

## Measuring the Performance of Service Orientated IT Management

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### Abstract

The growth of the service economy has resulted in service-oriented thinking. IT departments have increasingly adopted IT service management (ITSM) frameworks, particularly the IT infrastructure library (ITIL). Despite the appeal and the potential to realise benefits, the practice of ITSM is hindered by difficulty in measuring performance. Using a systematic literature review, survey and qualitative analysis, we analyse the performance measurement of the three most implemented ITIL processes: change, incident and problem management. This paper offers an empirical analysis and proposes an approach to organising ITSM performance metrics. The findings of a survey of 203 IT service managers conducted in 2009 are presented. The findings show that despite the proliferation of performance metrics, organisations implementing ITSM frameworks report challenges due to lack of expertise, limited resources and poor engagement within business.

**Keywords:** ITSM, ITIL, Performance Measurement, Balanced Scorecard.

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## INTRODUCTION

Previous ITSM studies have primarily focused on adoption and benefits but there is little research on the performance measurement of ITSM. Organisations have adopted ITSM frameworks such as IT infrastructure library (ITIL®) (OGC 2007) to achieve service oriented management of their IT/IS operations. 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 practising ITSM report realisation of benefits in cost savings and standardisation in delivery of IT service and support. The objective of the Australian Government Information Management Office (AGIMO) is to make Australia a leader in the application of information and communication technologies (ICT) to government services (Australian Government 2008) . An independent review of AGIMO policy by found that “agency governance was weak on ICT efficiency and there needed to be adequate capability for organisations to realise benefits from ICT projects. There was no formal means of assessing whether agencies had the capability to commission, manage and realise benefits from ICT projects ” (Reinecke 2010). This study is motivated by the potential to realise benefits from service orientation through ITSM initiatives. Among other factors, challenges in measurement and reporting of the performance of ITSM may be hindering the effective application of IT services.

The objective of this paper is to investigate the practice and issues associated with performance measurement of ITSM. The paper answers the following research questions:

- RQ1 which specific performance metrics can be used to measure ITSM benefits?
- RQ2 what are the challenges of measuring and reporting ITSM benefits?

A systematic literature review is followed by descriptive and qualitative analysis of results of a survey. Three processes are examined: change, incident and problem management. For each of these processes metrics, measurement and reporting challenges are then discussed. The results are structured according to the BSC and explored before conclusions are provided. Implications for theory and practice are considered.

The next section outlines the systematic literature review strategy performed on academic and industry literature. The review focuses on the importance and scope of performance measurement, approaches to IS performance measurement, and ITSM performance measurement.

## LITERATURE REVIEW

### Literature review strategy

A systematic literature review is undertaken to aggregate empirical evidence obtained using a variety of techniques in differing contexts (Kitchenham et al. 2009). The literature review progresses from general areas of organisation performance measurement and ITSM to the specific area of ITSM performance measurement. A review protocol was used to enhance the outcomes of the literature search.

A literature search was conducted on academic and industry publications of empirical and theoretical studies (Gacenga et al. 2010). In reviewing ITSM literature it is apparent that more has been published in industry press than in academia and it was therefore necessary to include

both areas. Articles from peer reviewed academic publications were supplemented by high quality practitioner journals. Literature from 1980 to the present on performance measurement and ITSM was reviewed. 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 et al. 2004). In searching for literature in ITSM and performance measurement the following keywords were used: 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. Literature searches were performed on Google scholar and AIS basket of eight journals. The articles captured in the search were reviewed and those addressing either performance measurement, IS, ITIL or ITSM performance measurement were further reviewed and analysed.

### **Review of previous studies**

Measuring organisational performance is described as the ultimate question in organisational analysis (Hall 1980). Performance measurement is: “the process of quantifying the efficiency and effectiveness of action” (Neely et al. 2005). Performance measurement should be understood as a broad term that “covers both overall economic and operational aspects” (Tangen 2005) including measures of productivity, profitability and quality.

