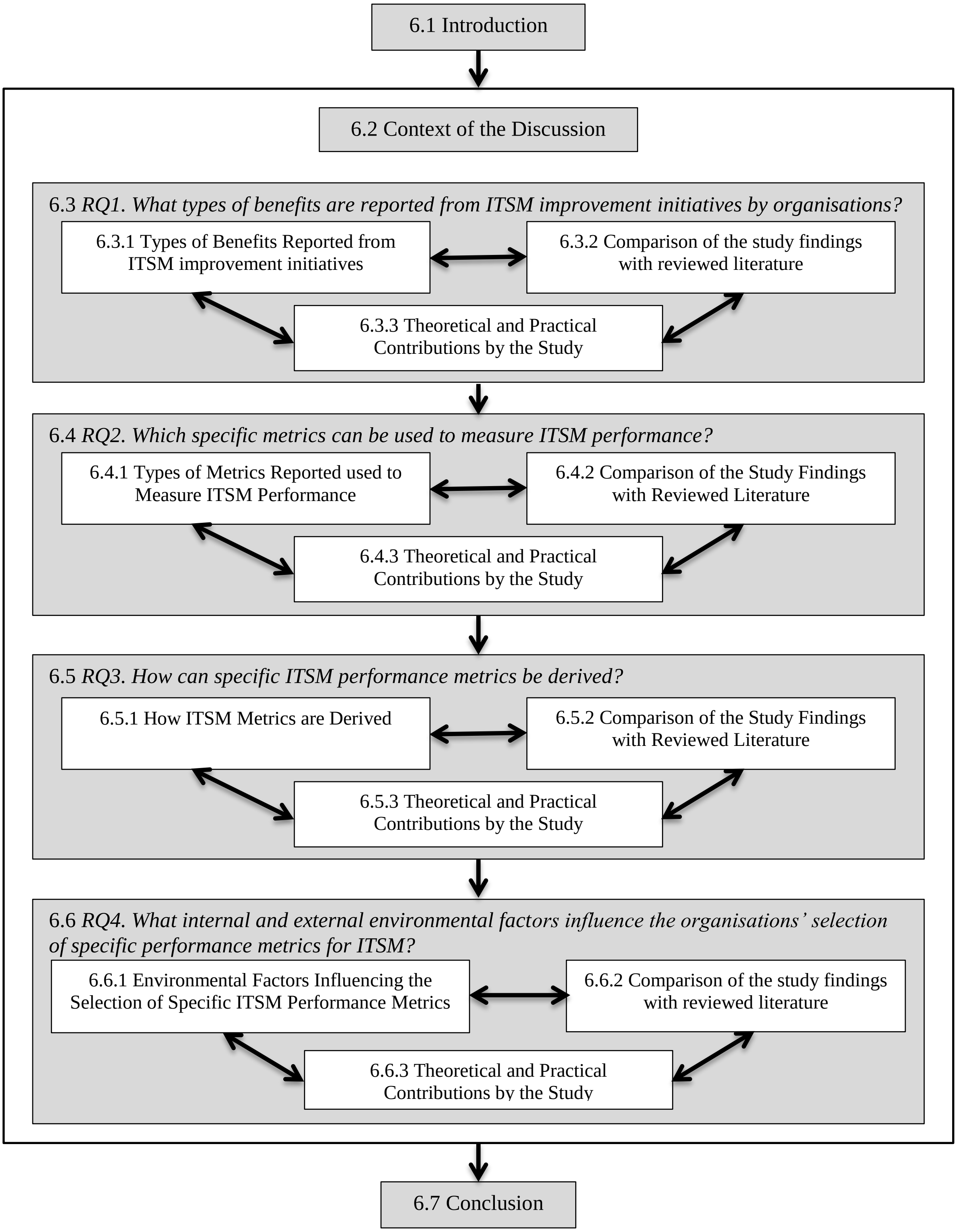

Figure 6.1 Chapter 6 overview and section linkages

6.2 Context of the discussion

The study used a multi-paradigmatic, mixed-method approach in developing an ITSM performance measurement framework. The context of the study paradigms, methods, results and outcome is shown in Figure 6.2.

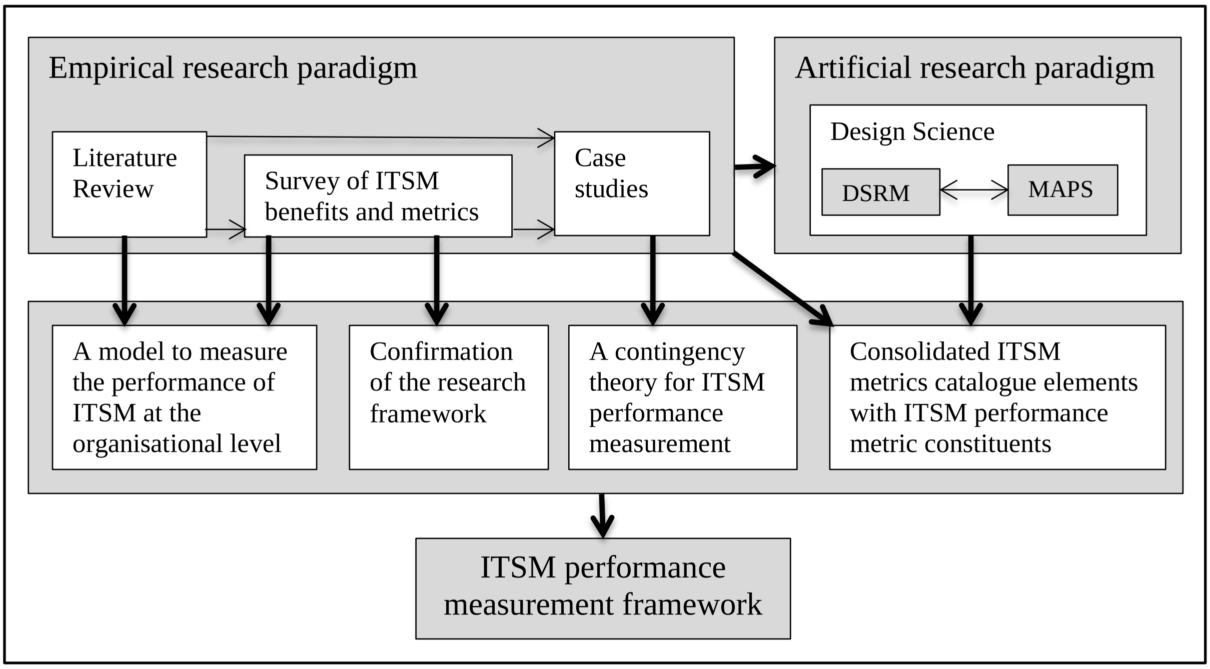

Figure 6.2 Context of the study

The literature review found limited research studies on the performance measurement of ITSM. Previous IT service management (ITSM) studies primarily focused on ITSM adoption and benefits. None of the studies reviewed addressed factors influencing the selection of ITSM performance metrics. Although organisations find this challenging, ITSM performance measurement should be done from a variety of perspectives. Breaking down metrics into their constituents enables performance measurement and engagement with stakeholders. There are a number of ITSM metrics catalogues available with guides on how to measure ITSM process performance but none of the ones found explained the metric classification schemes used. The existing ITSM metrics catalogues offered a variety of classification schemes with few making cross-reference and none offering comparisons of existing metrics catalogue. The existing ITSM frameworks provide methods for calculating process metrics but not a breakdown of the ITSM metric constituents. This study extends the existing ITSM metric catalogues by consolidating the metrics catalogue classifications, and breaking down metrics into constituents based on theoretical and empirical findings.

Based on the majority of responses provided, a typical organisation represented in the survey was located in the more populous Australian states; in the property, business service, government, education or finance and insurance industry sectors; Australian owned, with annual turnover greater than $50 million and employing more than 1,000 fulltime staff.

Based on the majority of responses received, the typical organisation in the study had the following performance measurement practices: predominantly implementing ITIL processes for one or two years; implemented change management, incident management, problem management; implemented incident management first then change management second followed by problem management; implementing one or two additional frameworks alongside ITSM framework processes as part of the IT service management improvement initiatives, typically Prince 2 and ISO 9000 or ISO/IEC 20000; limited use of performance measurement frameworks for ITSM; and when a performance measurement framework is used it is mainly the balanced scorecard (BSC) or the IT BSC. The survey respondents did not indicate using specific ITSM performance measurement frameworks. The case studies reported use of metrics from ITSM books but not the ITSM performance measurement frameworks.

The wide adoption of ITSM frameworks and the practice by organisations of implementing ITSM processes and using multiple frameworks may be based on the view that process implementation will result in benefits. However, this study's survey results and the statistical analysis did not confirm a correlation between ITSM processes and ITSM benefits. The study showed that there was an increase in reported benefits as organisations implemented up to four ITSM processes then a decrease in benefits reporting for organisations implementing more than four ITSM processes. Considering that continuous improvement is one of the fundamental principles of ITSM organisations, advancing in implementing ITSM frameworks would have been expected to be measuring ITSM performance and monitoring continuous improvement. The generally accepted view by ITSM practitioners that the maturity of ITSM implementation is indicated by the capability of process or number of processes implemented is disputed in the work of England (2011). Similarly, this study did not confirm a correlation between the number of ITSM processes implemented and the number of ITSM process metric responses. This study observed an increase in ITSM process metric responses for organisations implementing up to four ITSM processes; then a decline in ITSM process metric response for organisations implementing more than four ITSM processes.

There is a view—described in Cater-Steel et al. (2006a) and confirmed in Marrone and Kolbe (2010)—that the use of metrics is an indicator of a higher level of maturity of ITSM. This survey confirmed a moderate positive correlation between ITSM process benefits and ITSM processes. It could be argued that organisations implementing ITSM and conducting ITSM process performance measurement provided more ITSM process benefit responses. Though the results of the survey showed that the use of performance measurement frameworks in organisations implementing ITSM was not widespread, the study confirmed a correlation between performance measurement frameworks and ITSM process metrics. The study also confirmed a correlation between performance measurement frameworks and ITSM processes. These findings point to the importance of the use of performance measurement frameworks for ITSM organisations.

To gain a further understanding of ITSM performance measurement practice the case studies identified that external environment factors such as legislation and the industry sector; and internal environment factors such as the governance framework, IS function structure, and the ITSM and ICT tools in use influence the selection of ITSM performance framework and metrics. Other environmental factors influencing selection of ITSM performance metrics found in some, but not all, of the case study organisations included: external environment factors such as the competitive environment and the external customer, and internal environmental factors such as the ITSM manager perspective, organisation culture, corporate strategy and goals. The study developed an ITSM performance measurement framework that can be used to measure ITSM performance at various organisational levels. The multidimensional performance measurement framework developed provides a structure to conduct performance measures of ITSM at the organisational, service, function and process levels and provide information on the factors influencing the selection of ITSM metrics. The use of a design science approach in developing the

ITSM performance measurement framework enabled the use of research in design and resulted in the design, development, evaluation and communication of the ITSM PMF with theoretical and practical implications. In applying the DSRM, a gap in the design step in design science approaches was addressed, to an extent, by the use of the MAPs design method applied in this study. The study results are summarised in Figure 6.3. This section provided the context of the study results and detailed discussion of the results along the research questions is provided in sections 6.3 to section 6.7.

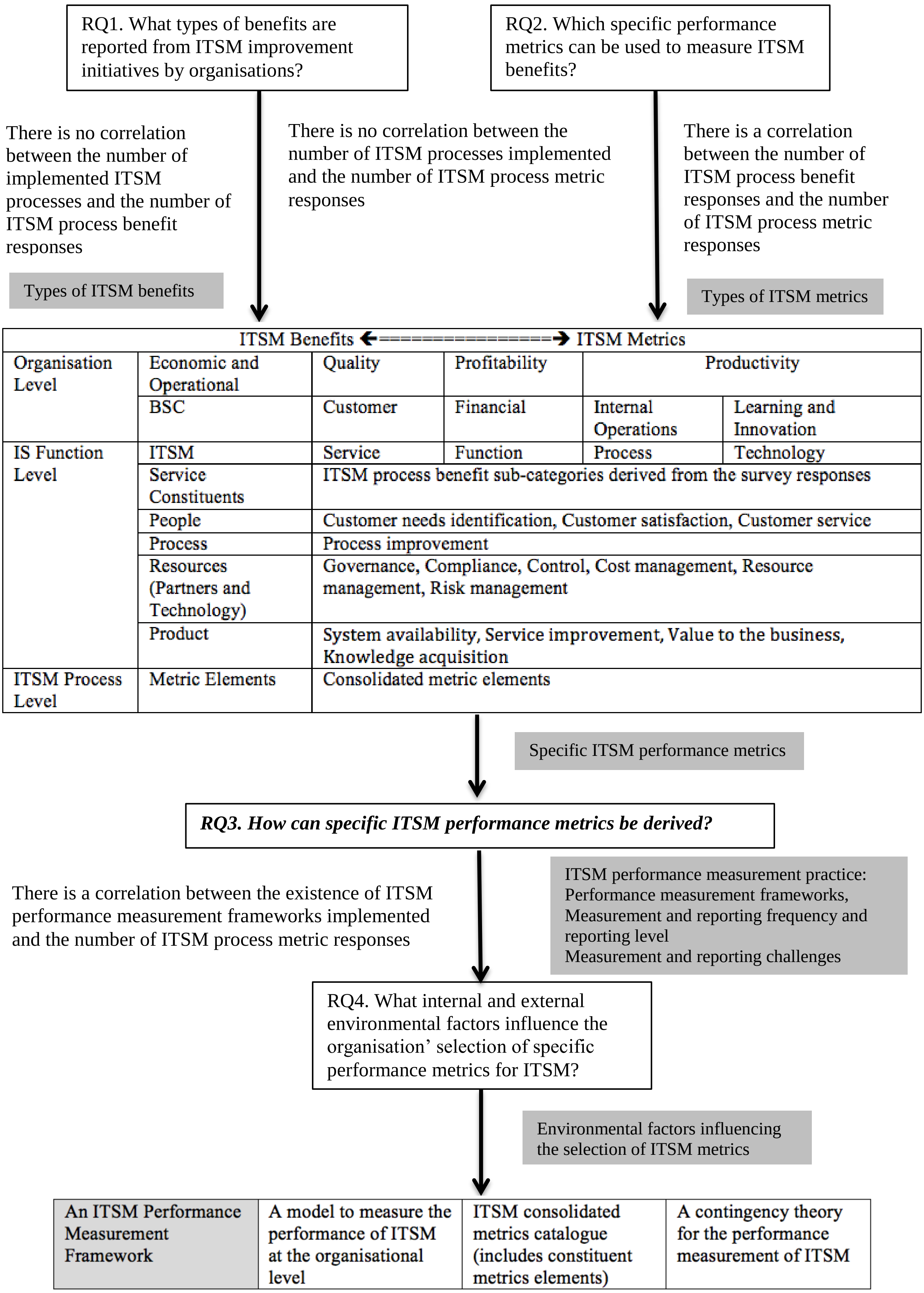

Figure 6.3 Summary of the study research questions and outcomes

6.3 RQ1: What types of benefits are reported from IT service management (ITSM) improvement initiatives by organisations?

This study established types of ITSM benefits based on findings from the literature review, surveys, case studies and development of the ITSM performance measurement framework.

The literature review yielded a variety of benefits ranging from ITSM benefits listed in conceptual and theoretical studies to empirical findings from studies. The literature reviewed on organisational and IS studies provided types of benefits from IS at the organisational and functional level. The study did not find any literature providing a definitive list of benefits that could be used by ITSM practitioners. There were lists of ITSM benefits from industry sources such as ITIL books from the OGC (2009).Sample lists of benefits are provided in Table E.2 on ITIL function benefits and Table E.1 on ITIL process benefits in Appendix E. The OGC (2009) texts, like other ITSM literature, do not provide categorisation and identification of unique benefits; the categorisation shown in the tables is that developed in this study.

The survey sought and received benefits on ITSM benefits at the organisational level as well as ITSM process level benefits. Using the ITSM benefit categorisation developed in this study a comparison of the OGC (2009) list of benefits from the literature review with the survey results shows that more process improvement and service improvement ITSM benefits are listed and fewer financial benefits (cost management and value to the business). The similarity in a focus on process improvement in the ITSM benefits lists may be explained by the fact that ITSM practitioners rely on OGC texts and undertake their ITIL training and examination based on OGC texts.

The study did not confirm a correlation between the number of ITSM processes implemented and ITSM benefits. Previous literature has not tested this correlation though OGC texts recommend the implementation of ITSM processes for realisation of benefits. The study results confirm ITSM practitioners' hesitation to invest in all the ITSM processes in their quest for ITSM benefits realisation. The results from the study survey indicate a strong preference by itSMF member organisations to adopt versions of ITIL. The adoption rate of individual ITIL processes and functions is uneven. Although the majority of survey respondents have adopted change, incident, problem, and service level management processes and the service desk function, other essential processes such as capacity and availability management are not widely adopted. In one of the case study organisations adoption of ITIL was deployed in instalments of groups of processes instead of what is observed as the primary practice of implementing ITIL processes individually and in sequential order. The practice of implementing ITIL processes in sequential order seems to result in a process focus in ITSM. Though the ITIL books underscore the importance of using all the ITSM processes, and in ITIL v3 a phased lifecycle is proposed, the practice is the implementation of processes as standalone units in series. The study found that ITSM benefits are reported primarily at the ITSM process level, but there is also reporting of overall organisational level ITSM benefits.

6.3.1 Types of organisational level ITSM benefits from a BSC perspective

The literature review, survey and case studies conducted in this research identified organisational level ITSM benefits. The findings on types of organisational level benefits were organised along BSC perspectives and the findings were used to structure the ITSM performance measurement framework developed in this study.

At the organisational level, a variety of ITSM benefits were reported along BSC perspectives, especially improved visibility and reputation of the IT department, delivery of IT services that underpin the business process, improved quality of business operations, and cost-justified IT infrastructure and IT services. When categorised, the organisational level ITSM benefits were mainly reported along the internal improvement perspective. The other three BSC perspectives had benefits almost evenly reported, with benefits along the business and financial perspectives leading—closely followed by benefits along the learning and innovation perspective. The concentration of ITSM benefits along the internal improvement perspective in this study matches similar concentration of internal improvement ITSM benefits in previous theoretical studies (Cater-Steel & McBride 2007; Chan et al. 2008; Hochstein et al. 2005c; Koch & Gierschner 2007; Potgieter et al. 2005; Šimková & Basl 2006; Spremic et al. 2008; Tan et al. 2010) and empirical studies (Cater-Steel & McBride 2007; Chan et al. 2008; Hochstein et al. 2005c; Koch & Gierschner 2007; Potgieter et al. 2005; Šimková & Basl 2006; Spremic et al. 2008; Tan et al. 2010). Unlike this study, previous theoretical and empirical studies providing ITSM benefits did not categorise the benefits, this, this study extends the findings of the earlier studies by consolidating the benefits and grouping and comparing them along the BSC perspective. The ITSM organisational level benefits identified in this study point to a relatively balanced approach to ITSM performance measurement that lays greater emphasis on internal operations. Given that the core objective of ITSM is service orientation, the study shows that this is yet to be achieved based on the ITSM practitioner emphasis on internal operations ITSM benefits at the organisational level.

The study found only a small minority of the ITSM practitioners used a performance measurement framework, with the BSC being the leading performance measurement framework—confirming the findings of Praeg and Schnabel (2006) on BSC being the most popular performance measurement framework in use. Given that close to half of the study survey respondents provided responses on the overall ITSM benefits at the organisational level and only a minority responded to the question on the implementation of a performance measurement framework, it could be argued that ITSM practitioners faced difficulty in the area of organisational level performance measurement, confirming the ITSM performance measurement challenge described by Son et al. (2005). This difficulty was confirmed in the study survey, case studies and ITSM performance measurement framework development evaluation feedback. The BSC was used in two of the case study organisations to provide a linkage between the ITSM process level metrics and the organisation level metrics. Though the literature reviewed provided a variety of approaches to organisational benefits such as the identification of causal links between BSC measures and financial outcomes (Ittner & Larcker 2003), or the use of the BSC as an organising framework linking functions to business processes, the organisations in this study primarily applied the BSC for linking ITSM process level performance with organisational level performance. Given the study findings, applying the BSC at the organisational level to draw a causal link between measures and financial outcomes would provide a valuable extension to the ITSM performance measurement and benefits reporting.

The ITSM benefits identified in the academic and the ITSM industry literature were not categorised into organisational and process level benefits. Previous ITSM empirical and theoretical studies did not make the distinction between types of benefits; this may have been as a result of previous studies focusing on ITSM adoption. A comparison of study survey findings, industry literature, and academic literature on the types of ITSM benefits at the organisational level shows a major emphasis on internal operation benefits. The theoretical studies provided more benefits along the customer perspectives and it could be argued that, theoretically, ITSM is customer oriented while in practice it is internally focused on the improvement of operations of the IT functions. There was a deficiency in the number of financial, learning and innovation benefits reported at the organisational level of ITSM performance.

The theoretical implications of the study findings are twofold. The deficiency in financial and ITSM organisation level learning and innovation benefits reported needs to be addressed for organisations to develop a balanced view of the performance of ITSM. Addressing the deficiency in financial and ITSM organisational level learning and innovation benefits reporting would improve communication and alignment with the strategic level of the organisation. The mismatch between theory and practice in terms of ITSM focus at the organisational level needs to be addressed.

The implications to practice include the identification of the lack of achievement of a balanced set of ITSM benefits reported at the organisational level.

6.3.2 Types of process level ITSM benefits

The literature review, survey and case studies conducted in this research identified types of process level ITSM benefits. The findings on types of ITSM process level benefits informed the categorisation of benefits types and structure of the ITSM performance measurement framework developed in this study. The industry literature, as well as the empirical and theoretical academic literature, did not provide types of categorising process benefits. This study developed categories and subcategories of ITSM process benefits that were used to compare the survey and case studies findings with the literature review findings. The theoretical and empirical academic studies selected in the literature review in this study provided overall ITSM benefits and not process level benefits. The industry literature, on the other hand, provided ITSM benefits for each ITSM process. ITSM practitioners sourced process benefits from websites, the ITSM framework manuals, and ITSM software.

Based on the categorisation of benefits along service constituents developed in this study, it was shown that the majority of ITSM process benefits focused on process improvement, and matching the internal business focus at the organisational level. The other categories of ITSM process benefits along service constituents were product, resources and people. The people category had the smallest number of benefits reported, while the process improvement category had the highest number. This again points to an internal focus on ITSM performance as well as a lack of balance of reported benefits across the service constituents. The lists of ITSM process benefits identified in the literature review were not definitive and lacked categorisation—this may have contributed to the imbalance of benefit distribution across the service constituents. Though a service focus is central to ITSM the lack of organising categories around service constituents means that the list of benefits provided by the industry literature confined the articulation of benefits along processes instead of services.

The study contributes to theory of ITSM benefits by developing types for process level ITSM benefits. Previous studies have not provided categorisation of the identified ITSM benefits. The typology provides a basis for identifying unique benefits as well as providing data for further development of an ITSM benefits taxonomy that can be used to extend ITSM ontologies.

6.4 RQ2: Which specific metrics can be used to measure ITSM performance?

Results from the literature review and the survey highlight specific performance metrics that can be used to measure ITSM benefits. The performance metrics identified from the literature review and the surveys are predominantly process metrics. There was variation and a lack of standardised classification of metrics in the literature and this may explain the lack of integrated classification of metrics from the survey responses. However, unlike reviewed ITSM benefits literature that lacked categorisation, there were a variety of ITSM metric categorisation schemes offered in the literature, for example, the OGC categorises metrics into service, process and technology metrics. This categorisation of metrics is vertical, moving from operational detailed technology metrics to high level summarising service metrics. This study identified that for ITSM performance measurement to be holistic, a horizontal dimension is required to cater for the development cycle of the service.

This study extends the existing ITSM metric categorisation by proposing horizontal performance metrics perspectives of service demand management performance, service resource management performance and service offering management performance.

The key classification of metrics is provided along ITSM processes, for example, incident metrics, problem metrics, and release metrics. This compartmentalisation of metrics may explain the observed lack of financial metrics when the study applied a BSC categorisation on the survey metrics. The process-oriented approach has financial management as an ITSM process, which has not yet been implemented in most of the surveyed organisations. Consequently, the measurement of the financial performance of ITSM processes implemented is not undertaken or reported in most of the survey and case study organisations. Another explanation may be that since the majority of respondents had ITIL implementations in the last four years or less, they may still be in the early stages of ITSM adoption. However, an analysis of the survey results points to the contrary as it was found that the trend in implementation of processes begins to decline after implementation of the fourth ITSM processes and also declines after the third year of implementation, as shown in section 4.5.4 in Chapter 4. It may be argued that once organisations implement their choice of ITSM processes they keep these processes and do not continue to implement the rest of the ITIL framework processes. It appears that since the financial management process was not widely implemented, financial metrics had also not been implemented. Though ITIL v3 recommends a lifecycle-approach to ITSM, the practice is a process-oriented approach with each process being treated as a component to be ‘implemented’ and then measured.

The BSC is structured for the use of quantitative and qualitative metrics. Despite the recognition of the importance of qualitative metrics there was a shortage of qualitative ITSM metrics offered by the ITSM literature and reported in the survey. The ITSM metrics provided primarily quantified ITSM performance in counts and percentages. The BSC perspectives provide for both an internal and external focus. The ITSM performance metrics in the literature and in use from the survey respondents were mainly along the internal BSC perspectives. The lack of qualitative metrics and the mainly internal focus may be a symptom of deficiency in IT functions to understand customer needs. The emphasis on quantitative metrics and an internal focus in ITSM practice may stem from the prominence of quantitative metrics and an internal focus found in ITSM performance measurement literature. The use of performance measurement frameworks for services such as SERVQUAL, SERVPERF and IS SERVQUAL could be a supplement that ITSM practitioners may apply to enhance qualitative metrics along the BSC customer perspective. None of the organisations surveyed used SERVQUAL. An earlier study on the applicability of SERVQUAL on IS quality found that four of SERVQUAL dimensions—reliability, responsiveness, assurance, and empathy—are useful in IS and recommended 'knowledge of these dimensions could provide practitioners with potential useful diagnostics' (Jiang, Klein & Crampton 2000). SERVQUAL has been adopted for use in IS by Kettinger and Lee (1994) whose work is extended for determining functional quality of individual services and applied to ITSM services by generating one performance score for each service (Hochstein (2004). Adopting an approach different to Hochstein (2004), Potgieter et al. (2005) used IS SERVQUAL to design customer satisfaction surveys to measure satisfaction with IS services. The ITSM evaluation framework developed in McNaughton et al. (2010) extends the use of IS SERVQUAL to develop survey questions to assess user perceptions of service quality and their satisfaction with the IT services; as well as for IT staff to look internally at perceptions on the quality of service provision. The use of IS SERVQUAL to develop survey questionnaires to measure customer satisfaction can assist ITSM managers derive qualitative aspects of overall IT service and specific IT services. However, this study develops an organising framework, categorisation of metrics and metric constituents that directly address the needs of ITSM managers faced with the challenge of knowing what to measure and how to measure and thus heeding the advice of Yuthas and Young (1998) on progressing performance measurement beyond examining satisfaction and usage measures.

6.4.1 Types of ITSM process level metrics

Close to half the survey respondents reported using a systematic approach to performance management. The majority of survey respondents used ITIL as the IT service management framework and, despite the fact that both ITIL v2 and ITIL v3 place great emphasis on continual improvement, the majority of survey respondents had not implemented performance measurement processes. The widely-held perception that performance measurement occurs at higher level of maturity may explain organisations' lack of implementation of ITSM performance measurement processes or the lack in application of performance measurement frameworks for ITSM. A process focus in making ITSM operational may also contribute to the approach of implementing processes piecemeal and in sequence starting with the processes addressing the pain points or those resulting in quick gains at the expense of processes that are perceived as needed later in the ITSM cycle, or not beneficial in the short term.

At the process level, the majority of ITSM metrics in use by most survey respondent organisations are product and process-oriented metrics. This aligns to the process-oriented approach in implementation at most of the organisations surveyed, as well as the approach primarily advocated in ITIL v2 books. Though ITIL v3 recommends a life cycle approach to ITSM, it is evident that this has not occurred in practice. It may be argued that the ITSM practice follows a product-oriented philosophy and not a service-oriented philosophy as promoted by ITIL books. This presents an added challenge to ITSM practitioners as possessing customer-focused metrics is identified as a critical success factor in ITSM implementation by Pollard and Cater-Steel (2009).

Theoretical studies have provided metrics to measure ITSM processes, ITSM profitability, productivity, and quality. There are even entire websites on ITSM key performance indicators. The categorisation of ITSM process level metrics into product, process, people and resources types developed in this study provides new dimensions to the IS service level categories provided in previous studies on service quality (Chang & King 2005; Martinsons et al. 1999; Myers et al. 1997), service impact (Martinsons et al. 1999; Saunders & Jones 1992) and business value (Martinsons et al. 1999). The difference in categorisation with the earlier studies may be explained by the shift in focus by IT functions from a technology to service orientation. In this study, ITSM performance measurement is focused on service demand management, service resource management and service offering management—leading to a more detailed categorisation than that developed in earlier studies. The categorisation of earlier studies focusing on service quality, service impact and business value falls under the service-offering dimension developed in this study.

Studies specifically addressing ITSM performance metrics ranged from those not providing types of process to those providing uncategorised lists of metrics (Iden & Langeland 2010; Lahtela et al. 2010; Spremic et al. 2008; Van Grembergen 2000). Unlike previous studies, this research developed types of ITSM performance metrics. By categorising ITSM performance metrics studies by subject matter this study identified profitability ITSM metrics (Hochstein et al. 2005c; itSMF Germany 2008; Moura et al. 2006a; Yixin & Bhattacharya 2008), productivity metrics (Donko & Traljic 2009; Moura et al. 2006a), and quality metrics (Donko & Traljic 2009; Praeg & Schnabel 2006). The categorisation developed in this study encompasses and integrates the findings in the previous studies by developing service constituent ITSM process categories of product, process, people and resources.

This study identified ITSM metrics at various organisational levels along the continuum described in OGC (2007a) ranging from service metrics, process metrics and technology metrics. This continuum of metrics is adopted by Brooks (2006); Smith (2008); and Steinberg (2006). Providing an alternative focus, Steinberg (2006) extends OGC (2002a) by giving emphasis to KPIs and CSFs and offering a metrics model for ITIL v2 framework processes. Extending the OGC (2007a) ITSM metrics classification, Brooks (2006) gives emphasis to specific methods for calculating process metrics and provides methods for the ITSM processes in the ITIL v2 framework; while Smith (2008) further develops the metrics classification and methods of Brooks (2006) by adding additional goal attributes for ITSM metrics catalogues. However, the reviewed literature does not offer an integration or consolidation of the metrics developed in the earlier studies. This study consolidates the ITSM process metrics findings in the previous literature by developing a consolidated ITSM process metrics catalogue that incorporates findings from Paxson (1996); and Son et al. (2005). The consolidated ITSM metrics catalogue developed in this study and described in section 5.2.1 provides ITSM practitioners with a consistent set of ITSM process attributes that can be used to build an ITSM metrics catalogue.

6.5 RQ3: How can specific ITSM performance metrics be derived?

At the process level the BSC was the framework mainly used by survey respondents and case study organisations that had a performance measurement framework for ITSM. The other organisations in the study either did not know if their organisation used a performance management framework, or did not think a performance measurement framework applied to their organisation. Despite this lack of awareness on ITSM performance measurement in their organisations, survey respondents were able to articulate the benefits of the ITSM processes, as well as provide specific ITSM process metrics.

The study extended the advice of Brown (1996); Chang and King (2005); and Scott (1995) on IS performance measurement by applying an input-process-output classification of ITSM performance measures to map resource acquisition, ITSM process effectiveness and organisational level performance in developing the ITSM PMF. The ITSM PMF provides performance measurement perspectives of service demand management, service resources management and service offering management. This study also applied the IS performance advice of Marchand and Raymond (2008) to the area of ITSM by providing a holistic (multidimensional/ balanced/integrated) view of organisational performance using a performance model.

The study did not find a definitive classification or typology of ITSM metrics that is widely adopted. Different studies, ITSM texts and ITSM tools used a variety of ITSM metric classifications. This has proved to be problematic for ITSM practitioners, especially when they attempt to compare their ITSM performance against that of other organisations. ITSM practitioners are seeking guidance about how to measure performance of their IT services: ‘I do not think there’s any well-defined model at a logical sense, even though cognitively people would think that there is’ (Case B, TL #241).

This study promotes a holistic view for performance measurement described in Henri (2004) of performance measurement. ITSM lays emphasis on customer orientation and the delivery of value in process-oriented systems (Van Bon & Van Selm 2008). Service orientation closely aligns with the goal and system models of organisational effectiveness. This is the case because a service-oriented approach takes a customer-focus with IT services ultimately aimed at achieving organisational goals. ITSM frameworks such as ITIL are process-oriented and consider the resources and activities required to attain the process goals. The BSC, which is recommended by the OGC (2011) and applied by ITSM practitioners in ITSM performance measurement, falls in the domain of holistic performance measurement models.

This research study extends the findings of the reviewed literature by including dimensions, levels and categories of organisation performance measurement into a service-oriented approach to the management of the IT/IS function. The ITSM performance measurement framework developed in this study and presented in Chapter 5 recognises the distinctions made between the short-term and long-term performance evaluation and proposes using a hierarchy with ITSM performance metrics and metrics constituents as a foundation for performance measurement and reporting of benefits along BSC perspectives, offering both a short term and long term perspective.

The ITSM performance measurement framework proposed in Chapter 5 can be used to link organisation level performance measurement with the performance measurement of their ITSM, as well as evaluate the metrics currently used for completeness in service orientation, financial and non-financial perspectives in broad economic terms. The metrics within each perspective are categorised into service, function, process and technology dimensions. These dimensions extend the service, process and technology dimensions from the OGC texts and the results of the survey and case studies. These represent ITSM functions, ITSM processes and ITSM technology metrics; while the service dimension includes metrics to account for end-to-end process outcomes. At the industry level, wide adoption of the performance measurement model could lead to standardisation of ITSM performance measurement and enhance the ability of organisations implementing ITSM to benchmark against other organisations using like terms.

The study found that practitioners used industry publications and websites to derive ITSM performance metrics with little reference to academic publications on the subject. Reference to the widely-used ITSM frameworks that are primarily process-oriented has resulted in ITSM metrics derived along ITSM processes. A listing of the ITSM process and function metrics using the categorisation for types of ITSM metrics developed in this study is shown in Table E.3 and Table E.4 in Appendix E. The industry publications focused on the methods of calculating metrics and offered formulas and unit measures that ITSM practitioners could readily use. A shortcoming of this approach identified in this study is that the metrics methods described by OGC (2007a), Brooks (2006); Smith (2008); and Steinberg (2006)—as well as metric methods built into ITSM software and found in metrics—were not consistent and failed to cross reference, indicating that the methods used in industry were varied. Academic studies on deriving ITSM performance metrics have also taken a process focus, for example, Yixin and Bhattacharya (2008) present a method for measuring the performance of change management. The use of the financial loss function to estimate the impact of the service level management process has been proposed by Moura et al. (2006a) and further applied by Donko and Traljic (2009). At the level of ITSM activities that are components of ITSM processes, Donko and Traljic (2006) apply the theory of Normatively Regulated Activities (NRA) to develop ITSM incident process activity metrics; whereas the Web Ontology Language (OWL) is applied by Valiente et al. (2012) to develop ITSM incident process activity metrics. This current study took a different direction and did not develop ITSM process metric methods, for example, how to calculate the mean time to restore a service or the method for calculating service outage, as ITSM process and activity metrics methods are addressed in existing industry and academic literature. This study offers consolidated metric catalogue elements that organisations can use to build consistent metric catalogues incorporating widely published metric attributes. This study also develops ITSM metric constituents that provide a template that may be used by organisations designing ITSM metrics and developing methods for ITSM metrics. This study focused on the more fundamental challenge of knowing what to measure and shifts the focus of performance measurement from ITSM process to multiple dimensions, providing a means for organisations to achieve completeness in their performance metrics.

