

# TOWARDS A FRAMEWORK AND CONTINGENCY THEORY FOR PERFORMANCE MEASUREMENT: A MIXED-METHOD APPROACH

(RESEARCH IN PROGRESS)

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## Abstract

*Few guidelines exist for industry practitioners on the performance measurement of IT Service Management (ITSM). Little academic research has been conducted on the performance measurement of ITSM. We propose to develop a framework and contingency theory for the performance measurement of ITSM by using a combination of methods and paradigms. We present a novel approach of mixed methods combining rigour and relevance.*

*A review of the existing industry and academic literature reveals that there exists a gap in theory for performance measurement of ITSM. There is also a lack of a contextualised performance measurement framework for ITSM. Reflecting on the progress to date we find benefits in a mixed-method approach that engages with industry practitioners and academics. We share our reflections on the lessons learnt from taking this approach. Our study contributes to theory and practice in the performance measurement of ITSM. We present research in progress detailing the design, application, and critical evaluation of the research methods used in the development and evaluation of theories in information systems in relation to the performance measurement of ITSM.*

*Keywords: Multi-paradigmatic, Mixed-methods, Systematic Literature Review, Performance Measurement, Design Science.*

# **1 INTRODUCTION**

## **1.1 Background and Research Questions**

The extensive adoption of IT Service Management (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 standardisations in delivery of IT service and support. The adoption of ITSM frameworks is not matched by adoption of performance measurement of ITSM. Little research has been reported on performance measurement of ITSM implementation.

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

1. What types of benefits are reported 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 the organisations' selection of specific performance metrics for ITSM? (RQ4)

## **1.2 Research Setting**

The study commenced in June 2009 with funding by an Australian Research Council (ARC) Linkage Project grant in partnership with Queensland Health (QH) and the IT Service Management Forum (itSMF) Australia. The ARC Linkage Project is based on an existing partnership with Queensland Health and itSMF representing an attempt to develop a performance measurement framework for ITSM. The project recognises that there is a need to transform the crucial IT infrastructure management of Australian industries by disseminating approaches such as ITSM. 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 and realise the benefits of improved ITSM.

## **1.3 Research Significance**

This study address an area that has been identified as significant and lacking in research by developing a framework that can be used for performance measurement of ITSM investments in organisations. The ITSM performance measurement framework will provide a basis of standardisation and performance comparison for organisations implementing ITSM.

The research also addresses an area that has been identified as challenging organisations implementing ITSM and this is addressed by developing a performance measurement framework that can be used to show a relationship between ITSM investment and benefit from this investment. The research contributes to the existing body of knowledge by addressing the gap that currently exists in ITSM performance measurement (Lahtela et al. 2010), performance measures and methods.

A key outcome for industry is the development of a comprehensive performance measurement framework that will encourage implementation of practices and processes that significantly reduce risks in ITSM.

## **1.4 Research Framework**

A conceptual framework for the study is depicted in Figure 1. The object of interest in this study is the performance measurement of ITSM in organisations. The specific features of performance measurement in organisations investigated are ITSM benefits, performance metrics and external environmental factors influencing the selection of metrics. We seek to understand any relationship and

direction of the relationship that may exist between benefits and metrics and since this is unknown we represent this with dotted lines in Figure 1. We also seek to identify the environmental factors that influence organisations' selection of ITSM performance metrics and this is depicted in Figure 1 by an arrow showing the direction of influence. An underlying theory for this framework is the contingency theory of organisations or management. The contingency theory of organisations is described as a loosely organised set of propositions which endorse the view that there are no universally valid rules of organisation and management (Luthans 1973; Rejc 2004). The contingency theory of management extended to performance measurement states that "there is no universally appropriate performance measurement system applicable to all organisations and in all circumstances" (Rejc 2004). Our research recognises the criticisms levelled at contingency theory and follows the advice by Weill and Olson (1989) for Management Information Systems (MIS) researchers: "research should remove or at least relax the four assumptions that make up the naïve meta-theory of a contingency theory in MIS. Rationality, functionalism, objectivism and deterministic approaches have constrained the development of the field. A generally more subjectivist, less functional, less un-reflexive and less deterministic approach is recommended." Part of our study investigates the contingent environmental factors, such as the organisations size, industry sector and strategy that influence the selection of performance measurement metrics used in ITSM.