The challenge of measuring performance has been recognised at the organisational level and a number of performance measurement frameworks and many metrics have been proposed such as SERVQUAL (Parasuraman et al. 1985), Sink and Tuttle model (Sink and Tuttle 1989), results and determinants framework (Fitzgerald et al. 1994), balanced scorecard (Kaplan and Norton 1992), performance pyramid (Lynch and Cross 1993) and the performance prism (Neely et al. 2002). At the IS/IT functional level a number of approaches have been undertaken, for example, IS success (DeLone and McLean 2003), IS productivity (Dedrick et al. 2003; Weill 1992), IS quality (Chang and King 2005; Pitt et al. 1995), IS effectiveness (Scott 1995; Seddon et al. 2002) and IS performance (Marchand and Raymond 2008; Saunders and Jones 1992; Son et al. 2005; van der Zee and de Jong 1999).

The measurement of the performance of ITSM 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 (McNaughton et al. 2010).

The value of IT expenditure makes the measurement of the performance of ITSM crucial. Gartner reports that organisations have a large expenditure on IT with the major share, estimated at 70 percent, being spent on IT operational expenses. They predict that worldwide IT spending will reach “\$3.6 trillion in 2011, a 5.1 percent increase from 2010. In 2010, worldwide IT spending totaled \$3.4 trillion, up 5.4 percent from 2009 levels” (Gartner Inc. 2011).

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 and Ben-Zvi 2011). They state that alignment continues to be elusive for four reasons, including organisations’ need to address many strategic alignment maturity components such as IT metrics.

It is claimed 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 and Norton 1992). It can be used to align departmental goals to the overall business strategy. Each BSC perspective has goals and measures. Strategic measures can be viewed, not as performance indicators in four independent perspectives, but as a series of cause-and-effect linkages among objectives in the four BSC perspectives (Kaplan and Norton 2004). In a paper discussing the importance of non-financial measures, Ittner and Lacker (2003) 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”. The BSC approach provides a common language for metrics and a bridge between IT and business since many senior business managers are familiar with it (van der Zee and de Jong 1999). The BSC is one of the most widely adopted performance management methodologies (Praeg and Schnabel 2006). BSC uses a mix of financial and non-financial indicators for performance measurement and management to plan, execute and monitor business strategies.

The BSC has been used in ITSM theoretical studies by other researchers for example, Donko and Traljic (2009) use the BSC for performance estimation of ITIL processes, Moura et al. (2006) use BSC perspectives to group business processes to facilitate IT-business personnel communication and Praeg et al. (2006) use the BSC to provide a multi-perspective approach for measuring IT-service performance. The BSC is also used to classify ITIL service management benefits in the ITIL books (2002, 2007).

## RESEARCH APPROACH

A study was conducted on ITSM benefits and specific performance metrics used to measure them. A member of itSMF Australia (itSMFA) is the survey unit of analysis. 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. The survey used an online questionnaire as it was low cost, easily accessible, provided a fast response and data collected would be available in electronic format (Sheehan 2001). Following the advice of Pinsonneault and Kraemer (1993) about survey research, descriptions and comparisons between distributions are provided.

The design of the qualitative data analysis is 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. The qualitative survey responses collected were downloaded to a Microsoft Excel spreadsheet. The qualitative responses were in free text and the first step involved identifying each unique response and recording it into a column on the spreadsheet. Additional columns on the spreadsheet were used to classify each metric used, measuring challenges and reporting challenges into the BSC perspectives. The BSC was used as it provides a method with which managers are familiar and was the most commonly used performance measurement framework in the survey (Gacenga et al. 2010). The metrics were allocated into the Data display involved creating frequency tables and charts summarising the BSC perspective classification of each metric used, measuring and reporting challenge. The data display was reviewed by the researchers and used as a basis for drawing conclusions.

## **Population and sample**

The survey used a non-probability purposive, expert sample of Australian ITSM practitioners. The sampling frame used was the database of itSMFA members in 2009. This sample was selected because the membership list was accessible to the researchers, provided a clearly defined membership and itSMF is the only internationally recognised and independent organisation dedicated to ITSM. The sample represents a subgroup of a population of IT management practitioners.

