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PERFORMANCE MEASUREMENT OF IT SERVICE MANAGEMENT: A CASE STUDY OF AN AUSTRALIAN UNIVERSITY

(RESEARCH IN PROGRESS)

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Abstract

IT departments are adopting service orientation by implementing IT service management (ITSM) frameworks. Most organisations are hesitant to discuss their ITSM performance measurement practices, tending to focus more on challenges. However there are good practices that are found amidst the challenges. We present a case study that provides an account of the performance measurement practices in the ICT Division of an Australian university. This case study was conducted with the aim of understanding the internal and external factors that influence the selection of ITSM performance metrics. It also explores how and why metrics and frameworks are used to measure the performance of ITSM in organisations. Interviews were conducted to identify the specific ITSM performance metrics used and how they were derived. It was found that a number of factors internal and external to the organisation influenced the selection of the performance metrics. The internal factors include meeting the need for improved governance, alignment of IT strategy with organisation strategy, having a mechanism to provide feedback to IT customers (university staff and students). External factors include benchmarking against others in the same industry and the choice of metrics offered by ITSM software tool adopted.

Keywords: ITSM, Service Science, Performance Measurement, Case Study.

1 INTRODUCTION

1.1 Background

The growth of the service economy has resulted in service oriented thinking as organisations attempt to increase value to their customers. 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 convergence of what is now labelled Service Science (Bardhan, Demirkan, Kannan, Kauffman, & Sougstad, 2010; Chesbrough & Spohrer, 2006; Galup, Dattero, Quan, & Conger, 2009; Maglio, Srinivasan, Kreulen, & Spohrer, 2006). In Computer Science this is evident in Infrastructure as a Service (IAAS), Software as a Service (SAAS), Service Oriented Architecture (SOA), and in Information Systems we have IT service management (ITSM) (Galup, et al., 2009). Organisations are faced with the challenge of managing IT no longer as a function but as a collection of services delivered to the customer, by administering a complex portfolio of capabilities, resources and offerings.

As more organisations embrace IT service management with a service oriented approach to managing the operations of their IT organisations, a number of ITSM frameworks, standards and models have been developed. Some of the common frameworks and models include IT infrastructure library (ITIL®) (OGC, 2007a), Microsoft® Operations Framework (MOF®) (Pultorak, Henry, & Leenards, 2008), IBM® Service Management Reference Model, HP®ITSM (van Bon, 2007) and the ITSM International Standard, ISO/IEC 20000 (ISO/IEC, 2005). Championed by the internationally active IT Service Management Forum (itSMF), ITIL has become widely adopted and recognised for providing effective management and control of IT service delivery and support (Barafort, Di Renzo, & Merlan, 2002; A Hochstein, Zarnekow, & Brenner, 2005).

One of the challenges faced by organisations adopting service orientation is the measurement of the performance of IT service management. The case study presented here is part of a study that aims to develop a performance measurement framework for IT service management. A performance measurement framework can be used by organisations to identify benefits gained from the implementation of ITSM frameworks to improve IT service. The study is funded by an Australian Research Council Linkage Project grant in partnership with Queensland Health and the IT Service Management Forum (itSMF) Australia.

1.2 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 investigated are ITSM benefits, performance metrics and external environmental factors influencing the selection of metrics. An underling theory for this framework is the contingency theory of organisations or management.

The initial phase of our study addresses the first research question: what types of benefits are reported from IT service management (ITSM) improvement initiatives by organisations? (RQ1) (Gacenga, Cater-Steel, & Toleman, 2010). The aim of this paper is to present preliminary findings from a pilot case study addressing the following research questions from the main study:

1. Which specific metrics can be used to measure ITSM performance? (RQ2)
2. How can specific metrics used to measure ITSM performance be derived? (RQ3)
3. What internal and external environmental factors influence the organisation's selection of specific performance metrics for ITSM? (RQ4)

The paper is organised as follows. Following a review of the literature on key concepts of service management and performance measurement, we present the methodology used for the case study, then results and discussions. We conclude with a summary of results, limitations of the study and future work.