6.5.1 A performance measurement framework for ITSM

This study proposes that using a performance measurement framework will enable an organisation to effectively measure and report the performance of IT service management. An ITSM PMF provides an organisation with a basis for the selection of ITSM metrics and enables the evaluation of completeness of the performance measurement. An ITSM PMF facilitates the linkage of performance measurement across the organisational levels. The ITSM performance measurement framework developed in this study supplements and builds on existing ITSM metric catalogues, the BSC framework and IS performance measurement frameworks. The study developed a performance measurement framework for ITSM incorporating findings from previous literature. The ITSM PMF developed includes components that address areas that were identified as gaps and blends with existing performance measurement theory and practice.

The study identified practitioner literature on performance measurement focused on providing guidance on ITSM process metrics methods, as shown in OGC (2007a), Brooks (2006); Smith (2008); and Steinberg (2006). In developing the ITSM performance measurement framework components, this study applied and extended the findings in ITSM performance measurement studies such as Lahtela et al. (2010); McNaughton et al. (2010); and Son et al. (2005). By using a mixed method approach and applying the BSC in developing a multidimensional measurement framework focusing specifically on ITSM performance, this study extends the findings of McNaughton et al. (2010) who used a design science approach in developing a framework for evaluating ITIL. An evaluation framework for ITIL with two vertical levels and four horizontal perspectives is proposed by McNaughton et al. (2010). The evaluation framework proposes corporate level and process level evaluation, which are included in this study and in Son et al. (2005), but lacks the levels of ITSM service, ITSM function and ITSM activities described and incorporated in the ITSM performance measurement framework propounded in this study. The management, user, IT employee and technology perspectives proposed by McNaughton et al. (2010) are identified as applicable to the corporate and process levels. This study extends and adds to the findings of McNaughton et al. (2010) by including additional vertical levels, specific horizontal perspectives for each level, and factors influencing the selection of ITSM performance measurement metrics. The ITSM PMF developed in this study, unlike the ITIL evaluation framework in McNaughton et al. (2010), extends the use of the BSC perspectives similar to Son et al. (2005) that alters the perspectives by applying recommendations of Martinsons et al. (1999). The ITSM PMF developed in this study provides a multidimensional model applicable to any organisation applying ITSM and differs from the approach taken in Lahtela et al. (2010) that develops a software ITIL measurement system designed for a single case study organisation.

6.5.2 A model to measure the performance of ITSM at the organisational level

The ITSM PMF developed in this study incorporates the BSC, which ensures the ITSM metrics used are easily linked to higher-level organisation objectives by applying common terminology for metrics used by IT and business (van der Zee & de Jong, 1999). Use of the BSC approach has the added benefit for IT management of integrating planning and evaluation cycles (van der Zee & de Jong, 1999). The BSC has been applied in previous theoretical studies by other ITSM researchers such as Donko and Traljic (2009), Moura et al. (2006), Praeg et al. (2006), van der Zee and de Jong (1999) and Grembergen et al. (2003).

This study identified a correlation between performance measurement and ITSM metrics and a correlation between ITSM metrics and ITSM benefits, but did not check for and establish a causal linkage between the four BSC perspectives proposed by Kaplan and Norton (2004) and described in a study by Ittner and Larcker (2003).

Though it is reported that the BSC is widely applied at the strategic level of organisations and adapted for the performance measurement of IS (Martinsons et al. 1999), this study found that ITSM practitioners seldom reported to the strategic level of management and faced challenges communicating ITSM performance and benefits to the strategic level. Based on the challenges faced and the ITSM practitioner performance measurement deficiencies, this study applied the advice of Van der Zee and de Jong (1999) to develop an ITSM PMF that allows for the integration of business goals and ITSM performance metrics.

The model proposed in this study extends the BSC literature by specifically applying BSC perspectives in the performance measurement of ITSM. This study contributes to theory by establishing a correlation between the existence of performance measurement frameworks and the number of ITSM process metrics, as well as a correlation between the existence of performance measurement frameworks and the number of ITSM processes. The implications of the study findings to practice include guidance on incorporation and use of the BSC in ITSM performance measurement. The findings also point to the significance of applying performance frameworks to ITSM processes and metrics.

6.5.3 ITSM performance metric constituents

This study established a relationship between the existence of performance measurement frameworks and ITSM metrics. Evidence of the importance of ITSM performance metrics to organisations implementing ITSM is shown by the investment of organisation resources on ITSM performance metrics in ITSM tools, websites, and consulting. The survey and case studies show that ITSM practitioners did not widely use performance measurement frameworks and the case studies revealed that none had developed ITSM metric catalogues. Some of the case study organisations relied on the ITSM metric catalogues found in the ITSM tools in use. Some indicated using ITSM metric catalogues, but did not provide sample catalogues when requested. The survey results showed that half of the ITSM measurement challenges related to measurement methods such as ‘finding the right metric and how to measure it’ and ‘quantifiable metrics that align to business needs’. The available literature on ITSM metric constituents varied on what constitutes an ITSM metric and provided metric catalogues that, when implemented, resulted in variations across organisations—making standardisation and comparison of ITSM performance results difficult. This study addressed the challenges in the ITSM metric constituent literature and practice by incorporating IS metric catalogue (Son et al. 2005) and Internet catalogue (Paxson 1996) classification schemes to extend and consolidate the existing ITSM metric catalogues established in studies by Brooks (2006); McNaughton et al. (2010); OGC (2011); Smith (2008); and Steinberg (2006). This study also addresses the ITSM metric constituent challenge by developing ITSM process metric constituents from a qualitative analysis of the survey ITSM process metric data. By identifying the ITSM metric constituents of process outcome, process stage, process type, process conduct and unit measures, this study addresses the challenge of gauging the impact of singular process improvements within the perspective of business described by Yixin and Bhattacharya (2008). This study takes this approach to developing ITSM process metric constituents as the study survey and case study results show that this area continues to challenge practitioners and is not fully developed in research. An alternative approach for explaining ITSM process metric constituents is the process activity approach to ITSM metrics offered in Donko and Traljic (2009) by applying Normatively Regulated Activity (NRA) theory extended by use of Business Process

Model and Notation (BPMN) in Brito e Abreu et al. (2010) with alternative modelling using Web Ontology Language (OWL) offered in Valiente et al. (2012). The process activity approach breaks down ITSM processes into constituent activities and then places focus on classifying activities and developing ontologies for ITSM process activities as a precursor to modelling for software solutions.

The metric constituents developed in this study contribute to theory by incorporating previous literature with the study findings to further the understanding of ITSM process metrics. This study also makes the contribution of arranging the results of previous literature and placing ITSM performance measurement efforts at the vertical organisational levels of organisation, service, function and process; and the horizontal ITSM performance levels of service demand management, service resources management, and service offering management. This study's findings have practical implications to industry as it provides constituents that can be used in the development of metric catalogues and to enhance the understanding of what to measure and how to measure.

6.5.4 ITSM performance measurement and reporting

The study identified that ITSM performance measurement and reporting primarily occurs at the operational and tactical level. The survey and results of the case studies show that ITSM performance measurement occurs primarily daily, weekly and monthly, while reporting occurs mainly monthly. It is evident from the surveys and case studies that ITSM reporting rarely occurs at the strategic level and attempts to report at the strategic level are problematic. Case study A provided a description of a failed attempt to report ITSM performance at the strategic level and the survey responses also provided instances of the challenges in reporting ITSM performance at the process level. The challenge appears to be the result of a lack of consolidating service metrics and coordination of the process level metrics with the strategic level goals. This shortcoming may be attributed to the low incidence of performance measurement framework use and the lack of evidence of existence of systematic ITSM metric catalogues.

6.5.4.1 Challenges in measuring performance

It is generally accepted that ITSM initiatives are beneficial, yet the survey showed organisations implementing ITSM frameworks struggle to present metrics to demonstrate the benefits and performance of ITSM to the business. This partly confirms the observation on the difficulty of conceptualising and measuring the overall performance of the IS function identified by Chang and King (2005).

From the BSC customer perspective, as identified by Pitt et al. (1995) and Šimková and Basl (2006), the stakeholders in an ITSM context will have different goals and this makes it difficult to determine what to measure and report.

The challenge of intangible benefits confirms Seddon et al.'s (2002) observations that this was among the foremost difficulties in identifying and measuring IS benefits.

ITSM measurement challenges may also be explained by the fact that both ITIL (the most commonly implemented ITSM framework) and the ISO/IEC 20000 standard advocate for performance measurement, but do not prescribe how this should be done.

Although respondents could list benefits and metrics, they encountered many difficulties in measuring and reporting ITSM performance within their organisations. The classification of ITSM metrics into a consolidated set of categories developed in this study, together with a definitive list of metrics developed in future studies, may alleviate some of the difficulties of measuring ITSM performance if adopted industry-wide. This study addresses the challenge by presenting a consolidated set of categories and lists of ITSM process metrics from research and practice that can be used as the basis for industry standardisation. The list provided by the study can be further enhanced in a future study by identifying unique benefits and metrics from the lists.

6.5.4.2 Challenges in reporting performance and benefits

The challenges in reporting ITSM benefits again show that the internal business perspective had the most challenges, but was closely followed by the customer perspective—both aspects pointing to the difficulty in knowing what to report and how to report. A recurring challenge identified in reporting ITSM benefits was that of measuring intangible benefits. This is a critical challenge as a good number of the benefits from ITSM would be intangible. It is of note that across the four perspectives a common challenge was finding ITSM metrics to report that aligned with the business. This was interesting because the respondents held the common perception of IT being outside the business instead of part of the business. It was consistent that the respondents experienced reporting challenges given the ITSM measurement challenges identified earlier.

Most of the benefits that accrue from ITSM efforts are intangible and non-financial and may not be realised in the short term but, rather, over time. These measuring and reporting challenges may be explained by stakeholder perceptions, intangibility and time delay. This time delay or lag observed in ITSM is also identified by Schryen and Bodenstein (2010) as a key issue in their classification of IS business value research.

From the customer perspective, as identified by Pitt et al. (1995), the stakeholders in an ITSM context will have different goals and this makes it difficult to determine what to measure and report. The intangibility of IT services may explain the challenges reported from the financial perspective. The challenges from the internal perspective can be explained by the time delay in realising ITSM benefits. Managers are under pressure to prove their effectiveness and their performance may be motivated by short term objectives as long term gains may not be factored into their performance evaluation. It is also interesting to note that despite the proliferation of ITSM tools, many respondents complained about problems with using the tools.

6.6 RQ4: What internal and external environmental factors influence the organisations' selection of specific performance metrics for ITSM?

This study found that organisations are faced with contingencies which influence the eventual selection of ITSM performance metrics. This study confirmed the finding that ITSM practitioners have numerous ITSM metrics at their disposal available from the ITIL continual service improvement (OGC 2007a) and service transition (OGC 2007c) publications, ITIL metrics books (Brooks 2006; Steinberg 2006), ITSM practitioner forums (itSMF International 2008), numerous vendor and consultant websites (EAB. Group Pty. Ltd. 2009), blogs (England 2011), and social networking sites (Van Bon 2011). The selection of the metrics is influenced by various external and internal environment factors. This study identified internal environment factors that include those of the parent organisation and IS organisation. This study applied the recommendation and confirmed the finding on the difficulty of providing a universal recommendation on how to measure ITSM and what ITSM metrics to use as a result of the varying contexts in which IT functions operate captured by Šimková and Basl (2006). This study advanced the findings of Saunders and Jones (1992) on the performance measurement challenge in measuring IS performance as a result of the multiple evaluation perspectives taken by the managers measuring performance. The survey and case study findings show that a range of internal and external environment factors influence the selection of ITSM performance metrics. By identifying the factors influencing the selection of metrics in a service-oriented approach this study extends the model presented by Myers et al. (1997) which was based on the work of Saunders and Jones (1992). Factors such as the size of the organisation and the industry sector identified in non service-oriented IS studies were not identified as influencing the selection of ITSM metrics in this study. This study identified a sub classification of internal environment factors in service-oriented approach to IT management.

There were similarities between the selected internal contingency factors influencing the selection of metrics identified in an IS function study by Myers et al. (1997) and this ITSM study. In addition to all those listed in the previous IS function study, this study found new internal contingency factors such as ICT tools, IS workgroup interactions and organisation performance measurement framework (such as the BSC) in use.

The external environment contingency factors which emerged in this study were different from those reported in the IS function study of Myers et al. (1997) and Saunders and Jones (1992): industry sector was the only common factor identified in those studies. Availability of resources and occurrence of adverse events such as natural disasters and the global financial crisis were factors in the Myers et al. (1997) list that were not influential in any of the case study organisations. Furthermore, this study identified new contingency factors such as legislation, external customer, and ITSM resources such as books, training and standards.

Unlike the findings of Myers et al. (1997) and Saunders and Jones (1992) there were no differences observed in the selection of metrics when comparisons were made between public/private, small/large organisations, or the duration of the ITSM initiative. Factors such as organisation size and ownership may have not influenced the selection of ITSM metrics due a service focus in ITSM, as opposed to the system focus in earlier studies.

By identifying the factors influencing the selection of ITSM performance metrics this study contributes to theory by applying the IS model developed in Myers et al. (1997) and Saunders and Jones (1992) in ITSM. The identification of factors influencing the selection of ITSM model addresses an area of ITSM performance that had previously been neglected.

The practical implication of identifying the factors influencing the selection of ITSM performance metrics is providing ITSM practitioners with a basis for contextualising ITSM performance measurement, as well as aiding in comprehension of ITSM performance measurement.

6.7 A contingency theory for the performance measurement of ITSM

This study applies the contingency theory of performance measurement to the area of ITSM. This study follows the direction taken by Rejc (2004) in applying the contingency theory of management to organisation performance measurement. This study develops a new sub section of internal environment factors and confirms the contingency model developed by Saunders and Jones (1992) and extended by Myers et al. (1997). The service focus pursued by organisations implementing ITSM has resulted in the new category of internal factors. This study applies the advice of Myers et al. (1997) on using case studies to gather information on the selection of ITSM metrics. However, this study takes a different direction from that taken by Myers et al. (1997); and Saunders and Jones (1992) by conducting research using a mixed method approach. In addition to using behavioural science survey and case study methods, this study also uses a design science approach in developing a performance measurement framework for ITSM that incorporates the factors influencing the selection of ITSM performance metrics.

A contingency theory for the performance measurement of ITSM makes a theoretical contribution by extending an explanatory model used on system-- focused IS to service-oriented IS.

6.8 Conclusion

This chapter addressed how the results of the survey, case studies and ITSM PMF artefact design answer the research questions within the context of the reviewed literature. The results of the survey, case studies and design answer the research questions and the contribution of the study to research and practice in performance measurement in research and practice is presented and appraised.

This chapter provided a discussion on the types of benefits reported from ITSM improvement initiatives, specific metrics used to measure ITSM performance and how the metrics can be derived and used to measure ITSM performance. This chapter presented a discussion on the internal and external environmental factors that influence the selection of ITSM performance metrics. The discussion shows a lack of categorisation for types of ITSM benefits and metrics and highlights the direction taken in this study towards addressing this challenge with the aim of easing the identification and communication of ITSM benefits. The discussion also dealt with the issue of deriving ITSM performance metrics and showed the limited use of performance measurement frameworks by organisations implementing ITSM. The discussion highlights the gap in qualitative ITSM performance metrics and proposes that practitioners apply methods (such as SERVQUAL) recommended in previous literature as a way of deriving qualitative service metrics.

Highlighting the new direction taken in this study, in advancing previous literature findings, this chapter discussed the relationships between key ITSM performance measurement variables. A discussion on the ITSM metric constituents highlights how this study addressed the challenge of gauging the impact of singular process improvements within the perspective of business. The study identified that ITSM performance measurement and reporting primarily occurs at the operational and tactical levels. This chapter also discussed the measuring and reporting method challenge identified as the primary type for organisations measuring ITSM performance. This chapter presented a discussion on how the study further explored ITSM performance measurement practices by identifying the internal and external factors influencing the selection of ITSM metrics. Finally, a discussion is presented on how the study applied the contingency theory of performance measurement to the area of ITSM.

Chapter 7 Conclusion

7.1 Introduction

This chapter provides a conclusion to the study by offering a summary of the key findings, followed by an account of the contributions of the research to theory and practice. The chapter concludes with a description of the limitations of the study and suggestions for future research.

This chapter is organised into six sections. Section 7.1 presents an introduction; a summary of the results of the research on IT service management (ITSM) performance measurement is provided in section 7.2; the significance of the study is presented in section 7.3; limitations of the research are provided in section 7.4; and suggestions on further research are provided in section 7.5. The conclusion to this chapter is provided in section 7.6. A summary of the organisation of the chapter is shown in Figure 7.1.

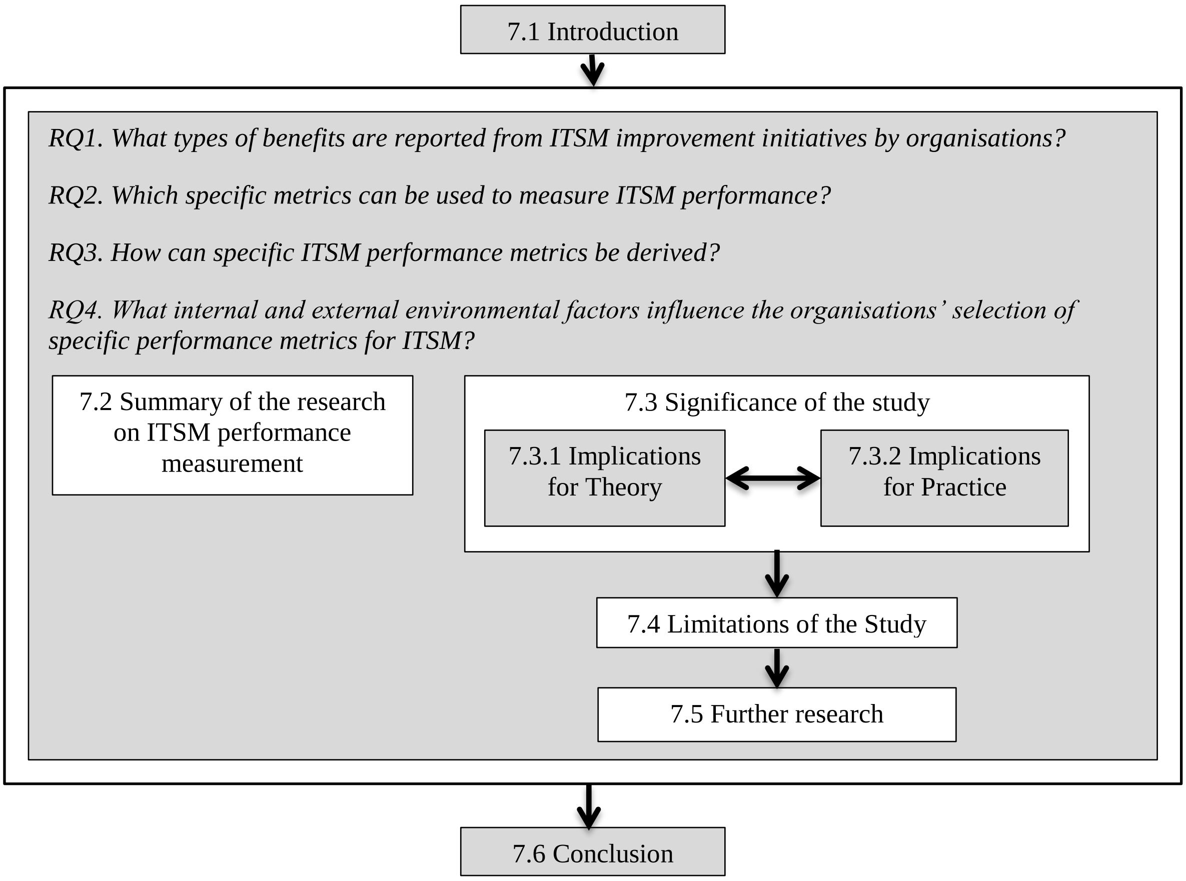

Figure 7.1 Chapter 7 overview and section linkages

7.2 Summary of the research on ITSM performance measurement

This study developed a performance measurement framework for ITSM using a multi-paradigmatic and mixed-methods approach. The study addressed the theoretical and practical problem of measuring the performance of IT service management. This IS study applied the behavioural science empirical data collection methods of survey and case study, and quantitative and qualitative data analysis techniques. The study used the artificial science method of design science research to develop the ITSM performance measurement framework (PMF) artefact to apply the empirical and theoretical research findings.

The research presented a conceptual model refined into a theoretical model by using a systematic literature review, survey and case studies on ITSM performance measurement that also resulted in types of ITSM benefits and metrics and categorised lists of ITSM process benefits and metrics. The research identifies the practice and challenges of measuring and reporting ITSM performance. The research presented the survey findings on the correlations between ITSM process implementation and benefits, ITSM process implementation and metrics, ITSM benefits and metrics, ITSM process implementation and performance measurement frameworks and correlation between ITSM metrics and performance measurement frameworks.

The results of the survey and case studies were applied to revise and confirm the study conceptual framework. Design Science Research Methodology (DSRM) and Matching Analysis Projection and Synthesis (MAPS) were used to develop the ITSM performance measurement framework comprised of a model to measure ITSM performance at the organisational level, a contingency theory for the performance measurement of ITSM, and ITSM performance metric constituents.

The research conducted in this study was presented in seven chapters. Chapter 1 presented the background to the research, the research problem, research questions and justification for the research. This study was motivated by the dearth of research undertaken to quantify the benefits of ITSM, the lack of a performance measurement framework for ITSM, and the challenges faced in measuring the performance of ITSM (Reinecke 2010; Šimková & Basl 2006; Yixin & Bhattacharya 2008) given the importance and size of investment in operating IT and the inconclusiveness of the literature on the contribution of IS to organisation performance (Brynjolfsson & Hitt 1995; Brynjolfsson & Hitt 1998; Dedrick et al. 2003). Four research questions were formulated to address the study research problem. Chapter 1 also presented an introduction to the methodology, structure of the dissertation, key definitions, delimitations, scope and key assumptions of the study.

In Chapter 2 the context of the research within the IS discipline is presented, followed by the literature review strategy, protocol and literature review findings organised around the study research questions. Chapter 2 demonstrated the need for the research, while highlighting the existing gaps in knowledge on the performance measurement of ITSM in academic, industry, theoretical and empirical studies. A review of the literature showed that there was a lack of categorisation of ITSM benefits and metrics, there is a lack of an industry standard ITSM performance measurement framework and there was no previous study on the factors influencing the selection of ITSM metrics.

Chapter 3 described and justified the study philosophical worldview, research design, selected strategies of inquiry and the research methods. Chapter 3 provided the research approach based on a realist philosophy and consisting of mixed-method design employing behavioural science data collection methods of survey and case study and non-parametric statistics, logical qualitative and content analysis, combined with the DSRM and MAPS methods for ITSM PMF artefact development.

In Chapter 4 the survey data collection, analysis and results are described, followed by the case study data collection, analysis and results. Chapter 4 presented the results on how the survey and case studies answer the four research questions within the study's theoretical framework. Chapter 4 also presented the limitations and ethical considerations of the research.

The following are the survey key findings:

1. The typical survey respondent in this study was a corporate itSMFA member in an organisation implementing ITIL and at least one other related process improvement framework for two years, with at least four processes including change management, incident management and problem management, and not using a performance measurement framework.
2. The study found a moderate, positive correlation between ITSM process benefit responses and ITSM process metric responses and positive correlation between the existence of performance measurement frameworks and ITSM metrics, as well as a correlation between the existence of ITSM performance measurement frameworks and ITSM process implementation.
3. The study found neither a correlation between the number of ITSM processes implemented and the number of ITSM benefits responses, nor between the number of ITSM processes implemented and the number of ITSM metric responses.

4. The top ITSM organisational level benefits were improved quality of business operations, cost justified IT infrastructure and IT services, improved visibility and reputation of the IT department, and delivery of services that underpin business processes.
5. The ITSM process benefits and metrics can be categorised along the service constituents types of process, product, resources and people; and further categorised into subtypes.
6. At the process level the majority of benefits were process improvement type benefits, and change management process benefits were the most commonly cited.
7. The majority of ITSM process metric responses were service improvement metrics, closely followed by process improvement metrics. The incident management process had the most metric responses.
8. The majority of ITSM practitioners do not use a performance measurement framework and the few that do primarily implement the BSC.
9. ITSM performance measurement occurs primarily monthly, quarterly and daily; and performance reporting mainly occurs monthly and at the operational level.
10. The most commonly-cited challenges in measuring ITSM performance relate to measurement methods, while the challenges in reporting ITSM performance primarily relate to stakeholders and reporting methods.

The following are the key case study findings:

1. The factors influencing the selection of performance metrics in organisations implementing IT service management are categorised into external contingency factors and internal contingency factors. The internal contingency factors are further categorised into parent organisation and IS organisation factors.
2. The governance framework, IS function structure, and ITSM and ICT tools in use are the internal environment factors influencing selection of ITSM metrics in all the six case study organisations.

3. Legislation and the industry sector are external environment factors influencing the selection of ITSM performance metrics in five of the six case studies.
4. There were internal and external environment factors influencing some of the case study organisations that were not influencing factors in the other organisations.
5. Organisational ownership, size and duration of ITSM implementation did not manifest as factors influencing the selection of ITSM metrics in the six case study organisations.

Chapter 5 presented the results of the design and development of the ITSM performance measurement framework using DSRM and MAPS. Chapter 5 describes the integration of the research and analysis results, laying emphasis on the ITSM PMF artefact design steps.

The following are the key developments and findings of the ITSM PMF artefact design:

1. The designed ITSM performance measurement framework comprises three components: a model to measure the performance of ITSM at the organisational level, a contingency theory for the performance measurement of ITSM, and ITSM performance measurement constituents.
2. For ITSM performance measurement to be holistic it should occur along a vertical axis of cascading levels ranging from organisation, service, function, process and along a horizontal axis of ITSM performance covering service demand management, service resources management, and service offering management.
3. At the organisational level, performance measurement should cover productivity, profitability and quality to facilitate reporting in broad economic and operational terms.
4. The four BSC perspectives of customer, financial, internal business, and learning and innovation are useful to gauge the completeness and balance of performance measures and as an aid to summarise and communicate

ITSM performance to the strategic levels of management in an organisation.

5. At the ITSM process level this study used IS and Internet metric categories to consolidate the existing ITSM metric catalogues, which had little or no cross-reference. This addresses the deficiency identified, as none of the literature reviewed provided a rationale for the ITSM metrics classification schemes used. This study did not find a set of industry-validated performance metrics for ITSM.
6. At the process level the study developed consolidated ITSM process metric attributes that may aid organisations develop performance metrics catalogues. Additionally, the ITSM process metric constituents of process outcome, process stage, process type, process conduct and unit measures aid in addressing the challenge of gauging the impact of singular process improvements within the perspective of business.
7. IS design science research methods reviewed on conducting the design step did not provide detailed guidance and the design method of MAPS was found to alleviate this deficiency.
8. An ITSM performance measurement framework contextualised to an organisation's reporting needs influences the perception of its usefulness.
9. The study developed a performance measurement perspective for IT service management and organises ITIL v3 processes along the study's developed ITSM performance dimensions of service demand, service resources and service offering.

In Chapter 6 a discussion on the interpretation of the results of the study was presented within the context of the reviewed literature. Chapter 6 discussed the findings in terms of each of the four research questions, as well as the outcome of the design of the ITSM performance measurement framework, and provided context and meaning to the study by comparing the results with similar studies.

The study answers the four research questions in the following way:

RQ1. What types of benefits are reported from ITSM improvement initiatives?

The study categorised benefits at the ITSM organisational process levels. The benefits reported from ITSM improvement initiatives are primarily process and service improvement benefits, with the majority being process level benefits reported from change, incident and problem management ITSM processes. The study provides categorised lists of benefits reported by ITSM practitioners.

RQ2. Which specific metrics can be used to measure ITSM performance?

The study found that ITSM practitioners predominantly used process metrics to measure the performance of ITSM and there was a scarcity of service level and organisational level metrics. A range of process-focused, customer and service-oriented process-specific process metrics are used to measure the performance of ITSM. The study provides a categorised list of ITSM process metrics used by ITSM practitioners.

RQ3. How can specific ITSM performance metrics be derived?

The study found that the main ITSM performance measurement challenges related to measurement methods. The existing literature was replete with ITSM process metrics and disparate classifications and methods for calculating the metrics. The major trend amongst ITSM practitioners was to measure ITSM performance using ITSM metrics. The study found that there was a lack of an ITSM performance measurement framework providing guidance on what to measure, as well as how to measure ITSM performance. The study developed a holistic ITSM performance measurement framework that can assist with deriving ITSM performance metrics.

RQ4. What internal and external environmental factors influence the organisations' selection of specific performance metrics for ITSM?

Internal and external environment factors influence the selection of ITSM performance metrics. Internal organisation factors include organisation and IS function specific factors. The governance framework, IS function structure, and ITSM and ICT tools in use are the internal environment factors influencing selection of ITSM metrics in all the six case study organisations. The study proposes a contingency theory for ITSM performance measurement. A summary of the study outcomes, theory, approach and contributions is presented in Table 7.1.

Table 7.1 Summary of the study outcomes, theory, approach and contributions

Study outcomes	**Theory Continuum: academic Big T and practitioner little t Theories (Schneberger et al. 2009) and Taxonomy: analysing, explaining, predicting, explaining and predicting, design and action (Gregor 2006)**	**Study Approach and application of theory**	**Contribution to theory**	**Contribution to practice**	**Novelty**
Types of ITSM organisation benefits	BSC – Little t theory used for analysing and describing	The literature review identified a lack of empirical ITSM benefit types. BSC perspectives used to collect survey responses. Miles and Huberman (1994) qualitative analysis used on survey data.	Empirical evidence from survey of ITSM benefits along BSC perspectives Extending BSC to develop ITSM organisation benefit typology. Providing ITSM benefit typology.	Basis of comparison of an organisations performance. Knowledge of the top ITSM organisation benefits along BSC perspectives. Organising typology aids ITSM managers identify benefit types and provides basis to evaluate balanced performance measurement.	Empirical ITSM benefits along BSC perspectives.
Types of ITSM process benefits Types of ITSM process metrics	OGC Service constituents – Little t theory used for analysing OGC people, process, partners, technology (PPPT) Little t theory for analysing and describing	LR used to identify gap in ITSM empirical benefit and metric types. Miles and Huberman (1994) logical qualitative analysis used to categorise survey responses and sub categories of ITSM process benefits emergent from survey.	Empirical evidence of ITSM process benefits and benefits from survey responses along ITSM framework processes. Extending PPPT to develop ITSM process benefit and metrics typology Providing ITSM process benefit typology with categorised benefits.	Typology of ITSM process benefits and metrics with list of ITSM process benefits and ITSM process metrics. Organising typology aids ITSM Managers classify ITSM benefit and metric types and provides a basis to pursue balanced distribution of ITSM metrics.	New categorisations of ITSM benefits and ITSM metrics.
How to derive specific ITSM process metrics: Consolidated ITSM process catalogue attributes. Deriving ITSM process metrics: a) Consolidated catalogue elements b) ITSM process metric constituents c) Nature of correlations of key ITSM performance measurement variables: • ITSM processes and benefits • ITSM processes and metrics • ITSM process benefits and metrics • ITSM process metrics and PMFs • ITSM processes and PMFs d) Types of challenges of measuring & reporting ITSM.	Internet, IS, ITSM metric classification Performance measurement - little t theory for explaining. Performance measurement design – little t theory for design. OGC little t – theory for explaining.	LR used to identify gap in ITSM and potential solutions outside ITSM as well as design literature. Survey used to identify PM practices case studies used to understand motives design science used to develop PMF. Non-parametric statistical tests on quantitative survey data. Miles and Huberman (1994) logical qualitative analysis used to categorise survey and identify ITSM process metrics constituents emergent from survey.	ITSM process metric derivation method Extending performance measurement theories to ITSM. Consolidation of ITSM performance metrics catalogue attributes. Empirical evidence of determination of previously undefined ITSM performance measurement variable relationships. Empirical evidence of types of ITSM measuring and reporting challenges from survey responses.	Means to achieving completeness of ITSM catalogues. Method for deriving ITSM process metrics.	Metric elements consolidation. New knowledge on what constitutes and ITSM process metric. Empirical ITSM measuring and reporting challenges.
External and internal environment factors influencing the selection of ITSM metrics	Contingency theory (management, performance, IS contingency model) – t Big T Theory for explaining Performance measurement theory – Big T Theory for explaining	Contingency theory used to develop model with content analysis performed on the case study qualitative data LR used to identify factors influencing selection – none found for ITSM IS factors and contingency theory used/applied to ITSM performance measurement.	Identification of factors influencing the selection of ITSM Metrics. Extending contingency theory of management to performance measurement of ITSM. Development of contingency theory for the performance measurement of ITSM.	ITSM Managers will be aware of the factors influencing their selection of ITSM metrics	New identification of factors influencing selection of ITSM Metrics Extension of organisation and IS performance measurement theory to ITSM.
ITSM performance measurement framework - Measuring ITSM performance Architecture: Vertical levels and Horizontal dimensions	Organisation performance measurement theory Big T – theory for design and action IS design theory – Big T theory for design and action Design theory – Big T, Theory for design and action	Using DSRM as overall design framework with the design step supplemented with MAPS DSRM used for overall design science approach with the design step supplemented with MAPS used for the design step, artefact developed and evaluated	Extending performance measurement theory on ITSM. Identify performance measurement planes – vertical horizontal for ITSM. Extending ITSM performance measurement theory – under developed area by providing empirically based and IS designed framework.	Provide managers with a comprehensive holistic, theory and empirically based PMF for ITSM	Holistic ITSM PMF based on empirical study and design with contextualising factors. Enhancement of DSRM design step using MAPS.
Architecture: Holistic (vertical and horizontal ITSM performance measurement dimensions) Service level ITSM performance measurement	Performance measurement theory – Neely et al. (2005), Henri (2004) Service management – Big T Theory for explaining OGC (ITSM) – Little t theory for explaining	Use service management and OGC ITSM framework to fashion service performance perspective.	Applying service management theory to consolidate process metrics to ITSM service metrics.	Provide a practical perspective on service performance management.	New way of perceiving service management from a performance perspective.
Horizontal ITSM performance dimensions: Service demand management, service resource management, service offering management	Service Science, Service management, OGC ITSM framework OCG (ITSM) Little t – theory for explaining.	Use OGC ITSM processes on basis for measuring ITSM performance. Develop ITSM process constituents.	Development of new process constituents helpful in PM of ITSM.	Practical way of creating metrics.	New knowledge on ITSM Process metric constituents.
Organisation level ITSM performance measurement	Tangen (2005) quality, productivity and profitability. Kaplan and Norton (1992) BSC four perspectives little t – theory for explaining.	Used BSC perspectives to summaries ITSM service performance.	Extending BSC perspectives to measuring org level ITSM metrics and reporting performance at the organisation level.	Provide ITSM manages with framework that easily integrates with BSC.	Application of DSRM on ITSM performance measurement design. Mapping of BSC to ITSM PMF.
Vertical ITSM performance levels Service, function, process, activity/technology (includes human activity and computer [hardware and software] activity	Activity /technology - OGC little t – theory for explaining - NRA computer activity - Ontology (OWL & UML) - Process complexity analysis.	Exploration of performance measurement initiatives at the activity level. - Challenge for ITL ITSM is lack of clear definition of activity.	Providing summary of the performance measurement basis and theory development effort and directions for ITSM activities.	Providing alternatives and framework that ITSM managers can use to integrate ITSM activity performance measurement.	Modified to service function, process, activity/technology and integrated with horizontal.