## **Questionnaire development**

The questionnaire comprised four sections: demographics; ITSM process implementation; ITSM benefits measurement; and ITSM challenges. The demographic questions used for this survey were drawn from previous ITIL adoption surveys (Cater-Steel et al. 2009). The survey questionnaire was designed and developed then evaluated by a panel of ten ITSM academic and industry experts. A pilot test was conducted on a sample of five ITSM practitioners and three academics before the survey was improved then administered. The testing helped to establish the reliability and validity of the questionnaire (Creswell 2009). The survey had 25 questions that could be completed in 20 minutes. In November 2009, a survey was conducted in partnership with itSMFA. A link to the online questionnaire was emailed to all 2,085 members in November 2009. To increase the response rate a prize draw of a netbook computer was offered and a reminder emailed.

## **RESULTS**

The survey received 263 responses achieving a return rate of 13 percent. The modest return rate may have been due to timing of follow-up, confidentiality concerns, or mistaking the email invitation as Spam (Sills and Song 2002). From the returned responses, 215 were considered complete. Two preliminary steps were undertaken prior to data analysis. Analysis of the email addresses provided by respondents revealed that in 35 cases, multiple questionnaires were received from some large organisations. These multiple responses were tested for consistency to validate the assumption that the responses of practitioners reflected the organisations' response. As the respondents worked in different ITSM roles and different locations it was decided to include these questionnaires as benefits derived and metrics used were essentially unique for each respondent. The responses also serve the purpose of verifying the information provided on the organisation and ITIL implementation. Bias was not detected when comparing successive "waves" of the questionnaire.

## **Characteristics of sample**

For this paper, data analysis is performed only on the 203 responses from organisations implementing ITIL. Almost all respondents used ITIL as their primary ITSM framework (95%). The respondents were drawn from an even spread of organisation sizes. Organisations in both the public and private sectors in Australia were represented. Practitioners reported a wide cross section of organisation positions with more than half of the respondents holding managerial roles.

## ITIL practice, related ITSM initiatives and performance frameworks

Most respondents indicated having multiple ITIL roles in the ITSM. A total of 471 responses for ITIL roles were reported. The three most frequently specified ITIL roles were Service Level Manager (13%), Change Manager (11%) and Incident Manager (8%).

In terms of duration of ITIL implementation, most had been using ITIL for less than four years (68%) and 22 percent between four and ten years. The most commonly implemented ITIL processes were change management, incident management, problem management, service level management and the service desk function. When asked to select the first three processes in sequence of implementation, incident management (52%), service desk function (27%) and change management (12%) led as the first process implemented.

The majority (83%) of organisations implemented additional frameworks alongside ITIL as part of the IT service improvement initiatives. Prince2® (IT project management framework) (61%); ISO 9000 (the International standard for quality management systems); ISO/IEC 20000 (the International ITSM standard) (37%) and CobiT (37%) were the most frequently cited.

The survey results indicate that the BSC (19%) and the closely related IT BSC (14%) were the most popular performance measurement frameworks used by itSMFA members. The second largest number (45%) of members selected “not applicable” and “do not know” to the same question. A variety of other responses (6%) included, maturity self-assessments, organisation-specific and contract-based assessments.

## Specific performance metrics used to measure ITSM benefits

The analysis of performance metrics was performed for the top three implemented ITIL processes: change, incident, and problem management. Classification into the BSC perspectives was done by one researcher then reviewed by another. Metrics were allocated to the BSC perspectives based on guidance from the ITIL continual service improvement book (OGC 2007).