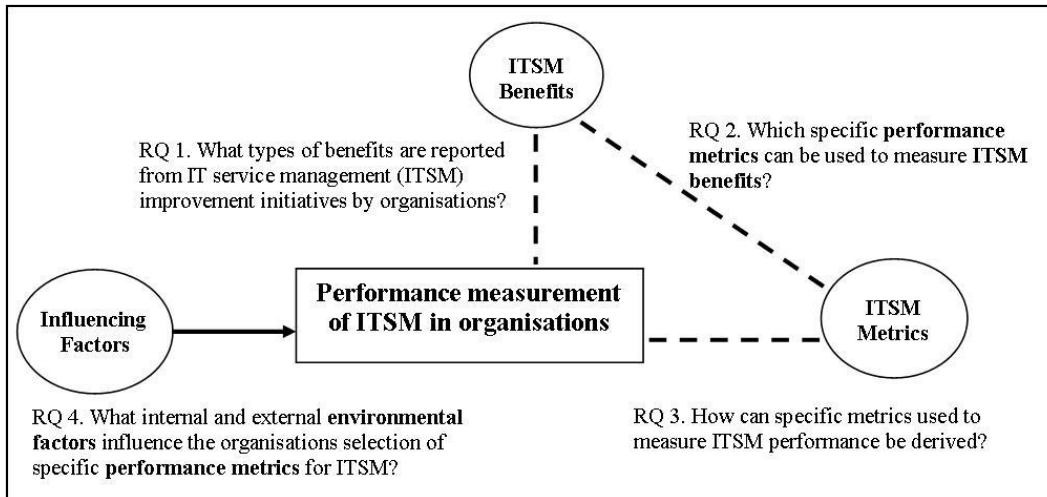


Figure 1 Conceptual Framework

2 SERVICES, SERVICE SCIENCE, SERVICE MANAGEMENT AND PERFORMANCE MEASUREMENT OF ITSM

There are various definitions of service in the literature reviewed. According to Katzan (2008, p. 2) “a service is a provider/client interaction that creates and captures value”, while Vargo et al. (2004, p. 2) define service as “the application of specialized competences (knowledge and skills) through deeds, processes, and performances for the benefit of another entity or the entity itself”. We apply the definition by OGC (2007b) “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 has been adopted as it is consistent with the other definitions and is widely adopted by the ITSM community.

Service Science has been defined 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” (Katzan, 2008, p. vii). This definition is based on that of the US National Investment and Innovation Act Sec. 1106 (US House of Representatives, 2007). We apply the definition by Maglio and Spohrer (2008): “Service science is the study of service systems, which are dynamic value co-creation configurations of resources (people, technology, organizations, and shared information)”. This definition is suitable as it aligns with information systems components of people, process, partners and technology and is consistent with the wider definition provided in the US Act which is the basis of many other service science definitions.

Service Management has been defined in different disciplines and we explored two definitions, one from IT service management and the other from Service Marketing. According to OGC (2007b): “Service Management is a set of specialized organisational capabilities for providing value to customers in the form of services”. We use the broader definition of service management by Albrecht cited in Gronroos (1994, p. 6): “Service management is a total organizational approach that makes quality of service, as perceived by the customer, the number one driving force for the operations of the business”.

ITSM performance measurement is important to organisations because of the significant value of IT investment. Gartner reports that organisations spend close to 70% of the IT budget on IT operations (Tracy, Guevara, Harcourt, & Stegman, 2006). Gartner predicted that worldwide IT spending will reach “\$3.6 trillion in 2011. In 2010, worldwide IT spending totalled \$3.4 trillion” (Gartner Inc., 2011).