7.3 Significance of the study

This study makes contributions to theory and practice from the results and findings, as well as from a research experience perspective. This section considers the significance of the study to theory based on the definition of theory adopted in this study derived from Gregor (2006); and Schneberger et al. (2009); and the taxonomy of theories described by Gregor (2006). Theory is perceived broadly to encompass models and frameworks existing in a continuum with major theories primarily the methodical efforts of academics at one end and minor theories primarily generated by the pragmatic efforts of industry practitioners at the other end of the continuum.

This research makes the following contributions to theory and practice:

a. The development of a framework that can be used by organisations to measure and report the performance of ITSM and identify the benefits gained from ITSM initiatives (RQ1), (RQ2), (RQ3), and (RQ4).

b. Development of a framework that can be used by organisations to organise ITSM metrics and aid in the standardisation of ITSM performance measurement (RQ2) and (RQ3).

c. Structuring of the performance measurement framework to facilitate communication with businesses by integrating with the Balanced Scorecard (BSC) to link the metrics and benefits with strategy (RQ1) and (RQ2).

d. Identifying the internal and external organisational factors that influence an organisations’ selection of ITSM performance metrics (RQ4).

e. Development of a contingency theory for the performance measurement of ITSM (RQ4).

f. Offering a comprehensive review of research on ITSM performance measurement (RQ1), (RQ2), (RQ3) and (RQ4).

g. Providing a method that could alleviate the lack of detailed guidance on the design step in IS design science based on a comprehensive review of literature on the design step in IS design science and design studies measurement (RQ3).

7.3.1 Implications for theory

The study contributes to theory by presenting a systematic literature review of performance measurement of ITSM. The study extends current literature on performance measurement by applying the BSC to classify organisation level ITSM benefits. Previous literature focused on prescribing the use of BSC on elements of IT service management such as service level management (Saunders & Jones 1992; Van der Zee & de Jong 1999; Van Grembergen et al. 2003). The BSC has been used in IS by previous researchers, but in this study it was used to classify organisational level benefits and incorporated in the ITSM performance measurement framework.

This study extends and applies service constituents in summarising ITSM process benefits and metrics and organises types of ITSM process benefits and metrics emergent from the study survey into subcategories. The study applies the system categories of input process and resources to categorise the challenges faced by practitioners in measuring and reporting ITSM performance.

This study contributes to ITSM performance measurement literature by identifying the performance metrics in use and the challenges faced in measuring and reporting the performance of ITSM. Existing literature focuses on prescribing metrics that can be used to measure ITSM performance (Barafort et al. 2005; Brooks 2006; Steinberg 2006). This contribution provides a new direction in current ITSM performance literature in that it focuses on an area of practitioner interest identified by Luftman and Ben-Zvi (2010) but not yet fully addressed in theory.

A contingency theory for the performance measurement of ITSM makes a theoretical contribution by extending an explanatory model used on system-focused IS to service-oriented IS.

7.3.2 Implications for practice

Although there has been broad adoption of ITSM frameworks, particularly ITIL, it is not generally accompanied by the practice of ITSM performance measurement. Implementation of performance measurement processes in concert with the initial processes would improve the service management efforts. Performance measurement concepts should be included in ITIL foundation training that is usually undertaken as part of ITIL implementation. In the ITIL v3 training scheme, performance measurement concepts are covered in the intermediate continual service improvement course.

Respondents to the survey could list benefits and metrics, but encountered difficulties in measuring and reporting benefits in their organisations. Measurement problems are associated with the fact that almost half the respondents are not using performance measurement frameworks, as shown by the numerous responses of ‘Not applicable’ or ‘Do not know’ when asked about performance measurement frameworks in use. The measuring and reporting challenges are evidence that having metrics without an organising framework will not alleviate the ITSM performance measurement challenges. The variation of classifications of metrics offered in the ITSM performance literature contributes further to implementation of ITSM measurement programs.

Business managers and ITSM practitioners can use this study to identify areas of potential imbalance in the performance measurement of ITIL. As the BSC perspectives are inter-related, imbalance may point to areas that might need management attention. It appears that there is a breakdown in communication between ITSM and the business. They should engage in a dialogue so that IT can determine what business wants reported, and then define meaningful metrics. Facilitating a dialogue between the business and operations has been described as one of the real benefits delivered by the BSC (Norreklit 2000).

Business managers and ITSM practitioners may also use the findings of the study to benchmark their current performance measurement practices.

The ITSM performance metrics selection model developed in this study was adapted from that used by Myers et al. (1997) and Saunders and Jones (1992). The model presented here represents an extension of their models by splitting internal factors into two categories: parent organisation and IS organisation. In extending the contingency theory to the area of ITSM, this study makes a contribution to the reference discipline of organisational studies.

The implications for practitioners are that the study provides a comprehensive set of ITSM performance dimensions and sample metrics that may help ITSM managers develop their own ITSM performance measurement frameworks.

The case study organisations with dedicated corporate performance measurement frameworks have clear ITSM performance metrics that are reported to the organisation. Such organisations have achieved effective integration of IS functions within the organisation. The factors identified as influencing the selection of ITSM performance metrics point to the strategic importance of ITSM performance measurement beyond meeting legal requirements. The study presents an ITSM metrics selection model, Figure 4.29 that managers can use to identify the internal and external organisation factors influencing the selection of ITSM metrics.

This study alerts ITSM practitioners on the importance of fully understanding the influence of the external environment, the parent organisation and the IS organisation on the selection of ITSM metrics. Although it is tempting for practitioners to adopt generic ITSM metrics unilaterally from the ITIL books or ITIL software, it is more effective to tailor the measures in response to their individual internal and external environments.

The ITSM PMF designed provides a framework which ITSM managers can use to holistically measure ITSM performance and achieve a balanced and integrated view of the distribution of ITSM performance metrics and benefits across the organisation; and along the management of the IT service demand, IT service resources and IT service offering.

7.4 Contributions to Theory and Practice

The study makes contributions to both theory and practice. The literature review is drawn form academic and practice sources and contributes to theory in ITSM by identifying and explaining key concepts in the under researched area of ITSM performance measurement. The study makes a contribution to IS by drawing on management literature on performance measurement to address ITSM performance measurement. The study applies service management theory to consolidate process metrics to ITSM service metrics. The study extends the BSC perspectives to measuring organisation level ITSM metrics and reporting performance at the organisation level.

The study makes a theoretical contribution by identifying specific ITSM benefits, metrics and challenges empirically. Testing the relationship between ITSM processes, benefits and metrics further develops the theoretical contribution. The study presents empirical evidence of determination of previously undefined ITSM performance measurement variable relationships. The study provides empirical evidence of types of ITSM measuring and reporting challenges from survey responses. The study presents an ITSM process metric derivation method and a consolidation of ITSM performance metrics catalogue attributes.

The study makes theoretical contributions by proposing a contingency theory for the performance measurement of ITSM. The study extends performance measurement theory on ITSM by identifying performance measurement planes for ITSM. The study extends the under developed area of ITSM performance measurement theory by providing an empirically based IS designed framework.

The study contributes to design science theory by providing an application of the DSRM and MAPS method in the design and development of an ITSM performance measurement framework.

The study provides necessary insight for ITSM managers and organisations faced with the challenge of measuring the performance of ITSM. The study develops a framework that can be used by organisations in the selection of their ITSM performance metrics as well as integrate different levels of ITSM performance measurement with organisational performance measurement. The study develops a holistic multi-level ITSM performance measurement framework that can be used to alleviate the ITSM performance measurement challenges faced by organisations. The study bridges the gap between theory and practice and shows the synergy achieved in applying ITSM research and practice. The performance measurement framework developed by the study contributes to practice by providing a basis of comparison of an organisations performance. The organising typology may aid ITSM managers identify benefit types and provides basis to evaluate balanced performance measurement. The study provides ITSM practitioners a means to achieving completeness of ITSM catalogues and a method for deriving ITSM process metrics.

The study achieves synergy between theory and practice by drawing on academic and practitioner literature and collaborating with academia and industry in the design, development and evaluation of the ITSM performance measurement framework.

7.5 Limitations of the study

The extent of the study was delimited by the philosophical worldview, research design, selected strategies of inquiry, and the research methods. By using a multi-paradigmatic and mixed-method approach there was a limitation to the extent to which a single method could be applied and, as a consequence, the benefits gained from using mixed-method approach to minimise the weaknesses inherent in each method resulted in the loss of the full benefit from each method used singularly. This study used a systematic literature review, a cross-sectional survey, case study method, and design science approach. The approach taken was deemed as suitable to this specific study and may not necessarily be ideal for future studies.

The limits defined in the systematic literature review (SLR) protocol resulted in the exclusion of literature that did not meet the predefined criteria. It is possible that relevant research is available in literature from non-English academic and industry literature excluded in this study.

A cross-sectional survey presents a single snapshot in time and further understanding may be provided by a longitudinal survey that will provide multiple snapshots across time. The population surveyed was limited to ITSM practitioners who are members of itSMF Australia and it is recognised that there are IS managers using service-oriented approaches who are not members of itSMF, as well as others using service-oriented frameworks other than ITIL. Further case evaluation may have been conducted but the study ran the risk and challenge of expanding the details of the case studies compounding to an already complex study.

A recognised limitation of the qualitative case study approach is the ability to generalise the findings. For this research, efforts were made to select cases to provide a broad representative sample in terms of industry sector, size and geographic location. Future research using parametric sampling and more powerful statistical analysis could be conducted to further quantify the correlations identified in this study.

The DSRM approach used in this study required involvement of third parties in the evaluation and communication steps. In this study, the third parties included the panel of experts involved in the design and testing of the questionnaire and case study; Case study organisation A involved in the evaluation stage; and ITSM industry and IS academic journal article and conference paper reviewers and editors. The operating timeframes and priorities of the third parties were different to those in this study and the third parties were beyond the control of this study. To fully evaluate the ITSM performance measurement framework developed in this study more time and resources were required than Case Study organisation A was willing to make available, given the circumstances of the organisation at the time of this study.

In the development of process metric constituents, qualitative analysis was performed on the top three implemented ITSM processes. This was as a result of the majority of the ITSM performance metrics provided along the top three benefits with a minority only given for the remaining ITSM processes. It is possible that further analysis on a data set of ITSM metrics for the excluded processes may result in additional ITSM metric constituents or may confirm the set of metric constituents developed in this study.

7.6 Further research

This study developed a performance measurement framework for ITSM, identified the relationships between key ITSM performance measurement variables, developed a categorisation for types of ITSM benefits and ITSM process metrics, and provided categorised lists of ITSM organisation benefits, ITSM process benefits and ITSM process metrics. This study provided descriptions of the performance measurement practices of organisations implementing ITSM. The study also identified the factors influencing the selection of ITSM performance metrics and proposed a contingency theory for the performance measurement of ITSM.

Future work will involve further developing the categorised list of ITSM benefits and ITSM metrics into a catalogue of unique ITSM benefits and ITSM metrics. To undertake the further development of the ITSM benefits and ITSM metrics catalogues this study recommends the use of an interpretivist research approach using hermeneutical methods such as discourse analysis or semantic analysis required to disambiguate and interpret responses to generate unique ITSM benefits and ITSM metrics.

Future studies involving surveys and/or longitudinal studies would broaden the applicability and representativeness of this research. Further studies may involve extending the case evaluation, applying the survey and case studies in other countries and implementing the ITSM performance measurement framework. Future work may extend the study to capture the extent of influence of the identified factors.

7.7 Concluding remarks

The challenges faced by organisations measuring the performance of ITSM may be alleviated by use of the ITSM performance measurement framework developed in this study. Given the correlation between the existence of performance measurement frameworks and ITSM metrics, measurement problems may be associated with not using performance measurement frameworks.

It is recognised that providing recommendations about what to measure and how to measure is not sufficient as ‘business executives have very different goals for IT, which means that the context or environment in which IT operates is a key factor and should be considered when searching IT payoffs’ (Šimková and Basl 2006). The internal and external environment factors influencing the selection of ITSM metrics identified in this study provide a guide that managers can use to direct their selection of ITSM metrics. The ITSM performance measurement framework developed in this study can help organisations integrate the reporting of ITSM performance along the BSC perspectives by aggregating IT service performance metrics and reporting to the strategic level of management.

The ITSM performance measurement framework can facilitate the organisation of ITSM process metrics and assist organisations to address the measuring and reporting challenges currently being experienced. The use of ITSM performance metrics with limited use of accompanying performance measurement frameworks may be evidence that having metrics without an organising framework will not alleviate the ITSM performance measurement challenges. Respondents could list benefits and metrics, but reported many difficulties in measuring and reporting benefits in their organisations.

There is an abundance of quantitative and internally focused performance metrics found in ITSM performance measurement literature and practice. On the contrary, there is a shortage of qualitative and externally focused performance metrics. The use of the ITSM performance measurement framework developed in this study would assist organisations achieve a balance and completeness in the measurement and reporting of ITSM performance.

This study addressed the enduring challenge of performance measurement that is crucial for organisations adopting ITSM in their efforts to improve their IT service. This study introduces an important step to standardising ITSM performance measurement, and develops an ITSM performance measurement framework that will be a valuable tool for organisations. The performance measurement framework can help service managers to better understand the performance of their ITSM processes and initiate improvement actions to address gaps identified.

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Appendices

List of Appendices

Appendix A – Literature Review Distribution and ITSM Benefits and Metrics

Table A.1 Distribution of selected literature by year of publication

Year	Count of selected literature	Percent
2012	6	2.7%
2011	9	4.0%
2010	13	5.8%
2009	27	12.1%
2008	21	9.4%
2007	16	7.1%
2006	17	7.6%
2005	12	5.4%
2004	17	7.6%
2003	9	4.0%
2002	12	5.4%
2001	3	1.3%
2000	9	4.0%
1999	5	2.2%
1998	3	1.3%
1997	4	1.8%
1996	5	2.2%
1995	5	2.2%
1994	6	2.7%
1993	3	1.3%
1992	6	2.7%
1991	2	0.9%
1990	3	1.3%
1989	3	1.3%
1988	1	0.4%
1985	1	0.4%
1984	1	0.4%
1982	1	0.4%
1981	1	0.4%
1980	2	0.9%
1977	1	0.4%
Total	**224**	**100%**

Table A.2 Distribution of selected literature by journal

Name of Journal, Conference	Frequency	Percent
Journal of Management Information Systems	10	9.9%
MIS Quarterly	7	6.9%
International Journal of Operations & Production Management	6	5.9%
Communications of the ACM	5	5.0%
Information Systems Management	4	4.0%
Decision Sciences	3	3.0%
European Journal of Information Systems	3	3.0%
Information & Management	3	3.0%
SIGMIS Database	3	3.0%
The Journal of Marketing	3	3.0%
Academy of Management Review	2	2.0%
Harvard Business Review	2	2.0%
IBM Systems Journal	2	2.0%
Information Systems Research	2	2.0%
International Journal of Productivity and Performance Management	2	2.0%
International Journal of Service Industry Management	2	2.0%
Journal of the Association for Information Systems	2	2.0%
ACM Computing Surveys	1	1.0%
Advances in Engineering Software	1	1.0%
Australian Journal of Information Systems	1	1.0%
Benchmarking: An International Journal	1	1.0%
British Journal of Management	1	1.0%
Communications of AIS	1	1.0%
Decision Support Systems	1	1.0%
Design Studies	1	1.0%
European Business Review	1	1.0%
Field Methods	1	1.0%
Information and Software Technology	1	1.0%
Information Research	1	1.0%
Information Resources Management Journal	1	1.0%
Information Systems Control Journal	1	1.0%
Information Systems Frontiers	1	1.0%
International Journal of Computer Science and Network Security	1	1.0%
International Journal of Information Systems in the Service Sector (IJISSS)	1	1.0%
Journal for East European Management Studies	1	1.0%
Journal of Applied Behavioral Science	1	1.0%
Journal of Computer Information Systems	1	1.0%
Journal of Information Systems	1	1.0%
Journal of Manufacturing Technology Management	1	1.0%
Journal of Service Research	1	1.0%
Knowledge-Based Systems	1	1.0%
Kybernetes	1	1.0%
Long Range Planning	1	1.0%
Management Accounting	1	1.0%
Management Accounting Research	1	1.0%
Management Science	1	1.0%
Managerial Finance	1	1.0%
Measuring Business Excellence	1	1.0%
MIS Quarterly Executive	1	1.0%
Performance Measurement and Metrics	1	1.0%
Philosophical Studies	1	1.0%
Selected readings on information technology management: contemporary issues	1	1.0%
Social Science Computer Review	1	1.0%
Strategy and Leadership	1	1.0%
The Electronic Journal of Information Systems Evaluation	1	1.0%
The International Journal of an Emerging Transdiscipline	1	1.0%
WSEAS Transactions on Information Science and Applications	1	1.0%
Total	**101**	**100.0%**

Table A.3 List of ITIL lifecycle phase benefits from OGC (2009)

ITSM Cycle	OGC Key Benefits
Continual service improvement	Return on investment (ROI): the difference between the benefit and the cost to achieve it
Continual service improvement	Improvements: outcomes that are favourably improved when compared to a 'before' state
Continual service improvement	Benefits: the gains achieved through realisation of improvements
Continual service improvement	Value of investment (VOI): the extra value created by the establishment of benefits that include non-monetary outcomes
Service design	Clear alignment with the business needs demonstrated through a focus on IT measurements directly related to key aspects of business performance
Service design	More effective and relevant processes, with improved measurement methods and metrics, enabling informed decision making
Service design	Improved consistency across all services and better integration with infrastructure components, leading to faster and simpler implementation, and improved quality of service
Service operation	Actual value is seen in the business
Service operation	Execution and measurement of plans, designs and optimisations
Service strategy	Tight coupling between the perception of business and IT value
Service strategy	Performance and measures that are business value based
Service strategy	Service development investment decisions driven by business priorities and clear return on investments (ROI) plans
Service strategy	Improved use of IT investments
Service strategy	Agile adaptation of IT services to pre-empt and meet changing business needs
Service strategy	Clear visibility of linkages between business services and IT service assets
Service transition	Aligns new or changed services with the customer's business requirements
Service transition	Ensures that customers and users can use new or changed service effectively
Service transition	Enables high volumes of change and release for the business
Service transition	An understanding of the level of risk during and after change, e.g. service outage, disruption

Table A.4 ITIL process benefits extracted from OGC (2009)

ITSM Process	OGC Key Process Benefit
Service portfolio management	Enable customers to understand what services are available
Service portfolio management	Enable customers to understand what charges are associated with each service
Service portfolio management	Enable customers to understand why they should use these services
Service portfolio management	Enable customers to understand why they should take these services from that specific service provider
Service portfolio management	Enable the service provider to understand what strengths, weaknesses and gaps exist in their service portfolio
Service portfolio management	Enable the service provider to understand what their investment priorities and risks are
Service portfolio management	Enable the service provider to understand how their service assets (resources and capabilities) should be allocated to address these priorities and risks
Demand management	Service provider and customer benefit from the efficiency and consistency in service quality that this brings
Financial management	Provide guiding information for continual service improvement strategy
Financial management	Ensure service improvement investment decisions are based upon sound financial considerations of the balance between the cost of an improvement and the individual value that it will provide to the customer in terms of desired business customers
Service catalogue management	Provide the business with an accurate, consistent picture of the IT services in

ITSM Process	OGC Key Process Benefit
	use, how they are intended to be used, the business processes they enable and associated levels of service levels
Service level management	Provides a reliable communication channel and a trusted relationship between the customers and business representatives
Service level management	Supplies the business with agreed service targets and the required management information to ensure those targets have been met
Capacity management	Ensures that IT resources are planned and scheduled to deliver a consistent level of service, matched to the agreed current and future needs of the business
Availability management	Ensures that the availability of services matches current and future business needs, and that the business impact of any unavailability is minimized
ITSCM	Invaluable in supporting the business strategy, as it is driven by business risk as identified by business continuity planning
ITSCM	Ensures that recovery arrangements for IT services are aligned to the business needs
Information security management	Ensures an information security policy is maintained and enforced that fulfils the needs of the business security policy and the requirements of corporate governance
Information security management	Raises awareness across the organisation of the need to secure all information assets
Supplier management	Ensures that all underpinning services supplied externally are appropriate to support the agreed targets and business needs laid out in the SLAs ensuring delivery of a seamless, end-to-end service to the business
Transition planning and support	An integrated approach to planning improves the alignment of service transition plans with the plans of the customers, suppliers and the business, and can significantly improve a service provider's ability to handle high volumes of change and releases
Change management	Provides value by promptly evaluating and delivering the changes required by the business, and by minimizing the disruption and re-work caused by failed changes
Service asset and configuration management	Optimizes the performance of services assets and configurations and therefore improves the overall performance of the service
Service asset and configuration management	Minimizes the costs and risks caused by poorly managed assets, e.g. service outages, fines, incorrect license fees and failed audits
Knowledge management	Effective knowledge management is a powerful asset for people in all roles across all stages of the service lifecycle
Release and deployment management	Ensuring that customers and users can use the new or changed service in a way that supports the business and by delivering change faster, at optimum cost and with minimal risk
Release and deployment management	Minimize troubleshooting and re-work
Service validation and testing	Preventing service failures that can harm the service provider's business and other customer's assets, which can result in outcomes such as loss of reputation, loss of money, loss of time, injury and death
Event management	Enables faster entry to service management processes, especially incident management, and the possibility of automating activities which deliver cost savings
Incident management	Detecting and resolving incidents, resulting in lower downtime to the business
Incident management	Aligning IT activity to business priorities and assigning resources as necessary
Incident management	Identification of potential improvements to services
Incident management	Identification of additional training or service requirements in IT or the business
Request fulfilment	Provide quick and effective access to standard services which can lead to increased productivity for business staff and improved quality of services and products
Problem management	Helps ensure that availability and quality of services meets the business needs
Problem management	Helps to save money by reducing the number of incidents and the effort needed to resolve them resulting in less downtime for the business
Access management	Helps to maintain confidentiality, integrity and the availability of data and intellectual property
Access management	IT carries out activities defined in security management
Service desk function	Improved customer service, perception and satisfaction

ITSM Process	OGC Key Process Benefit
Service desk function	Single point of contact, communication and information
Service desk function	Better quality and faster turnaround of customer or user requests
Service desk function	Improved usage of IT support resources and increased productivity of users
Service desk function	More meaningful management information for decision support
7-step improvement process	Increased number of CSI-driven process and service improvement opportunities identified
7-step improvement process	Value is created through a constant focus on the application of the principles of the service lifecycle, the delivery of services, and on the processes implemented with a view to ensuring they continue to align with, and deliver against, business requirements and to identify opportunities for continual improvement
Service reporting	Reporting that focuses on the future as strongly as the past also provides a means to market IT services that are directly aligned to the positive or negative experiences of the business
Service measurement	Enables business to validate previous decisions
Service measurement	Enables business to set direction in order to hit targets
Service measurement	Enables business to justify that a course of action is required
Service measurement	Enables business to intervene and to take corrective action

Table A.5 ITIL process metrics extracted from OGC (2009)

ITSM Process	OGC Key Process Metrics
7-step improvement process	Ensure manual data collection is being carried out accurately and consistently. Manually capturing data on how a process was carried out and what the outcome was can be seen as an administrative overhead. Ongoing communication about the benefits of performing these tasks is essential.
Access management	Number of incidents requiring a reset of access lights
Access management	Number of incidents caused by incorrect access settings
Access management	Number of requests for access
Availability management	Percentage reduction in cost of unavailability
Availability management	Percentage reduction in the unavailability of services and components
Availability management	Percentage reduction in critical time failures e.g. during peak business usage hours
Capacity management	Timely justification and implementation of new technology in line with business requirements
Capacity management	Percentage accuracy of forecasts of business trends
Capacity management	Reduction in the business disruption caused by a lack of adequate IT capacity
Capacity management	Percentage reduction in the number of SLA breaches due to poor service or component performance
Change Management	Number of changes implemented which meet the customer's agreed requirements
Change Management	Reduction in the number of unauthorized changes
Change Management	Reduction in the number and percentage of unplanned changes and emergency fixes
Change Management	Change success rate (percentage of changes deemed successful at review/number of RFCs approved)
Change Management	Percentage of incidents attributable to changes
Change Management	Reduction in the number of disruptions to services, defects and rework caused by inaccurate specifications, poor or incomplete impact assessment
Evaluation	Number of failed designs that have been transitioned
Evaluation	Cycle time to perform an evaluation (low and reducing)
Evaluation	Variance from service performance required by customers (minimal and reducing)
Evaluation	Number of incidents against the service (low and reducing)
Event management	Number of events by category, by significance, by platform and by type of event
Event management	Number and percentage of events that required human intervention
Event management	Number and percentage of repeat or duplicate events
Financial management	Financial trends for funding, value and accounting
Financial management	Service utilisation data, including by service, customers, users, department, etc.
Incident management	Average cost per incident by category, priority and resolution group

ITSM Process	**OGC Key Process Metrics**
Incident management	Number and percentage of incidents by category, priority, time of day
Incident management	Size of incident backlog
Incident management	Percentage of incidents meeting required service levels for response time and resolution time, by priority and category
Incident management	Number and percentage of incidents by Service Desk agent and resolving group
Information security Management	Increased awareness of the information Security Policy throughout the organisation
Information security Management	Increase in the acceptance of, and conformance to security procedures
Information security Management	Percentage decrease in security breaches
ITSCM	All service recovery targets are agreed and documented and are achievable within the ITSCM plans
ITSCM	Overall reduction in the assessed risk and impact of possible disasters
Knowledge Management	Reduced dependency on personnel for knowledge
Knowledge Management	Reduced time and effort required to support and maintain services
Knowledge Management	Reduced time to find information for diagnosis and resolving incidents and problems
Problem management	Average cost of handling problems
Problem management	Number and percentage of problems resolved within SLA targets
Problem management	Size of backlog
Problem management	Number of known errors added to KEDB
Release and deployment management	Reduced discrepancies in configuration audits compared with the real world
Release and deployment management	Reduced resources and costs to diagnose and fix incidents and problems in deployment and production
Release and deployment management	Increased customer and user satisfaction with the service delivered
Release and deployment management	Reduced number of incidents for the service
Release and deployment management	Reduced variance from services performance required by customers
Request fulfilment	Average cost by type of request
Request fulfilment	Number and percentage of requests meeting agreed target times
Request fulfilment	User satisfaction
Request fulfilment	Mean elapsed time to handle service requests by category
Request fulfilment	Size of backlog and number of requests at each stage
SACM	Accuracy in budgets and charges for the assets utilised by each customer or business unit
SACM	Ratio of used licenses against paid for licenses (should be close to 100%)
SACM	Reduction in the use of unauthorised hardware and software, non standard and variant builds that increase complexity, support costs and risk to the business services
SACM	Percentage reduction in business impact of outages and incidents caused by poor asset and configuration management
SCM	Number of variances detected between the information contained within the service catalogue and the 'real-world' situation
SCM	Number of IT services recorded and managed within the service catalogue as a percentage of those being delivered and transitioned in the live environment
Service measurement	Business contribution - showing IT supports the business
Service measurement	Internal and external customer satisfaction
Service measurement	Key IT processes
Service measurement	Risk and compliance
Service measurement	Service performance against strategic business and IT plans
Service reporting	Representation of past performance
Service reporting	Future mitigation of past issues
Service reporting	Future improvements
Service validation and testing	Effort required to find defects i.e. number of defects (by significance, type, category etc.) compared with testing resource applied
Service validation and testing	Reduction of repeat errors- feedback from testing ensures that corrective action within design and transition (through CSI) prevents mistakes from being repeated in subsequent releases or services
Service validation and testing	Percentage incidents linked to errors that could have been discovered in testing and released into live environment
Service validation and testing	Number and percentage of errors that could discovered in testing
Service validation and testing	Testing evidence found as percentage of incidents occurring in live environments
Service validation and testing	Inspection and testing return on investment

ITSM Process	OGC Key Process Metrics
SLM	Percentage increased in customer satisfaction
SLM	Percentage reduction in SLA targets missed
SLM	Percentage increase of SLA reviews completed on time
SLM	Percentage increase in SLAs agreed against operational services being run
SPM	Business activities to support definition of PBAs and ongoing monitoring or maintenance
SPM	Actual demand patterns to support activity or demand modelling
Supplier Management	Increase in the number of supplier and contractual targets aligned with the SLA and the SLR targets
Supplier Management	Reduction in the number of service breaches caused by suppliers
Supplier Management	Increase in the number of suppliers meeting the targets within the contract
Supplier Management	Increase in the number of suppliers with nominated supplier managers
Transition planning and support	Number of releases implemented that meet the customer's agreed requirements in terms of cost, quality, scope and release schedule (expressed as a percentage of all releases)
Transition planning and support	Reduced number of incidents caused by change
Transition planning and support	Reduced number of issues, risks and delays caused by inadequate planning

Table A.6 ITIL function metrics extracted from OGC (2009)

ITSM Function	OGC Key Metrics
Application management function	Reports and files transmitted to users in accordance with service levels (measurement of agreed outputs)
Application management function	(Training and skills development)
Application management function	Transaction rates achieved (measurement of agreed outputs)
Application management function	Application management teams contribute to many process activities (process metrics)
Application management function	Number of maintenance windows exceeded (measurement of maintenance activity)
Application management function	Ability of users to access applications (measurement of agreed outputs)
Application management function	Response times, availability of systems, data integrity, etc. (application performance)
IT operations management function	Number of exceptions to scheduled activities and jobs (IT operations control)
IT operations management function	Number of data or system restores (IT operations control)
IT operations management function	Equipment implementation, number of items, success, etc. (IT operations control)
IT operations management function	Process metrics - IT operations Management contributes to many process activities (IT operations control)
IT operations management function	Number of incidents related to the buildings, power and cooling, etc.
IT operations management function	Power usage statistics
IT operations management function	Number of security incidents
Service desk function	Average Service Desk cost of handling an incident
Service desk function	Percentage of incidents resolved by the first line without the need for escalation
Service desk function	Average time to resolve an incident (by first line)
Service desk function	Average time to escalate an incident
Service desk function	Percentage of customer or user updates conducted within target service levels
Service desk function	Average time to review and close a resolved call
Technical management function	Achievement of service levels to the business, both positive and negative, for example the number of incidents related t o a Technical Management team (measurement of agreed outputs)
Technical management function	Service level achievement (measurement of agreed outputs)
Technical management function	Training and skills development
Technical management function	Technical management teams contribute to many process activities (process metrics)
Technical management function	Mean time between failures of specified equipment - to support purchasing decisions and effectiveness of maintenance
Technical management function	Transaction rates and availability (measurement of agreed outputs)
Technical management function	Utilisation rates of memory, availability of systems, etc. technology performance)
Technical management function	Measurement of maintenance activity - for example, number of maintenance windows exceeded

Appendix B – Data Collection Instruments

University of Southern Queensland

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OFFICE OF RESEARCH AND HIGHER DEGREES
Ashley Steele
Ethics Officer
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Thursday, 8 October 2009

Francis Gacenga
14 McShane Drive
Mount Kynoch,
Toowoomba QLD 4350

Dear Francis,

Thankyou for submitting your project below for human ethics clearance. The USQ Fast Track Human Research Ethics Committee (FTHREC) assessed your application and agreed that your proposal meets the requirements of the *National Statement on Ethical Conduct in Human Research.* Your project has been endorsed and full ethics approval granted.

Project Title	A Performance measurement Framework for IT Service Management to Improve Crucial IT Infrastructure in Private and Public Sector Organisations
Approval no	H09REA102
Period of Approval	08/10/2009 – 08/10/2010
FTHREC Decision	**Approved as submitted**

The standard conditions of this approval are that:

(a) you conduct the project strictly in accordance with the proposal submitted and granted ethics approval, including any amendments made to the proposal required by the FTHREC;
(b) you advise the HREC (email: ethics@usq.edu.au) immediately if any complaints or expressions of concern raised, or any other issue in relation to the project which may warrant review of ethics approval of the project;
(c) You make submission to the HREC for approval of any amendments, or modifications to the approved project before implementing such changes;
(d) in the event you require an extension of ethics approval for this project, please make written application in advance of the end-date of this approval;
(e) you provide the HREC with a written "Annual Progress Report" for every year of approval. The first progress report is due 12 months after the start date of this approval (by **08/10/2010**);
(f) you provide the HREC with a written "Final Report" when the project is complete;
(g) if the project is discontinued, you advise the HREC in writing of the discontinuation.

For (c) to (f) proformas are available on the USQ ethics website: http://www.usq.edu.au/research/ethicsbio/human

Please note that failure to comply with the conditions of approval and the *National Statement on Ethical Conduct in Human Research* may result in withdrawal of approval for the project.

You may now commence your project. I wish you all the best for the conduct of the project

Yours sincerely

Ashley Steele

Ashley Steele
Ethics Officer
Office of Research and Higher Degrees

Toowoomba • Springfield • Fraser Coast **usq.edu.au**

Figure B.1 Ethics approval

SECTION A: Your organisation

1. To which itSMF Australia membership category do you belong?

Corporate ☐ Vendor ☐ Individual ☐ Other (please specify) ☐

2. What is your position in your organisation?

Project Manager ☐	IT Manager ☐	Service Manager ☐	Help Desk Supervisor ☐
Operations Manager ☐	Technical Expert ☐	Trainer ☐	Consultant ☐

Other (please specify) _______________

3. To which business sector does your organisation belong?

Accommodation, cafes and restaurants ☐	Construction ☐
Finance and insurance ☐	Manufacturing ☐
Property and business services (includes IT firms) ☐	Transport and storage ☐
Agriculture, forestry and fishing ☐	Education ☐
Government administration and defence ☐	Mining ☐
Communication services ☐	Electricity, gas and water ☐
Health and community services ☐	Personal and other services ☐
Retail trade ☐	Other (please state) ___________

SECTION B: ITIL®V2 processes

1. What ITSM framework has your organisation primarily adopted/adapted?

ITIL® v2 (IT Infrastructure Library) ☐	ITIL® v3 ☐
IBM Service Management Reference Model ☐	MOF (Microsoft Operations Framework) ☐
HP ITSM (ITSM Reference Model) ☐	Other (please specify) _____________

2. What is the duration in years of your current ITIL® V2 implementation?

One ☐	Two ☐	Three ☐	Four ☐	Five ☐	Six ☐
Seven ☐	Eight ☐	Nine ☐	Ten ☐	Other (please specify) ☐	

3. What is/are your role(s) in the ITIL® V2 implementation?

Incident Manager ☐	Problem Manager ☐	Change Manager ☐
Release Manager ☐	Configuration Manager ☐	Service Level Manager ☐
Availability Manager ☐	Capacity Manager ☐	IT Service Continuity Manager ☐
Financial Manager ☐	1st Level Support ☐	2nd Level Support ☐
3rd Level Support ☐	Other (please specify) ____________	

4. What ITIL® V2 processes has your organisation implemented?

Incident Management ☐	Problem Management ☐	Configuration Management ☐
Change Management ☐	Release Management ☐	Service Desk Function ☐
Service Level Management ☐	IT Financial Management ☐	Capacity Management ☐
Availability Management ☐	IT Service Continuity Mgt ☐	Other (please specify)

5. Which were the first three processes/function implemented?

First Process _____________ Second Process____________ Third Process _________________

6. What other related standards and frameworks has the organisation implemented or is implementing?

ISO/IEC 20000 ☐	ISO 9000 ☐	PRINCE2® ☐	PMBOK ☐
Six Sigma ☐	CobiT ® ☐	Other (please specify) ____________________	

SECTION C: ITIL® V2 BENEFITS MEASUREMENT

1. What performance measurement or process maturity framework or standard is/are used in your organisation?

Balanced Score Card	☐	IT Balanced Score Card	☐	CMMI ®	☐
CMMI ® for Services	☐	ISO15504 (Information Technology — Process Assessment)			☐
Don't know	☐	Not applicable	☐	Other (please specify) _________	

2. For the ITIL® V2 processes you are involved in please list the key benefit(s) realized from the implementation of the process (For example, Process: Problem Management, Benefit: increased customer service levels)

Incident Management _____________ Problem Management ______________
Configuration Management __________ Change Management _____________
Release Management _____________ Service Desk Function _____________
Service Level Management _____________ IT Financial Management
Capacity Management _____________ Availability Management _____________
IT Service Continuity Management _____________

3. For each of the ITIL® V2 processes you are involved in please list the metric(s) used to measure the key benefit(s) realized from the implementation of the process. (For example, Process: Problem Management, Benefit: increased customer service levels, Metric: Number of incidents resolved by known error).