BSC Perspective	Customer	Internal business	Innovation & learning	Financial
Change management metrics	(30%) “Number of successful changes implemented.” ID # 178	(44%) “Reduced emergency changes and reduction in failed changes.” ID# 98	(26%) “Number of incidents caused by change.” ID# 144	(0%)
Incident management metrics	(12%) “Customer Satisfaction” ID# 19	(82%) “Percentage calls closed at first point” ID# 168	(6%) “Addressing specific types of frequent incidents to avoid re-occurrence” ID# 175	(0%)
Problem management metrics	(2.5%) “Avoidance of Service Penalties for SLA breaches” ID# 155	(90%) “Number of repeat incidents” ID# 125	(7.5%) “ Incident trend by classification” ID# 4	(0%)

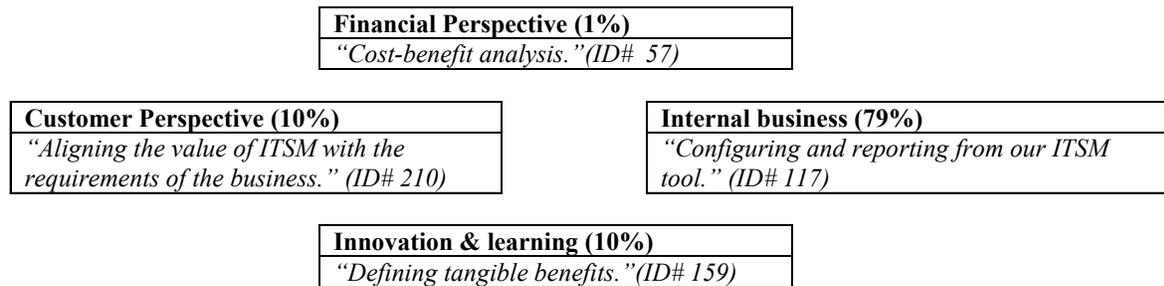
**Table 1.** Proportions of change, incident and problem management process metrics along BSC perspectives

In relation to the change management process (95 responses) almost half of the metrics were mapped to the internal business perspective (44%). In relation to the incident management process (98 responses) the internal business perspective (82%) received the highest number of responses. For the problem management process (40 responses) the internal business perspective (90%) scored the highest number of responses as shown in

**Table 1.** None of the reported metrics for change management, incident management and problem management related to the BSC financial perspective.

### Challenges in measuring benefits

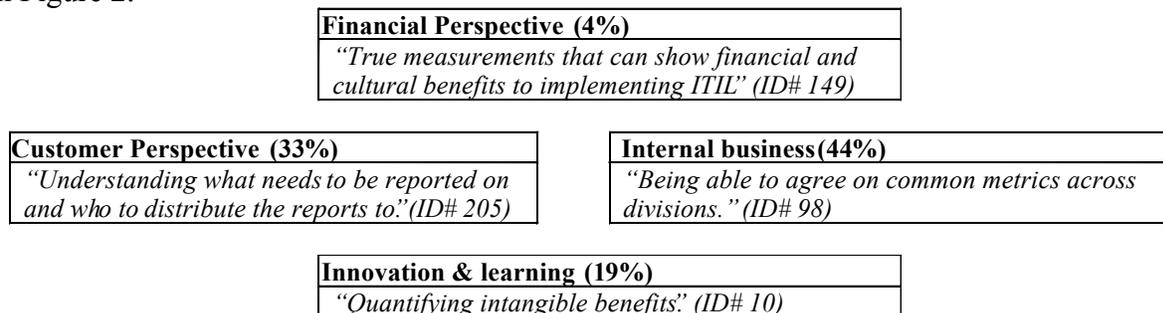
In response to the question on the single biggest challenge in measuring ITSM benefits, 100 responses in total were provided. These were analysed and aggregated along the four BSC perspectives based on advice from the ITIL continual service improvement book (OGC 2007). The perspective with the most challenges reported was internal business perspective (79% of responses) as represented in Figure 1 with an example of each. The customer perspective and innovation and learning perspective each had 10 percent of the responses. A single response was mapped to the BSC financial perspective.



**Figure 1.** Proportion of top challenges of measuring ITSM benefits

### Challenges in reporting benefits

When asked for the single biggest challenge in reporting ITSM benefits, the leading aggregated category was internal business perspective (45%), followed by customer perspective (34%), innovation and learning perspective (19%) and financial perspective (3%) as summarised in Figure 2.