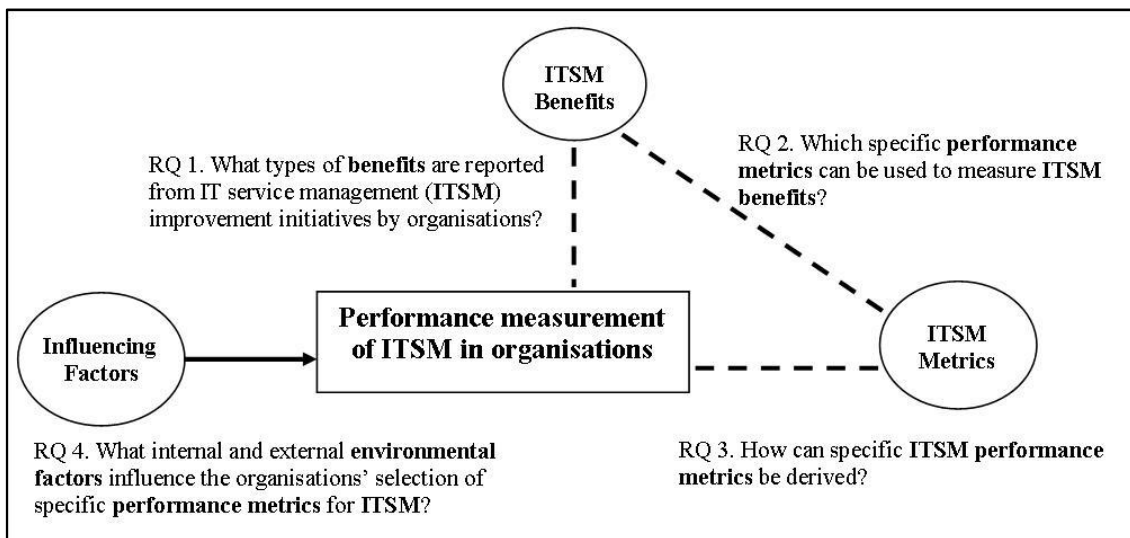


Figure 1. Conceptual Framework

In December 2009, we conducted a survey to provide a broad snapshot of ITSM benefits and specific performance metrics used to measure them and published the findings in Gacenga et al. (2010). We surveyed itSMF Australia members to ascertain the *type of benefits accrued from ITSM* (RQ1) and the *metrics currently used* (RQ2). This was followed in 2010 by a series of in-depth case studies of private and public sector organisations, undertaken to fully answer RQ3: *how can specific metrics ITSM performance metrics be derived?* and RQ4: *what internal and external environmental factors influence the organisations' selection of specific performance metrics for ITSM?* We used case studies to gain an in-depth understanding of ITSM performance measurement within its real-life context.

The following section provides a literature review on performance measurement in ITSM.

## 2 PERFORMANCE MEASUREMENT IN ITSM

We define ITSM as *a customer-oriented approach by IT practitioners to manage IT operations organised around IT services*. Our definition is founded on aspects of other definitions of ITSM: Salle (2004) process-oriented; Winniford, Conger and Erickson-Harris (2009) organisation as the customer; van Bon and van Selm (2008) process and customer orientation; Keel, Orr, Hernandez, Patrocinio and

Bouchard (2007) customer orientation without the mechanics of organisation; Black, Draper, Lococo, Matar and Ward (2007) and Conger, Winniford and Erickson-Harris (2008) definition, management and delivery of IT services. Frameworks typically applied in ITSM include ITIL, Microsoft® Operations Framework (MOF®) (Pultorak et al. 2008), IBM® Service Management Reference Model and HP®ITSM (van Bon 2007). ITIL is a library of books that offer best practices for ITSM, a lifecycle-based process-oriented framework that organisation can use to create, design, deliver and maintain customer-focused IT services. In use is the recently ratified ITSM International Standard, ISO/IEC 20000 (ISO/IEC 2005). 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 et al. 2006). In defining ITSM we distinguish it from governance and quality assurance.

A recognised challenge in performance measurement efforts and literature for both practitioners and academics is the poor definition of terms that leads to a lack of clarity (Tangen 2005). Performance measurement is: “the process of quantifying the efficiency and effectiveness of action” (Neely, Gregory and Platts 2005). Performance measurement should be understood as a broad term that “covers both overall economic and operational aspects” including measures of productivity, profitability and quality (Tangen 2005).

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.				