Incident Management _____________ Problem Management _____________
Configuration Management _____________ Change Management _____________
Release Management _____________ Service Desk Function _____________
Service Level Management _____________ IT Financial Management _____________
Capacity Management _____________ Availability Management _____________
IT Service Continuity Management _____________

4. For each of the ITIL® V2 processes you are involved in please state the frequency (daily, weekly, monthly, quarterly, ad hoc) benefit measurement and reporting is done for each of the ITIL processes you are involved in. To which level of management (Strategic, Tactical or Operational) are the metrics reported?

	Process	*Frequency of Measurement*	*Frequency of Reporting*	*Level of Management*
Process one				
Process two				
Process three				
Process four				
Process five				

5. Please select the key business and financial benefit(s) realized from the overall ITSM implementation

Business perspective
- Improved quality of business operations
- Better working relationships between the Customers and IT
- More reliable business support
- Enhanced Customer satisfaction
- Customers know what to expect from IT
- IT Service Continuity procedures more focused on the business
- Increased Productivity of Business and Customer Staff

Financial perspective
- Cost justified IT infrastructure and IT services
- Savings on cost of errors
- Reduced cost of implementing change
- Efficient cost to meet availability targets
- Cost savings from optimal capacity
- Appropriate service continuity expenditure
- Cost effective management of hardware and software contracts

Employee perspective
- Improved visibility and reputation of the IT department
- IT Staff have clear expectations
- Increased productivity of IT staff
- Improved job satisfaction

Innovation perspective

- Delivery of IT Services that underpin business processes
- Better information on current services
- Increased flexibility and adaptability of IT services
- Improved ability to recognise changing trends and adapt to them
- Greater flexibility from the business

Internal perspective

- Improved communications and inter-team working
- Improved metrics and management reporting
- Process maturity benefits
- Better information on current services
- Clearer view of current IT capability
- Clearly defined roles and responsibilities

SECTION D: ITSM CHALLENGES

1. What would you say is the single biggest challenge in implementing ITSM processes? ____________
2. What would you say is the single biggest challenge in measuring ITSM benefits? ________________
3. What would you say is the single biggest challenge in reporting ITSM benefits? __________________

Figure B.2 Survey questionnaire extract: ITIL v2 questions

Dear Sir/Madam,

ITSM BENEFITS SURVEY

I am conducting a survey on Information Technology Service Management (ITSM) benefits realized by organisations that have or are in the process of implementing ITSM. This study will be followed by case studies as part of my Doctor of Philosophy degree in Information Systems.

I would appreciate it if you could use some of your valuable time to respond to the survey. Your participation will help ensure that the survey is fully representative.

Please be assured that your responses will be treated as strictly confidential as organisations and individuals will not be identified in the findings. If any information could lead to identification it will not be published. If you would like a copy of the survey results, provide your email address at the end of the survey. The questionnaire should take a approximately 15 minutes to complete. I would appreciate you completing the questionnaire by 10 December.

There will be a prize draw with the top prize being a Netbook computer. To be entered in the draw complete the questionnaire and provide your email address at the end of the survey.

To start the survey please click the following link:

http://www.surveymonkey.com/s.aspx?sm=iXFduwrSfDxTlvDwwkXZQg_3d_3d

Thank you for your participation.

Sincerely,

I look forward to your response.

Kind regards,

Francis Gacenga
School of Information Systems
Faculty of Business
University of Southern Queensland
TOOWOOMBA QLD 4350 Australia
Ph +61 7 4631 1252 Email:gacenga@usq.edu.au

Figure B.3 ITSM survey questionnaire cover letter

Survey of ITSM Benefits - WIN A NETBOOK COMPUTER!

Earlier we invited you to participate in a survey under collaboration with the University of Southern Queensland (USQ).

If you have not participated we encourage you to do so. Below are some of the potential key benefits for completing the survey:

- Provides a picture of the state of ITSM in Australia allowing members to use as a benchmark.
- List of top benefits and challenges common to organisations implementing ITSM.
- Get an understanding of what works well in terms of implementing processes, measuring and reporting benefits of ITSM.
- Identify trends in frameworks and standards related to ITSM, and
- Form a basis of comparison with other International studies (USA & UK).

Please be assured that your responses will be treated as strictly confidential as organisations and individuals will not be identified in the findings. If any information could lead to identification it will not be published. itSMF Australia will provide Members with the survey results.

There will be a prize draw with the top prize being a Netbook computer. To be entered in the draw complete the questionnaire and provide your email address at the end of the survey.The survey will close on Friday 18th December 2009.

If you started the survey, but did not complete it, you can click back into it at any time and continue from where you stopped.

Please click on the following link to either start or continue:

Start Survey

Thank you for your participation.

Figure B.4 Survey of ITSM Benefits and Metrics reminder

Title of Project: A Performance Measurement Framework for IT Service Management

Name of Interviewee(s): ____

____

Position: ____

ITSM Process Role: ____

Organisation: ____

Interviewer: Francis Gacenga

Purpose of the Interview: The purpose of this interview is to gain an in depth understanding of the ITSM performance measurement practices at your organisations to aid in the development of a performance measurement framework being developed as part of a PhD study.

Ethical Issues: I would like to record the interview on a digital recorder if this is alright with you. Please sign the interview consent form. During the interview I will be referring to the printed interview questions and taking notes. Transcripts of the interview and a report of the case study will be sent to you for authentication.

Introduction: For the purposes of the recording please introduce yourself, stating your name and role in the organisation.

Date: ______________________

Time: Start ____________ End _____________

In this interview I will ask questions on how the performance of ITSM is measured in your organisation.

A. IT Service Management (ITSM) Performance Measurement Framework

A.1 From the survey I realise you are primarily using ITIL as your ITSM framework. What framework(s) are you currently using to measure the performance of your IT service management?
____

A.2 Do you know if other frameworks were considered when your organisation selected the framework(s) for measuring the performance of your ITSM?

____

A.3 When did you implement the framework(s) used to measure the performance of your ITSM?
____

A.4 What internal organisation factors influenced the decision to implement the framework used to measure the performance of your ITSM?

____

____

A.5 Were there factors external to the organisation that influenced the decision to implement the framework used to measure the performance of your ITSM?

A.6 What are the objectives of measuring the performance of your ITSM?

A.7 Is the framework used to measure the performance of your ITSM only or is it part of the entire organisations performance measurement?

A.8 At what levels of the organisation (top, middle and operational) is the performance of your ITSM measured?

A.9 What are the roles of those involved in measuring and reporting the performance of your ITSM?

A.10 How do you align the measurement of the performance of your ITSM to the overall organisations strategy?

A.11 We know that the overall ITSM provides your organisation benefits. What has your organisation gained from measuring the performance of your ITSM?

A.12 Is it possible for you to provide documentation of the ITSM performance measurement framework used?

B. ITSM Performance Metrics

B.1 In terms of the measurement of the performance of the implemented ITSM do you use ITSM tools, spreadsheets, surveys or do it manually?

B2. Can you give me examples of metrics that you use related to ITSM?

B.3 Does your IT organisation (division, department, unit, team) maintain a catalogue/dictionary of current ITSM performance metrics? Please provide me with the metrics (service) catalogue (definitions and attributes).

B.4 What factors (industry, size, ownership, legislation, competitors, customers, historical) influenced the selection of the metrics used to measure the performance of ITSM?

B.5 How are the metrics organised (for example areas of focus such as people, process, partners and technology) within the ITSM performance measurement framework? Why are the metrics organised in this way?

B.6 Are the metrics classified into categories for example lead vs. lag, qualitative vs. quantitative, internal vs. external, financial vs. nonfinancial? Why do you use this specific categorisation?
Please provide documentation of the various classifications?

B.7 Who is involved in collecting metrics and at what levels of the organisations are they positioned?
Please provide me with an organisation chart.

B.8 Do you review the effectiveness of the ITSM performance metrics collected?

B.9 Do you think that some of the metrics are more effective than others? Why?

B.10 How do you ensure the ITSM performance metrics are accurate (validity and reliability)?

C. ITSM Performance Reporting

C.1 How do you use the information collected from the measurement of the performance of your ITSM (for monitoring, planning, improvements, decision-making)?

C.2 How is reporting of the measurement of the performance of your ITSM done (verbally, dashboards, emails, webpage)?

C.3 To what levels (top, middle and operational) is the measurement of the performance of your ITSM reported?

C.4 What is the rationale for having the measurement of the performance of your ITSM reported at these levels?

C.5 What is the frequency of reporting of the measurement of the performance of your ITSM?
For example daily, weekly, monthly, quarterly, ad hoc and the reason for the time frame. Why this frequency?

C.6 What are the outcomes (decisions, actions, behaviour change) from the reporting of the measurement of the performance of your ITSM?

C.7 How do you determine what reports, from measurement of the performance of your ITSM, are relevant to the report users (management / the business)?

C.8 Please provide sample reports (dashboards, spreadsheets, emails, web pages) of measurement of the performance of your ITSM.

C.9 You may provide any other information and documentation you would like to add.

THANK YOU FOR YOUR PARTICIPATION.

Figure B.5 Case study interview questions

Table B.1 Case study interview question mapping to research questions

Interview Question	Aim	Research Question
A.1 From the survey I realise you are primarily using ITIL as your ITSM framework. What framework(s) are you currently using to measure the performance of your IT service management?	To identify what PMF(s) is being used.	*Which specific metrics can be used to measure ITSM performance? (RQ2)*
A.2 Do you know if other frameworks were considered when your organisation selected the framework(s) for measuring the performance of your ITSM?	To identify if alternatives were considered in selection.	*Which specific metrics can be used to measure ITSM performance? (RQ2)*
A.3 When did you implement the framework(s) used to measure the performance of your ITSM?	To identify duration of use which may impact on experience using PMFs.	*Which specific metrics can be used to measure ITSM performance? (RQ2)*
A.4 Were there factors internal to the organisation that influenced the decision to implement the framework used to measure the performance of your ITSM?	To understand the internal factors that influence decision on PMF.	*What internal and external environmental factors determine organisations' selection of specific performance metrics for ITSM? (RQ4)*
A.5 Were there factors external to the organisation that influenced the decision to implement the framework used to measure the performance of your ITSM?	To understand the external factors that influence decision on PMF.	*What internal and external environmental factors determine organisations' selection of specific performance metrics for ITSM?(RQ4)*
A.6 What are the objectives of measuring the performance of your ITSM?	To determine what the goals of measuring are.	*What types of benefits are reported from IT service management (ITSM) improvement initiatives by organisations?(RQ1)*
A.7 Is the framework used to measure the performance of your ITSM only or is it part of the entire organisations performance measurement?	To understand how the PMF is used.	*Which specific metrics can be used to measure ITSM performance? (RQ2)*
A.8 At what levels of the organisation (top, middle and operational) is the performance of your ITSM measured?	To understand **how** the measurement of PMF is organised.	
A.9 What are the roles of those involved in measuring and reporting the performance of your ITSM?	To understand **how** the measurement of PMF is organised.	
A.10 How do you align the measurement of the performance of your ITSM to the overall organisations strategy?	To understand **how** the performance measures are linked to the strategy.	*How can specific ITSM performance metrics be derived? (RQ3)*
A.11 We know that the overall ITSM provides your organisation benefits. What has your organisation gained from measuring the performance of your ITSM?	To understand the benefits gained and probably the motivation.	*What types of benefits are reported from IT service management (ITSM) improvement initiatives by organisations?(RQ1)*
A.12 Is it possible for you to provide documentation of the ITSM performance measurement framework used?	To have evidence that can be used for content analysis.	
B.1 In terms of the measurement of	To understand how	*How can specific ITSM performance*

Interview Question	Aim	Research Question
the performance of the implemented ITSM do you use ITSM tools, spreadsheets, surveys or do it manually?	the measurement of ITSM performance is made operational.	*metrics be derived? (RQ3)*
B2. Can you give me examples of metrics that you use related to ITSM?	To have specific examples of metrics in use.	*Which specific metrics can be used to measure ITSM performance? (RQ2)*
B.3 Does your IT organisation (division, department, unit, team) maintain a catalogue/dictionary of current ITSM performance metrics? Please provide me with the metrics catalogue (definitions and attributes).	To get physical evidence of the definitions and attributes of metrics in use.	*Which specific metrics can be used to measure ITSM performance? (RQ2)*
B.4 What factors (industry, size, ownership, legislation, competitors, customers, historical) influenced the selection of the metrics used to measure the performance of ITSM?	To understand the internal factors that influence selection of specific metrics.	*What internal and external environmental factors determine organisations' selection of specific performance metrics for ITSM?(RQ4)*
B.5 How are the metrics organised (for example areas of focus such as people, process, partners and technology) within the ITSM performance measurement framework? Why are the metrics organised in this way?	To extract organising themes or perspectives integrating the metrics in use. Understand why this is done.	*How can specific ITSM performance metrics be derived? (RQ3)*
B.6 Are the metrics classified into categories for example lead vs. lag, qualitative vs. quantitative, internal vs. external, financial vs. nonfinancial? Why do you use this specific categorisation? Please provide documentation of the various classifications?	To extract themes or perspectives that can be used to analyse the metrics in use. Understand why this is done.	*How can specific ITSM performance metrics be derived? (RQ3)*
B.7 Who is involved in collecting metrics and at what levels of the organisations are they positioned? Please provide me with an organisation chart.	To understand **who** is involved and commitment of the organisation to measurement.	
B.8 Do you review the effectiveness of the ITSM performance metrics collected?	To have an in depth understanding of how the effectiveness of measurement is determined.	*What types of benefits are reported from IT service management (ITSM) improvement initiatives by organisations?(RQ1)*
B. 9 Do you think that some of the metrics are more effective than others? Why?		
B.10 How do you ensure the ITSM performance metrics are accurate (validity and reliability)?	To gain from the understanding acquired from retrospect.	*How can specific ITSM performance metrics be derived? (RQ3)*
C.1 How do you use the information collected from the measurement of the performance of your ITSM (for monitoring, planning, improvements, decision-making)?	To understand what performance measurement of ITSM is used for.	*What types of benefits are reported from IT service management (ITSM) improvement initiatives by organisations?(RQ1)*
C.2 How is reporting of the measurement of the performance of your ITSM done (verbally, dashboards, emails, webpage)?	To understand how the reporting is done	*How can specific ITSM performance metrics be derived? (RQ3)*
C.3 To what levels (top, middle and	Understand who uses	*How can specific ITSM performance*

Interview Question	Aim	Research Question
operational) is the measurement of the performance of your ITSM reported?	the reports from the measurement of ITSM	*metrics be derived? (RQ3)*
C.4 What is the rationale for having the measurement of the performance of your ITSM reported at these levels?	Understand why reporting is done.	*How can specific ITSM performance metrics be derived? (RQ3)*
C.5 What is the frequency of reporting of the measurement of the performance of your ITSM? For example daily, weekly, monthly, quarterly, ad hoc and the reason for the time frame. Why this frequency?	To understand **how** the reporting is done.	
C.6 What are the outcomes (decisions, actions, behaviour change) from the reporting of the measurement of the performance of your ITSM?	To understand **why** the reporting is done.	*What types of benefits are reported from IT service management (ITSM) improvement initiatives by organisations?(RQ1)*
C.7 How do you determine what reports, from measurement of the performance of your ITSM, are relevant to the report users (management / the business)?	To understand **how** the reports are selected.	*How can specific ITSM performance metrics be derived? (RQ3)*
C.8 Please provide sample reports (dashboards, spreadsheets, emails, web pages) of measurement of the performance of your ITSM.	To have evidence that can be used for content analysis.	*What types of benefits are reported from IT service management (ITSM) improvement initiatives by organisations?(RQ1)*
C.9 You may provide any other information and documentation you would like to add.	To get information that I may not have thought about and may prove useful.	

Appendix C – Survey Results Detailed Tables, Lists and Case Study Data Collection Instruments

Table C.1 Respondent's itSMFA membership category

Member Category	Frequency	Percent	Cumulative Percent
Corporate	156	73.9%	73.9%
Individual	48	22.7%	96.7%
Vendor	7	3.3%	100.0%
Total	**211**	**100.0%**	

Table C.2 Respondent's position in the organisation

Respondent's Position in Organisation	Frequency	Percent	Cumulative Percent
Service Manager	44	20.9%	20.9%
IT Manager	39	18.5%	39.3%
Consultant	29	13.7%	53.1%
ITIL Process Manager	14	6.6%	59.7%
Other	14	6.6%	66.4%
Technical Expert	13	6.2%	72.5%
Project Manager	10	4.7%	77.3%
Business Manager	10	4.7%	82.0%
Change Manager	8	3.8%	85.8%
Director	8	3.8%	89.6%
Business Analyst	7	3.3%	92.9%
Help Desk Supervisor	6	2.8%	95.7%
Operations Manager	6	2.8%	98.6%
Trainer	3	1.4%	100.0%
Total	**211**	**100.0%**	

Table C.3 Respondent's ITSM role

ITSM Role	Frequency	Percent	Cumulative Percent
Change Manager v2	48	8.7%	8.7%
Service Level Manager v2	38	6.9%	15.6%
Incident Manager v2	33	6.0%	21.6%
Configuration Managerv2	27	4.9%	26.5%
Problem Manager v2	26	4.7%	31.2%
Service Catalogue Manager v3	19	3.4%	34.7%
Release Manager v2	18	3.3%	37.9%
2nd Level Support v2	18	3.3%	41.2%
Service Level Manager v3	18	3.3%	44.5%
3rd Level Support v2	17	3.1%	47.5%
Change Manager v3	17	3.1%	50.6%
Consultant v2	15	2.7%	53.4%
IT Service Continuity Manager v2	14	2.5%	55.9%
Service Owner v3	13	2.4%	58.3%
Overall ITSM Manager	12	2.2%	60.4%
1st Level Support v2	11	2.0%	62.4%
Knowledge Manager v3	11	2.0%	64.4%
Project Manager	10	1.8%	66.2%
Financial Manager v2	9	1.6%	67.9%
IT Service Continuity Manager v3	9	1.6%	69.5%
Configuration Manager v3	9	1.6%	71.1%
Technical Analyst/ Architect v3	8	1.5%	72.6%
Compliance Manager v3	8	1.5%	74.0%
Availability Manager v2	7	1.3%	75.3%
Project / Program Manager v3	7	1.3%	76.6%
Service Portfolio Manager v3	7	1.3%	77.9%
Service Design Manager v3	7	1.3%	79.1%
IT Security Manager v3	7	1.3%	80.4%
Release Manager v3	7	1.3%	81.7%
Business/ Other Sponsor	7	1.3%	82.9%
Capacity Manager v2	6	1.1%	84.0%
Risk Manager v3	6	1.1%	85.1%
IT Architect v3	6	1.1%	86.2%
Change Owner v3	6	1.1%	87.3%
Designer/Architect/Analyst	6	1.1%	88.4%
2nd Level Support v3	5	0.9%	89.3%
No Involvement Unknown	5	0.9%	90.2%
1st Level Support v3	4	0.7%	90.9%
3rd Level Support	4	0.7%	91.7%
Business Process Developer	4	0.7%	92.4%
Continual Improvement/Quality/Reporting	4	0.7%	93.1%
Financial Manager v3	3	0.5%	93.6%
Capacity Manager v3	3	0.5%	94.2%
Service Desk Manager v2	2	0.4%	94.6%
Supplier Manager v3	2	0.4%	94.9%
Application Developer v3	2	0.4%	95.3%
Problem Analyst	2	0.4%	95.6%
Service Design and Improvement v2	1	0.2%	95.8%
Supply Chain Manager v2	1	0.2%	96.0%
Applications Analyst/ Architect v3	1	0.2%	96.2%
Availability Manager v3	1	0.2%	96.4%
Test Manager v3	1	0.2%	96.6%
IT Technical Role	1	0.2%	96.7%

ITSM Role	Frequency	Percent	Cumulative Percent
Incident Resolver	1	0.2%	96.9%
Incident Coordinator	1	0.2%	97.1%
Problem Manager	1	0.2%	97.3%
Customer Service Manager	1	0.2%	97.5%
Administrator	1	0.2%	97.6%
Technology Area Manager	1	0.2%	97.8%
Monitoring Manager	1	0.2%	98.0%
Scheduling Manager	1	0.2%	98.2%
Portfolio Manager	1	0.2%	98.4%
Service Level Manager	1	0.2%	98.5%
IT Executive Officer	1	0.2%	98.7%
IT Manager	1	0.2%	98.9%
Risk and Compliance Manager	1	0.2%	99.1%
Customer management Process Owner	1	0.2%	99.3%
IT strategy development Process Owner	1	0.2%	99.5%
Change management Process Owner	1	0.2%	99.6%
Release to production Process Owner	1	0.2%	99.8%
Other	1	0.2%	100.0%
Total	551	100.0%	

Table C.4 State/Territory distribution

State/Territory		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	VIC	50	23.7%	24.2%	24.2%
	NSW	46	21.8%	22.2%	46.4%
	QLD	32	15.2%	15.5%	61.8%
	WA	32	15.2%	15.5%	77.3%
	ACT	17	8.1%	8.2%	85.5%
	SA	17	8.1%	8.2%	93.7%
	TAS	9	4.3%	4.3%	98.1%
	NT	4	1.9%	1.9%	100.0%
	Total	207	98.1%	100.0%	
Missing	**System**	**4**	**1.9%**		
Total		**211**	**100.0%**		

Table C.5 Industry sector

Industry Sector	Frequency	Percent	Cumulative Percent
Property and business services (includes IT firms)	56	26.5%	26.5%
Government administration and defence	55	26.1%	52.6%
Education	32	15.2%	67.8%
Finance and insurance	22	10.4%	78.2%
Manufacturing	9	4.3%	82.5%
Communication services	7	3.3%	85.8%
Electricity, gas and water	7	3.3%	89.1%
Health and community services	7	3.3%	92.4%
Personal and other services	5	2.4%	94.8%
Other	5	2.4%	97.2%
Transport and storage	4	1.9%	99.1%
Mining	1	0.5%	99.5%
Retail trade	1	0.5%	100.0%
Total	**211**	**100.0**	

Table C.6 Ownership of organisation

Ownership		**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Government Organisation	87	41.2%	41.6%	41.6%
	Wholly Australian owned Public Listed Company	37	17.5%	17.7%	59.3%
	Wholly Australian owned Private Company	33	15.6%	15.8%	75.1%
	Wholly funded by foreign capital	17	8.1%	8.1%	83.3%
	Partially Australian and foreign owned	11	5.2%	5.3%	88.5%
	Don't Know	10	4.7%	4.8%	93.3%
	Partly Australian owned Public Listed Company	8	3.8%	3.8%	97.1%
	Partly Australian owned Private Company	6	2.8%	2.9%	100.0%
	Total	209	99.1%	100.0%	
Missing	**System**	**2**	**0.9%**		
Total		**211**	**100.0**		

Table C.7 Annual turnover

Annual Turnover	**Frequency**	**Percent**	**Cumulative Percent**
More than $150 million	82	38.9%	38.9%
Don't know	66	31.3%	70.1%
$50 million to $150 million	28	13.3%	83.4%
$10 million to $49 million	18	8.5%	91.9%
$5 million to $9 million	9	4.3%	96.2%
Less than $5 million	8	3.8%	100.0%
Total	**211**	**100.0%**	

Table C.8 Total number of staff

Staff Total	**Frequency**	**Percent**	**Cumulative Percent**
200 to 999 full time staff	57	27.0%	27.0%
More than 10000 full time staff	41	19.4%	46.4%
2000 to 4999 full time staff	39	18.5%	64.9%
5000 to 9999 full time staff	30	14.2%	79.1%
1000 to 1999 full time staff	28	13.3%	92.4%
Less than 200 full time staff or equivalent	16	7.6%	100.0%
Total	**211**	**100.0%**	

Table C.9 Distribution of ITSM framework adoption

ITSM framework implemented	Frequency	Percent	Cumulative Percent
ITIL® v2 (IT Infrastructure Library)	114	54.0%	54.0%
ITIL® v3	90	42.7%	96.7%
HP ITSM (IT Service Management Reference Model)	4	1.9%	98.6%
Other (please specify)	2	0.9%	99.5%
MOF (Microsoft Operations Framework)	1	0.5%	100.0%
Total	**211**	**100.0**	

Table C.10 Distribution of duration of ITSM framework use

Duration	Frequency	Percent	Cumulative Percent
1 year	55	26.1%	26.1%
2 years	55	26.1%	52.1%
3 years	23	10.9%	63.0%
Not Indicated	22	10.4%	73.5%
5 years	15	7.1%	80.6%
4 years	12	5.7%	86.3%
6 years	10	4.7%	91.0%
10 years	7	3.3%	94.3%
Less than 1 year	6	2.8%	97.2%
8 years	3	1.4%	98.6%
7 years	2	0.9%	99.5%
9 years	1	0.5%	100.0%
Total	**211**	**100.0%**	

Table C.11 Mapping of implemented ITSM framework process

ITIL v2 (645 responses)	ITIL v3 (706 responses)	HP ITSM (44 responses)	MOF (16 processes)	Other (4 responses)	Group Number
IT financial management v2	Financial management v3	Cost management HPITSM	Financial management MOF		0
	Demand management v3	Customer management HP	Customer service MOF		1
	Service portfolio management v3				2
	Service catalogue management v3		Business and IT alignment MOF		3
Capacity management v2	Capacity managementv3	Capacity management HPITSM			4
Availability management v2	Availability management v3	Availability management HPITSM			5
Service level management v2	Service level management v3	Service level management HPITSM	Reliability MOF		6
	Information security management v3	Security management HPITSM			7
	Supplier management v3				8
IT Service Continuity Management v2	IT service continuity management v3			Risk Management Other ITSM	9

ITIL v2 (645 responses)	**ITIL v3 (706 responses)**	**HP ITSM (44 responses)**	**MOF (16 processes)**	**Other (4 responses)**	**Group Number**
	Transition planning and support v3	Service planning HPITSM	Project planning MOF		10
Change management v2	Change management v3	Change management HPITSM	Change and configuration MOF		11
Configuration management v2	Service Asset & Configuration Management v3	Configuration management HPITSM			12
	(Service) Validation & Testing Management v3	Build and test HPITSM	Build MOF		13
Release management v2	Release & deployment management v3	Release to production HPITSM	Deploy MOF	Release management other ITSM	14
	Service evaluation management v3	Business assessment HP HPITSM	Service monitoring and control MOF		15
	Service knowledge management v3				16
	Event management v3				17
	Request fulfilment v3				18
Incident management v2	Incident management v3	Incident management HPITSM			19
Problem management v2	Problem management v3	Problem management HPITSM	Problem management MOF	Problem management other ITSM	20
	Access management v3				21
Document management v2					22
Governance v2			Governance, risk and compliance MOF		23
		Operations management HPITSM	Operations MOF		24
Service Desk Function			Stabilise MOF		25
		IT strategy development HP	Policy MOF		26
			Envision MOF		27
			Team MOF		28
	Consulting / Implementing for Clients v3			Consulting / Implementing for clients other ITSM	29
Partially implemented/Starting/Variety/Unsure v2	Partially implemented/Starting/ Variety/Unsure v3				30

Table C.12 Distribution of all implemented ITSM framework processes

ITSM Process	Frequency	Percent	Cumulative Percent
Change management v2	105	7.4%	7.4%
Incident management v2	103	7.3%	14.7%
Service desk function	95	6.7%	21.4%
Change management v3	80	5.7%	27.1%
Incident management v3	80	5.7%	32.7%
Problem management v2	77	5.4%	38.2%
Service level management v2	62	4.4%	42.5%
Problem management v3	61	4.3%	46.9%
Configuration management v2	55	3.9%	50.7%
Service level management v3	53	3.7%	54.5%
Release management v2	46	3.3%	57.7%
Service catalogue management v3	41	2.9%	60.6%
Service asset & configuration management v3	40	2.8%	63.5%
Request fulfilment v3	34	2.4%	65.9%
IT service continuity management v2	29	2.0%	67.9%
Capacity managementv3	29	2.0%	70.0%
Event management v3	29	2.0%	72.0%
Access management v3	29	2.0%	74.1%
IT service continuity management v3	28	2.0%	76.0%
Availability management v3	27	1.9%	78.0%
Release & deployment management v3	27	1.9%	79.9%
Capacity management v2	24	1.7%	81.6%
Availability management v2	23	1.6%	83.2%
Information security management v3	23	1.6%	84.8%
Service knowledge management v3	23	1.6%	86.4%
Service portfolio management v3	22	1.6%	88.0%
IT financial management v2	20	1.4%	89.4%
Transition planning and support v3	18	1.3%	90.7%
Supplier management v3	16	1.1%	91.8%
Financial management v3	12	0.8%	92.7%
Demand management v3	11	0.8%	93.4%
Service evaluation management v3	11	0.8%	94.2%
Service validation & testing management v3	9	0.6%	94.8%
Partially implemented/Starting/Variety/Unsure v3	5	0.4%	95.2%
Incident management HPITSM	4	0.3%	95.5%
Problem management HPITSM	4	0.3%	95.8%
Change management HPITSM	4	0.3%	96.0%
Service level management HPITSM	4	0.3%	96.3%
Configuration management HPITSM	3	0.2%	96.5%
Security management HPITSM	3	0.2%	96.7%
Release to production HPITSM	3	0.2%	97.0%
Partially implemented/Starting/Variety/Unsure v2	3	0.2%	97.2%
Consulting / Implementing for clients	2	0.1%	97.3%
Customer management HP	2	0.1%	97.5%
IT strategy development HP	2	0.1%	97.6%
Operations management HPITSM	2	0.1%	97.7%
Service planning HPITSM	2	0.1%	97.9%
Availability management HPITSM	2	0.1%	98.0%
Capacity management HPITSM	2	0.1%	98.2%
Cost management HPITSM	2	0.1%	98.3%
Build and test HPITSM	2	0.1%	98.4%
Document management v2	1	0.1%	98.5%
Governance v2	1	0.1%	98.6%
Business and IT alignment MOF	1	0.1%	98.7%
Reliability MOF	1	0.1%	98.7%
Policy MOF	1	0.1%	98.8%
Financial management MOF	1	0.1%	98.9%
Envision MOF	1	0.1%	98.9%
Project planning MOF	1	0.1%	99.0%
Build MOF	1	0.1%	99.1%
Stabilize MOF	1	0.1%	99.2%
Deploy MOF	1	0.1%	99.2%
Governance, risk and compliance MOF	1	0.1%	99.3%
Change and configuration MOF	1	0.1%	99.4%

Team MOF	1	0.1%	99.4%
Operations MOF	1	0.1%	99.5%
Service monitoring and control MOF	1	0.1%	99.6%
Customer service MOF	1	0.1%	99.6%
Problem management MOF	1	0.1%	99.7%
Business assessment HP	1	0.1%	99.8%
Release management Other ITSM	1	0.1%	99.9%
Risk management Other ITSM v3	1	0.1%	99.9%
Consulting / Implementing for clients other ITSM	1	0.1%	100.0%
Total	**1415**	**100.0%**	

Table C.13 Sequence of ITSM process implementation

ITSM Process / Order	**Sequence of Implementation**		
	1st	**2nd**	**3rd**
Incident management v2	50	40	5
Change management	5	35	46
Incident management v3	49	17	4
Service desk function	51	6	5
Change management v3	17	31	14
Problem management v3	1	15	23
Problem management	0	15	23
Service level management	6	5	15
Configuration management	3	5	7
Request fulfilment v3	0	5	7
Service asset & configuration management v3	1	3	6
Service catalogue management	1	2	3
Partially implemented/Starting/Variety/Unsure v3	2	2	1
Release management	0	0	5
Problem management	1	1	2
Incident management	2	1	0
(Information) security management	1	1	1
Change management	1	1	1
Consulting / Implementing for Clients	1	1	1
Release & deployment management v3	0	0	3
(Service) knowledge management v3	1	0	1
Incident management, Problem management	0	0	2
It financial management	0	0	2
Service portfolio management	0	1	1
Change and configuration MOF	1	0	0
Governance v3	1	0	0
Incident, problem, change, configuration, service desk function	1	0	0
Operations management	1	0	0
Availability management	0	0	1
Capacity management	0	0	1
Document management v3	0	1	0
Envision MOF	0	1	0
Event management v3	0	1	0
Incident management, request fulfilment	0	1	0
IT financial, IT service continuity management	0	0	1
IT service continuity management	0	0	1
Release to production	0	1	0
Release, service level , capacity, availability, supplier management	0	1	0

Table C.14 Related ITSM framework distribution

Related ITSM Framework Distribution	Frequency	Percent	Cumulative Percent
PRINCE2®	97	27.5%	27.5%
ISO 9000	61	17.3%	44.8%
ISO/IEC 20000	61	17.3%	62.0%
Six Sigma	40	11.3%	73.4%
PMBOK	37	10.5%	83.9%
CobiT®	35	9.9%	93.8%
Not Sure	4	1.1%	94.9%
ISO27001	3	0.8%	95.8%
CMMI	2	0.6%	96.3%
None	2	0.6%	96.9%
Agile	1	0.3%	97.2%
APQC	1	0.3%	97.5%
ISO15504, CMMI	1	0.3%	97.7%
KCS	1	0.3%	98.0%
LEAN	1	0.3%	98.3%
LEAN, PMI	1	0.3%	98.6%
MSP	1	0.3%	98.9%
OHS	1	0.3%	99.2%
P&F Investment Management Standard	1	0.3%	99.4%
PMP, CMMI	1	0.3%	99.7%
SOX	1	0.3%	100.0%
Total	**353**	**100.0%**	

Table C.15 Number of ITSM processes implemented by number of ITSM benefit responses cross tabulation

	Number of ITSM Benefit Responses									
Number of ITSM Processes Implemented	**Count**	0	1	2	3	4	5	6	7 to 21	**Total**
	1	12	1	0	0	0	0	0	0	13
	2	4	0	3	1	0	0	0	2	10
	3	12	1	1	9	2	0	0	0	25
	4	5	2	2	4	13	0	0	2	28
	5	14	1	2	1	6	6	0	0	30
	6	9	1	1	4	3	3	2	0	23
	7	3	1	1	2	2	1	1	1	12
	8 to 22	42	6	0	0	1	1	0	20	70
	Total	101	13	10	21	27	11	3	25	211

Table C.16 Spearman's correlation between ITSM processes and benefits

			Number of implemented ITSM processes	**Number of ITSM process benefit responses**
Spearman's rho	**Number of implemented ITSM processes**	Correlation Coefficient	1	0.039
		Sig. (2-tailed)	.	0.575
		N	211	211
	Number of ITSM process benefit responses	Correlation Coefficient	0.039	1
		Sig. (2-tailed)	0.575	.
		N	211	211