**Figure 2.** Proportion of top challenges of reporting ITSM benefits

## DISCUSSION

### **Which specific performance metrics can be used to measure ITSM benefits? (RQ1)**

There is an evident gap in metrics along the financial perspective. It was considered odd that there was a total lack of metrics identified at the process level along the BSC financial perspective. An explanation may be that the majority of respondents had ITIL implementations that were four years or less and they may still be in the early stages of ITSM adoption. Incident management was the first implemented process for the majority of respondents and it also scored the highest number of metrics and benefits. It appears that the longer the processes had been used the higher the frequency of benefits and metrics reported. Reporting benefits for change, incident and problem management was occurring mainly at the operational level of management. Much less reporting was occurring to the tactical and strategic levels of management.

### **What are the challenges of measuring and reporting ITSM benefits? (RQ2)**

From the comments provided by the respondents, it is clear that the major measuring and reporting challenges stem from three sources: lack of measurement expertise, limited resources and poor engagement within the business.

A consistent theme in the comments regarding measurement was the admission that the practitioners lack measurement expertise e.g. “knowing what metrics to capture” (ID# 30). A related issue was concerns about the data quality of the measures undertaken e.g. “consistency/integrity of data” (ID# 7, 43, 78), “accurate recording of data” (ID# 23, 144, 146, 177), “quality of data” (ID# 171).

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), “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). The challenge of intangible benefits confirms Seddon et al.'s (2002) observations that this was among the most important difficulty identifying and measuring IS benefits.

Benefits may not be realised in the short term but over time, e.g. “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). This time delay or lag is identified by Schryen and Bodenstein (2010) as a key issue in their classification of IS business value research. The challenges from the BSC internal perspective may be explained by the time delay in realising ITSM benefits.

It is apparent from the comments that practitioners who know what to measure complain of insufficient resources in terms of time e.g. “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 e.g. “effective tool that isn't labour intensive” (ID# 22), “configuring and reporting from our ITSM tool” (ID#136).

Measuring and reporting performance to multiple stakeholders increases the complexity of the task e.g. “defining reporting requirements to meet the needs of multiple customers” (ID# 78); “Being able to slice and dice the data in different ways to present it to different parts of the organisation” (ID# 138). 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.

Communication challenges reported highlight the presence of a “disconnect” between IT and the business defined as a “conflict, pervasive yet unnatural, that has misaligned the objectives of executive managers and technologists and that impairs or prevents organizations from obtaining a cost-effective return from their investment in information technology” (Wang 1994). Many practitioners indicated that their efforts to engage with business are futile. Examples of the frustration experienced by practitioners: “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), “getting senior managers to take action on measures” (ID# 71). Furthermore, some ITSM staff fear the outcome of reporting to senior management: e.g. “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), “explaining results good or bad in a way that makes sense” (ID# 51).

## CONCLUSION AND IMPLICATIONS

In summary ITSM practitioners articulated metrics used but also reported challenges measuring and reporting ITSM performance due to lack of expertise, limited resources and poor engagement within business. Few of the reported ITIL process specific metrics were found in the financial perspective. This may point to IT practitioners having a weakness in financial measurement and reporting of process specific benefits.

The study reported in this paper makes a contribution by providing a snapshot along BSC perspectives of the actual ITIL metrics and challenges of measuring and reporting ITSM process implementations. This paper addresses the enduring challenge of performance measurement that is crucial for organisations undertaking ITSM initiatives in their efforts to improve their IT service.

IT service management demands the measurement, evaluation and improvement of IT service processes. However, the use of measurement and analysis in ITSM is not straightforward. In addition to knowledge of service processes, it requires knowledge of the concepts of measurement and how to practically apply such concepts.

### Implications for theory

The study contributes to theory by presenting a systematic literature review of performance measurement of ITSM and applying the balanced scorecard approach in a qualitative analysis of survey results.