*Table 1. Review of ITIL performance measurement studies.*

The measurement of the benefits and performance of ITIL is gaining interest, with recent studies and publications proposing ITIL performance metrics (Barafort et al. 2005; Brooks 2006; Steinberg 2006; van Grembergen et al. 2003), IT service performance and quality measures (Hochstein 2004; Praeg and Schnabel 2006), business value of ITIL (itSMF Germany 2008; Moura et al. 2006; Šimková and Basl 2006; Yixin and Bhattacharya 2008), ITIL process capability and maturity assessment (itSMF International 2008; Valdés et al. 2009), software for measuring ITIL process performance (Lahtela et al. 2010) and evaluation frameworks for ITIL (Hochstein et al. 2005; McNaughton et al. 2010). One challenge is a lack of a performance measurement framework that would help organisations to select contextualised ITSM performance metrics. The efforts so far identified from the prior studies have mainly focused on developing ITIL performance metrics, quality measures and financial metrics (Akatsu 2007; Barafort et al. 2005; Bartolini et al. 2006; Chan et al. 2008; Donko and Traljic 2006; Lahtela et al. 2010; Potgieter et al. 2005; Spremic et al. 2008; Tiong et al. 2009; van Grembergen et al.

2003; Yixin and Bhattacharya 2008). Less than a handful of studies have developed ITIL performance measurement systems, frameworks or models (Donko and Traljac 2009; Hochstein 2004; McNaughton et al. 2010; Praeg and Schnabel 2006). A review of the studies that have developed ITIL performance measurement frameworks is summarised in Table 1.

### 3 RESEARCH APPROACH

This research project uses multi-paradigmatic and mixed-methods approach. The study uses the social science and the design science paradigms in applying mixed methods. Mixed-method research is defined as one 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 and Plano Clark 2011). We selected a mixed-method approach as phenomena in information systems are complex and comprise socio-technical as well as artificial components. The overlaying framework for the design of the study is summarised in an adoption of Creswell’s (2009) model in Figure 2.

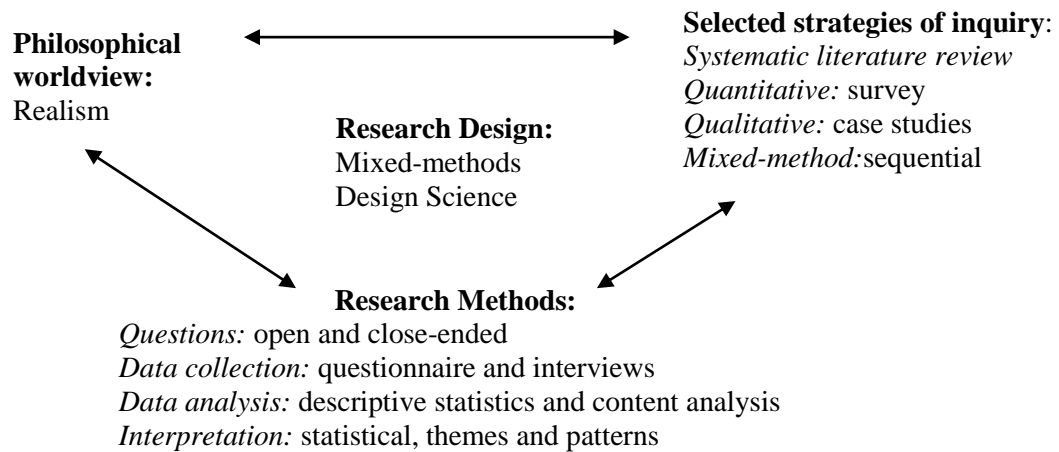


Figure 2. The interconnection of worldviews, strategies of inquiry and research methods

The design science approach used is the Information Systems Design Research (ISDR) by Peffers, Tuunane, Rothenberger and Chatterjee (2008). According to Hevner, March, Park and Ram (2004) “design science creates and evaluates IT artefacts intended to solve identified organisational problems”. The design research process model by Peffers et al. (2008) as shown in Figure 3 is adopted. We apply the six steps represented in boxes in developing a performance measurement framework.

#### 3.1 Research Philosophy

In terms of research philosophy, we apply a definition of realism based on Galliers (1992) 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. This philosophy underlies the multi-method research approach.