Previous studies and publications have tackled different aspects of the challenging subject of the measurement of ITSM performance: the aspect of ITIL performance metrics (Barafort, Di Renzo,

Lejeune, Prime, & Simon, 2005; Brooks, 2006; Steinberg, 2006; van Grembergen, De Haes, & Amelinckx, 2003), IT service performance and quality measures (Axel Hochstein, 2004; Praeg & Schnabel, 2006), business value of ITIL (itSMF Germany, 2008; Moura, Sauve, Jornada, & Radziuk, 2006; Šimková & Basl, 2006; Yixin & Bhattacharya, 2008), ITIL process capability and maturity assessment (itSMF International, 2008; Valdés et al., 2009), software for measuring ITIL process performance (Lahtela, Jäntti, & Kaukola, 2010) and evaluation frameworks for ITIL (A Hochstein, et al., 2005; McNaughton, Ray, & Lewis, 2010). The case study reported addresses an aspect of ITSM performance measurement previously lacking in research: the factors that influence the selection of ITSM performance metrics.

3 METHODOLOGY

The pilot case study was conducted after a survey of ITSM benefits. The results of the survey were used to select the candidate organisations for the case studies. We developed the case study questions from the survey findings and literature reviewed. The interview questions were reviewed by a panel of three academic and two industry experts. Heeding advice from Yin (2009) we used a case study protocol “as part of a carefully designed research that would include an overview of the project, field procedures, questions and a guide for the report”. Our case study protocol applied the following steps: planning, data collection, data analysis, development of case study report and validation of the report (Neale, Thapa, & Boyce, 2006, pp. 5-6; Tellis, 1997, p. 11). The interview questions are provided in Appendix A.

We conducted an interview with four ICT staff members including senior managers. Two interviews were conducted on-site over several 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 we reviewed. The interviews were audio-taped, transcribed and then verified by interviewees. The case study report compiled based on information extracted from the transcript and documents reviewed. The case study report was sent to the interviewees for validation. 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 late 2010.

4 RESULTS AND DISCUSSION

4.1 Background of the university

The university has a number of campuses across Australia with a substantial number of international students. Seventy five percent of the university students access services and learning materials online. The university has fewer than 2,000 fulltime staff and an annual turnover in excess of \$200 million. The ICT Division has almost 100 staff with an annual turnover between \$5 and \$10 million. The university has a significant investment in ICT resources with ICT expenditure representing at least 10 percent of institutional expenditure and 10 percent of the organizations’ staff budget is spent on ICT staffing. To maintain confidentiality the university and respondents are not identified in this paper. Quotations from the four respondents are italicized and referenced as Manager A to D.

The ICT Division was established in 2006 following a major ICT organisational review. A key recommendation of the review was to achieve strategic planning and alignment of the previously existing distributed ICT support services. The ICT Division was formed to provide a professional, managed, efficient ICT service model across the entire university. The ICT organisation is now centralised and headed by a CTO. The ICT Division has evolved since the formation of the university back in the 1960s. Initially the ICT service was delivered through a distributed structure that was problematic, lacking strategic planning, with poorly aligned ICT support services. The new restructured ICT Division provided ICT support and services to the entire university under a

centralised organisational structure with distributed support areas. Performance measurement was identified early on as a key competency that would be important to demonstrate accountability and show alignment of what the ICT Division was doing through the achievement of the overall university strategy.

The review also led to the formation of a new section that is responsible for the overall organisational ICT performance. It reports, every six months, on a number of key performance indicators at the organisational strategy level. Manager A summed up the reporting function as *“looking at the ICT Divisions’ performance and assessing how the Division meets its constituents’ needs.”*

4.2 Description of the ITSM implementation

During the review, a number of managers researched ITSM frameworks in use at similar organisations in order to select the most appropriate one for the university. The research entailed visiting other similar organisations in the region and investigating what they were doing in terms of IT service management. Based on this research the university opted to select from a number of different frameworks and methodologies that were found to be in use. The ICT Division implemented some ITIL version 2 processes and some CobiT® processes together with the capability maturity model as part of their IT service management initiative. Aspects of ValIT® and the Balanced Scorecard (BSC) are also used. ITSM was broadly viewed to include components of governance, service management and quality assurance. The ITSM implementation began at the same time as the centralisation of the IT organisation. The implemented processes are summarised in Appendix B.