Our study extends current literature on performance measurement using the BSC by applying it to classify the performance measurement practices of organisations using ITIL. Previous literature has focused on prescribing the use of BSC on elements of IT service management such as service level management (van der Zee and de Jong 1999; van Grembergen et al. 2003). The BSC has been used in IS by previous studies but in this paper it was used to examine and illustrate the performance measurement practices of ITSM. This paper extends and applies the BSC in summarising current metrics used, and challenges faced in measuring ITSM performance for the top three implemented ITIL processes: problem management, incident management and change management.

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 (2011) and not yet fully addressed in theory.

### **Implications for practice**

Although there has been a broad adoption of ITSM frameworks, particularly ITIL, it is not generally accompanied by the practice of ITSM performance measurement. It may be beneficial, in the initial phases, for organisations to implement performance measurement processes. Performance measurement concepts should be included in ITIL foundation training that is usually undertaken as part of ITIL implementation.

Respondents could list benefits and metrics for the survey, but encountered many difficulties in measuring and reporting benefits in their organisations. Measurement problems may be 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 may be evidence that having metrics without an organising framework will not alleviate the ITSM performance measurement challenges.

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 may 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 find out what business wants reported, and then can 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 results show that operational level ITIL processes are the most frequently adopted and performance measurement and reporting is mainly occurring at the operational level. The majority of ITIL metrics, change management (44%), incident management (82%) and problem management (90%), are reported along the internal business perspective. This may indicate that IT functions are internally focused and are yet to achieve a customer focus. Managers need to address the alignment of business and IT by use of performance metrics, as there is clearly an existing gap.

### **Limitations and future research**

The study used a cross-sectional survey though a more detailed understanding may be provided by a longitudinal survey. This study described and analysed the performance measurement practices of the top three implemented ITIL processes. Future work will involve analysing the performance measurement practices on the remaining ITIL processes and developing a catalogue of ITSM metrics and a performance measurement framework. To do this, content analysis of case study interviews and documents will be conducted on organisations that are implementing ITSM and using performance measurement frameworks. This study may encourage future research to improve understanding of the performance measurement of ITSM.

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## REFERENCES

- Australian Government. (2008) "The Australian Government Information Management Office."
- Barafort, B., Di Renzo, B., Lejeune, V., Prime, S. and Simon, J.-M. (2005) "ITIL based Service Management measurement and ISO/IEC 15504 Process Assessment: A win-win opportunity," *SPICE Conference*, Austria.
- Barafort, B., Di Renzo, B. and Merlan, O. (2002) "Benefits resulting from the combined use of ISO/IEC 15504 with the Information Technology Infrastructure Library (ITIL)," *4th International Conference on Product Focussed Software Development and Process Improvement (PROFES)*.
- Brooks, P. (2006) *Metrics for IT Service Management*, 1st ed. Van Haren Pub., Zaltbommel, Netherlands.
- Cater-Steel, A., Tan, W.-G. and Toleman, M. (2009) "itSMF Australia 2008 Conference: summary of ITSM standards and frameworks survey responses." University of Southern Queensland, Toowoomba, Australia.
- Chang, J. and King, W. (2005) "Measuring the performance of Information Systems: A functional scorecard," *Journal of Management Information Systems* 22 (1), pp 85-115.
- Creswell, J.W. (2009) *Research design: qualitative, quantitative, and mixed methods approaches*, 3rd ed. Sage Publications, Thousand Oaks.
- Dedrick, J., Gurbaxani, V. and Kraemer, K.L. (2003) "Information Technology and economic performance: A critical review of the empirical evidence," *ACM Computing Surveys* 35 (1), pp 1-28.
- DeLone, W.H. and McLean, E.R. (2003) "The DeLone and McLean model of Information Systems success: A ten-year update," *Journal of Management Information Systems* 19 (4), pp 9-30.
- Donko, D. and Traljic, I. (2009) "Measurement of service effectiveness and establishment of baselines," *WSEAS Transactions on Information Science and Applications* 6 (8), pp 1310-1319.
- Fitzgerald, L., Johnston, R., Brignall, S., Silvestro, R. and Voss, C. (1994) *Performance measurement in service businesses*. CIMA, Cambridge.
- Gacenga, F., Cater-Steel, A. and Toleman, M. (2010) "An International analysis of IT Service Management benefits and performance measurement," *Journal of Global IT Management* 13 (4), pp 28-63.
- Gartner Inc. (2011) "Quarterly IT spending forecast." Gartner Inc.
- Gomes, C.F., Yasin, M.M. and Lisboa, J.V. (2004) "A literature review of manufacturing performance measures and measurement in an organizational context: A framework and direction for future research," *Journal of Manufacturing Technology Management* 15 (6), pp 511-530.
- Hall, R.H. (1980) "Effectiveness theory and organisational effectiveness," *Journal of Applied Behavioral Science* 16 (4), pp 536-545.