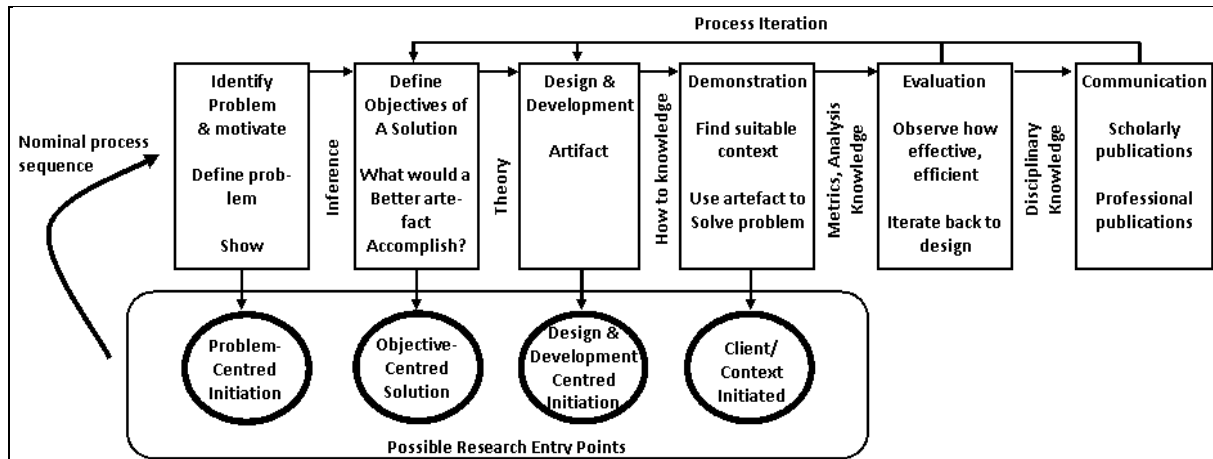


Figure 3. Design Science Method Process Model (Peppers et al. 2008)

### 3.2 Research Methodology

This study uses mixed methods from the social sciences as well as the artificial sciences to ensure both rigour and relevance is 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. This research design is appropriate for this study as it addresses relevance through application of the framework and development of theory, making a contribution to the IS body of knowledge. In the first stage of the study, a systematic literature review was undertaken to aggregate empirical evidence obtained using a variety of techniques in differing contexts (Kitchenham et al. 2009). We chose to use a systematic literature review 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 et al. 2003), software engineering and IS (Kitchenham et al. 2009).

We conducted a survey to provide a broad snapshot of ITSM benefits and specific performance metrics used to measure them. 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 that “survey research aimed at description asks simply about the distribution of some phenomena in a population or among subgroups of a population.” Open-ended and close-ended survey questions were used. Descriptive statistics were calculated on the close-ended questions and qualitative analysis was applied to the open-ended questions. The descriptive statistics included frequency distributions and cross tabulations. The qualitative data analysis of the open-ended questions was based on three main flows of activities: data reduction, data display and conclusion drawing/verification (Miles and Huberman 1994). Data reduction involved sorting then coding the responses. Data display involved creating frequency tables and charts to be used as a basis for conclusion drawing. The survey addressed “RQ1: *what types of benefits are reported from ITSM improvement initiatives?*” and partially addressed “RQ2: *Which specific metrics can be used to measure ITSM performance?*”

In depth case studies of private and public sector organisations were conducted to fully answer RQ2, “RQ3: *how can specific metrics used to measure ITSM performance be derived?*” and “RQ4: *what internal and external environmental factors influence the organisations’ selection of specific performance metrics for ITSM?*” According to Yin (2009) a case study is 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 method will enable controlled observations and deductions and allow for replication and generalisation (Yin 2009). The case study organisations were rigorously selected from the survey results. Selected organisations had identified ITSM benefits and performance measurement and were drawn from public and private sector, large and small size, profit and not-for-profit and from a wide geographic area. Following a pilot case study, interviews were conducted with six organisations in Australia. Content analysis of the case study interview transcripts and the sample documents is in progress. We use the following definition of content analysis “a systematic, replicable technique for compressing many words of text into fewer content categories based on explicit rules of coding” (Krippendorff 1980; Weber 1990). The content analysis is performed to discover and describe the focus of organisational attention on the performance measurement of ITSM. The inferences made using content analysis will be corroborated using statistical tests on the survey data. The content analysis will follow 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 organisations and integrate the findings of the case studies with survey results and literature to identify the factors that influence 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): “theoretical insights of case studies arise from methodological rigor and multiple-case comparative logic”. A criterion based evaluation of the performance measurement framework is undertaken at three levels based on feedback from a panel of experts. The three levels, based on advice from 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.