Implementation of IT service management was effected as business as usual and was not run as a standalone project. The key activities in implementation included procurement, training and ITSM software tool deployment. The software tool selected was HEAT by FrontRange Solutions® *“All this data comes from the HEAT database, which the service desk uses”* (Manager D). A consultant was engaged to guide the university in the selection of the tool, implementation of IT service management improvements and staff training. The university settled for one of the leading ITSM tools in the market that was popular with other organisations in the higher education sector. An important milestone, in process and procedure implementation, was achieved once the ICT Division staff and customers were aware of the process and procedure and knew the outcome of using the process and systems. According to Manager B success could be deemed to be achieved when *“the users know it and they do it and it is engrained; the procedures are there and they are engrained”*. Another key milestone was signalled by the full expenditure of the budget allocated for the implementation. The budget included ITIL books, training, ITSM software and the consultancy.

4.3 ITSM performance measurement framework and metrics

The performance measurement of ITSM covers the entire ICT Division. Implementation of ITSM performance measurement began with the appointment of key staff including the performance analyst, followed by the identification of key areas within the Division that needed ongoing monitoring, collection and publishing of better information and statistics. The CTO consulted with people across the university to develop the IT organisational structure as well as its performance measurement. According to Manager A, *“We were cherry-picking from a number of different frameworks and methodologies that were out there that we knew about at the time”*. The university did not select a framework for measuring the performance of ITSM but settled for a hybrid derived from frameworks such as the BSC, CobiT, ValIT, ITIL and operationalised with metrics sourced from the ITSM software tool, industry and academic literature.

The service delivery processes exhibited the best initial success in performance measurement. With the ITSM system and the ITSM software tool in place it was possible, from early on, to track incidents and requests from customers. This provided a mechanism for easy recording and reporting on incidents. This information was used by the relationship management process to demonstrate benefits for customers. Service level agreements exist with each of the faculties and university sections. These

agreements specify the service response benchmarks that the Division is aiming to achieve. The ITSM software tool provides the capability to collect and report the necessary data required to demonstrate compliance with these targets.

For the Division of ICT the objectives of performance measurement include gathering metrics and reporting on:

- the workload from particular customer groups
- the range of issues raised
- the speed and responsiveness of the service together with confirmation that the issues are satisfactorily resolved the first time
- the variations and differences that occur from one customer group to another and the ability to define the variations in order to objectively specify what the customer group expected from the ICT Division
- what is reported and actually delivered to the customer.

Ultimately it is not just about how quickly or how many jobs the ICT Division completes in a particular month but the range of jobs and their comparative importance. The mechanism dealing with assessment and prioritisation of calls through to the final resolution and completion is also important. Ensuring that the customer is kept informed regarding proposed actions and any issues that may delay final resolution are critical in maintaining customer satisfaction. According to Manager A, *“The ICT Division achieved significant success with this because of the mechanisms and processes we put in place to facilitate the conversation with our customer along the way”*.

4.4 What is measured and reported?

Performance metrics are selected to help achieve the goals of continuous improvement: benchmark against past performance, accountability, transparency, communication with customers and alignment with the overall university strategy. Manager A indicated that *“measurement was effected after establishing the management of the measurement process and identifying the indicators to measure that would provide meaningful information and benefits to our customers.”* Sample areas where performance is measured and metrics used are depicted in Table 1.