- Hochstein, A. (2004) "Managing IT service quality as perceived by the customer: The service oriented IT SERVQUAL," *Proceedings of the International Telecommunications Society (ITS) 15th Biennial Conference*, Berlin.
- itSMF Germany. (2008) "Total Value of IT (TVITEM)." itSMF Deutschland e.V., p Presentation to the Annual Congress 2008 in Neuss.
- itSMF International. (2008) "Self Assessment (ITIL V2)."
- Ittner, C.D. and Lacker, D.F. (2003) "Coming Up Short on Nonfinancial Performance Measurement," *Harvard Business Review* (November), pp 1-9.
- Kaplan, R. and Norton, D. (2004) "The strategy map: Guide to aligning intangible assets," *Strategy and Leadership* 32 (5), pp 10-17.
- Kaplan, R.S. and Norton, D. (1992) "The Balanced Scorecard-Measures That Drive Performance," *Harvard Business Review* 70 (1), pp 71-79.
- Kitchenham, B., Brereton, P., Budgen, D., Turner, M., Bailey, J. and Linkman, S. (2009) "Systematic literature reviews in Software Engineering - A systematic literature review," *Information and Software Technology* 51 (1), pp 7-15.
- Lahtela, A., Jäntti, M. and Kaukola, J. (2010) "Implementing an ITIL-based IT Service Management measurement system," in: Marko, J., Jukka, K. (Eds.), *Fourth International Conference on Digital Society*, St. Maarten, Netherlands Antilles, pp 249-254.
- Luftman, J. and Ben-Zvi, T. (2011) "Judicious IT investments continue post-recession ", *CIO Net*. CIONet International.
- Lynch, R.L. and Cross, K.F. (1993) *Measure up!: yardsticks for continuous improvement*. Brackwell Business, Cambridge, Mass.
- Marchand, M. and Raymond, L. (2008) "Researching performance measurement systems: An information systems perspective," *International Journal of Operations & Production Management* 28 (7), pp 663 - 686.
- McNaughton, B., Ray, P. and Lewis, L. (2010) "Designing an evaluation framework for IT Service Management," *Information & Management* 47 (4), pp 219-225.
- Miles, M.B. and Huberman, A.M. (1994) *Qualitative data analysis: an expanded sourcebook*, 2nd ed. SAGE, Thousand Oaks, Calif.
- Moura, A., Sauve, J., Jornada, J. and Radziuk, E. (2006). *A quantitative approach to IT investment allocation to improve business results*, Proceedings of the Seventh IEEE International Workshop on Policies for Distributed Systems and Networks, pp. 87-95.
- Neely, A., Adams, C. and Kennerley, M. (2002) *The Performance Prism: the scorecard for measuring and managing business success*. Prentice Hall Financial Times, London.
- Neely, A., Gregory, M. and Platts, K. (2005) "Performance measurement system design: A literature review and research agenda," *International Journal of Operations & Production Management* 25 (12), pp 1228 - 1263.
- Norreklit, H. (2000) "The balance on the Balanced Scorecard a critical analysis of some of its assumptions," *Management Accounting Research* 11 (1), pp 65-88.
- OGC. (2002) *Planning to implement service management*. TSO, London.
- OGC. (2007) *Continual service improvement*. TSO, London.
- Parasuraman, A., Zeithaml, V.A. and Berry, L.L. (1985) "A conceptual model of service quality and its implications for future research," *The Journal of Marketing* 49 (4), pp 41-50.
- Pinsonneault, A. and Kraemer, K.L. (1993) "Survey research methodology in management information systems: an assessment," *Journal of Management Information Systems* 10 (2), pp 75-105.