Table C.17 Distribution of categorised ITSM process benefit responses

ITSM process benefit / ITIL Process	Process improvement	Service improvement	Customer service	Customer satisfaction	System improvement	System availability	Cost management	Control	Resource management	Risk management	Value to the business	Customer needs identification	Compliance	Knowledge acquisition	Governance	**Total**
Change v2	31	6	2	1	11	8	4	12	1	5	2	0	1	0	0	**25**
Incident v2	44	9	6	6	3	2	3	2	0	0	0	1	0	1	0	**7**
Service Desk	30	3	12	6	1	1	1	3	0	0	0	1	0	0	0	**5**
Problem v2	19	6	1	2	8	2	2	0	1	0	0	0	0	0	0	**3**
Configuration v2	15	5	1	1	1	1	1	1	10	0	0	1	1	0	0	**14**
Incident v3	20	5	7	2	0	1	0	1	2	0	0	0	0	0	0	**3**
Change v3	9	0	2	2	5	4	0	3	1	6	2	0	2	0	0	**14**
Service level v2	9	4	3	9	0	0	2	1	2	0	0	4	0	0	0	**9**
Release v2	14	5	1	1	2	1	0	4	0	0	0	0	1	0	0	**5**
Problem v3	7	4	6	1	4	1	0	0	1	0	1	0	0	0	0	**2**
SLM v3	1	1	4	7	1	0	1	0	1	0	0	1	1	0	0	**4**
ITSCM v2	8	2	0	1	0	2	1	0	0	2	0	0	0	0	0	**3**
Capacity v2	7	1	0	1	1	1	1	0	2	0	0	1	0	0	0	**4**
SCM v3	4	5	1	1	0	0	1	0	1	0	0	1	0	0	0	**3**
Availability v2	2	1	0	2	1	3	0	0	0	0	0	3	0	0	0	**3**
Financial v2	0	1	0	1	0	0	5	0	1	0	1	0	0	0	0	**7**
Request fulfilment v3	0	6	2	1	0	0	0	0	0	0	0	0	0	0	0	**0**
Capacity v3	0	1	0	1	0	2	1	0	0	2	1	0	0	0	0	**4**
Access v3	1	1	1	0	0	0	0	1	0	2	0	0	1	0	0	**4**
Deployment v3	3	0	0	0	1	0	1	1	0	0	0	0	0	0	1	**3**
Financial v3	1	1	0	0	0	0	3	1	1	0	0	0	0	0	0	**5**
Knowledge v3	3	0	0	1	0	0	0	0	0	0	1	0	1	1	0	**3**
ITSCM v3	2	0	0	0	0	1	0	0	1	1	1	0	0	0	0	**3**
SACM v3	1	0	0	0	0	0	0	0	2	0	2	0	0	1	0	**5**
SPM v3	4	1	0	0	0	0	1	0	0	0	0	0	0	0	0	**1**
Demand v3	0	0	1	1	0	0	1	0	0	0	2	0	0	0	0	**3**
Change HPITSM	0	1	0	1	1	0	0	0	1	0	0	0	0	0	0	**1**
Incident HPITSM	2	1	0	0	0	0	0	0	1	0	0	0	0	0	0	**1**
Security v3	0	0	0	0	1	1	0	0	0	1	0	0	1	0	0	**2**
Supplier v3	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	**3**

ITSM process benefit / ITIL Process	Process improvement	Service improvement	Customer service	Customer satisfaction	System improvement	System availability	Cost management	Control	Resource management	Risk management	Value to the business	Customer needs identification	Compliance	Knowledge acquisition	Governance	**Total**
Event v3	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Service level HPITSM	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	**1**
Problem HPITSM	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	**0**
Release HPITSM	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	**0**
Validation v3	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	**1**
Configuration HPITSM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	**1**
Evaluation v3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	**1**
Operations HPITSM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Transition v3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Total	**240**	**73**	**53**	**50**	**42**	**33**	**32**	**30**	**30**	**19**	**16**	**13**	**9**	**3**	**1**	**644**

Table C.18 Categorised list of all ITSM process benefit responses

ITSM Process	ITSM Process Benefit	ITSM process benefit sub-category	Industry Sector
Access v3	ISMS compliance	Compliance	Property and business services (includes IT firms)
Access v3	Much better controls over access	Control	Government administration and defence
Access v3	Increase customer service levels meeting KPI's and satisfaction	Customer service	Government administration and defence
Access v3	Efficiencies between the support groups	Process improvement	Government administration and defence
Access v3	Reduce risk to customer business (reputation) by effectively and efficiently granting access to business information in accordance with Customer security requirements	Risk management	Property and business services (includes IT firms)
Access v3	Reduced risk	Risk management	Property and business services (includes IT firms)
Access v3	Reduced turnaround times	Service Improvement	Property and business services (includes IT firms)
Availability v2	Early consideration of needs	Customer needs identification	Communication services
Availability v2	Mapped to service requirements	Customer needs identification	Property and business services (includes IT firms)
Availability v2	Understanding of service requirements	Customer needs identification	Property and business services (includes IT firms)
Availability v2	Improved user/customer satisfaction	Customer satisfaction	Property and business services (includes IT firms)
Availability v2	Increased customer satisfaction	Customer satisfaction	Property and business services (includes IT firms)
Availability v2	Better planning	Process improvement	Property and business services (includes IT firms)
Availability v2	Implementation of process across designated business areas	Process improvement	Property and business services (includes IT firms)
Availability v2	Reduced rework	Service Improvement	Property and business services (includes IT firms)
Availability v2	Controls and process ensure a fundamental level of uptime	System availability	Property and business services (includes IT firms)
Availability v2	Better hours of availability for customers	System availability	Finance and insurance
Availability v2	Improved availability	System availability	Property and business services (includes IT firms)
Availability v2	Network functionality increased	System improvement	Education
Capacity v3	Containing costs	Cost management	Communication services
Capacity v3	Manage expectation and identify business constrains to deliver expectation	Customer satisfaction	Education
Capacity v3	Decreased risk	Risk management	Education
Capacity v3	Identification of potential bottlenecks	Risk management	Property and business services (includes IT firms)
Capacity v3	Improved performance	Service improvement	Property and business services (includes IT firms)
Capacity v3	Less outages	System	Transport and storage

ITSM Process	**ITSM Process Benefit**	**ITSM process benefit sub-category**	**Industry Sector**
		availability	
Capacity v3	Minimises business disruption (productivity) by ensuring service have right level of capacity to cope with Customer demands	System availability	Property and business services (includes IT firms)
Capacity v3	Increased value and efficiency	Value to the business	Education
Capacity v2	Lowering cost by utilising different forms of storage	Cost management	Government administration and defence
Capacity v2	Early consideration of needs	Customer needs identification	Communication services
Capacity v2	Increased customer satisfaction	Customer satisfaction	Property and business services (includes IT firms)
Capacity v2	Awareness of utilisation and the environment to allow for planning of future expansion and monitoring existence performance	Process improvement	Property and business services (includes IT firms)
Capacity v2	Better planning	Process improvement	Property and business services (includes IT firms)
Capacity v2	Implementation of process across designated business areas	Process improvement	Property and business services (includes IT firms)
Capacity v2	Increase in successful change	Process improvement	Property and business services (includes IT firms)
Capacity v2	Management of technical resources	Process improvement	Property and business services (includes IT firms)
Capacity v2	Problems with capacity are avoided	Process improvement	Finance and insurance
Capacity v2	Reduction of capacity related incidents	Process improvement	Finance and insurance
Capacity v2	Controlled / JIT capacity allocation	Resource management	Property and business services (includes IT firms)
Capacity v2	Informed decision making for ICT investment	Resource management	Property and business services (includes IT firms)
Capacity v2	Reduced rework	Service Improvement	Property and business services (includes IT firms)
Capacity v2	Improved availability	System availability	Property and business services (includes IT firms)
Capacity v2	Network functionality increased	System improvement	Education
Change v3	Diligence	Compliance	Manufacturing
Change v3	Governance	Compliance	Manufacturing
Change v3	Better change management control	Control	Government administration and defence
Change v3	Control	Control	Communication services
Change v3	Control of operational environment	Control	Manufacturing
Change v3	Increased customer satisfaction	Customer satisfaction	Education
Change v3	Increased customer satisfaction with transition and continuity levels	Customer satisfaction	Communication services
Change v3	Increased customer service levels	Customer service	Education
Change v3	Increased customer service levels	Customer service	Government administration and defence
Change v3	Better co-ordination of changes with other parties	Process improvement	Property and business services (includes IT firms)

ITSM Process	ITSM Process Benefit	ITSM process benefit sub-category	Industry Sector
Change v3	Better documentation	Process improvement	Government administration and defence
Change v3	Better visibility and connection between changes and problems	Process improvement	Finance and insurance
Change v3	Clear process management	Process improvement	Property and business services (includes IT firms)
Change v3	Helps in lifecycle management of technology	Process improvement	Education
Change v3	Increased notification	Process improvement	Personal and other services
Change v3	Increased plan and rollout of system changes	Process improvement	Education
Change v3	Systematic change procedure preparation	Process improvement	Government administration and defence
Change v3	Visibility of changes	Process improvement	Education
Change v3	Greater certainty about what is in production	Resource management	Property and business services (includes IT firms)
Change v3	Decreased risk	Risk management	Education
Change v3	Lowering of risks has occurred	Risk management	Government administration and defence
Change v3	Predicted outages	Risk management	Government administration and defence
Change v3	Reduced risk to live systems	Risk management	Manufacturing
Change v3	Reduction in feral changes	Risk management	Education
Change v3	Wider awareness of risk too	Risk management	Government administration and defence
Change v3	Reduced downtime	System availability	Property and business services (includes IT firms)
Change v3	Reduced outage through stakeholder input	System availability	Personal and other services
Change v3	Reduced unmanaged change and therefore unplanned outages	System availability	Education
Change v3	Reduction in outages	System availability	Property and business services (includes IT firms)
Change v3	Increased stability in production environments	System improvement	Property and business services (includes IT firms)
Change v3	Less business interruption & better visibility - less outages	System improvement	Transport and storage
Change v3	Less unexpected outages from change	System improvement	Education
Change v3	Reduced service incidents arising from implementing Change	System improvement	Other
Change v3	Stable environment	System improvement	Government administration and defence
Change v3	Maximise the value from information held about assets and their use	Value to the business	Property and business services (includes IT firms)
Change v3	Maximise value from asset investment by tracking and monitoring asset performance	Value to the business	Property and business services (includes IT firms)
Change HPITSM	Improved customer satisfaction	Customer satisfaction	Education
Change HPITSM	Better resource management - prioritisation	Resource	Education

ITSM Process	ITSM Process Benefit	ITSM process benefit sub-category	Industry Sector
		management	
Change HPITSM	Reduced impact	Service Improvement	Education
Change HPITSM	Stabilised environment	System improvement	Property and business services (includes IT firms)
Change v2	Improved Governance over scheduled outages	Compliance	Education
Change v2	Better control	Control	Property and business services (includes IT firms)
Change v2	Better control of the infrastructure	Control	Personal and other services
Change v2	Better controls of changes to infrastructure and software	Control	Finance and insurance
Change v2	Control	Control	Property and business services (includes IT firms)
Change v2	Control & management of change	Control	Other
Change v2	Control of changes	Control	Property and business services (includes IT firms)
Change v2	Control of impact to business	Control	Property and business services (includes IT firms)
Change v2	Control over changes requested	Control	Finance and insurance
Change v2	Controlled changes	Control	Property and business services (includes IT firms)
Change v2	Controlled changes	Control	Government administration and defence
Change v2	Controlled method of managing changes	Control	Property and business services (includes IT firms)
Change v2	Process control (approvals; documentation)	Control	Communication services
Change v2	Better control of cost to organisation on change activity	Cost management	Government administration and defence
Change v2	Budget and SOE	Cost management	Property and business services (includes IT firms)
Change v2	Costs measurement	Cost management	Communication services
Change v2	Reduction in the cost to deliver services	Cost management	Property and business services (includes IT firms)
Change v2	Increased customer satisfaction	Customer satisfaction	Property and business services (includes IT firms)
Change v2	Improved customer service due to reduced risk of issues	Customer service	Government administration and defence
Change v2	Trace-ability and customer service	Customer service	Personal and other services
Change v2	Ability to track changes to infrastructure/network	Process improvement	Manufacturing
Change v2	Better communication	Process improvement	Government administration and defence
Change v2	Better planned upgrades	Process improvement	Property and business services (includes IT firms)
Change v2	Better visibility	Process improvement	Transport and storage
Change v2	Capture workload more effectively	Process improvement	Government administration and defence
Change v2	Change control and coordination of changes	Process improvement	Education
Change v2	Change management	Process improvement	Government administration and defence

ITSM Process	ITSM Process Benefit	ITSM process benefit sub-category	Industry Sector
Change v2	Communication channels implemented as part of the process are a huge improvement - we are much more transparent as an IT organisation	Process improvement	Education
Change v2	Configuration relationships (including correlation of change notifications and approvals)	Process improvement	Communication services
Change v2	Consistent process across organisation	Process improvement	Government administration and defence
Change v2	Decrease in incidents	Process improvement	Property and business services (includes IT firms)
Change v2	Effective controls in ensuring a structured approach for implementing change that has a fall-back plan	Process improvement	Property and business services (includes IT firms)
Change v2	Ensures all changes are managed and tested effectively	Process improvement	Finance and insurance
Change v2	Fewer disruptions to the business	Process improvement	Finance and insurance
Change v2	General awareness of system changes	Process improvement	Government administration and defence
Change v2	Impact assessment of changes has meant more successful changes on the whole	Process improvement	Education
Change v2	Impacts of changes	Process improvement	Education
Change v2	Increased visibility	Process improvement	Property and business services (includes IT firms)
Change v2	Increased visibility and communication of changes	Process improvement	Education
Change v2	Less change induced incidents	Process improvement	Health and community services
Change v2	Less impact	Process improvement	Property and business services (includes IT firms)
Change v2	Lodging and tracking of all changes where none existed before	Process improvement	Health and community services
Change v2	More visibility of changes	Process improvement	Communication services
Change v2	Raise the awareness amongst end-users & IT	Process improvement	Other
Change v2	Reporting on problems resolved by change	Process improvement	Finance and insurance
Change v2	Request for change visibility and single point for managing change	Process improvement	Electricity, gas and water
Change v2	Stakeholder involvement	Process improvement	Government administration and defence
Change v2	Tracking and risk assessment of changes	Process improvement	Government administration and defence
Change v2	Tracking changes through system development lifecycle and ability to audit	Process improvement	Education
Change v2	Visibility of changes and associated workload	Process improvement	Government administration and defence
Change v2	Visible process	Process improvement	Education
Change v2	Better management of project scope	Resource management	Property and business services (includes IT firms)
Change v2	Better planning and risk assessment	Risk management	Education

ITSM Process	ITSM Process Benefit	ITSM process benefit sub-category	Industry Sector
Change v2	Improved risk management and communications.	Risk management	Education
Change v2	Reduced risk to the agency	Risk management	Government administration and defence
Change v2	Risk mitigation	Risk management	Manufacturing
Change v2	Understanding our risk	Risk management	Education
Change v2	Improved delivery of projects	Service Improvement	Property and business services (includes IT firms)
Change v2	Improved resource allocation	Service Improvement	Transport and storage
Change v2	Reduced number of failures after change implementation	Service Improvement	Education
Change v2	Reduced rework	Service Improvement	Property and business services (includes IT firms)
Change v2	Reduction in unexpected incidents	Service Improvement	Communication services
Change v2	Reduction of impacts	Service Improvement	Electricity, gas and water
Change v2	Assurance that business will still run after change has been implemented	System availability	Government administration and defence
Change v2	Higher availability	System availability	Education
Change v2	Higher change success rate - fewer change related system outages	System availability	Property and business services (includes IT firms)
Change v2	Increased availability	System availability	Property and business services (includes IT firms)
Change v2	Less disruptions from change	System availability	Other
Change v2	Less errors	System availability	Property and business services (includes IT firms)
Change v2	Less outages to business	System availability	Government administration and defence
Change v2	Reduced outages	System availability	Finance and insurance
Change v2	Environment less volatile	System improvement	Health and community services
Change v2	More stability	System improvement	Transport and storage
Change v2	Network functionality increased	System improvement	Education
Change v2	Reduced change related incidents	System improvement	Education
Change v2	Reduction in incident due to change	System improvement	Finance and insurance
Change v2	Reduction in incidents due to controlling changes	System improvement	Finance and insurance
Change v2	Reduction in incidents related to change	System improvement	Personal and other services
Change v2	Reduction in incidents resulting from changes. Forward schedule of changes and better resource planning	System improvement	Manufacturing
Change v2	Reduction in incidents through control of changes	System improvement	Education
Change v2	Reduction in issues after implementation	System	Property and business

ITSM Process	ITSM Process Benefit	ITSM process benefit sub-category	Industry Sector
		improvement	services (includes IT firms)
Change v2	Reduction in problems caused by changes	System improvement	Finance and insurance
Change v2	Changes reviewed for business benefit and approved	Value to the business	Retail trade
Change v2	Control of what changes are made - better business value	Value to the business	Government administration and defence
Configuration HPITSM	Control over configuration items	Resource management	Property and business services (includes IT firms)
Configuration v2	Compliance with license requirements	Compliance	Finance and insurance
Configuration v2	Better control	Control	Property and business services (includes IT firms)
Configuration v2	Reduced cost to deliver services	Cost management	Property and business services (includes IT firms)
Configuration v2	Clear understanding of business impact	Customer needs identification	Property and business services (includes IT firms)
Configuration v2	Increased customer satisfaction	Customer satisfaction	Property and business services (includes IT firms)
Configuration v2	SLA relationships	Customer service	Communication services
Configuration v2	Ability to identify rogue assets and track MACs more effectively	Process improvement	Finance and insurance
Configuration v2	Application owner relationships	Process improvement	Communication services
Configuration v2	Beginning to control configuration changes	Process improvement	Health and community services
Configuration v2	Better Incident impact identification	Process improvement	Transport and storage
Configuration v2	Configuration documentation	Process improvement	Communication services
Configuration v2	Consistent process across organisation	Process improvement	Government administration and defence
Configuration v2	Data modelling and system mapping	Process improvement	Education
Configuration v2	Escalation processes	Process improvement	Communication services
Configuration v2	Improved Change notification	Process improvement	Transport and storage
Configuration v2	Improved overall management of IT assets	Process improvement	Finance and insurance
Configuration v2	Organisation	Process improvement	Communication services
Configuration v2	Reducing duplication of effort	Process improvement	Property and business services (includes IT firms)
Configuration v2	Reporting on CI's with issues	Process improvement	Finance and insurance
Configuration v2	Support personnel	Process improvement	Communication services
Configuration v2	Understanding relationships of systems to services	Process improvement	Education
Configuration v2	Greater control of assets and equipment	Resource management	Health and community services
Configuration v2	Asset management	Resource management	Property and business services (includes IT firms)

ITSM Process	**ITSM Process Benefit**	**ITSM process benefit sub-category**	**Industry Sector**
Configuration v2	Asset register	Resource management	Retail trade
Configuration v2	Better understanding of client devices in the environment	Resource management	Property and business services (includes IT firms)
Configuration v2	Better understanding of I.T environment (underpinning other processes)	Resource management	Property and business services (includes IT firms)
Configuration v2	Better view on installed software on hardware items	Resource management	Property and business services (includes IT firms)
Configuration v2	Contract relationships	Resource management	Communication services
Configuration v2	Greater awareness of all CI's	Resource management	Education
Configuration v2	Remote software deployment	Resource management	Manufacturing
Configuration v2	Visibility/Report-ability of our IT assets.	Resource management	Finance and insurance
Configuration v2	Better service desk service and clearly understanding of impacts of incidents and changes.	Service Improvement	Finance and insurance
Configuration v2	Improved service	Service Improvement	Property and business services (includes IT firms)
Configuration v2	Reduced impact from changes	Service Improvement	Electricity, gas and water
Configuration v2	Reduced rework	Service Improvement	Property and business services (includes IT firms)
Configuration v2	Service impact baseline	Service Improvement	Property and business services (includes IT firms)
Configuration v2	Outage windows	System availability	Communication services
Configuration v2	Network functionality increased	System improvement	Education
Demand v3	Containing costs	Cost management	Communication services
Demand v3	Manage customer expectation	Customer satisfaction	Education
Demand v3	Ensuring that best market services are made available to future and existing customers	Customer service	Property and business services (includes IT firms)
Demand v3	Increased value	Value to the business	Education
Demand v3	Maintaining market position	Value to the business	Property and business services (includes IT firms)
Deployment v3	Control of environment	Control	Manufacturing
Deployment v3	Effective and efficient deployment of changes to the infrastructure to minimise cost and disruption	Cost management	Property and business services (includes IT firms)
Deployment v3	Control and governance to when changes occur	Governance	Manufacturing
Deployment v3	Ensure business is trained and aware of how to use the new functionality for maximum benefit	Process improvement	Property and business services (includes IT firms)
Deployment v3	Less clashes of releases with each other and more available staff	Process improvement	Government administration and defence
Deployment v3	More productive UAT/pilot testing - better communication & results	Process improvement	Transport and storage
Deployment v3	Improved software quality	System improvement	Property and business services (includes IT firms)

ITSM Process	ITSM Process Benefit	ITSM process benefit sub-category	Industry Sector
Evaluation v3	Track and ensure benefits from investment are released as expected (and any unintended benefits are also identified and recognised)	Value to the business	Property and business services (includes IT firms)
Event v3	Starting to see incidents	Process improvement	Government administration and defence
Event v3	Increased productivity and effectiveness in identifying possible events and establishing standard repeatable responses to handle them	Service Improvement	Property and business services (includes IT firms)
Event v3	Reduction in user impact incidents	Service Improvement	Property and business services (includes IT firms)
Financial v2	Controlled asset spend	Cost management	Property and business services (includes IT firms)
Financial v2	Clear reporting on costs to deliver services	Cost management	Property and business services (includes IT firms)
Financial v2	Meet budgeted cost & revenue targets	Cost management	Property and business services (includes IT firms)
Financial v2	Visibility of and controls around IT expenditure	Cost management	Property and business services (includes IT firms)
Financial v2	We can now accurately track and report expenditure both OPEX and CAPEX	Cost management	Finance and insurance
Financial v2	Increased customer satisfaction	Customer satisfaction	Property and business services (includes IT firms)
Financial v2	Informed decisions on ICT investment	Resource management	Property and business services (includes IT firms)
Financial v2	Reduced rework	Service Improvement	Property and business services (includes IT firms)
Financial v2	Understanding of asset value per service	Value to the business	Property and business services (includes IT firms)
Financial v3	Control	Control	Communication services
Financial v3	Better visibility and understanding total cost of ownership	Cost management	Transport and storage
Financial v3	Ensuring appropriate spend	Cost management	Property and business services (includes IT firms)
Financial v3	Reduced "revenue leakage"	Cost management	Property and business services (includes IT firms)
Financial v3	Increased transparency and value	Process improvement	Education
Financial v3	Centralised budget allocation	Resource management	Education
Financial v3	Competitively priced services (customers getting best priced product on the market)	Service Improvement	Property and business services (includes IT firms)
Incident v3	More control over how incidents are resolved	Control	Property and business services (includes IT firms)
Incident v3	Increased customer satisfaction	Customer satisfaction	Education
Incident v3	Increased customer satisfaction	Customer satisfaction	Government administration and defence
Incident v3	Better customer service	Customer service	Education
Incident v3	Better customer service	Customer service	Government administration and defence
Incident v3	Increase customer service levels meeting KPI's and satisfaction	Customer service	Government administration and defence
Incident v3	Increased customer service levels	Customer service	Education

ITSM Process	ITSM Process Benefit	ITSM process benefit sub-category	Industry Sector
Incident v3	Increased customer service levels	Customer service	Government administration and defence
Incident v3	Increased customer service levels	Customer service	Government administration and defence
Incident v3	Meet SLA's	Customer service	Communication services
Incident v3	Better communication between resolver groups	Process improvement	Property and business services (includes IT firms)
Incident v3	Clarity of ownership	Process improvement	Education
Incident v3	Clearer processes for handling and prioritising service incidents	Process improvement	Other
Incident v3	Common language	Process improvement	Education
Incident v3	Consistent process for incident management/escalation/communications	Process improvement	Finance and insurance
Incident v3	Establish process to resolve as soon as possible	Process improvement	Manufacturing
Incident v3	Increased tracking of IT support work undertaken	Process improvement	Education
Incident v3	Managing the entire lifecycle of events	Process improvement	Health and community services
Incident v3	More awareness to IT issues generally	Process improvement	Government administration and defence
Incident v3	More job transparency	Process improvement	Government administration and defence
Incident v3	More transparency in the process	Process improvement	Finance and insurance
Incident v3	Process awareness	Process improvement	Manufacturing
Incident v3	Quick turnaround of issues	Process improvement	Manufacturing
Incident v3	Quicker restoration of service	Process improvement	Property and business services (includes IT firms)
Incident v3	Quicker work around	Process improvement	Transport and storage
Incident v3	Respond ASAP	Process improvement	Government administration and defence
Incident v3	Standard process	Process improvement	Education
Incident v3	Structured response to incidents	Process improvement	Personal and other services
Incident v3	Track incidents	Process improvement	Education
Incident v3	Tracking of security incidents for our ISMS	Process improvement	Property and business services (includes IT firms)
Incident v3	Better resource utilisation	Resource management	Government administration and defence
Incident v3	Better time management	Resource management	Education
Incident v3	Improved response & resolution times	Service Improvement	Education
Incident v3	Improved response time	Service Improvement	Property and business services (includes IT firms)
Incident v3	Improved service	Service Improvement	Property and business services (includes IT firms)

ITSM Process	ITSM Process Benefit	ITSM process benefit sub-category	Industry Sector
Incident v3	Improved service restoration	Service Improvement	Property and business services (includes IT firms)
Incident v3	Increased resource use efficiency	Service Improvement	Education
Incident v3	Minimise business disruption by managing failures in service responsive to business impact and urgency	System availability	Property and business services (includes IT firms)
Incident HPITSM	Single point of contact	Process improvement	Education
Incident HPITSM	Trend analysis	Process improvement	Education
Incident HPITSM	Better resource management	Resource management	Education
Incident HPITSM	Reduced restoration time	Service Improvement	Property and business services (includes IT firms)
Incident v2	Better control	Control	Education
Incident v2	Process control	Control	Communication services
Incident v2	Reduced cost to deliver services	Cost management	Property and business services (includes IT firms)
Incident v2	SLA and cost measurement	Cost management	Communication services
Incident v2	Understanding service delivery costs	Cost management	Government administration and defence
Incident v2	Better aligned (faster) response	Customer needs identification	Property and business services (includes IT firms)
Incident v2	Improved customer satisfaction	Customer satisfaction	Finance and insurance
Incident v2	Increased customer satisfaction	Customer satisfaction	Property and business services (includes IT firms)
Incident v2	Increased Customer Satisfaction Levels	Customer satisfaction	Other
Incident v2	Increased end-user satisfaction	Customer satisfaction	Property and business services (includes IT firms)
Incident v2	Increased user satisfaction	Customer satisfaction	Property and business services (includes IT firms)
Incident v2	Understanding the types of issues coming from our customers to focus our investment & education	Customer satisfaction	Manufacturing
Incident v2	Better servicing of customers and faster resolution of incidents	Customer service	Finance and insurance
Incident v2	Customers able to seek assistance	Customer service	Health and community services
Incident v2	Increased customer service	Customer service	Government administration and defence
Incident v2	Increased customer service levels	Customer service	Property and business services (includes IT firms)
Incident v2	Increased customer service levels	Customer service	Education
Incident v2	Meets all SLAs	Customer service	Education
Incident v2	Greater knowledge sharing	Knowledge acquisition	Health and community services
Incident v2	Ability to do trend analysis	Process improvement	Education

ITSM Process	ITSM Process Benefit	ITSM process benefit sub-category	Industry Sector
Incident v2	Ability to provide meaningful reports to the e business and supports problem management	Process improvement	Finance and insurance
Incident v2	Accurate reflecting of IT incidents in the client environment	Process improvement	Property and business services (includes IT firms)
Incident v2	Better business communication	Process improvement	Personal and other services
Incident v2	Capture workload more effectively	Process improvement	Government administration and defence
Incident v2	Certainty of outcome from incident	Process improvement	Education
Incident v2	Common error analysis	Process improvement	Communication services
Incident v2	Common processes	Process improvement	Manufacturing
Incident v2	Consistency with call logging	Process improvement	Other
Incident v2	Consistent process across organisation	Process improvement	Government administration and defence
Incident v2	Efficiency	Process improvement	Property and business services (includes IT firms)
Incident v2	Efficient way to monitor issues	Process improvement	Government administration and defence
Incident v2	Faster incident resolution	Process improvement	Health and community services
Incident v2	Focus on removing initial impact rather than problem analysis as this first stage	Process improvement	Education
Incident v2	Improved communication with clients	Process improvement	Finance and insurance
Incident v2	Improved resolution times	Process improvement	Education
Incident v2	Improved tracking and accountability to resolution	Process improvement	Education
Incident v2	Improved turnaround time for issues	Process improvement	Property and business services (includes IT firms)
Incident v2	Incident Resolution Documentation	Process improvement	Communication services
Incident v2	Incident visibility and tracking	Process improvement	Electricity, gas and water
Incident v2	Increased incident resolution	Process improvement	Government administration and defence
Incident v2	Increased track-ability of incidents	Process improvement	Personal and other services
Incident v2	Informing management	Process improvement	Property and business services (includes IT firms)
Incident v2	Issue tracking	Process improvement	Property and business services (includes IT firms)
Incident v2	Management and recording of infrastructure and application issues	Process improvement	Government administration and defence
Incident v2	Management information	Process improvement	Transport and storage
Incident v2	Monitoring and metrics	Process improvement	Education
Incident v2	No lost incident	Process improvement	Retail trade

ITSM Process	**ITSM Process Benefit**	**ITSM process benefit sub-category**	**Industry Sector**
Incident v2	Post incident reviews to improve performance	Process improvement	Government administration and defence
Incident v2	Promoted expanded help desk role	Process improvement	Government administration and defence
Incident v2	Quicker resolution times	Process improvement	Education
Incident v2	Quicker service restoration	Process improvement	Education
Incident v2	Rapid incident resolution	Process improvement	Finance and insurance
Incident v2	Reactive workload prioritisation	Process improvement	Transport and storage
Incident v2	Reduced mean time to restore/respond	Process improvement	Finance and insurance
Incident v2	Reduction in mean time to resolve after hours	Process improvement	Electricity, gas and water
Incident v2	Relationship with Configuration	Process improvement	Communication services
Incident v2	Repeatable incident response and escalation	Process improvement	Property and business services (includes IT firms)
Incident v2	Reporting on incidents	Process improvement	Government administration and defence
Incident v2	Standardisation of process	Process improvement	Manufacturing
Incident v2	Tracking of incidents properly	Process improvement	Government administration and defence
Incident v2	Tracking reactive workload by department	Process improvement	Transport and storage
Incident v2	Trending	Process improvement	Health and community services
Incident v2	Visibility of issues	Process improvement	Government administration and defence
Incident v2	Better response	Service improvement	Communication services
Incident v2	Better service restoration time	Service improvement	Education
Incident v2	Defined service targets and improved response times	Service Improvement	Health and community services
Incident v2	Fast restoration of services	Service Improvement	Property and business services (includes IT firms)
Incident v2	Improved call handling and assignment	Service Improvement	Property and business services (includes IT firms)
Incident v2	Improved service availability	Service Improvement	Property and business services (includes IT firms)
Incident v2	Reduced rework	Service Improvement	Property and business services (includes IT firms)
Incident v2	Reduced time to restore	Service Improvement	Transport and storage
Incident v2	Reduced timeframe for service restoration	Service Improvement	Personal and other services
Incident v2	Less down time	System availability	Finance and insurance
Incident v2	Managing outages	System availability	Property and business services (includes IT firms)
Incident v2	Network functionality increased	System improvement	Education

ITSM Process	ITSM Process Benefit	ITSM process benefit sub-category	Industry Sector
Incident v2	Reduction in incident time and greater visibility and management of major incidents	System improvement	Manufacturing
Incident v2	Reduction in incidents	System improvement	Finance and insurance
ITSCM v3	Ability to operate through incidents	Process improvement	Property and business services (includes IT firms)
ITSCM v3	Clarity of process and expectations	Process improvement	Property and business services (includes IT firms)
ITSCM v3	Increased awareness of systems involved in running a service	Resource management	Education
ITSCM v3	Reduced risk	Risk management	Property and business services (includes IT firms)
ITSCM v3	Minimise business disruption (productivity & reputation) during disaster events by supporting customer ability to continue business activities during such	System availability	Property and business services (includes IT firms)
ITSCM v3	Value add / business continuity	Value to the business	Communication services
ITSCM v2	Minimise business cost due to ICT failures	Cost management	Property and business services (includes IT firms)
ITSCM v2	Increased customer satisfaction	Customer satisfaction	Property and business services (includes IT firms)
ITSCM v2	Clear processes and control points provide a basis for service continuity to be managed from at all	Process improvement	Government administration and defence
ITSCM v2	Ensuring there is a documented and established plan to ensure that Service can function with back up solutions	Process improvement	Property and business services (includes IT firms)
ITSCM v2	Fast recovery in the event of a disaster	Process improvement	Finance and insurance
ITSCM v2	Implementation of process across designated business areas	Process improvement	Property and business services (includes IT firms)
ITSCM v2	Increased confidence in ability to restore services following a disaster	Process improvement	Finance and insurance
ITSCM v2	Strong disaster recovery for services requiring it	Process improvement	Property and business services (includes IT firms)
ITSCM v2	Support and trust from management/executives	Process improvement	Finance and insurance
ITSCM v2	Support business continuity planning	Process improvement	Communication services
ITSCM v2	Proven disaster recovery process for key corporate applications	Risk management	Education
ITSCM v2	Risk management	Risk management	Property and business services (includes IT firms)
ITSCM v2	Better response mechanisms following outages/disasters	Service improvement	Property and business services (includes IT firms)
ITSCM v2	Reduced rework	Service Improvement	Property and business services (includes IT firms)
ITSCM v2	Ensure that the key business systems can be restored in a timely fashion reducing risk and increases customer confidence in our organisation	System availability	Finance and insurance
ITSCM v2	Improved availability	System availability	Property and business services (includes IT firms)
Knowledge v3	Maintain structure and governance for	Compliance	Finance and insurance

ITSM Process	ITSM Process Benefit	ITSM process benefit sub-category	Industry Sector
	outsourced help desk		
Knowledge v3	Increase Customer Satisfaction	Customer satisfaction	Property and business services (includes IT firms)
Knowledge v3	Sharing and use of available information about services	Knowledge acquisition	Property and business services (includes IT firms)
Knowledge v3	Decreased time to resolution	Process improvement	Property and business services (includes IT firms)
Knowledge v3	Improved support efficiency as known errors are captured	Process improvement	Property and business services (includes IT firms)
Knowledge v3	Provide gap analysis for problem management	Process improvement	Property and business services (includes IT firms)
Knowledge v3	Maximise value from collection	Value to the business	Property and business services (includes IT firms)
Operations HPITSM	Increased efficiency of operations and event management	Process improvement	Property and business services (includes IT firms)
Problem v3	Increased customer satisfaction	Customer satisfaction	Education
Problem v3	Better customer service	Customer service	Government administration and defence
Problem v3	Increase customer service levels meeting KPI's and satisfaction	Customer service	Government administration and defence
Problem v3	Increased customer service levels	Customer service	Education
Problem v3	Increased customer service levels	Customer service	Government administration and defence
Problem v3	Increased customer service levels	Customer service	Education
Problem v3	Meet SLA's and Customer Sat	Customer service	Communication services
Problem v3	Acknowledgement of workarounds and live issues	Process improvement	Manufacturing
Problem v3	Identify problems and track their progress	Process improvement	Education
Problem v3	More awareness to IT issues generally	Process improvement	Government administration and defence
Problem v3	More job transparency	Process improvement	Government administration and defence
Problem v3	Permanent resolution of incident causes	Process improvement	Finance and insurance
Problem v3	Process awareness	Process improvement	Manufacturing
Problem v3	Quick turnaround of issues	Process improvement	Manufacturing
Problem v3	Better resource utilisation	Resource management	Government administration and defence
Problem v3	Better service	Service Improvement	Transport and storage
Problem v3	Improved service	Service Improvement	Property and business services (includes IT firms)
Problem v3	Increased resource use efficiency	Service Improvement	Education
Problem v3	Managing effective future delivery	Service Improvement	Government administration and defence
Problem v3	Reduced downtime	System availability	Property and business services (includes IT firms)