Sample Performance Areas	Sample Metrics	Sample Report
Budget expenditure particularly on software and services that are associated with core applications provided	ICT expenses, telephony costs, return on investment from implemented processes	Budget report
Project status	Scope, resources, risk	Risk review
Internet traffic, email traffic, spam, viruses	Volume of email and spam and ICT expenses, internet usage	User reference group (URG) reports
Server and network performance	Calls logged, system uptime	URG reports
Customer satisfaction and service quality	Staff technical skills, communication and empathy skills	Industry based service quality benchmark survey report
Jobs completed: categories, types and priorities of jobs	Number of requests for change (RFC) approved per month, number of RFCs with a business plan, first call resolution, calls logged, escalation times, SLA targets met	Service Level Agreement (SLA) Report
ICT Division internal metrics	Trend reports	ICT strategy committee report
Capability and how service is delivered	Maturity assessments	ICT strategy committee report
Environmental performance	E-waste collected	ICT strategy committee report
Business impact of implemented process	Quality Management Framework	ICT strategy committee report

Table 1 Sample of Performance Areas, Metrics and Reports

Reports are presented in a variety of formats including dashboards, web pages, meetings (for example relationship meetings, user reference groups, strategy committee meetings), spreadsheets, charts,

traffic light reports, and simple graphs that allow customers to easily see performance status at a glance. According to Manager B *“The reports that came out of HEAT that we would take along to the relationship meetings and stuff like that basically showed the jobs that we’d do, categories of the jobs, what type, you know, we’ve got priorities, whether they were for this service or the next service.”*

4.5 Factors influencing metrics selection

A number of factors internal and external to the ICT Division influenced the selection of the performance metrics. The internal factors included meeting the need for improved governance, alignment of IT strategy with the university’s strategy, having a mechanism to provide feedback to ICT customers while dealing with university staff who are protective of their areas of responsibility. Benchmarking the university against others provided external factors which exerted significant influence on the metrics selected. Another external factor originated from the ITSM software tool. A summary of the successes and challenges of performance measurement of ITSM is listed in Table 2. The performance measurement successes and challenges listed in Table 2 may be due to a number of reasons such as the limitations of the selected tool or how the change to ITSM was implemented.

Performance measurement successes
Developing performance measurements over time and incrementally improving them.
Service Level Management meetings with customer groups accompanied by reports help to strengthen the relationship between ICT and customers.
Performance measurement of infrastructure remains work in progress in the last four years but the Division is now at the stage where it can better measure infrastructure. Infrastructure is being consolidated and standardised which will assist to make future monitoring and measurement easier.
The transition from distributed servers to integration and consolidation of the server and network environment will result in a more consistent way of measuring the infrastructure.
Performance measurement challenges
Putting the performance measurement system and IT service management together and developing the objectives at the same time as formation. It is difficult to do everything all at once. <i>“So you can’t do everything at once and you need to build momentum and you need to build confidence in the value that the information is providing” (Manager A).</i>
Implementation of performance measurement of infrastructure has been slower due to the complexity of the environment. It is not easy to implement ITSM performance measurement in an organisation that has not used one before. A two year delay of a major ICT review that was meant to occur in 2008 has led to a level of inertia leading to uncertainty and this may be symptomatic of the organisation taking on too much as it tries to achieve more with less.
Delivering a consistent service that ensures continuity and confidence across a geographically dispersed organisation. Achieving standardisation and consistency requires commitment over time.
Resources: Low staffing levels, limited funding and competing priorities. Developing a culture where performance measurement is not perceived as an <i>“extra administrative task; we need to automate as much as possible” (Manager B).</i>
Overcoming cultural bias and the natural tendency for staff to feel threatened by performance measurement and fear regarding the purpose of metrics. Ensuring that performance measurement is focused on improving processes, availability, and reliability of ICT services and systems and is not seen as focusing on individual performance.
Completing the feedback loop in the Plan-Do-Check-Act cycle is a challenge as a gap is realised after the act phase moving into the re-plan phase.

Table 2 Performance measurement successes and challenges

4.6 Lessons learnt by the ICT Division

Performance measurement provides the ICT Division with information on the actual ICT needs of the university and how these needs are met. This assists the Division contribute to improving the organisation through better informed decisions. Manager A said *“for example from the metrics*

collected we are better positioned to predict future capacity constraints and plan for providing, for example, more bandwidth, replace servers, or identify potential bottlenecks in processes or systems”.