A catalogue of metrics will be developed based on the literature review, survey and case study results. The catalogue of metrics will be made available to ITSM practitioners and based on their evaluation a prototype of the ITSM performance measurement framework will be developed then evaluated by a panel of experts. The panel comprises three ITSM academics and seven industry experts. The role of the panel of experts is to provide valuable industry insights as well as ensure that the methods used are valid, rigorous and the results relevant. The panel of experts reviewed and provided advice on the questionnaire. The panel of experts will also review the case study reports, the catalogue of metrics and the performance measurement framework. The performance measurement framework prototype will be modified based on their evaluation. A contingency theory of performance measurement of ITSM will be developed from the research results.

An iteration of the research approach summarizing the research design and method is depicted in

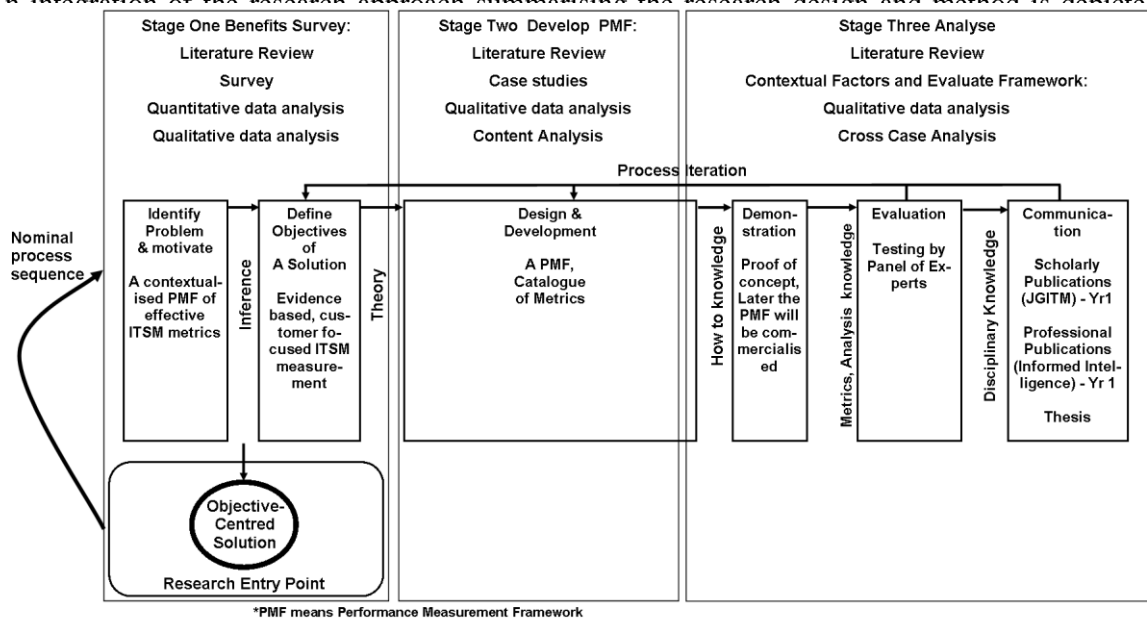


Figure 4.