ITSM Process	ITSM Process Benefit	ITSM process benefit sub-category	Industry Sector
Problem v3	Fixing major problems	System improvement	Education
Problem v3	Recover hidden issues	System improvement	Government administration and defence
Problem v3	Recover hidden issues	System improvement	Other
Problem v3	Reduction in incidents due to fix of root cause	System improvement	Property and business services (includes IT firms)
Problem v3	Maximising value from investment and minimising business disruption by increasing reliability of service with reactive and proactive analysis and resolution of service quality and performance issues	Value to the business	Property and business services (includes IT firms)
Problem HPITSM	Improved customer service	Customer service	Education
Problem HPITSM	Reduced outages	System availability	Property and business services (includes IT firms)
Problem v2	Reduce I.T spend	Cost management	Property and business services (includes IT firms)
Problem v2	Reduced cost to deliver services	Cost management	Property and business services (includes IT firms)
Problem v2	Increased customer satisfaction	Customer satisfaction	Property and business services (includes IT firms)
Problem v2	Increased Customer Satisfaction levels	Customer satisfaction	Other
Problem v2	Improved customer service	Customer service	Personal and other services
Problem v2	Capture workload more effectively	Process improvement	Government administration and defence
Problem v2	Consistent process across organisation	Process improvement	Government administration and defence
Problem v2	Coordinated management of errors	Process improvement	Property and business services (includes IT firms)
Problem v2	Declining numbers of incident escalated to problem	Process improvement	Education
Problem v2	Escalation of incidents to problem for further investigation and resolution	Process improvement	Health and community services
Problem v2	Escalation point for business units	Process improvement	Transport and storage
Problem v2	Escalation point for technical staff	Process improvement	Transport and storage
Problem v2	Escalation point out of incident management	Process improvement	Transport and storage
Problem v2	Improved analysis	Process improvement	Property and business services (includes IT firms)
Problem v2	Less incidents	Process improvement	Property and business services (includes IT firms)
Problem v2	Less recurrence of problems	Process improvement	Finance and insurance
Problem v2	More structure	Process improvement	Communication services
Problem v2	Move to proactive focus; Incident correlation; Relationship with Configuration; Known Error documentation process	Process improvement	Communication services
Problem v2	Permanent solutions	Process improvement	Property and business services (includes IT firms)

ITSM Process	ITSM Process Benefit	ITSM process benefit sub-category	Industry Sector
Problem v2	Proactive Problem Management	Process improvement	Property and business services (includes IT firms)
Problem v2	Roll up of incidents into problems had not previously been attempted	Process improvement	Government administration and defence
Problem v2	Seeing trends - easier to get through incidents	Process improvement	Government administration and defence
Problem v2	Some root causes identified	Process improvement	Health and community services
Problem v2	Visibility of problems and accountability to resolve	Process improvement	Education
Problem v2	Better managed resources	Resource management	Property and business services (includes IT firms)
Problem v2	Better service during problems	Service Improvement	Health and community services
Problem v2	Reduced impact of systemic IT problems	Service Improvement	Property and business services (includes IT firms)
Problem v2	Reduced number of Incidents	Service Improvement	Transport and storage
Problem v2	Reduced rework	Service Improvement	Property and business services (includes IT firms)
Problem v2	Reduction in recurring incidents	Service Improvement	Personal and other services
Problem v2	Reduction of ongoing problems	Service Improvement	Manufacturing
Problem v2	Improved system availability	System availability	Property and business services (includes IT firms)
Problem v2	Increased availability	System availability	Personal and other services
Problem v2	Better root cause analysis and reduced 'repeat' incidents	System improvement	Property and business services (includes IT firms)
Problem v2	Identify root causes and implement preventative measures	System improvement	Finance and insurance
Problem v2	Network functionality increased	System improvement	Education
Problem v2	Reduction in after hours incidents	System improvement	Electricity, gas and water
Problem v2	Reduction in number of recurring incidents	System improvement	Manufacturing
Problem v2	Reduction in repeat problems	System improvement	Finance and insurance
Problem v2	Removed a number of major systemic issues and stabilised core infrastructure	System improvement	Education
Problem v2	Root cause and workaround	System improvement	Finance and insurance
Release HPITSM	More reliable transitioning	Process improvement	Property and business services (includes IT firms)
Release HPITSM	Less disruption to end users through release controlling when changes are deployed to end users with consideration to end users business needs	System availability	Education
Release v2	Increased governance of released software	Compliance	Personal and other services
Release v2	Better control	Control	Property and business services (includes IT firms)
Release v2	Better control of changes	Control	Government administration and defence

ITSM Process	ITSM Process Benefit	ITSM process benefit sub-category	Industry Sector
Release v2	More control of release	Control	Communication services
Release v2	Process Control (change implementation plans)	Control	Communication services
Release v2	Increased customer satisfaction	Customer satisfaction	Property and business services (includes IT firms)
Release v2	Improved customer service due to reduced risk of issues	Customer service	Government administration and defence
Release v2	Better understanding of impacts if the change goes wrong	Process improvement	Government administration and defence
Release v2	Clear methods for development and deployment	Process improvement	Property and business services (includes IT firms)
Release v2	Fewer issues sith enhancements and upgrades	Process improvement	Property and business services (includes IT firms)
Release v2	Higher release success rate	Process improvement	Property and business services (includes IT firms)
Release v2	Higher visibility of planned work	Process improvement	Finance and insurance
Release v2	Improved turn-around time of changes	Process improvement	Finance and insurance
Release v2	Increased successful change	Process improvement	Property and business services (includes IT firms)
Release v2	Increased visibility	Process improvement	Property and business services (includes IT firms)
Release v2	Less impact	Process improvement	Property and business services (includes IT firms)
Release v2	More prepared to support	Process improvement	Communication services
Release v2	Reduced incidents	Process improvement	Property and business services (includes IT firms)
Release v2	Relationship with Configuration (for example alarms can be correlated to in progress changes)	Process improvement	Communication services
Release v2	Smoother transition from projects to operations	Process improvement	Education
Release v2	Visibility to the agency of all changes	Process improvement	Government administration and defence
Release v2	Improved release quality	Service Improvement	Personal and other services
Release v2	Increased infrastructure stability and created a more stable communication channel with some customer groups	Service Improvement	Education
Release v2	Reduced rework	Service Improvement	Property and business services (includes IT firms)
Release v2	Service transition planning (where applied)	Service Improvement	Property and business services (includes IT firms)
Release v2	Streamlined much of the work from specific customer groups into the release process which has decreased workload	Service Improvement	Education
Release v2	Increased availability	System availability	Property and business services (includes IT firms)
Release v2	Network functionality increased	System improvement	Education
Release v2	Reduction in problems caused by changes	System improvement	Finance and insurance
Request v3	Customer Satisfaction	Customer satisfaction	Communication services

ITSM Process	ITSM Process Benefit	ITSM process benefit sub-category	Industry Sector
Request v3	Better and quicker request fulfilment process	Customer service	Property and business services (includes IT firms)
Request v3	Increase customer service levels meeting KPI's and satisfaction	Customer service	Government administration and defence
Request v3	Improved service	Service Improvement	Property and business services (includes IT firms)
Request v3	Improved time responses	Service Improvement	Government administration and defence
Request v3	Increased productivity	Service Improvement	Property and business services (includes IT firms)
Request v3	Provide better service	Service Improvement	Government administration and defence
Request v3	Reduced turnaround times	Service Improvement	Property and business services (includes IT firms)
Request v3	Responsiveness and minimised cost in identifying and developing standardised responses to (predictable) requests for services	Service Improvement	Property and business services (includes IT firms)
SACM v3	Knowledge for billing	Knowledge acquisition	Communication services
SACM v3	Ability to find info	Process improvement	Manufacturing
SACM v3	Better asset management	Resource management	Property and business services (includes IT firms)
SACM v3	Better monitoring of assets	Resource management	Property and business services (includes IT firms)
SACM v3	Maximise the value from information held about assets and their use	Value to the business	Property and business services (includes IT firms)
SACM v3	Maximise value from asset investment by tracking and monitoring asset performance	Value to the business	Property and business services (includes IT firms)
SCM v3	Contain costs	Cost management	Communication services
SCM v3	Common area of understanding between customer and service providers about the services being provided	Customer needs identification	Property and business services (includes IT firms)
SCM v3	Increased customer satisfaction and service transparency	Customer satisfaction	Education
SCM v3	Increased customer service levels	Customer service	Government administration and defence
SCM v3	Centralised procurement & billing	Process improvement	Transport and storage
SCM v3	Improved awareness of the services provided by ITS	Process improvement	Education
SCM v3	Increase understanding of products and services offered	Process improvement	Education
SCM v3	Visible service listing	Process improvement	Education
SCM v3	Constraining options	Resource management	Communication services
SCM v3	Clearer understanding of business of the services we offer and the level of service we provide	Service Improvement	Other
SCM v3	Clearly defined services	Service Improvement	Government administration and defence
SCM v3	Defined service manager	Service Improvement	Education

ITSM Process	ITSM Process Benefit	ITSM process benefit sub-category	Industry Sector
SCM v3	Defines core business services and enabling services	Service Improvement	Education
SCM v3	Making services and their interactions visible	Service Improvement	Education
Security v3	Good practice	Compliance	Communication services
Security v3	Management of risks	Risk management	Property and business services (includes IT firms)
Security v3	Minimise business disruption (productivity & reputation) due to security incidents by ensuring IT security controls are aligned to and meet business requirements	System availability	Property and business services (includes IT firms)
Security v3	More secure environment	System improvement	Transport and storage
Service Desk	Better and consistent control and management of all IT Incidents and Requests	Control	Other
Service Desk	Control	Control	Property and business services (includes IT firms)
Service Desk	Key performance indicators	Control	Education
Service Desk	Bring to front incident resolution/reduce cost of services	Cost management	Property and business services (includes IT firms)
Service Desk	Better alignment to support demand and appropriate skills	Customer needs identification	Education
Service Desk	First point resolution for many requests/faults is much appreciated by customers	Customer satisfaction	Education
Service Desk	High levels of Customer Satisfaction Survey Results	Customer satisfaction	Education
Service Desk	Improved customer satisfaction	Customer satisfaction	Finance and insurance
Service Desk	Improved Customer satisfaction and first call resolution	Customer satisfaction	Manufacturing
Service Desk	Increased customer satisfaction	Customer satisfaction	Property and business services (includes IT firms)
Service Desk	Increased customer satisfaction levels	Customer satisfaction	Property and business services (includes IT firms)
Service Desk	Better customer service	Customer service	Finance and insurance
Service Desk	Better customer support	Customer service	Health and community services
Service Desk	Improved customer service	Customer service	Health and community services
Service Desk	Improved customer service levels	Customer service	Property and business services (includes IT firms)
Service Desk	Improved level of customer service and shared responsibility	Customer service	Health and community services
Service Desk	Increased customer service	Customer service	Government administration and defence
Service Desk	Increased customer service	Customer service	Communication services
Service Desk	Increased customer service levels	Customer service	Education
Service Desk	Increased customer service levels	Customer service	Manufacturing
Service Desk	Increased customer service levels	Customer	Government administration

ITSM Process	**ITSM Process Benefit**	**ITSM process benefit sub-category**	**Industry Sector**
		service	and defence
Service Desk	More customer/service focus	Customer service	Communication services
Service Desk	Trace-ability and customer service	Customer service	Personal and other services
Service Desk	Central information	Process improvement	Property and business services (includes IT firms)
Service Desk	Centralised desk for multiple customers	Process improvement	Property and business services (includes IT firms)
Service Desk	Centralised single point of contact for logging incidents	Process improvement	Property and business services (includes IT firms)
Service Desk	Co-ordinated support	Process improvement	Health and community services
Service Desk	Consistent process across organisation	Process improvement	Government administration and defence
Service Desk	Faster call resolution	Process improvement	Education
Service Desk	Faster resolution of minor issues	Process improvement	Property and business services (includes IT firms)
Service Desk	First call resolution improvement	Process improvement	Property and business services (includes IT firms)
Service Desk	History of incidents accrued	Process improvement	Health and community services
Service Desk	Improved customer relations	Process improvement	Education
Service Desk	Improved logging and tracking	Process improvement	Education
Service Desk	Managing flow of information about regional and global disruptions	Process improvement	Property and business services (includes IT firms)
Service Desk	One central location that all customers can call	Process improvement	Government administration and defence
Service Desk	Reduced mean time to restore/respond	Process improvement	Finance and insurance
Service Desk	Resolve I.T related calls promptly & within agreed timeframes	Process improvement	Property and business services (includes IT firms)
Service Desk	Significant improvement to 1st call resolution	Process improvement	Manufacturing
Service Desk	Single entry point for support	Process improvement	Government administration and defence
Service Desk	Single point of call	Process improvement	Education
Service Desk	Single point of consistent contact	Process improvement	Property and business services (includes IT firms)
Service Desk	Single point of contact	Process improvement	Transport and storage
Service Desk	Single point of contact	Process improvement	Retail trade
Service Desk	Single point of contact	Process improvement	Education
Service Desk	Single point of contact	Process improvement	Other
Service Desk	Single point of contact and quality of service	Process improvement	Property and business services (includes IT firms)
Service Desk	Single point of contact for all IT related issues	Process improvement	Government administration and defence

ITSM Process	ITSM Process Benefit	ITSM process benefit sub-category	Industry Sector
Service Desk	Single point of contact for ICT	Process improvement	Electricity, gas and water
Service Desk	Single point of contact for our customers and logging / tracking of incidents	Process improvement	Finance and insurance
Service Desk	Single point of contact so less confusion from customers on how to interact with IT	Process improvement	Government administration and defence
Service Desk	Single point of contact works well for customers and for call logging/tracking	Process improvement	Education
Service Desk	Tracking and history of Incidents	Process improvement	Government administration and defence
Service Desk	Better response times to requests	Service improvement	Other
Service Desk	Reduced phone wait time	Service Improvement	Government administration and defence
Service Desk	Reduced rework	Service Improvement	Property and business services (includes IT firms)
Service Desk	Less distractions for 2nd level	System availability	Transport and storage
Service Desk	Network functionality increased	System improvement	Education
Service level v3	Measurement and accountability	Compliance	Government administration and defence
Service level v3	Minimise cost wastage by ensuring that agreed levels of services are defined and monitored.	Cost management	Property and business services (includes IT firms)
Service level v3	Greater understand between Business and IT re criticality of Services provided	Customer needs identification	Personal and other services
Service level v3	Better expectation management	Customer satisfaction	Property and business services (includes IT firms)
Service level v3	Customer awareness	Customer satisfaction	Manufacturing
Service level v3	Customer Satisfaction	Customer satisfaction	Communication services
Service level v3	Customer Satisfaction -- very important	Customer satisfaction	Education
Service level v3	Improved Customer Satisfaction	Customer satisfaction	Property and business services (includes IT firms)
Service level v3	Increased customer satisfaction and transparency	Customer satisfaction	Education
Service level v3	Increased customer satisfaction levels and timely response to requests	Customer satisfaction	Education
Service level v3	Agreed customer service delivery levels	Customer service	Government administration and defence
Service level v3	Business confidence in IT Services	Customer service	Transport and storage
Service level v3	Increased customer service	Customer service	Property and business services (includes IT firms)
Service level v3	Manage service levels and service level agreements within the business	Customer service	Education
Service level v3	Repeatability	Process improvement	Government administration and defence
Service level v3	Easier to set outsource contract SLAs	Resource management	Finance and insurance
Service level v3	Increased service levels	Service	Government administration

ITSM Process	ITSM Process Benefit	ITSM process benefit sub-category	Industry Sector
		Improvement	and defence
Service level v3	Stability	System improvement	Government administration and defence
Service level HPITSM	Greater understanding of delivery expectations and improved performance	Customer satisfaction	Property and business services (includes IT firms)
Service level HPITSM	Improved service	Service Improvement	Education
Service level HPITSM	Benefit realisation through better management of services	Value to the business	Education
Service level v2	Enables us to establish meaningful performance measures with the business and report performance	Control	Finance and insurance
Service level v2	Management of service revenue lines	Cost management	Education
Service level v2	Used for determining funding levels	Cost management	Government administration and defence
Service level v2	Align I.T service provision with business needs	Customer needs identification	Property and business services (includes IT firms)
Service level v2	Alignment of service purpose to requirements	Customer needs identification	Education
Service level v2	Bringing IT closer to the business - gaining an understanding of business needs	Customer needs identification	Government administration and defence
Service level v2	Improved understanding of business requirements	Customer needs identification	Education
Service level v2	Clear SLAs managed with each customer	Customer satisfaction	Property and business services (includes IT firms)
Service level v2	Customers have clearer picture of what to expect in terms of service	Customer satisfaction	Education
Service level v2	Expectations are set with the customer	Customer satisfaction	Finance and insurance
Service level v2	Improved customer satisfaction	Customer satisfaction	Finance and insurance
Service level v2	Improving level of managed expectation - early stages of development	Customer satisfaction	Education
Service level v2	Increased customer satisfaction	Customer satisfaction	Property and business services (includes IT firms)
Service level v2	Set expectations	Customer satisfaction	Other
Service level v2	Shared expectations of service	Customer satisfaction	Education
Service level v2	Understanding of SLA's	Customer satisfaction	Property and business services (includes IT firms)
Service level v2	Better relationship with customer	Customer service	Property and business services (includes IT firms)
Service level v2	Better understanding of the clients	Customer service	Government administration and defence
Service level v2	Increased customer service levels	Customer service	Government administration and defence
Service level v2	Ability to monitor performance and meet service targets	Process improvement	Property and business services (includes IT firms)
Service level v2	Capture workload more effectively	Process improvement	Government administration and defence

ITSM Process	ITSM Process Benefit	ITSM process benefit sub-category	Industry Sector
Service level v2	Consistent process across organisation	Process improvement	Government administration and defence
Service level v2	Consistent reporting base / measures	Process improvement	Property and business services (includes IT firms)
Service level v2	Consistent service levels across customers	Process improvement	Property and business services (includes IT firms)
Service level v2	Improved performance reporting	Process improvement	Finance and insurance
Service level v2	Introduction of first service levels and their monitoring	Process improvement	Electricity, gas and water
Service level v2	More structured improvement program	Process improvement	Communication services
Service level v2	Structure around time frames and scope of support of services	Process improvement	Property and business services (includes IT firms)
Service level v2	Improved decision making for ICT investment	Resource management	Property and business services (includes IT firms)
Service level v2	Vendor relationship increased and Network availability	Resource management	Education
Service level v2	Clarity on service outcomes and client satisfaction	Service Improvement	Property and business services (includes IT firms)
Service level v2	Documented services targets	Service Improvement	Education
Service level v2	Improved reporting	Service Improvement	Property and business services (includes IT firms)
Service level v2	Reduced rework	Service Improvement	Property and business services (includes IT firms)
Service portfolio v3	Services are managed cost-effectively throughout the lifecycle; specifying the economic value to be realised throughout whole lifecycle	Cost management	Property and business services (includes IT firms)
Service portfolio v3	Consistency	Process improvement	Communication services
Service portfolio v3	Increased efficiency and utility	Process improvement	Education
Service portfolio v3	Managing services over their lifecycle	Process improvement	Education
Service portfolio v3	Portfolios created and managed	Process improvement	Government administration and defence
Service portfolio v3	Transparency in the services offered to different business Unit	Service Improvement	Education
Supplier v3	Containing costs	Cost management	Communication services
Supplier v3	Effective and efficient management of supplier relationships to ensure consistent delivery of service to defined quality and to contractual specifications	Cost management	Property and business services (includes IT firms)
Supplier v3	Reduced cost of supplier	Cost management	Property and business services (includes IT firms)
Supplier v3	Better relationship management - better service	Customer service	Transport and storage
Transition v3	Maximise customer ability to maximise return on technology investments and minimise disruption from their implementation by planning transition into production	Customer service	Property and business services (includes IT firms)
Validation v3	Improved software quality	System improvement	Property and business services (includes IT firms)

ITSM Process	ITSM Process Benefit	ITSM process benefit sub-category	Industry Sector
Validation v3	Customer ability to maximise value from technology investments and minimised disruption from their implementation	Value to the business	Property and business services (includes IT firms)

Table C.19 Number of ITSM processes implemented by number of ITSM metrics responses cross tabulation

		Number of ITSM Metric Responses							
	Count	0	1	2	3	4	5	6 to 11	**Total**
Number of ITSM Processes Implemented	1	12	1	0	0	0	0	0	13
	2	5	1	2	2	0	0	0	10
	3	16	1	2	6	0	0	0	25
	4	7	3	7	3	6	1	1	28
	5	15	4	2	5	3	1	0	30
	6	12	1	1	5	2	2	0	23
	7	4	0	2	2	1	1	2	12
	8	9	1	0	0	1	0	0	11
	9 to 22	38	4	1	2	1	0	13	59
	Total	118	16	17	25	14	5	16	211

Table C.20 Spearman's correlation between ITSM processes and metrics

			Number of implemented ITSM processes	**Number of ITSM process metric responses**
Spearman's rho	**Number of implemented ITSM processes**	Correlation Coefficient	1	0.01
		Sig. (2-tailed)	.	0.882
		N	211	211
	Number of ITSM process metric responses	Correlation Coefficient	0.01	1
		Sig. (2-tailed)	0.882	.
		N	211	211

Table C.21 Number of ITSM process benefit responses by number of ITSM process metric responses cross tabulation

		Number of ITSM Metric Responses							
	Count	0	1	2	3	4	5	6 to 11	**Total**
Number of ITSM Benefit Responses	0	101	0	0	0	0	0	0	101
	1	1	10	1	0	1	0	0	13
	2	3	3	4	0	0	0	0	10
	3	4	0	5	12	0	0	0	21
	4	3	0	5	7	11	0	1	27
	5	2	1	2	3	0	3	0	11
	6	0	0	0	1	1	1	0	3
	7 to 21	4	2	0	2	1	1	15	25
	Total	118	16	17	25	14	5	16	211

Table C.22 Spearman's correlation between ITSM processes and metrics

			Number of ITSM Benefit Responses	Number of ITSM Metric Responses
Spearman's rho	**Number of ITSM Benefit Responses**	Correlation Coefficient	1	0.501**
		Sig. (2-tailed)	.	0
		N	110	110
	Number of ITSM Metric Responses	Correlation Coefficient	0.501**	1
		Sig. (2-tailed)	0	.
		N	110	110

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

Table C.23 Distribution of categorised ITSM process metrics responses

ITSM Process	ITSM Process Metric Category										
	Service improvement	**Process improvement**	**System improvement**	**Customer satisfaction**	**Cost management**	**Resource management**	**Risk management**	**Systems availability**	**Compliance**	**Knowledge acquisition**	**Total**
Incident v2	29	14	13	11	0	0	0	1	0	0	68
Change v2	1	28	31	3	0	0	1	1	2	0	67
Service Desk	23	12	0	6	0	0	0	0	0	0	41
Incident v3	22	5	0	4	0	0	0	1	0	0	32
Problem v2	8	12	8	1	0	0	0	0	1	0	30
Change v3	1	5	17	3	0	0	0	0	0	0	26
Service level v2	4	4	0	10	0	0	0	1	3	0	22
Release v2	8	2	3	2	1	0	0	0	0	0	16
Problem v3	8	2	2	0	0	0	0	2	0	0	14
Configuration v2	2	3	1	0	0	7	0	0	0	0	13
SLM v3	3	3	0	5	1	0	0	1	0	0	13
ITSCM v2	1	2	0	0	1	0	7	0	0	0	11
Availability v2	0	2	1	2	0	0	0	3	0	0	8
Capacity v2	0	4	1	0	1	1	0	0	0	0	7
Financial v2	0	0	0	0	7	0	0	0	0	0	7
Knowledge v3	4	1	0	0	0	0	0	0	0	1	6
Request v3	2	1	0	2	0	1	0	0	0	0	6
SCM v3	0	1	1	2	0	0	0	0	0	0	4
Change HPITSM	0	2	0	1	0	0	0	0	0	0	3
Deployment v3	0	2	1	0	0	0	0	0	0	0	3
ITSCM v3	0	1	0	0	0	0	2	0	0	0	3
Security v3	1	1	0	0	0	0	0	0	1	0	3
Access v3	0	0	0	2	0	0	0	0	0	0	2
Capacity v3	0	0	0	0	0	2	0	0	0	0	2
Event v3	1	1	0	0	0	0	0	0	0	0	2

ITSM Process	ITSM Process Metric Category										
	Service improvement	**Process improvement**	**System improvement**	**Customer satisfaction**	**Cost management**	**Resource management**	**Risk management**	**Systems availability**	**Compliance**	**Knowledge acquisition**	**Total**
Incident HPITSM	1	0	1	0	0	0	0	0	0	0	2
Problem HPITSM	1	0	0	0	0	0	0	0	0	0	1
Release HPITSM	0	0	0	1	0	0	0	0	0	0	1
SACM v3	0	0	0	0	0	1	0	0	0	0	1
Service level HPITSM	0	0	0	1	0	0	0	0	0	0	1
Service portfolio v3	0	1	0	0	0	0	0	0	0	0	1
Supplier v3	0	0	0	0	1	0	0	0	0	0	1
Validation v3	1	0	0	0	0	0	0	0	0	0	1
Total	**121**	**109**	**80**	**56**	**12**	**12**	**10**	**10**	**7**	**1**	**418**

Table C.24 Categorised list of all ITSM process metric responses

ITSM Process	ITSM Process Metric	Category of ITSM Process Metric	Industry Sector
Accessv3	Access delivered within stated target deadline	Customer satisfaction	Property and business services (includes IT firms)
Accessv3	Number of incidents resolved within agreed timeframes	Customer satisfaction	Government administration and defence
Availability v2	Additional availability hours delivered	System availability	Finance and insurance
Availability v2	Availability thresholds met	Customer satisfaction	Property and business services (includes IT firms)
Availability v2	Better availability	System availability	Communication services
Availability v2	Fewer outages and service level agreements (SLA) penalties	System improvement	Property and business services (includes IT firms)
Availability v2	Impact penalties reduced	Process improvement	Property and business services (includes IT firms)
Availability v2	Increased system availability	System availability	Personal and other services
Availability v2	Plan produced\updated	Process improvement	Property and business services (includes IT firms)
Availability v2	Service availability percentage measured against target where this information is available	Customer satisfaction	Education
Capacity v2	Capacity forecasting	Resource management	Finance and insurance
Capacity v2	Fewer urgent changes (for unplanned capacity requirements)	Process improvement	Property and business services (includes IT firms)
Capacity v2	Number of capacity events detected	Process improvement	Property and business services (includes IT firms)

ITSM Process	ITSM Process Metric	Category of ITSM Process Metric	Industry Sector
Capacity v2	Number of incidents with cause code of "capacity"	Process improvement	Finance and insurance
Capacity v2	Plan produced\updated	Process improvement	Property and business services (includes IT firms)
Capacity v2	Planned budget spend	Cost management	Property and business services (includes IT firms)
Capacity v2	Reduction in capacity related incident	System improvement	Communication services
Capacity v3	Average CPU	Resource management	Property and business services (includes IT firms)
Capacity v3	Disk utilisation	Resource management	Property and business services (includes IT firms)
Change HPITSM	Number of changes implemented within timeline	Customer satisfaction	Education
Change HPITSM	Number of successful changes	Process improvement	Education
Change HPITSM	Percentage of successful	Process improvement	Property and business services (includes IT firms)
Change v2	Better planning and testing	Process improvement	Government administration and defence
Change v2	Breakdown of changes by priority	Customer satisfaction	Government administration and defence
Change v2	Change advisory board	Process improvement	Education
Change v2	Category/type/item recorded for each change record	Process improvement	Manufacturing
Change v2	Change compliance reporting	Compliance	Government administration and defence
Change v2	Change management	Process improvement	Government administration and defence
Change v2	Change packages immediately successful	System improvement	Government administration and defence
Change v2	Change percentage success rate	Process improvement	Property and business services (includes IT firms)
Change v2	Change volumes	Process improvement	Transport and storage
Change v2	Changes by type	Process improvement	Transport and storage
Change v2	Changes implement by date and category	Process improvement	Education
Change v2	Compliance to process	Compliance	Education
Change v2	Customer survey responses indicate increased satisfaction	Customer satisfaction	Government administration and defence
Change v2	Failed changes against changes implemented	Process improvement	Finance and insurance
Change v2	Unplanned outages against planned outages	Process improvement	Finance and insurance
Change v2	Impacts to service	Service improvement	Property and business services (includes IT firms)

ITSM Process	**ITSM Process Metric**	**Category of ITSM Process Metric**	**Industry Sector**
Change v2	Implemented monthly	Process improvement	Health and community services
Change v2	Incidents related to changes	Process improvement	Transport and storage
Change v2	Increased availability to business	System availability	Government administration and defence
Change v2	Less than 2% of all changes are backed out	System improvement	Other
Change v2	Less than 2% of all changes fail	System improvement	Other
Change v2	Less than 5% of all changes are emergency	System improvement	Other
Change v2	Maintaining a record of all changes that can be referred to	Process improvement	Education
Change v2	Misclassification	Process improvement	Education
Change v2	Number of changes approved	Process improvement	Health and community services
Change v2	Number of changes by classification	Process improvement	Manufacturing
Change v2	Number of successful changes versus unsuccessful changes	System improvement	Manufacturing
Change v2	Number of unauthorised changes	Process improvement	Manufacturing
Change v2	Number of authorised changes against configuration items	Process improvement	Education
Change v2	Number of change related incidents	System improvement	Education
Change v2	Number of changes backed out	System improvement	Property and business services (includes IT firms)
Change v2	Number of changes completed successfully	System improvement	Property and business services (includes IT firms)
Change v2	Number of changes completed without issues	System improvement	Finance and insurance
Change v2	Number of changes implemented successfully	System improvement	Property and business services (includes IT firms)
Change v2	Number of changes presented at the CAB	Customer satisfaction	Education
Change v2	Number of changes reviewed/approved/implemented in period	Process improvement	Education
Change v2	Number of failed changes	System improvement	Government administration and defence
Change v2	Number of failed changes	System improvement	Property and business services (includes IT firms)
Change v2	Number of failed changes	System improvement	Government administration and defence
Change v2	Number of incidents & RFC's logged / resolved	System improvement	Government administration and defence
Change v2	Number of incidents caused	System improvement	Property and business services (includes IT firms)

ITSM Process	ITSM Process Metric	Category of ITSM Process Metric	Industry Sector
Change v2	Number of incidents caused by change	System improvement	Government administration and defence
Change v2	Number of incidents resulting from an implemented change	System improvement	Property and business services (includes IT firms)
Change v2	Number of incidents shown as relating to changes	System improvement	Electricity, gas and water
Change v2	Number of incidents with cause code of "change"	System improvement	Finance and insurance
Change v2	Number of open/closed change requests	Process improvement	Property and business services (includes IT firms)
Change v2	Number of reverted incidents	Process improvement	Government administration and defence
Change v2	Number of successful changes	System improvement	Finance and insurance
Change v2	Number of successful changes implemented	System improvement	Government administration and defence
Change v2	Number of unplanned outages	System improvement	Education
Change v2	Number of weekly changes by type	Process improvement	Government administration and defence
Change v2	Number successful changes	System improvement	Retail trade
Change v2	Operational reporting to improve process	Process improvement	Education
Change v2	Percentage of successful changes	Process improvement	Property and business services (includes IT firms)
Change v2	Percentage of successful changes	Process improvement	Education
Change v2	Percentage of successful Changes	Process improvement	Education
Change v2	Process avoidance both by work unit	Process improvement	Education
Change v2	Reduced emergency changes and reduction in failed changes	System improvement	Personal and other services
Change v2	Reduced risk to the agency	Risk management	Government administration and defence
Change v2	Reduction in changes over time	System improvement	Health and community services
Change v2	Reduction in number of changes that fail	System improvement	Government administration and defence
Change v2	Reduction in number of system outages due to changes	System improvement	Government administration and defence
Change v2	Reduction in the number of incidents arising from unmanaged changes	System improvement	Finance and insurance
Change v2	Scheduled	Process improvement	Health and community services
Change v2	Stability of environment	System improvement	Health and community services
Change v2	Success rate	System improvement	Communication services

ITSM Process	**ITSM Process Metric**	**Category of ITSM Process Metric**	**Industry Sector**
Change v2	Successful change rate	System improvement	Transport and storage
Change v3	All changes approved; tested; effectiveness reviewed	Process improvement	Property and business services (includes IT firms)
Change v3	Better records	Process improvement	Government administration and defence
Change v3	Changes approved	Customer satisfaction	Education
Change v3	Changes declined	Customer satisfaction	Education
Change v3	Changes logged	Process improvement	Education
Change v3	Efficiency target maintained	System improvement	Communication services
Change v3	Incidents caused by change	System improvement	Finance and insurance
Change v3	Less outages	System improvement	Education
Change v3	Minimum service lapse duration	Service improvement	Communication services
Change v3	More details of changes implemented	System improvement	Government administration and defence
Change v3	Number of emergency changes	System improvement	Property and business services (includes IT firms)
Change v3	Number of incidents caused by change	System improvement	Property and business services (includes IT firms)
Change v3	Number of changes	System improvement	Property and business services (includes IT firms)
Change v3	Number of changes applied (by impact)	System improvement	Property and business services (includes IT firms)
Change v3	Number of changes released successfully by attributes	System improvement	Government administration and defence
Change v3	Number of changes that cause outages	System improvement	Manufacturing
Change v3	Number of incidents arising from Changes	System improvement	Other
Change v3	Number of incidents resulting from changes	System improvement	Manufacturing
Change v3	Percentage of scheduled changes versus emergency RFC's	System improvement	Education
Change v3	Percentage of successful changes	System improvement	Government administration and defence
Change v3	Percentage of failed changes	System improvement	Property and business services (includes IT firms)
Change v3	Promptness of workflow queue	Process improvement	Communication services
Change v3	Shorter timeframes for resolution	Process improvement	Property and business services (includes IT firms)
Change v3	Successful changes	System improvement	Property and business services (includes IT firms)