The Service Desk teams of the ICT Division interface with staff and students regularly and directly while the back office teams work with limited customer interface. The back office teams tend to be role oriented and this can lead to a mismatch in the sense of urgency or priority of calls. Service Delivery requests to back office teams may be treated as another task on the job and the back office team may not appreciate the urgency and impact of the job to the customer as clearly as the front office teams. According to Manager C: *“I would say all staff across the [ICT] Division are really involved in it. Without their help we can’t really report on anything so it’s across the whole Division”.*

When asked how the Division determines the effectiveness of the metrics, Manager A’s response was *“we know our ITSM performance metrics are effective: if we are getting minimal negative feedback and when negative feedback is the exception. When we are delivering our services in a manner that is consistent with our customers’ expectations in terms of responsiveness, timeliness, consistency and quality and we have the feedback and evidence to demonstrate that we are delivering what they want.”*

Another important lesson learnt is that the professionalism of the person dealing with an incident, the experience they bring to the job, their knowledge, ability to solve the issue immediately without delay and need for a repeat fix, are all critical to the customer’s experience of the service. *“Good IT service is not just about the speed at which we might respond to something. It’s some of the values that go around that service – empathy, communication and professionalism”* (Manager A), *“We certainly understand the importance of trying to implant these types of things”* (Manager B).

The University has invested significant time, effort and human resources in its measurement of the performance of ITSM and evidently, has sustained improvements and learnt valuable lessons.

5 CONCLUSION

In summary the pilot case study shows that a number of factors internal and external to the organisation influenced the selection of the performance metrics. The internal factors include meeting the need for improved governance, alignment of IT strategy with organisation strategy, and having a mechanism to provide feedback to IT customers (university staff and students). External factors include benchmarking against others in the same industry and the choice of metrics offered by ITSM software tool adopted.

Prior to the pilot case study, a survey of all members of itSMF Australia was conducted and the results analysed. The survey findings were published in an academic journal, (Gacenga, et al., 2010) and presented at an international conference (Gacenga, Cater-Steel, & Toleman, 2011). The survey results have also appeared in the industry press and were presented at a practitioner forum. The pilot case study reported here is research in progress. Following the pilot case study, the interview questions were revised and used to study ITSM measurement at six large organisations. Content analysis of the case study interview transcripts and documents collected is being conducted. Based on the results, a catalogue of ITSM performance metrics and a performance measurement framework is under development. Development involves the design and field testing of the prototype framework. From the study findings and cross-case analysis, contingency theory is being extended to address the performance measurement of IT service management.

It is recognised that the findings presented here are limited as they represent only one organisation. In addition, although the interview questions had been pretested by ITSM academics and practitioners, the pilot case study exposed several flaws. Consequently improvements were made to the sequence, clarity and language of the interview questions.

Despite the challenges experienced by organisations implementing service oriented IT service management frameworks, there are actual performance benefits realised. Equally challenging is the

measurement of the performance of ITSM which is influenced by internal and external factors. A key lesson learnt by the organisation is that performance measurement provides the IT department with information on how it meets the organisation's requirements.

Notes:

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

CobiT® and ValIT® – are registered trademarks of the Information Systems Audit and Control Association (ISACA).

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Appendix A Interview Questions

Interview Question	Research Question
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 this 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.	

Appendix B ITIL and CobiT Implemented Processes

ITIL v2 Implemented Processes	Incident Management
	Service Desk Function
	Service Level Management
	Release Management
	Change Management
CobiT Processes at Maturity Level 2 (defined)	Problem Management (work in progress)
	Define a strategic IT plan
	Define the IT processes, organisation and relationships
	Manage projects
	Identify automated solutions
	Manage service desk and incidents
	Acquire and maintain application software
	Acquire and maintain technology infrastructure
	Procure IT resources
	Install and accredit solutions and changes
	Define and manage service levels
	Educate and train users
	Manage changes
	Manage problems
	Ensure continuous service
Ensure systems security	
Manage the physical environment	

Table B 1 Implemented ITSM Processes

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