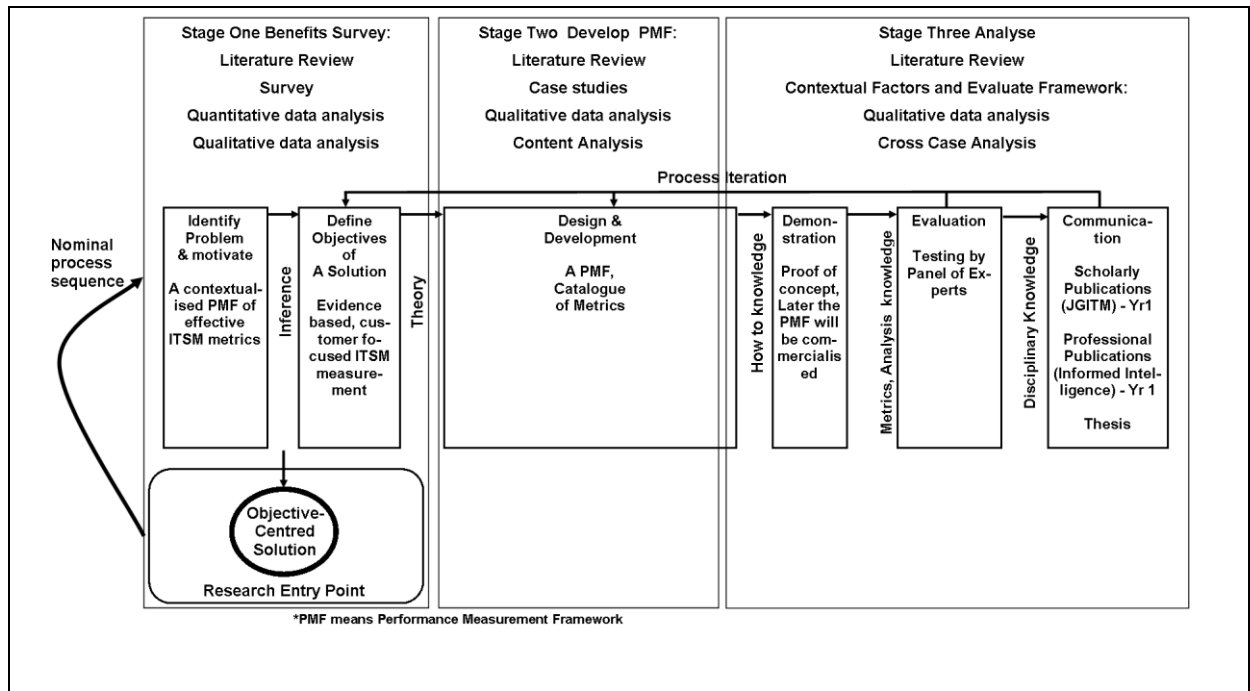


Figure 4. Research Approach - Design and Method

## 4 STUDY PROGRESS TO DATE

To date a survey of all members of itSMF Australia has been conducted and the results analysed and published in industry and academic journals. The survey findings have been published in an academic journal, (Gacenga et al. 2010) and presented at an international conference (Gacenga et al. 2011). The survey results have also been published in practitioner press (Gacenga 2010a; Gacenga 2010b) and



presented at an itSMF Australia practitioner seminar. Six case study interviews were conducted and content analysis has been performed and results submitted for consideration of publication in an international journal and conference. A metrics catalogue is under development.

Recent research in the field of ITSM is incorporated with continuing review of the literature. The next steps involve cross case analysis and development of the performance measurement framework. Development involves the design and field testing of the prototype.

## **5 RESEARCH METHODS INSIGHTS**

Reflecting on the progress to date the following insights have emerged that may be of interest to other researchers using a mixed-method approach.

Involving industry and academic members in a panel of experts has contributed to rigour in the design of the questionnaire. Significant revisions were made on the number of questions, content and format of the questionnaire based on input from the panel of experts. Pilot testing the survey questionnaire on a sample of five ITSM practitioners and three academics proved beneficial as it improved the practicality of the survey before it was administered. Online surveys are now widely used because they are easily accessible. Due to the potential for low response, we found it important to carefully consider online survey administration to ensure minimisation of non-response error before its occurrence. It is useful to include robust follow ups when using online surveys to increase the response rate. When using email it is useful to record information on email failures such as mailer daemon errors and routing to junk email as this may explain some non-response and used to improve response when making follow-ups. Where possible and necessary it would also be important in considering using random sampling so as to apply parametric analysis even when generalisation may not be planned.

The survey and case studies were integrated as we used the survey responses to select the organisations for the case studies. The case study pre-selection revealed that some of the respondents did not fully understand the survey questions. In one instance a respondent who had given details on their performance measurement practices, when contacted to participate in a case study, indicated that they may have overstated their performance measurement practices in the survey. This made the benefit of following up surveys with in-depth case studies evident. One key reason for conducting the survey was to identify the organisations for case study. The approach of surveying prior to case study proved valuable as it enabled us to have diverse representation, essential to investigating the contingency, contextual factors influencing performance measurement.

Early publication and submission of results to academic and industry outlets has been very useful. Interaction with ITSM practitioners yielded practical advice on what was considered important and valuable by industry experts. Feedback from practitioners who have read our published articles and attended our presentations have highlighted areas of interest such as contextualising factors that influence the selection of ITSM performance metrics. Academic reviewers of our work have provided valuable methodological and theoretical insights. We have re-examined our assumptions of the study based on reviewer feedback that initially appeared critical but on extra contemplation proved invaluable. We have also gained from reviewers drawn from an international pool who have at least in one case made us aware of efforts in ITSM performance measurement in a non-English speaking country that had otherwise not gained our attention.

By adopting mixed methods and engaging with academia and industry we hope to achieve the benefit of integrating rigour and relevance. By involving industry in design and evaluation we achieve relevance and application of academic methods provides necessary rigour.

### **Notes:**

ITIL® – is a registered trademark of the UK, Office of Government Commerce;

CobiT® – is a registered trademark of the Information Systems Audit and Control Association (ISACA).

## **6 ACKNOWLEDGMENTS**

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