ITSM Process	ITSM Process Metric	Category of ITSM Process Metric	Industry Sector
Change v3	Successful Changes	System improvement	Education
Change v3	Surveys	Customer satisfaction	Communication services
Configuration v2	Accuracy of configuration management database (CMDB)	Resource management	Finance and insurance
Configuration v2	Accuracy of CMDB\configuration management system (CMS)	Resource management	Property and business services (includes IT firms)
Configuration v2	Accuracy of configuration information (audits)	Resource management	Property and business services (includes IT firms)
Configuration v2	Degree of accuracy	Resource management	Communication services
Configuration v2	Improved configuration management due to greater knowledge of impact	Process improvement	Finance and insurance
Configuration v2	Mean time to resolve incidents/requests	Service improvement	Finance and insurance
Configuration v2	Number of CI's linked to other CI's	Resource management	Property and business services (includes IT firms)
Configuration v2	Number of incidents shown as relating to changes	System improvement	Electricity, gas and water
Configuration v2	Number of incorrect CIs detected	Process improvement	Property and business services (includes IT firms)
Configuration v2	Physical CI's reconciliation to Finance Asset Register	Resource management	Education
Configuration v2	Quality of configuration information	Process improvement	Health and community services
Configuration v2	Reduced numbers of untraceable items	Resource management	Property and business services (includes IT firms)
Configuration v2	Time to implement change	Service improvement	Personal and other services
Deployment v3	Actual change dates compared with planned release dates	Process improvement	Manufacturing
Deployment v3	Less incidents related to releases	System improvement	Property and business services (includes IT firms)
Deployment v3	Number of releases that need to be rescheduled	Process improvement	Manufacturing
Event v3	Number of jobs conducted	Process improvement	Government administration and defence
Event v3	Time taken to complete jobs	Service improvement	Government administration and defence
Financial v2	Cost reduction and improved budgeting	Cost management	Finance and insurance
Financial v2	Costs associated with change	Cost management	Finance and insurance
Financial v2	Financial targets tracked and met	Cost management	Property and business services (includes IT firms)
Financial v2	Percentage of services covered by cost model	Cost management	Education
Financial v2	Planned budget spend	Cost management	Property and business services (includes IT firms)
Financial v2	Recoveries in dollar figures	Cost management	Education

ITSM Process	**ITSM Process Metric**	**Category of ITSM Process Metric**	**Industry Sector**
Financial v2	Spend versus actual cost of services	Cost management	Property and business services (includes IT firms)
Incident HPITSM	Mean time to restore/respond (MTTR)	Service improvement	Property and business services (includes IT firms)
Incident HPITSM	Number of incidents	System improvement	Property and business services (includes IT firms)
Incident v2	Abandoned rate	Service improvement	Other
Incident v2	Addressing specific types of frequent incidents to avoid recurrence	System improvement	Education
Incident v2	Average age of closed calls	Service improvement	Manufacturing
Incident v2	Average seconds to Answer	Service improvement	Other
Incident v2	Breach and escalation	Service improvement	Education
Incident v2	Classification etc.	Process improvement	Manufacturing
Incident v2	Closed 1st point and aged outstanding's	Service improvement	Finance and insurance
Incident v2	Compliance with SLAs	Customer satisfaction	Education
Incident v2	Customer response times	Customer satisfaction	Health and community services
Incident v2	Customer Satisfaction	Customer satisfaction	Manufacturing
Incident v2	Faster resolution	Service improvement	Communication services
Incident v2	First call	Process improvement	Education
Incident v2	First Line Resolution	Process improvement	Other
Incident v2	First resolution	Process improvement	Education
Incident v2	Incident volumes	System improvement	Transport and storage
Incident v2	Incidents appropriately categorised	Process improvement	Government administration and defence
Incident v2	Incidents by product	Process improvement	Communication services
Incident v2	Incidents closed within agreed thresholds	Service improvement	Property and business services (includes IT firms)
Incident v2	Incidents meeting SLA targets	Customer satisfaction	Finance and insurance
Incident v2	Incidents per work group	Process improvement	Communication services
Incident v2	Incidents related to changes	System improvement	Transport and storage
Incident v2	Incidents resolved at 1st level	Process improvement	Government administration and defence
Incident v2	Increased customer satisfaction - number of incidents resolved at first contact	Customer satisfaction	Government administration and defence

ITSM Process	ITSM Process Metric	Category of ITSM Process Metric	Industry Sector
Incident v2	Increased customer service	Customer satisfaction	Government administration and defence
Incident v2	Major systems uptime	Systems availability	Personal and other services
Incident v2	Mean time to resolution	Service improvement	Education
Incident v2	Mean time to resolve	Service improvement	Electricity, gas and water
Incident v2	Mean time to resolve incidents	Service improvement	Finance and insurance
Incident v2	Mean time to response	Service improvement	Education
Incident v2	Mean time to respond/ restore (MTTR)	Service improvement	Government administration and defence
Incident v2	Mean time to respond/ restore (MTTR)	Service improvement	Education
Incident v2	Number of calls logged	Process improvement	Manufacturing
Incident v2	Number of calls resolved at first level	Process improvement	Finance and insurance
Incident v2	Number of incidents	System improvement	Education
Incident v2	Number of Incidents	System improvement	Government administration and defence
Incident v2	Number of incidents -Logged & resolved	System improvement	Government administration and defence
Incident v2	Number of incidents & RFC's logged / resolved	System improvement	Government administration and defence
Incident v2	Number of incidents handled	System improvement	Health and community services
Incident v2	Number of incidents raised	System improvement	Health and community services
Incident v2	Number of incidents reported	System improvement	Property and business services (includes IT firms)
Incident v2	Number of incidents resolved	System improvement	Government administration and defence
Incident v2	Number of Incidents restored by the known fix	System improvement	Property and business services (includes IT firms)
Incident v2	Number of jobs logged	Process improvement	Retail trade
Incident v2	Number of priority 1/2 incidents in period	System improvement	Education
Incident v2	Number of resolved incidents	Service improvement	Personal and other services
Incident v2	Outstanding calls report	Service improvement	Finance and insurance
Incident v2	Percentage resolved in agreed timeframe and backlog	Customer satisfaction	Electricity, gas and water
Incident v2	Percentage of calls closed at first point	Service improvement	Education

ITSM Process	ITSM Process Metric	Category of ITSM Process Metric	Industry Sector
Incident v2	Reduction in the number of status update calls at the service desk	Service improvement	Property and business services (includes IT firms)
Incident v2	Resolution per priority	Service improvement	Property and business services (includes IT firms)
Incident v2	Resolution rate	Service improvement	Health and community services
Incident v2	Resolution times per priority	Service improvement	Property and business services (includes IT firms)
Incident v2	Resolved and still active each month	Service improvement	Health and community services
Incident v2	Resolved or outstanding for a period	Service improvement	Property and business services (includes IT firms)
Incident v2	Response Times	Service improvement	Education
Incident v2	SLA performance for response and restore times	Customer satisfaction	Finance and insurance
Incident v2	SLA performance by priority	Customer satisfaction	Manufacturing
Incident v2	SLAs	Customer satisfaction	Communication services
Incident v2	Time taken to resolve against service level	Customer satisfaction	Education
Incident v2	Time taken to resolve incidents	Service improvement	Property and business services (includes IT firms)
Incident v2	Time to complete	Service improvement	Retail trade
Incident v2	Time to resolve	Service improvement	Education
Incident v2	Time to resolve incidents	Service improvement	Finance and insurance
Incident v2	Time to restore	Service improvement	Transport and storage
Incident v2	Timeliness by work unit	Service improvement	Education
Incident v2	Top ten categories	Process improvement	Education
Incident v2	Trend analysis	Process improvement	Government administration and defence
Incident v2	Type of calls logged Incidents/Tasks	Process improvement	Manufacturing
Incident v3	Calls	Process improvement	Health and community services
Incident v3	Closed rates	Service improvement	Health and community services
Incident v3	Effective delivery	Service improvement	Government administration and defence
Incident v3	Incident resolution time	Service improvement	Education
Incident v3	Incidents closed by due date (%)	Service improvement	Government administration and defence

ITSM Process	ITSM Process Metric	Category of ITSM Process Metric	Industry Sector
Incident v3	Incidents resolved at first contact	Service improvement	Property and business services (includes IT firms)
Incident v3	Incidents resolved within criteria	Customer satisfaction	Property and business services (includes IT firms)
Incident v3	Incidents resolved within SLA	Customer satisfaction	Property and business services (includes IT firms)
Incident v3	Increased resolution rates	Service improvement	Property and business services (includes IT firms)
Incident v3	Job tracking tool	Process improvement	Education
Incident v3	Less incidents	Service improvement	Education
Incident v3	Number of incidents reported each week	Service improvement	Government administration and defence
Incident v3	Number of jobs conducted	Process improvement	Government administration and defence
Incident v3	Number of breach calls	Service improvement	Manufacturing
Incident v3	Number of Incidents	Service improvement	Education
Incident v3	Number of incidents per month	Service improvement	Government administration and defence
Incident v3	Number of incidents raised/resolved	Service improvement	Other
Incident v3	Number of incidents resolved within agreed timeframes	Service improvement	Government administration and defence
Incident v3	Number of P1 incidents	Process improvement	Manufacturing
Incident v3	Percentage of satisfied customers as per quick survey responses	Customer satisfaction	Education
Incident v3	Quicker restoration of service	Service improvement	Property and business services (includes IT firms)
Incident v3	Resolution times	Service improvement	Property and business services (includes IT firms)
Incident v3	Response and resolution times against SLA targets	Customer satisfaction	Education
Incident v3	Service level compliance	Service improvement	Other
Incident v3	Service restoration time; process issues arising from major incident reviews	Service improvement	Finance and insurance
Incident v3	System downtime per month	Systems availability	Government administration and defence
Incident v3	Time taken to complete jobs	Service improvement	Government administration and defence
Incident v3	Time to resolve	Service improvement	Education
Incident v3	Time to resolve by category	Service improvement	Education

ITSM Process	ITSM Process Metric	Category of ITSM Process Metric	Industry Sector
Incident v3	Time to respond	Service improvement	Education
Incident v3	Time to restore per priority	Service improvement	Property and business services (includes IT firms)
Incident v3	Types	Process improvement	Health and community services
ITSCM v2	Completion and success rate on IT Service Continuity Tests	Service improvement	Property and business services (includes IT firms)
ITSCM v2	Cost of risks identified	Cost management	Property and business services (includes IT firms)
ITSCM v2	DR tests completed successfully	Process improvement	Property and business services (includes IT firms)
ITSCM v2	Number of hours before disaster recovery facility/systems instated	Risk management	Property and business services (includes IT firms)
ITSCM v2	Number of processes for which Service Continuity measures have been defined	Risk management	Government administration and defence
ITSCM v2	Number of successful disaster recovery tests	Risk management	Finance and insurance
ITSCM v2	Percentage of services with DR plan and/or current test performed	Risk management	Education
ITSCM v2	Success biannual recovery testing	Risk management	Education
ITSCM v2	Test results	Process improvement	Communication services
ITSCM v2	Test results against recovery time objectives.	Risk management	Finance and insurance
ITSCM v2	Tested and resourced	Risk management	Government administration and defence
ITSCM v3	Plans up to date	Process improvement	Property and business services (includes IT firms)
ITSCM v3	Testing effective	Risk management	Property and business services (includes IT firms)
ITSCM v3	Testing successful/reports	Risk management	Property and business services (includes IT firms)
Knowledge v3	Creation	Knowledge acquisition	Property and business services (includes IT firms)
Knowledge v3	Incidents raised	Service improvement	Property and business services (includes IT firms)
Knowledge v3	Increased resolution rates	Service improvement	Property and business services (includes IT firms)
Knowledge v3	Participation	Service improvement	Property and business services (includes IT firms)
Knowledge v3	Re-use of Knowledge	Process improvement	Property and business services (includes IT firms)
Knowledge v3	Time to resolution of service request or incidents	Service improvement	Property and business services (includes IT firms)
Problem HPITSM	Number of client impacting outages	Service improvement	Property and business services (includes IT firms)

ITSM Process	ITSM Process Metric	Category of ITSM Process Metric	Industry Sector
Problem v2	Avoidance of service penalties for SLA breaches	Compliance	Property and business services (includes IT firms)
Problem v2	Duration of problem resolution	Service improvement	Education
Problem v2	Incident trend by classification	Process improvement	Property and business services (includes IT firms)
Problem v2	Incidents related to problems	Process improvement	Property and business services (includes IT firms)
Problem v2	Linked incidents	Process improvement	Health and community services
Problem v2	Number of incidents	System improvement	Electricity, gas and water
Problem v2	Number of incidents & RFC's logged / resolved	Process improvement	Government administration and defence
Problem v2	Number of incidents matched and moved to problem management and reduction in overall call rates	System improvement	Finance and insurance
Problemv2	Number of incidents rolled into problems	System improvement	Government administration and defence
Problem v2	Number of known errors	Process improvement	Government administration and defence
Problem v2	Number of open problems and time they have been open as defined by priority - potential v impact	Service improvement	Property and business services (includes IT firms)
Problem v2	Number of permanent fixes implemented	Service improvement	Property and business services (includes IT firms)
Problem v2	Number of problem records	Process improvement	Government administration and defence
Problem v2	Number of problems resolved	Service improvement	Finance and insurance
Problem v2	Number of recurring incidents for each problem	System improvement	Education
Problem v2	Number of repeat incidents	System improvement	Finance and insurance
Problem v2	Number of resolved problems	System improvement	Personal and other services
Problem v2	Problem resolution rate	Service improvement	Health and community services
Problem v2	Problem volumes	Process improvement	Transport and storage
Problem v2	Problems by affected business units	Customer satisfaction	Transport and storage
Problem v2	Problems by category	Process improvement	Education
Problem v2	Problems by number of associated Incidents	Process improvement	Transport and storage
Problem v2	Problems identified from patterns of incidents	Process improvement	Health and community services
Problem v2	Reduction in number of recurring incidents	System improvement	Manufacturing
Problem v2	Reduction in the number of problem and age of problems	System improvement	Personal and other services

ITSM Process	ITSM Process Metric	Category of ITSM Process Metric	Industry Sector
Problem v2	Resolved by known error	Service improvement	Health and community services
Problem v2	Root causes identified	Process improvement	Health and community services
Problem v2	Time spent vs. incidents fixed	Service improvement	Property and business services (includes IT firms)
Problem v2	Time taken problem to known error	Service improvement	Finance and insurance
Problem v2	Tracking of progress	Process improvement	Communication services
Problem v3	Count of open problems and its ageing	Service improvement	Manufacturing
Problem v3	Increased levels of system availability	Systems availability	Government administration and defence
Problem v3	Increased resolution rates	Service improvement	Property and business services (includes IT firms)
Problem v3	Less incidents	System improvement	Government administration and defence
Problem v3	Managing effective future delivery	Service improvement	Government administration and defence
Problem v3	Number of jobs conducted	Process improvement	Government administration and defence
Problem v3	Number of repeating incidents solved	System improvement	Government administration and defence
Problem v3	Number of breach calls	Service improvement	Manufacturing
Problem v3	Number of incidents resolved by known error	Service improvement	Education
Problem v3	Number of Incidents resolved by known error	Service improvement	Education
Problem v3	Record delinquency	Process improvement	Finance and insurance
Problem v3	Reduction in incidents due to fix of root cause	Service improvement	Property and business services (includes IT firms)
Problem v3	System downtime hours assured	Systems availability	Government administration and defence
Problem v3	Time taken to complete jobs	Service improvement	Government administration and defence
Release HPITSM	Number of releases to same target audience within specific timeframe	Customer satisfaction	Education
Release v2	Change advisory board	Customer satisfaction	Education
Release v2	Cost	Cost management	Property and business services (includes IT firms)
Release v2	Impact	Service improvement	Property and business services (includes IT firms)
Release v2	Number of completed release plans	Process improvement	Education
Release v2	Number of defects resulting from release	System	Finance and insurance

ITSM Process	ITSM Process Metric	Category of ITSM Process Metric	Industry Sector
		improvement	
Release v2	Number of incidents after release	System improvement	Property and business services (includes IT firms)
Release v2	Number of incidents with cause code of "change"	System improvement	Finance and insurance
Release v2	Number of releases reviewed/approved/implemented in period	Process improvement	Education
Release v2	Number of software releases tested and reduction approval time	Service improvement	Personal and other services
Release v2	Number of successful releases	Service improvement	Education
Release v2	Number of successful releases	Service improvement	Government administration and defence
Release v2	On target performance (time)	Customer satisfaction	Property and business services (includes IT firms)
Release v2	Percentage of successful releases	Service improvement	Education
Release v2	Release percentage success rate	Service improvement	Property and business services (includes IT firms)
Release v2	Success rate	Service improvement	Communication services
Release v2	Visibility to the agency of all changes	Service improvement	Government administration and defence
Request v3	Better and quicker request fulfilment process	Service improvement	Property and business services (includes IT firms)
Request v3	Number of jobs conducted	Process improvement	Government administration and defence
Request v3	Number of assets out of service/unused	Resource management	Property and business services (includes IT firms)
Request v3	Number of incidents resolved within agreed timeframes	Customer satisfaction	Government administration and defence
Request v3	Requests delivered within stated target deadline	Customer satisfaction	Property and business services (includes IT firms)
Request v3	Time taken to complete jobs	Service improvement	Government administration and defence
SACM v3	Number of assets out of service/unused	Resource management	Property and business services (includes IT firms)
SCM v3	Helps in managing customer expectation	Customer satisfaction	Education
SCM v3	Number of incidents/problems/requests raised and resolved	System improvement	Other
SCM v3	Reduction in the number of calls incorrectly assigned	Process improvement	Education
SCM v3	SLAs signed	Customer satisfaction	Government administration and defence

ITSM Process	ITSM Process Metric	Category of ITSM Process Metric	Industry Sector
Security v3	Access reviews performed	Process improvement	Property and business services (includes IT firms)
Security v3	Incidents raised and resolved	Service improvement	Property and business services (includes IT firms)
Security v3	Internal audits performed	Compliance	Property and business services (includes IT firms)
Service Desk	Abandoned Rate	Service improvement	Other
Service Desk	Average call time	Service improvement	Education
Service Desk	Average seconds to answer	Service improvement	Other
Service Desk	Average speed to answer	Service improvement	Manufacturing
Service Desk	Call rates	Service improvement	Finance and insurance
Service Desk	Call resolution rate at service desk	Service improvement	Property and business services (includes IT firms)
Service Desk	Call volumes	Service improvement	Transport and storage
Service Desk	Calls answered within thresholds	Service improvement	Property and business services (includes IT firms)
Service Desk	Calls by type	Process improvement	Transport and storage
Service Desk	Calls resolved at first contact	Process improvement	Property and business services (includes IT firms)
Service Desk	Calls taken and closed per agent	Process improvement	Property and business services (includes IT firms)
Service Desk	Compliance with SLA's	Customer satisfaction	Education
Service Desk	Customer satisfaction	Customer satisfaction	Health and community services
Service Desk	Customer satisfaction when calls are closed	Customer satisfaction	Health and community services
Service Desk	Customer survey	Customer satisfaction	Communication services
Service Desk	Customer\user satisfaction	Customer satisfaction	Property and business services (includes IT firms)
Service Desk	First call resolution	Service improvement	Manufacturing
Service Desk	First call resolution	Service improvement	Manufacturing
Service Desk	First fix rate	Service improvement	Finance and insurance
Service Desk	First line resolution	Service improvement	Other
Service Desk	Increased level of customer service - building knowledge base of solutions	Customer satisfaction	Government administration and defence
Service Desk	Initial call resolution	Process improvement	Finance and insurance
Service Desk	Number and type of incidents resolved	Service	Health and community

ITSM Process	**ITSM Process Metric**	**Category of ITSM Process Metric**	**Industry Sector**
		improvement	services
Service Desk	Number of call per staff member	Process improvement	Government administration and defence
Service Desk	Number of calls	Process improvement	Education
Service Desk	Number of calls resolved at first point of contact	Service improvement	Government administration and defence
Service Desk	Number of dropped calls	Service improvement	Education
Service Desk	Number of first call resolutions	Process improvement	Education
Service Desk	Number of incidents resolved at first level percentage to mature over time	Service improvement	Property and business services (includes IT firms)
Service Desk	Number of reassignments	Process improvement	Education
Service Desk	Number of ticket reassignments	Process improvement	Finance and insurance
Service Desk	Percentage of calls closed at first point	Process improvement	Education
Service Desk	Percentage of service requests versus percentage of faults	Service improvement	Education
Service Desk	Phone and quantitative data	Process improvement	Retail trade
Service Desk	Resolution rate	Service improvement	Transport and storage
Service Desk	Resolved and equitable assignments of team members	Process improvement	Health and community services
Service Desk	Response rate	Service improvement	Health and community services
Service Desk	Response times	Service improvement	Education
Service Desk	Time taken to attend to issues	Service improvement	Property and business services (includes IT firms)
Service Desk	Time taken to resolve at first point of contact	Service improvement	Property and business services (includes IT firms)
Service Desk	Total number of incidents raised	Service improvement	Health and community services
Service level HPITSM	SLA's met	Customer satisfaction	Property and business services (includes IT firms)
Service level v2	Accuracy of service catalogue	Service improvement	Education
Service level v2	Annual customer satisfaction survey	Customer satisfaction	Finance and insurance
Service level v2	Customer satisfaction surveys	Customer satisfaction	Education
Service level v2	Extent that each customer group agreed service arrangements	Customer satisfaction	Education
Service level v2	Improved customer satisfaction levels	Customer satisfaction	Finance and insurance
Service level v2	Incidents meeting SLA targets	Customer satisfaction	Finance and insurance
Service level v2	Minutes of SLA breach per service item	Service	Finance and insurance

ITSM Process	ITSM Process Metric	Category of ITSM Process Metric	Industry Sector
		improvement	
Service level v2	Number of documented SLAs	Process improvement	Education
Service level v2	Number of incidents & RFC's logged / resolved	Service improvement	Government administration and defence
Service level v2	Number of service agreements	Process improvement	Education
Service level v2	Number of SLAs & percentage success rate	Customer satisfaction	Property and business services (includes IT firms)
Service level v2	Number of SLAs met	Customer satisfaction	Property and business services (includes IT firms)
Service level v2	Percentage of business areas that have SLA	Compliance	Education
Service level v2	Percentage of SLA aligned with services catalogue	Compliance	Education
Service level v2	Performance against KPIs	Customer satisfaction	Electricity, gas and water
Service level v2	Reduction in SLA breached incidents and failed changes	Service improvement	Personal and other services
Service level v2	Reporting on time - visibility of not meeting SLAs	Compliance	Property and business services (includes IT firms)
Service level v2	Service desk function and availability	Process improvement	Education
Service level v2	Service levels met	Customer satisfaction	Property and business services (includes IT firms)
Service level v2	SLAs are mostly measured under incident	Customer satisfaction	Education
Service level v2	System availability	Systems availability	Finance and insurance
Service level v2	Tracking of progress	Process improvement	Communication services
SLM v3	Availability	Systems availability	Government administration and defence
SLM v3	Cost effectiveness	Cost management	Government administration and defence
SLM v3	Customer feedback	Customer satisfaction	Property and business services (includes IT firms)
SLM v3	Customer Satisfaction Survey	Customer satisfaction	Property and business services (includes IT firms)
SLM v3	Functions meeting SLA	Customer satisfaction	Property and business services (includes IT firms)
SLM v3	Helps to resolve incident and/or request in hourly manner	Service improvement	Education
SLM v3	Incident response	Process improvement	Government administration and defence
SLM v3	Incidents responded to	Process improvement	Government administration and defence
SLM v3	More detailed documentation	Process improvement	Government administration and defence

ITSM Process	ITSM Process Metric	Category of ITSM Process Metric	Industry Sector
SLMv3	Percentage of calls completed within service levels	Customer satisfaction	Education
SLMv3	Service availability	Service improvement	Government administration and defence
SLMv3	Service target exceptions	Customer satisfaction	Property and business services (includes IT firms)
SLMv3	Time	Service improvement	Government administration and defence
SPM v3	Identify and defines clearly the number of services offered	Process improvement	Education
Supplier v3	Cost	Cost management	Property and business services (includes IT firms)
Validation v3	Less incidents related to releases	Service improvement	Property and business services (includes IT firms)

Table C.25 Existence of performance measurement framework by number of ITSM process metric responses cross tabulation

	PMF Use			
	Count	**Not using PMF**	**Using PMF**	**Total**
Number of ITSM Metric Responses	Zero	88	13	101
	One	5	8	13
	Two	7	3	10
	Three	12	9	21
	Four	14	13	27
	Five	7	4	11
	Six	1	2	3
	Seven	1	1	2
	Eight	2	4	6
	Nine	3	0	3
	Ten	0	1	1
	Eleven	2	8	10
	Fourteen	0	1	1
	Twenty one	2	0	2
	Total	**144**	**67**	**211**

Table C.26 Spearman’s correlation between presence of ITSM process metric responses and the existence of performance measurement frameworks

			Presence of ITSM Metric(s) Responses	Existence of performance measurement framework(s) use
Spearman's rho	**Presence of ITSM Metric(s) Responses**	Correlation Coefficient	1	**.338****
		Sig. (2-tailed)	.	0
		N	211	211
	Existence of performance measurement framework(s) use	Correlation Coefficient	**.338****	1
		Sig. (2-tailed)	0	.
		N	211	211

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

Table C.27 Spearman's correlation between number of ITSM processes implemented and existence of performance measurement framework implementation

			ITSM Processes	Using PMF
Spearman's rho	ITSM Processes	Correlation Coefficient	1	.179**
		Sig. (2-tailed)	.	0.009
		N	211	211
	Using PMF	Correlation Coefficient	.179**	1
		Sig. (2-tailed)	0.009	.
		N	211	211

*. Correlation is significant at the 0.05 level (2-tailed).

Table C.28 Distribution of ITSM performance measurement frequency

ITSM Process	**Monthly**	**Quarterly**	**Daily**	**Ad Hoc**	**Not Stated**	**Monthly, Daily**	**Total**
Incident management	23	22	35	4	0	1	85
Change management	26	33	13	3	0	0	75
Problem management	17	16	12	7	1	0	53
Service level management	11	11	7	1	0	0	30
Service desk function	5	4	15	1	0	0	25
Configuration management	8	3	3	1	0	0	15
Release management	2	3	2	1	0	0	8
Service catalogue management	2	2	1	3	0	0	8
IT service continuity management	1	3	1	0	0	0	5
Request fulfilment	1	0	2	1	0	0	4
Service portfolio management	1	1	1	1	0	0	4
Capacity management	2	1	0	0	0	0	3
Release and deployment Management	1	2	0	0	0	0	3
Service knowledge management	2	1	0	0	0	0	3
It financial management	2	0	0	0	0	0	2
Availability management	0	0	1	0	0	0	1
Demand management	1	0	0	0	0	0	1
Information security management	0	1	0	0	0	0	1
Service asset and configuration management	0	1	0	0	0	0	1
Transition planning and support	0	0	0	1	0	0	1
TOTAL	**105**	**104**	**93**	**24**	**1**	**1**	**328**

Table C.29 Distribution of categories of ITSM measurement challenges

ITSM measurement category	**Frequency**	**Percent**
Measurement methods	64	51%
Measurement stakeholders	21	17%
Measurement tools	16	13%
Measurement data	14	11%
Measurement resources	11	9%
Total	**126**	**100%**

Table C.30 Distribution of ITSM performance reporting frequency

ITSM Process	Monthly	Quarterly	Weekly	Ad Hoc	Daily	Not stated	Total
Incident management	41	25	3	4	10	2	**85**
Change management	38	9	25	1	1	1	**75**
Problem management	29	5	9	7	2	1	**53**
Service level management	18	10	1	1	0	0	**30**
Service desk function	13	4	5	1	2	0	**25**
Configuration management	12	1	1	1	0	0	**15**
Release management	5	0	1	2	0	0	**8**
IT service continuity management	3	1	0	0	0	0	**4**
Service catalogue management	3	1	0	4	0	0	**8**
Capacity management	2	0	0	0	0	1	**3**
IT financial management	2	0	0	0	0	0	**2**
Service knowledge management	2	1	0	0	0	0	**3**
Availability management	1	0	0	0	0	0	**1**
Demand management	1	0	0	0	0	0	**1**
Information security management	1	0	0	0	0	0	**1**
Request fulfilment	1	1	1	1	0	0	**4**
Service asset and configuration	1	0	0	0	0	0	**1**
Service portfolio management	1	1	0	2	0	0	**4**
Release and deployment Management	0	2	0	1	0	0	**3**
Transition Planning and Support	0	0	0	1	0	0	**1**
Total	**174**	**62**	**46**	**26**	**15**	**5**	**328**

Table C.31 Distribution of ITSM performance reporting level

ITSM Process	Operational	Tactical	Strategic	Not Stated	Total
Incident management	58	15	8	4	85
Change management	41	17	13	4	75
Problem management	27	14	9	3	53
Service level management	10	14	6	0	30
Service desk function	22	1	2	0	25
Configuration management	10	3	2	0	15
Release management	2	2	4	0	8
Service catalogue management	4	2	2	0	8
IT service continuity management	2	1	2	0	5
Request fulfilment	3	1	0	0	4
Service portfolio management	1	0	2	1	4
Capacity management	1	0	1	1	3
Release and deployment management	2	0	1	0	3
Service knowledge management	2	1	0	0	3
IT financial management	1	0	1	0	2
Availability management	1	0	0	0	1
Demand management	0	0	1	0	1
Information security management	0	0	1	0	1
Service asset and configuration	1	0	0	0	1
Transition planning and support	0	0	1	0	1
Total	**188**	**71**	**56**	**13**	**328**

Table C.32 Distribution of categories of ITSM reporting challenges

ITSM reporting challenges	**Frequency**	**Percent**
Reporting stakeholders	48	40%
Reporting methods	45	37%
Reporting tools	13	11%
Reporting resources	8	7%
Reporting data	7	6%
Total	**121**	**100%**

Dear Sir/Madam,

CASE STUDY OF ITSM BENEFITS AND PERFORMANCE MEASUREMENT

Thank you for completing the ITSM Performance Measurement and Benefits survey conducted through itSMF Australia in December 2009. From the responses given by your organisation your practices appear to be an exemplar on ITSM performance measurement and we would like your organisation to be a case study for further research.

The case study is part of a Doctor of Philosophy degree in Information Systems at the University of Southern Queensland and is sponsored by the Australian Research Council and supported by itSMF Australia. The aim of the case study is to obtain a detailed understanding of the application of ITSM Performance Measurement at your organisation.

The case study is designed to have a minimal impact on your organisations operations and a request is made for a half a day physical visit at your organisation with follow up by email. I would like to meet with someone from your organisation to discuss this further. More details of the questions and targeted participants of the case study will be sent to you in preparing for the case study.

I would appreciate if you could indicate your willingness to participate in the case study by return email. Your participation will help ensure that the case studies are fully representative. After the case studies are analysed a booklet with a catalogue of ITSM metrics will be published and a copy will be made available to your organisation.

I have received USQ Ethics approval to conduct the case studies. Please be assured that your responses will be treated as strictly confidential as organisations and individuals will not be identified in the findings. I will provide you with details of the aims, objectives and significance of the study and are free to withdraw at any time if any information could lead to identification it will not be published.

Please contact me at gacenga@usq.edu.au for further clarification.

Francis Gacenga

Figure C.1 Case study invitation letter

Dear Sir/Madam,

CASE STUDY OF ITSM BENEFITS AND PERFORMANCE MEASUREMENT

I enjoyed meeting you at the itSMF Australia National Conference in Melbourne. Thanks for considering a case study of your organisation's ITSM performance measurement. As per our conversation here are additional details of the request to facilitate in organising the case study.

Thank you for completing the ITSM performance measurement and benefits survey conducted through itSMF Australia in December 2009. From the responses given by your organisation your practices appear to be an exemplar on ITSM performance measurement and we would like your organisation to be a case study for further research.

The case study is part of a Doctor of Philosophy degree in Information Systems at the University of Southern Queensland sponsored by the Australian Research Council and supported by itSMF Australia. The aim of the case study is to obtain a detailed understanding of the application of ITSM performance measurement at your organisation.

The case study is designed to have a minimal impact on your organisation's operations. A request is made for a half day physical visit at your organisation with follow up by email. I would like to meet with ITSM survey respondents from your organisation to discuss this further. More details of the questions and targeted participants of the case study will be sent to you prior to the case study.

I would appreciate if you could confirm your participation in the case study by return email. Your participation will help ensure that the case studies are fully representative. After the case studies are analysed a booklet with a catalogue of ITSM metrics will be published and a copy will be sent to your organisation.

I have USQ Ethics approval to conduct the case studies. Please be assured that your responses will be treated as strictly confidential as organisations and individuals will not be identified in the findings. You are free to withdraw from the study at any time. I will provide you with details of the aims, objectives and significance of the study. If any information could lead to identification it will not be published.

Please contact me at gacenga@usq.edu.au for further clarification.

Francis Gacenga

Figure C.2 Case study follow up letter

ITIL Performance Measurement Project Information
Title of Project: A Performance Measurement Framework for IT Service Management to Improve Crucial IT Infrastructure in Private and Public Sector Organisations

Purpose: The study aims to identify benefits gained by the implementation of the IT Infrastructure Library (ITIL) and to develop a performance measurement framework for improving IT service infrastructure. ITIL has been described as the industry best practice IT Service Management framework to support and deliver IT support and services. ITIL has been readily adopted by organisations in both the public and private sector worldwide. To date few empirical studies have been published quantifying the benefits gained from implementing ITIL. To address this problem the study aims to develop a framework that can be used for performance measurement of ITIL investments in organisations. This will provide a basis of standardization and performance comparison for organisations implementing ITIL. The performance measurement framework can be used to show a relationship between ITIL investment and benefit from this investment.

Expected duration of participation: 1 hour interview, at a later date 15 minutes to review interview findings.

The interviews will be held at a location and time convenient to the interviewee. The researcher will ask questions and record the answers on a digital audio recorder for later transcription. The information gathered will be sent back to the interviewee for confirmation.

Confidentiality and privacy: the identity of the participants will not be disclosed in the final thesis or in any working documents that the research team may prepare in conjunction with the study unless explicit permission is granted by the organisation involved. All notes and audio recordings arising from meetings with the participants and any confidential documents provided by them will be secured in the researcher's office at USQ. These artefacts will be destroyed on the completion of the study or when they are no longer deemed to be useful.

Please note that your participation is voluntary and you may withdraw at anytime without prejudice. If you have any questions, please contact Francis Gacenga by phone 07 4631 1252.

You will be provided with a summary of the information you provide in the interview, as well as the research paper from the completed study.

This study adheres to the Guidelines of the ethical review process of The University of Southern Queensland. Whilst you are free to discuss your participation in this study with the researcher (contactable on 07 4631 1252), Should you have any concern about the conduct of this research project, please contact the USQ Ethics Officer, Office of Research & Higher Degrees, University of Southern Queensland, West Street, Toowoomba QLD 4350, Telephone (07) 4631 2690, email: ethics@usq.edu.au

Informed Consent Form
Title of Project: A Performance Measurement Framework for IT Service Management to Improve Crucial IT Infrastructure in Private and Public Sector Organisations

Investigator: Francis Gacenga

Date:

I hereby agree to be involved in the above research project as a respondent. I have read the research information pertaining to this research project and understand the nature of the research and my role in it.

Name of research subject ……………………Signature of research subject ……………………

Figure C.3 ITSM case study participation consent form

Table C.33 Case study interview questions

Title of Project: A Performance Measurement Framework for IT Service Management

Name of Interviewee(s): ____

____

Position: ____

ITSM Process Role: ____

Organisation: ____

Interviewer: Francis Gacenga

Purpose of the Interview: The purpose of this interview is to gain an in depth understanding of the ITSM performance measurement practices at your organisations to aid in the development of a performance measurement framework being developed as part of a PhD study.

Ethical Issues: I would like to record the interview on a digital recorder if this is all right with you. Please sign the interview consent form. During the interview I will be referring to the printed interview questions and taking notes. Transcripts of the interview and a report of the case study will be sent to you for authentication.

Introduction: For the purposes of the recording please introduce yourself, stating your name and role in the organisation.

Date: ________________________

Time: Start ____________________ End _________________

In this interview I will ask questions on how the performance of ITSM is measured in your organisation.

A. IT Service Management (ITSM) Performance Measurement Framework

A.1 From the survey I realise you are primarily using ITIL as your ITSM framework. What framework(s) are you currently using to measure the performance of your IT service management?
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A.2 Do you know if other frameworks were considered when your organisation selected the framework(s) for measuring the performance of your ITSM?

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A.3 When did you implement the framework(s) used to measure the performance of your ITSM?
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A.4 What internal organisation factors influenced the decision to implement the framework used to measure the performance of your ITSM?