- Pitt, L., Watson, R. and Kavan, C. (1995) "Service quality: A measure of Information Systems effectiveness," *Management Information Systems Quarterly* 19 (2), pp 173-187.
- Praeg, C. and Schnabel, U. (2006) "IT-Service Cachet - Managing IT-Service performance and IT-Service quality," *Proceedings of the 39th Hawaii International Conference on System Sciences*. IEEE CS, Hawaii.
- Reinecke, I. (2010) "Independent review of implementation of the ICT reform program." Commonwealth of Australia.
- Saunders, C.S. and Jones, J.W. (1992) "Measuring performance of the Information Systems function," *Journal of Management Information Systems*. M.E. Sharpe Inc., pp 63-82.
- Schryen, G. and Bodenstein, C. (2010) "A Decision-Theoretic foundation of IS business value research," *18th European Conference on Information Systems*, Pretoria.
- Scott, J.E. (1995) "The measurement of Information Systems effectiveness: Evaluating a measuring instrument," *SIGMIS Database* 26 (1), pp 43-61.
- Seddon, P., Graeser, V. and Willcocks, L. (2002) "Measuring organizational IS effectiveness: An overview and update of senior management perspectives," *SIGMIS Database* 33 (2), pp 11-28.
- Sheehan, K.B. (2001) "E-mail survey response rates: A review ", *Journal of Computer-Mediated Communication*
- Sills, S.J. and Song, C. (2002) "Innovations in survey research," *Social Science Computer Review* 20 (1), pp 22-30.
- Šimková, E. and Basl, J. (2006). *Business value of IT*, Systems Integration Conference, Prague.
- Sink, D.S. and Tuttle, T.C. (1989) *Planning and measurement in your organization of the future*. Industrial Engineering and Management Press, Norcross, Ga.
- Son, S., Weitzel, T. and Laurent, F. (2005) "Designing a process-oriented framework for IT performance management systems," *The Electronic Journal of Information Systems Evaluation* 8 (3), pp 219-228.
- Steinberg, R.A. (2006) *Measuring ITIL: Measuring, reporting and modeling the IT Service Management metrics that matter most to IT senior executives*. Trafford, Victoria, B.C.
- Tangen, S. (2005) "Demystifying productivity and performance," *International Journal of Productivity and Performance Management* 54 (1), pp 34 - 46.
- Valdés, O., St-Jean, M., Renault, A., Picard, M., Cortina, S., Betry, V. and Barafort, B. (2009) *ITSM process assessment supporting ITIL*. Van Haren Publishing, Amersfoort.
- van der Zee, J.T.M. and de Jong, B. (1999) "Alignment is not enough: Integrating business and Information Technology management with the balanced business scorecard," *Journal of Management Information Systems* 16 (2), pp 137-156.
- van Grembergen, W., De Haes, W. and Amelinckx, S.I. (2003) "Using COBIT and the Balanced Scorecard as instruments for Service Level Management," *Information Systems Control Journal* 456 -62.
- Wang, C.B. (1994) *Techno Vision*. McGraw-Hill, Inc.
- Weill, P. (1992) "The relationship between investment in Information Technology and firm performance: A study of the valve manufacturing sector," *Information Systems Research* 3 (4), pp 307-333.
- Yixin, D. and Bhattacharya, K. (2008). *Estimating business value of IT services through process complexity analysis*, Network Operations and Management Symposium. IEEE, pp. 208-215.

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