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A.5 Were there factors external to the organisation that influenced the decision to implement the framework used to measure the performance of your ITSM?

A.6 What are the objectives of measuring the performance of your ITSM?

A.7 Is the framework used to measure the performance of your ITSM only or is it part of the entire organisations performance measurement?

A.8 At what levels of the organisation (top, middle and operational) is the performance of your ITSM measured?

A.9 What are the roles of those involved in measuring and reporting the performance of your ITSM?

A.10 How do you align the measurement of the performance of your ITSM to the overall organisations strategy?

A.11 We know that the overall ITSM provides your organisation benefits. What has your organisation gained from measuring the performance of your ITSM?

A.12 Is it possible for you to provide documentation of the ITSM performance measurement framework used?

B. ITSM Performance Metrics

B.1 In terms of the measurement of the performance of the implemented ITSM do you use ITSM tools, spreadsheets, surveys or do it manually?

B2. Can you give me examples of metrics that you use related to ITSM?

B.3 Does your IT organisation (division, department, unit, team) maintain a catalogue/dictionary of current ITSM performance metrics? Please provide me with the metrics (service) catalogue (definitions and attributes).

B.4 What factors (industry, size, ownership, legislation, competitors, customers, historical) influenced the selection of the metrics used to measure the performance of ITSM?

B.5 How are the metrics organised (for example areas of focus such as people, process, partners and technology) within the ITSM performance measurement framework? Why are the metrics organised in this way?

B.6 Are the metrics classified into categories for example lead vs. lag, qualitative vs. quantitative, internal vs. external, financial vs. nonfinancial? Why do you use this specific categorisation?
Please provide documentation of the various classifications?

B.7 Who is involved in collecting metrics and at what levels of the organisations are they positioned?
Please provide me with an organisation chart.

B.8 Do you review the effectiveness of the ITSM performance metrics collected?

B.9 Do you think that some of the metrics are more effective than others? Why?

B.10 How do you ensure the ITSM performance metrics are accurate (validity and reliability)?

C. ITSM Performance Reporting

C.1 How do you use the information collected from the measurement of the performance of your ITSM (for monitoring, planning, improvements, decision-making)?

C.2 How is reporting of the measurement of the performance of your ITSM done (verbally, dashboards, emails, webpage)?

C.3 To what levels (top, middle and operational) is the measurement of the performance of your ITSM reported?

C.4 What is the rationale for having the measurement of the performance of your ITSM reported at these levels?

C.5 What is the frequency of reporting of the measurement of the performance of your ITSM?
For example daily, weekly, monthly, quarterly, ad hoc and the reason for the time frame. Why this frequency?

C.6 What are the outcomes (decisions, actions, behaviour change) from the reporting of the measurement of the performance of your ITSM?

C.7 How do you determine what reports, from measurement of the performance of your ITSM, are relevant to the report users (management / the business)?

C.8 Please provide sample reports (dashboards, spreadsheets, emails, web pages) of measurement of the performance of your ITSM.

C.9 You may provide any other information and documentation you would like to add.

THANK YOU FOR YOUR PARTICIPATION.

Table C.34 Case study protocol

CASE STUDY PROTOCOL FOR ITSM PERFORMANCE MEASUREMENT STUDY

Introduction

To conduct a reliable case study effectively a systematic, logical and repeatable protocol should be used. Reliability is achieved in many ways in a case study. One of the most important methods is the development of a case study protocol (Tellis 1997). The protocol contains the instrument and the procedures and is a major tactic in increasing the reliability of case study research. This pilot case study is exploratory as it aims at developing the final protocol that will be used. The five case studies that follow the pilot case study will be explanatory as they aim at identifying the benefits gained from implementing ITSM and the metrics used to measure the metrics as well as the environmental factors that determine organisations selection of specific metrics. This will result in the development of a performance measurement framework for IT Service Management. The pilot case study is being used to get an in depth understanding of the ITSM implementation at Queensland Health.

Overview of the project

The study aims at developing a performance measurement framework for ITSM by gaining an in-depth understanding of the ITSM performance measurement practices of organisations based on a theoretical foundation of performance measurement frameworks. The project uses a design science approach. Theoretical foundation will be gained from a systematic literature review. The qualitative data collected from the survey and the case study will be analysed using content analysis. The internal and external environment factors that influence the selection of ITSM metrics will be determined by cross case analysis of the case study data.

Case Study Protocol

Yin (2009) recommends the use of case study protocols as part of a carefully designed research that would include an overview of the project, field procedures, questions and a guide for the report. The following steps taken from (Neale et al. 2006; Tellis 1997) will be used in conducting the case study:

1. Planning
2. Data Collection – Field procedures and questions
3. Data Analysis

4. Develop Case Study Narrative – Guide for the report

5. Validate the Narrative

6. Cross compare case studies

Planning
The Case study protocol was designed in the planning phase. The case study selection was deliberate and was done to maximize what can be learned within the study's time limit. The case studies will focus on the following research questions:

1. *What types of benefits are reported from IT service management (ITSM) improvement initiatives by organisations? (RQ1)*

2. *Which specific metrics can be used to measure ITSM performance and how can these metrics be derived? (RQ2)*

3. *How can specific ITSM performance metrics be derived? (RQ3)*

The cross case study analysis which will be conducted at a later stage will aim to answer the fourth research question:

4. *What internal and external environmental factors determine organisations' selection of specific performance metrics for ITSM? (RQ4)*

These case studies will aim to offer multiple perspectives in analysis by considering the views of a variety of ITSM process managers using the same questions. The interaction between the various ITSM process managers will also be considered. The interviews will be a follow up of the survey, which will have been earlier administered. During the interviews supporting documents will be collected to confirm the validity of the processes. The pilot case study respondents will not be used in the main survey.

Data Collection
Interviews will be scheduled to occur in September for the pilot case study. Interview questions have been developed and are based on answering the research questions RQ1, RQ2, RQ3 and RQ4. The interviews will be used to go into depth, as they will be a follow up on the issues raised by the questionnaire. The case study interviews will be recorded and then transcribed. During the interview the interviewee will be mainly asked pre-designed open-ended questions and will be followed-up for further clarifications and requests for supporting documents will be made. Documents to be collected will include letters, organisational charts, memos, emails, minutes of meetings, administrative documents, press releases, newspaper articles and any other document that will be made available by the organisation.

Data Analysis
The data collected will be analysed using content analysis. According to (Krippendorff 1980, p. 21) "Content analysis is a research technique for making replicable and valid inferences from data to their context". The computer software will be used to aid in the content analysis of the qualitative survey responses, the case study data and data from the documents collected. The following coding scheme will be used:

1. Define the recording units
2. Define the categories
3. Test coding on sample of text
4. Assess accuracy or reliability
5. Revise the coding rules
6. Return to step 3
7. Code all the text
8. Assess achieved reliability or accuracy (Weber 1990a, pp. 21-4).

Case Study Narrative

Development
According to (McNamara 1997) "The narrative is a highly readable story that integrates and summarizes key information around the focus of the case study. The narrative should be complete to the extent that it is the eyes and ears for an outside reader to understand what happened regarding the case. A case study narrative will be developed with the following structure:

1. An Introduction to the organisation
2. A description of the ITSM implementation
3. The ITSM Benefits Identification and Performance Metrics
4. Successes and Challenges
5. Future developments

Validation
The case study narrative will then be validated by the interviewee to ensure that it represents an accurate account of their case. The participants will be sent the case study narrative to review and their comments and feedback will be included in the final narrative.
Case Study Cross Comparisons
Cross comparison of the case studies will not include the pilot case study and is therefore not detailed in this protocol.

Table C.35 Content analysis instructions

Please use the following steps in performing the content analysis.
The trial run found it was beneficial to code and identify factors from a hard copy.
Step 1. Read through the interview transcripts and identify and mark with a highlighter the factors that influence the selection of ITSM performance metrics. As you read through please note the focus is:
What internal and external environmental factors influence the organisation's selection of specific performance metrics for ITSM? (RQ4)
Please note that **external environmental factors** are those, "outside the organisational system", and **internal environmental factors**, "outside the control of the specific manager (ITSM manager) but within the organisation".
Step 2. Place the identified factors in one of the listed categories or create a new category if not on list (please carefully review existing categories before creating new ones) and record the following:
(a) Presence of a variable – use line number.
When cross-referencing use the line number.
Ignore the interviewer comments for the analysis.
Step 3. Make annotations and comments on the transcript as you go along, as this will be helpful in the review meeting.
Step 4. Print out a hard copy of the marked transcript if you had been marking and working on an electronic version. Email me the electronic version.
Step 5. Print out a hard copy a completed table 1 with the factors identified.
Step 6. Bring the annotated transcript and completed table 1 to the review meeting.

	CASE			
	Reference (line number)			
INTERNAL FACTORS				
Mission of organisation (msn)				
Size of organisation (size)				
Goals of (gls)				
Top management support (tms)				
IS executive hierarchical placement (ehp)				
Maturity of IS function				

(mif)				
Size of IS function (sif)				
Structure of IS function (str)				
Management philosophy/style (mps)				
Responding ITSM Manager perspective (rmp)				
Culture of organisation (icl)				
IS budget size (ibs)				
ITSM tools				
Governance framework				
Internal customers (other departments inside the organisation) (icr)				
EXTERNAL FACTORS				
Industry (idy)				
Competitive environment (cnv)				
Culture – external to organisation (ecl)				
Economy (ecy)				
Availability of resources (aor)				
Climate (cmt) (Floods, GFC, Earthquake)				
Legislation (lgl)				
External Customer (outside the organisation) (cmr)				

Appendix D – Design Instruments and List of Study Publications

Table D.1 Planned steps for extracting the design method elements

<table>
<tr><td colspan="2">Design method
The overarching design framework used is the IS design research approach (Peffers et al. 2008) has six steps:
1. Identify problem
2. Define objectives of a solution
3. Design and development
4. Demonstration
5. Evaluation, and
6. Communication
The design steps applied in step 3, design and development use the matching, analysis and projection macro and micro cycle described in Chow and Jonas (2008).</td></tr>
<tr><td>Step</td><td>Description</td></tr>
<tr><td rowspan="7">Step 3. Design and development</td><td>Step 3.1: Using the results of the literature review, survey and case studies the study established performance measurement framework, elements, metrics and practices in use in industry.</td></tr>
<tr><td>Step 3.2: Fragment the benefits and metrics reported from the survey into constituent performance metric elements (refer to Table D.2).</td></tr>
<tr><td>Step 3.3: Build a list of metrics using the survey data incorporating the ITSM metric constituents.</td></tr>
<tr><td>Step 3.4: The research team review metrics list and check for consistency and reach consensus.</td></tr>
<tr><td>Step 2.5: Industry meeting 1 Case A. Examines catalogue of metrics:
• review metrics catalogue and check for consistency, reliability and validity
• populate Case A metrics catalogue using the metrics template.</td></tr>
<tr><td>Step 2.6: Perform key words in context analysis to provide descriptions and identify metric constituents, performance dimensions and metric gaps in performance areas.</td></tr>
<tr><td>Step 2.7: Update the spreadsheet table of metrics.</td></tr>
<tr><td rowspan="4">Step 5. Evaluation</td><td>Step 5.1: Industry Meeting 2 Case A. Identify IT services to be evaluated.</td></tr>
<tr><td>Step 5.2: Evaluate ITSM performance at Case A using the ITSM PMF.</td></tr>
<tr><td>Step 5.3: Poll the ITSM managers on the usefulness of the ITSM PMF and identify areas of improvement.</td></tr>
<tr><td>Step 5.4: Using feedback from Case A. Improve the design and build of the ITSM PMF.</td></tr>
</table>

Table D.2 Key concepts used as a foundation of guiding the design

Concept	Description
Performance measurement	Performance measurement should cover operational as well as broad economic areas, including: productivity, profitability and quality. Performance of the service is dependent on what it is used for, not what it was designed for. Physical goods and services are part of the delivery of value.
Customers	“Customers are not primarily interested in what they buy and consume, but in what they can do with what they have in their possession” (Grönroos 2008). Customers do not buy goods or services; they buy offerings, which create value (Gummeson, 1995).
The traditional distinction between goods and services	Taking on the advice of Vargo and Lusch (2004) The study excludes the emphasis on goods versus services as the distinction has been made increasingly blurred and this is the case in IS where reference is made to products as services (SaaS, PaaS, IaaS – Cloud Computing, Servitisation). Physical goods and services are part of the delivery of value.
IT services	An IT service results in the automation, transformation or information of organisation actions (Zuboff 1988). IT services are conceptualised, designed, built, operationalized, maintained, improved and retired by actors using tools and relying on capabilities. The focus is not on how IT increases firm performance but rather on how IT services contribute to the organisations performance.

Table D.3 Publications from the study

Journal Articles (4)

Gacenga, F, Cater-Steel, A & Toleman, M 2010, 'An International analysis of IT service management benefits and performance measurement', *Journal of Global Information Technology Management*, vol. 13, no. 4, pp. 28-63.

Gacenga, F, Cater -Steel, A, Toleman, M & Tan, W-G 2011, 'Measuring the performance of service orientated IT management', *Sprouts: working papers on information environments, systems and organisations*, vol. 11, no. 162.

Gacenga, F, Cater-Steel, AP & Toleman, M 2011, 'Measuring the performance of IT service management', *Communications of Global Information Technology*, vol. 3, pp. 13-25.

Gacenga, F, Cater -Steel, A, Toleman, M & Tan, W-G 2012, 'A proposal and evaluation of a design method in design science research', *The Electronic Journal of Business Research Methods*, vol. 10, no. 2, pp. 89-100.

Book Chapter (1)

Gacenga, F, Cater -Steel, A, Toleman, M & Tan, W-G 2012, 'Measuring IT service management performance: a model development', in Z Belkhamza & SA Wafa (eds), *Measuring Organisational Information Systems Success: New Technologies and Practices*, Business Science Reference (an imprint of IGI Global), Hershey PA, pp. 102-19.

Conference Papers (4)

Gacenga, F & Cater -Steel, A 2011, *Performance measurement of IT service management: a case study of an Australian university*, Brisbane, Australia, July 8-11, SBN: [978-1-86435-644-1]; Research-in-progress paper, <http://aisel.aisnet.org/pacis2011/63>.

Gacenga, F, Cater-Steel, A & Toleman, M 2011, 'Measuring the performance of IT service management', paper presented to 12th Global Information Technology Management Association World Conference, Las Vegas, USA, 5 -7 June.

Gacenga, F, Cater -Steel, A, Tan, W-G & Toleman, M 2011, *IT service management: towards a contingency theory of performance measurement*, Shanghai, December 4-7, 978-0-615-55907-0, <http://aisel.aisnet.org/icis2011/proceedings/servicescience/5>.

Gacenga, F, Cater -Steel, A, Tan, W-G & Toleman, M 2012, *Alleviating Design Silence in Design Science Research: a Proposal of a Design Method*, Academic Publishing International, University of Bolton, UK, 28-29 June 2012, <http://www.academic-bookshop.com/ourshop/prod_2105844-lt095gtECRM-2012-Proceedings-of-the-11th-European-Conference-on-Research-Methodology-for-Business-and-Management-Studies-Bolton-UK-Print-version.html>.

Gacenga, F, Cater-Steel, AP & Tan, W-G 2011, *Towards a framework and contingency theory for performance measurement: a mixed-method approach*, Brisbane, Australia, July 8-11, ISBN: [978-1-86435-644-1]; Research-in-progress paper, <http://aisel.aisnet.org/pacis2011/64>.

Industry Press Articles (3)

Gacenga, F & Cater -Steel, A 2010, 'Delivering value through IT service management metrics', *Informed Intelligence, Bulletin of itSMF Australia*, Summer, pp. 8-9.

Gacenga, F, Cater -Steel, A & Toleman, M 2011, 'Cut once, measure twice: a case study of performance measurement practices', *Informed Intelligence, Bulletin of itSMF Australia*, Autumn.

Gacenga, F & Cater -Steel, A 2010, 'What's your PMF challenge', *Informed Intelligence, Bulletin of itSMF Australia*, Winter, pp. 14-7.

Industry Conference Proceedings (1)

Gacenga, F, Cater-Steel, A, Toleman, M & Tan, W-G 2011, 'Keeping score: measuring ITSM performance', paper presented to 14th National Conference of IT Service Management Forum (itSMF) Australia, Perth, Australia, 17-19 August.

Industry Forum Presentation (1)

Cater-Steel, A, Kolbe, LM, Marrone, M & Gacenga, F 2010, *Achieving value through IT service management transformation: an international perspective*, itSMF Australia, State Library of Queensland, Brisbane, December, <http://www.itsmf.org.au/modules/resource/file.php?id=699>.

Appendix E – Lists of Categorised ITSM benefits and metrics and PMF Evaluation Criteria

Table E.1 ITIL function benefits from OGC (2009) categorised

ITSM Cycle	OGC Key Benefits	ITSM Benefit Category
Service strategy	Improved use of IT investments	Service improvement
Service strategy	Tight coupling between the perception of business and IT value	Customer satisfaction
Service strategy	Performance and measures that are business value based	Customer satisfaction
Service strategy	Service development investment decisions driven by business priorities and clear return on investments (ROI) plans	Process improvement
Service strategy	Agile adaptation of IT services to pre-empt and meet changing business needs	Service improvement
Service strategy	Clear visibility of linkages between business services and IT service assets	Service improvement
Service design	Improved consistency across all services and better integration with infrastructure components, leading to faster and simpler implementation, and improved quality of service	Service improvement
Service design	Clear alignment with the business needs demonstrated through a focus on IT measurements directly related to key aspects of business performance	Process improvement
Service design	More effective and relevant processes, with improved measurement methods and metrics, enabling informed decision making	Process improvement
Service transition	Enables high volumes of change and release for the business	Process improvement
Service transition	An understanding of the level of risk during and after change, e.g. service outage, disruption	Risk management
Service transition	Aligns new or changed services with the customer's business requirements	Customer satisfaction
Service transition	Ensures that customers and users can use new or changed service effectively	Customer satisfaction
Service operation	Execution and measurement of plans, designs and optimisations	Process improvement
Service operation	Actual value is seen in the business	Customer satisfaction
Continual service improvement	Improvements: outcomes that are favourably improved when compared to a 'before' state	Service improvement
Continual service improvement	Benefits: the gains achieved through realisation of improvements	Value to the business
Continual service improvement	ROI: the difference between the benefit and the cost to achieve it	Cost management

ITSM Cycle	OGC Key Benefits	ITSM Benefit Category
Continual service improvement	VOI: the extra value created by the establishment of benefits that include non-monetary outcomes	Value to the business

Table E.2 ITIL process benefits from OGC (2009) categorised

ITSM Process	OGC Key Process Benefit	ITSM Benefit Category
SPM	Enable customers to understand what services are available	Customer satisfaction
SPM	Enable customers to understand what charges are associated with each service	Customer satisfaction
SPM	Enable customers to understand why they should use these services	Customer satisfaction
SPM	Enable customers to understand why they should take these services from that specific service provider	Customer satisfaction
SPM	Enable the service provider to understand what strengths, weaknesses and gaps exist in their service portfolio	Service improvement
SPM	Enable the service provider to understand what their investment priorities and risks are	Risk management
SPM	Enable the service provider to understand how their service assets (resources and capabilities) should be allocated to address these priorities and risks	Risk management
Demand management	Service provider and customer benefit from the efficiency and consistency in service quality that this brings	Service improvement
Financial management	Provide guiding information for continual service improvement strategy	Service improvement
Financial management	Ensure service improvement investment decisions are based upon sound financial considerations of the balance between the cost of an improvement and the individual value that it will provide to the customer in terms of desired business customers	Cost management
SCM	Provide the business with an accurate, consistent picture of the IT services in use, how they are intended to be used, the business processes they enable and associated levels of service levels	Service improvement
SLM	Provides a reliable communication channel and a trusted relationship between the customers and business representatives	Process improvement
SLM	Supplies the business with agreed service targets and the required management information to ensure those targets have been met	Customer satisfaction
Capacity management	Ensures that IT resources are planned and scheduled to deliver a consistent level of service, matched to the agreed current and future needs of the business	Resource management
Availability management	Ensures that the availability of services matches current and future business needs, and that the business impact of any unavailability is minimized	Customer satisfaction
ITSCM	Invaluable in supporting the business strategy, as it is driven by business risk as identified by business continuity planning	Risk management
ITSCM	Ensures that recovery arrangements for IT services are aligned to the business needs	Customer satisfaction
Information security management	Ensures an information security policy is maintained and enforced that fulfils the needs of the business security policy and the requirements of corporate governance	Governance
Information security management	Raises awareness across the organisation of the need to secure all information assets	Knowledge management

ITSM Process	OGC Key Process Benefit	ITSM Benefit Category
Supplier management	Ensures that all underpinning services supplied externally are appropriate to support the agreed targets and business needs laid out in the SLAs ensuring delivery of a seamless, end-to-end service to the business	Resource management
Transition planning and support	An integrated approach to planning improves the alignment of service transition plans with the plans of the customers, suppliers and the business, and can significantly improve a service provider's ability to handle high volumes of change and releases	Process improvement
Change management	Provides value by promptly evaluating and delivering the changes required by the business, and by minimising the disruption and re-work caused by failed changes	Value to the business
SACM	Optimises the performance of services assets and configurations and therefore improves the overall performance of the service	Service improvement
SACM	Minimises the costs and risks caused by poorly managed assets, e.g. service outages, fines, incorrect licence fees and failed audits	Cost management
Knowledge management	Effective knowledge management is a powerful asset for people in all roles across all stages of the service lifecycle	Process improvement
Release and deployment management	Ensuring that customers and users can use the new or changed service in a way that supports the business and by delivering change faster, at optimum cost and with minimal risk	Process improvement
Release and deployment management	Minimise troubleshooting and re-work	Process improvement
Service validation and testing	Preventing service failures that can harm the service provider's business and other customer's assets, which can result in outcomes such as loss of reputation, loss of money, loss of time, injury and death	Risk management
Event management	Enables faster entry to service management processes, especially incident management, and the possibility of automating activities which deliver cost savings	Process improvement
Incident management	Detecting and resolving incidents, resulting in lower downtime to the business	System improvement
Incident management	Aligning IT activity to business priorities and assigning resources as necessary	Customer satisfaction
Incident management	Identification of potential improvements to services	Service improvement
Incident management	Identification of additional training or service requirements in IT or the business	Knowledge management
Request fulfilment	Provide quick and effective access to standard services which can lead to increased productivity for business staff and improved quality of services and products	Service improvement
Problem management	Helps ensure that availability and quality of services meets the business needs	Customer satisfaction
Problem management	Helps to save money by reducing the number of incidents and the effort needed to resolve them resulting in less downtime for the business	Cost management
Access management	Helps to maintain confidentiality, integrity and the availability of data and intellectual property	Resource management
Access management	IT carries out activities defined in security management	Process improvement
Service desk function	Improved customer service, perception and satisfaction	Customer satisfaction

ITSM Process	OGC Key Process Benefit	ITSM Benefit Category
Service desk function	Single point of contact, communication and information	Process improvement
Service desk function	Better quality and faster turnaround of customer or user requests	Service improvement
Service desk function	Improved usage of IT support resources and increased productivity of users	Service improvement
Service desk function	More meaningful management information for decision support	Process improvement
7-step improvement process	Increased number of CSI-driven process and service improvement opportunities identified	
7-step improvement process	Value is created through a constant focus on the application of the principles of the service lifecycle, the delivery of services, and on the processes implemented with a view to ensuring they continue to align with, and deliver against, business requirements and to identify opportunities for continual improvement	Value to the business
Service reporting	Reporting that focuses on the future as strongly as the past also provides a means to market IT services that are directly aligned to the positive or negative experiences of the business	Service improvement
Service measurement	Enables business to validate previous decisions	Process improvement
Service measurement	Enables business to set direction in order to hit targets	Process improvement
Service measurement	Enables business to justify that a course of action is required	Process improvement
Service measurement	Enables business to intervene and to take corrective action	Compliance

Table E.3 ITIL process metrics from OGC (2009) categorised

ITSM Process	OGC Key Process Metrics	ITSM Metric Category
Release and deployment management	Reduced discrepancies in configuration audits compared with the real world	Compliance
Financial management	Financial trends for funding, value and accounting	Cost management
Availability management	Percentage reduction in cost of unavailability	Cost management
SACM	Accuracy in budgets and charges for the assets utilised by each customer or business unit	Cost management
Release and deployment management	Reduced resources and costs to diagnose and fix incidents and problems in deployment and production	Cost management
Incident management	Average cost per incident by category, priority and resolution group	Cost management
Request fulfilment	Average cost by type of request	Cost management
Problem management	Average cost of handling problems	Cost management
SLM	Percentage increased in customer satisfaction	Customer satisfaction
Capacity management	Timely justification and implementation of new technology in line with business requirements	Customer satisfaction
Supplier Management	Increase in the number of supplier and contractual targets aligned with the SLA and the SLR targets	Customer satisfaction
Supplier Management	Reduction in the number of service breaches caused by suppliers	Customer satisfaction
Transition planning and support	Number of releases implemented that meet the customer's agreed requirements in terms of cost, quality, scope and release schedule (expressed as a percentage of all releases)	Customer satisfaction
Change Management	Number of changes implemented which meet the customer's agreed requirements	Customer satisfaction
Release and deployment management	Increased customer and user satisfaction with the service delivered	Customer satisfaction
Request fulfilment	Number and percentage of requests meeting agreed target times	Customer satisfaction
Request fulfilment	User satisfaction	Customer satisfaction
Problem management	Number and percentage of problems resolved within SLA targets	Customer satisfaction
Service measurement	Business contribution - showing IT supports the business	Customer satisfaction
Service measurement	Internal and external customer satisfaction	Customer satisfaction
Information security Management	Increased awareness of the information Security Policy throughout the organisation	Knowledge management
Knowledge Management	Reduced dependency on personnel for knowledge	Knowledge management
SPM	Business activities to support definition of PBAs and ongoing monitoring or maintenance	Process improvement
SPM	Actual demand patterns to support activity or demand modelling	Process

ITSM Process	**OGC Key Process Metrics**	**ITSM Metric Category**
		improvement
Financial management	Service utilisation data, including by service, customers, users, department, etc.	Process improvement
SCM	Number of variances detected between the information contained within the service catalogue and the 'real-world' situation	Process improvement
SLM	Percentage reduction in SLA targets missed	Process improvement
SLM	Percentage increase of SLA reviews completed on time	Process improvement
Capacity management	Percentage accuracy of forecasts of business trends	Process improvement
ITSCM	All service recovery targets are agreed and documented and are achievable within the ITSCM plans	Process improvement
Information security Management	Increase in the acceptance of, and conformance to security procedures	Process improvement
Transition planning and support	Reduced number of incidents caused by change	Process improvement
Change Management	Reduction in the number of unauthorized changes	Process improvement
Change Management	Reduction in the number and percentage of unplanned changes and emergency fixes	Process improvement
Change Management	Change success rate (percentage of changes deemed successful at review/number of RFCs approved)	Process improvement
Change Management	Percentage of incidents attributable to changes	Process improvement
Knowledge Management	Reduced time and effort required to support and maintain services	Process improvement
Knowledge Management	Reduced time to find information for diagnosis and resolving incidents and problems	Process improvement
Release and deployment management	Reduced number of incidents for the service	Process improvement
Service validation and testing	Effort required to find defects i.e. number of defects (by significance, type, category etc.) compared with testing resource applied	Process improvement
Service validation and testing	Reduction of repeat errors- feedback from testing ensures that corrective action within design and transition (through CSI) prevents mistakes from being repeated in subsequent releases or services	Process improvement
Service validation and testing	Percentage incidents linked to errors that could have been discovered in testing and released into live environment	Process improvement
Service validation and testing	Number and percentage of errors that could discovered in testing	Process improvement
Service validation and testing	Testing evidence found as percentage of incidents occurring in live environments	Process improvement
Evaluation	Number of failed designs that have been transitioned	Process improvement
Evaluation	Cycle time to perform an evaluation (low and reducing)	Process improvement
Event management	Number of events by category, by significance, by platform and by type of event	Process improvement
Event management	Number and percentage of events that required human intervention	Process improvement
Event management	Number and percentage of repeat or duplicate events	Process

ITSM Process	OGC Key Process Metrics	ITSM Metric Category
		improvement
Incident management	Number and percentage of incidents by category, priority, time of day	Process improvement
Incident management	Size of incident backlog	Process improvement
Incident management	Percentage of incidents meeting required service levels for response time and resolution time, by priority and category	Process improvement
Incident management	Number and percentage of incidents by Service Desk agent and resolving group	Process improvement
Request fulfilment	Mean elapsed time to handle service requests by category	Process improvement
Request fulfilment	Size of backlog and number of requests at each stage	Process improvement
Problem management	Size of backlog	Process improvement
Problem management	Number of known errors added to KEDB	Process improvement
Access management	Number of incidents requiring a reset of access lights	Process improvement
Access management	Number of incidents caused by incorrect access settings	Process improvement
7-step improvement process	Ensure manual data collection is being carried out accurately and consistently. Manually capturing data on how a process was carried out and what the outcome was can be seen as an administrative overhead. Ongoing communication about the benefits of performing these tasks is essential.	Process improvement
Service reporting	Representation of past performance	Process improvement
Service reporting	Future mitigation of past issues	Process improvement
Service reporting	Future improvements	Process improvement
Service measurement	Key IT processes	Process improvement
Supplier Management	Increase in the number of suppliers meeting the targets within the contract	Resource management
Supplier Management	Increase in the number of suppliers with nominated supplier managers	Resource management
SACM	Ratio of used licences against paid for licences (should be close to 100%)	Resource management
SACM	Reduction in the use of unauthorised hardware and software, non standard and variant builds that increase complexity, support costs and risk to the business services	Resource management
ITSCM	Overall reduction in the assessed risk and impact of possible disasters	Risk management
Transition planning and support	Reduced number of issues, risks and delays caused by inadequate planning	Risk management
Service measurement	Risk and compliance	Risk management
SCM	Number of IT services recorded and managed within the service catalogue as a percentage of those being delivered and transitioned in the live environment	Service improvement
SLM	Percentage increase in SLAs agreed against operational services being run	Service improvement
Capacity management	Reduction in the business disruption caused by a lack of adequate IT capacity	Service improvement

ITSM Process	OGC Key Process Metrics	ITSM Metric Category
Change Management	Reduction in the number of disruptions to services, defects and rework caused by inaccurate specifications, poor or incomplete impact assessment	Service improvement
Release and deployment management	Reduced variance from services performance required by customers	Service improvement
Evaluation	Variance from service performance required by customers (minimal and reducing)	Service improvement
Evaluation	Number of incidents against the service (low and reducing)	Service improvement
Access management	Number of requests for access	Service improvement
Service measurement	Service performance against strategic business and IT plans	Service improvement
Capacity management	Percentage reduction in the number of SLA breaches due to poor service or component performance	System improvement
Availability management	Percentage reduction in the unavailability of services and components	System improvement
Availability management	Percentage reduction in critical time failures e.g. during peak business usage hours	System improvement
Information security Management	Percentage decrease in security breaches	System improvement
SACM	Percentage reduction in business impact of outages and incidents caused by poor asset and configuration management	System improvement
Service validation and testing	Inspection and testing return on investment	Value to the business

Table E.4 ITIL function metrics from OGC (2009) categorised

ITSM Function	OGC Key Metrics	ITSM Metric Category
Service desk function	Average Service Desk cost of handling an incident	Cost management
Technical management function	Achievement of service levels to the business, both positive and negative, for example the number of incidents related t o a Technical Management team (measurement of agreed outputs)	Customer satisfaction
Technical management function	Service level achievement (measurement of agreed outputs)	Customer satisfaction
Application management function	Reports and files transmitted to users in accordance with service levels (measurement of agreed outputs)	Customer satisfaction
Technical management function	Training and skills development	Knowledge management
Application management function	(Training and skills development)	Knowledge management
Service desk function	Percentage of incidents resolved by the first line without the need for escalation	Process improvement
Service desk function	Average time to resolve an incident (by first line)	Process improvement

ITSM Function	**OGC Key Metrics**	**ITSM Metric Category**
Service desk function	Average time to escalate an incident	Process improvement
Service desk function	Percentage of customer or user updates conducted within target service levels	Process improvement
Service desk function	Average time to review and close a resolved call	Process improvement
Technical management function	Technical management teams contribute to many process activities (process metrics)	Process improvement
Technical management function	Mean time between failures of specified equipment - to support purchasing decisions and effectiveness of maintenance	Process improvement
IT operations management function	Number of exceptions to scheduled activities and jobs (IT operations control)	Process improvement
IT operations management function	Number of data or system restores (IT operations control)	Process improvement
IT operations management function	Equipment implementation, number of items, success, etc. (IT operations control)	Process improvement
IT operations management function	Process metrics - IT operations Management contributes to many process activities (IT operations control)	Process improvement
IT operations management function	Number of incidents related to the buildings, power and cooling, etc.	Process improvement
Application management function	Transaction rates achieved (measurement of agreed outputs)	Process improvement
Application management function	Application management teams contribute to many process activities (process metrics)	Process improvement
Application management function	Number of maintenance windows exceeded (measurement of maintenance activity)	Process improvement
IT operations management function	Power usage statistics	Resource management
IT operations management function	Number of security incidents	Risk management
Application management function	Ability of users to access applications (measurement of agreed outputs)	Service improvement
Technical management function	Transaction rates and availability (measurement of agreed outputs)	System improvement
Technical management function	Utilisation rates of memory, availability of systems, etc. technology performance)	System improvement
Technical management function	Measurement of maintenance activity - for example, number of maintenance windows exceeded	System improvement
Application management function	Response times, availability of systems, data integrity, etc. (application performance)	Systems availability

Table E.5 Criteria for evaluation ITSM performance metrics catalogue elements

Objectives of the evaluation The performance measurement framework and catalogue are evaluated for:	Usefulness and fitness (useful now and in the future)
	Capability to assist the organisation to select contextualized metrics
	Capability to assist the organisation to generate relevant reports to the organisation and
	Capability to assist the organisation to provide an integrated set of ITSM performance metrics.
Metrics constituents: rationale Three key concepts for any measurement framework according to (Paxson 1996)	Metric – the fundamental property we wish to measure
	Method – the way to attempt to measure the property
	Measurement – the result of the specific application of the method
	Identify metric elements – according to Paxson (1996), a property to be measured can be fruitfully viewed in terms of a collection of simpler, underlying properties.
	The identification of ITSM metrics elements (underlying properties) is based on elements identified from previous literature and the definition of performance measurement as the quantification and qualification of action.
Description of metrics catalogue elements	ITSM performance metric – the quantification and/or qualification of IT service management action focused on an object or object feature.
	ITSM metric elements - identification involved fragmenting metrics collected from the ITSM survey responses and case studies into constituents:
	Name of metric – an identifying name for the metric
	Benefit – the desired outcome or result of the IT service management action
Description of Constituent metrics catalogue elements	Quality – the characteristic of the IT service management action or object, typically described in degrees using adjectives (qualify the object), adverbs (qualify the action) and determiners (qualify definiteness).
	Quantity – the numerate value of the IT service management action or object typically expressed as a count or volume.
	Object – the focus of the IT service management action being undertaken and measured
	Object feature – a characteristic of the IT service management action of focus
	Action being measured – the goal directed ITSM activity of the IT service management action, usually an activity within an ITSM process.
	Beneficiary (BSC) – the perspective that gains from the service action based on the four BSC perspectives of customer, finance, internal operations and innovation and learning.
Evaluation actions	Test catalogue and PMF for validity of metrics and metric elements
	Verify usefulness of the PMF and categorisation of metric elements
	Map a sample of current QH metrics using the PMF to the proposed catalogue
	Provide feedback on the use of the ITSM PMF and metrics catalogue
	Suggest improvements to the ITSM PMF and metrics catalogue